



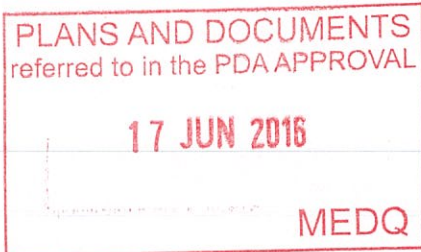
**PORTSIDE EAST – BUILDING 16A & 16B
HAMILTON**

Project

DA – SUPERIOR DESIGN OUTCOMES REPORT

**BROOKFIELD RESIDENTIAL PROPERTIES
ON BEHALF OF
MULTIPLY PORTSIDE EAST PTY LTD**

Client



EMF GRIFFITHS

SUSTAINABILITY CONSULTANTS

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EXECUTIVE SUMMARY

The proposed development, Portside East Buildings 16a & 16b, comprises of two towers that rise from a podium level.

EMF Griffiths are the project's sustainability consultants. This report outlines the project's commitment to superior design outcomes with respect to ESD.

The key achievements which can be considered a superior design outcome with respect to ESD are as follows:-

Façade amenity	A high performance integrated façade that incorporates extensive private balconies that provide passive shading and shelter from wind and intense sunlight. Brief requirements have been incorporated that include study and analysis of daylight levels and natural ventilation to inform the design process.
Energy management & Lifecycle impacts	The buildings incorporate significant passive design initiatives that result in a reduction in annual cooling demand when compared to a standard deemed to satisfy outcome. The annual thermal energy load is less than the code required levels. This results in direct reduction in energy to heat and cool the building with associated improvements in running costs, efficient resource use and less greenhouse gas emissions.
Water	Rainwater is to be harvested to meet the site's irrigation demands.
Transport	The development features secure bicycle parking spaces for each dwelling and for retail visitors.
Waste and materials	As a brief requirement, materials shall be selected which minimise the use of materials that deplete natural resources or create toxic pollution in their manufacture. Materials with potential for end of life recycling or that contain or are manufactured with high levels of recycled or waste materials are encouraged.

SECTION 1.0 INTRODUCTION

EMF Griffiths has been engaged by Brookfield Residential Properties on behalf of Multiplex Portside East Pty Ltd to report on Superior Design Outcomes (SDO's) required by the Department of State Development, Infrastructure and Planning (DSDIP) at Portside East Buildings 16a & 16b.

This report will demonstrate how the proposed development protects, manages and enhances natural systems and promotes the efficient use of materials, water and energy to minimise impacts on the environment. It will illustrate the project's specific targeted measures that contribute to a sustainable development.

The development has set real and attainable goals to achieve a superior design outcome. The project focuses on the following:-

- A commitment to passive design principles, including energy efficiency and thermal comfort as well as integration of daylight and natural ventilation.
- Project requirements for responsible materials selection and waste reduction
- Water use reduction through rainwater harvesting and efficiency measures
- Transport initiatives such as encouraging cleaner modes of transport

1.1 BUILDING DESCRIPTION

The building consists of 1 level of basement car parking, ground floor retail and 2 additional levels of podium car parking. The residential towers extend from levels 01 to 19 and consist of 1, 2, 3 bed apartments and penthouses. The building 16A level 20 includes a recreation deck with residents' pool.

SECTION 2.0 SUPERIOR DESIGN OUTCOMES

The following sections illustrates the targeted outcomes by the development to responsibly impacts upon the local environment. This addresses environmental, social and economic sustainability aspects for the buildings' occupants, users and the wider community.

2.1 FACADE AMENITY

Deliverable	Development Strategy
Daylight	The building is designed with consideration for solar access to each apartment. The apartments designed to allow the high levels of natural lighting and direct sunlight in particular.
Glare Control	Glare from direct sunlight is considered in apartment design. Glare is a function of contrast against surrounding surfaces and angle of incidence and can cause discomfort to occupants. Provision for blinds is made as part of the base building. Blinds are an optional extra as part of the sales package and experience is that they are generally installed by the tenant.
Natural Ventilation	Window openings and sliding doors to living areas and bedrooms have openings to allow for cross-flow ventilation. To maximise the number of apartments with natural cross ventilation apartments are located on the corner of the floor plates, or jutting out sections of the apartment to allow for multiple external walls for a single room. Size and location of operable areas of windows are being explored to maximise availability of natural ventilation. As the design of the buildings do not allow for cross ventilation or two storey apartments, simple measures such as door catches are being explored to facilitate internal airflow between rooms in the apartments. As a design brief requirement, design for cross ventilation is part of the ESD scope of works and will be studied throughout the design phases to achieve an acceptable ventilation outcome.
Internal Noise Levels	Building services noise is required to meet the satisfactory design sound levels provided in Table 1 of AS/NZS 2107:2000; 35 L _{Aeq} dB (A) for sleeping areas and 45 L _{Aeq} dB (A) for common areas.
Private External Space	Private open space (balcony /terrace) is targeted at a minimum of 12% of the NSA for each apartment on level 3 and above. All balconies are currently approximately 2.4m width, which is capable of taking an external table setting. The private open space is generally directly accessible from the primary living area. The master bedroom of higher standard apartments generally also has access to a private balcony. By providing flexible indoor - outdoor type rooms that can be comfortably used during all seasons internal living spaces can be reduced significantly.
Accessible Housing	17 units in Building 16a and 14 units in Building 16b will be designed in accordance with <i>PDA Guidelines no.2 Accessible Housing</i> .

2.2 ENERGY MANAGEMENT

Deliverable	Development Strategy
Improved NatHERS Rating	<p>Current Queensland Development Code (QDC) Performance Criteria P1 requires that each unit must;</p> <ul style="list-style-type: none"> -Individually achieve an energy rating of not less than 4 stars and, -Collectively achieve an average energy rating of not less than 5 stars <p>The Superior Design Outcome will target;</p> <ul style="list-style-type: none"> -Individually achieve an energy rating of not less than 5 stars and, -Collectively achieve an average energy rating of not less than 6 stars
Thermal Comfort	All dwellings are required to have a heating and cooling load of maximum 55 MJ/m ²
Energy Sub-metering	<p>Sub-metering is targeted for substantive energy uses within the building (greater than 10kVa) and to monitor light and general power consumption for common areas.</p> <p>A minimum of check metering is to be provided that allows monitoring of changing trends.</p>
Lux Levels	A minimum of 320Lux and a maximum of 400 lux is to fall on the surface (nominally 900mm above floor level) of the following: Kitchen Sink; Cook top or Stove; and Vanity Basins in Bathrooms and Ensuites.
Energy Efficient Appliances	<p>Project team to explore the preferential specification of high star rated energy efficient appliances for refrigerators, clothes washers, clothes dryers and dishwashers and other installed appliances as part of the base building works.</p> <p>Ratings are to be included in returnable schedules.</p>
Energy Efficient Lighting	LED lighting to be used as standard in apartments. Excludes a heat lamp used in a bathroom for the purpose of radiating heat.
Energy Efficient Lifts	<p>Regenerative drive converts the excess energy generated by a lift into electricity that can be reused elsewhere in the building. With conventional drives, this energy is converted into heat, which then needs to be removed from the building by air conditioning systems.</p> <p>Regenerative drive can cut lift energy consumption by 20-35% on average, depending on building height and lift speed. Regenerative drives are included in proposed lift design.</p>
Efficient Appliances	Gas hobs to be included as standard for apartments as a more efficient method of cooking than electric hobs.
Efficient Ventilation Systems	<p>Demand based ventilation systems are included preferentially over large centralised systems.</p> <p>Individual toilet exhausts are to be provided for apartments so that a demand based system is provided rather than a 24/7 central system for the whole building.</p> <p>CO monitoring is to be provided on car park exhausts so ventilation will match demand from the space.</p> <p>The car park also has natural air intakes which save energy on supply air fans.</p>

2.3 WATER

Deliverable	Development Strategy
Rainwater Collection and Re-Use	Water requirement for landscape irrigation is to be sourced from non-potable water (e.g., rainwater). This is also included for stormwater design to reduce peak flows during a stormwater event.
Water Conservation	Current Queensland Development Code (QDC) Performance Criteria P6 requires that; All shower roses have a minimum 3-star Water Efficiency Labelling and Standards rating 4.5 to 9 litres per minute.
Water Conservation	Current Queensland Development Code (QDC) Performance Criteria P7 requires that; All toilet cisterns have a dual flush function and have a minimum 4-star Water Efficiency Labelling and Standards rating 4.5 litres per flush full flush and 3 litres per flush half flush, and are compatible with the size of the toilet bowl to allow for proper functioning of the toilet.
Water Conservation	Current Queensland Development Code (QDC) Performance Criteria P8 requires that; All tap ware have a minimum 4-star Water Efficiency Labelling and Standards rating, 6.5 to 7.5 litres per minute with tap aerator.
Water Efficient Appliances	Dishwashers and washing machines are to be supplied as part of the base building works. High WELS rated fixtures are being explored for the project and the rating will be included in returnable schedules.
Water Meters	Water meters are required on all major water uses in the project and in each dwelling and a practical mechanism for data monitoring is identified.
Fire System Water Consumption	Fire pump test water is proposed to be recovered at a minimum. The project is exploring the inclusion of hydrant test water reuse, provided that a fire water storage tank can be located on site. Sprinkler water is not considered acceptable for reuse.
Fire System Water Consumption	Each floor or section of a building fitted with a sprinkler system is to have isolation valves or shut-off points for floor-by-floor testing.

2.4 TRANSPORT

Deliverable	Development Strategy
Bicycle Facilities - Residents	To encourage cycling as a mode of transport, provision of resident bicycle parking spaces will be provided in the common areas. 1 nominated secure bicycle parking space per apartment. Intended to be located in storage cages and racks.
Bicycle Facilities - Visitors	Visitor bike spaces are to be provided to retail level in an accessible on-grade location, signposted and near a major public entrance. 1 space per 400m ² residential GFA for visitors. 1 space per 200m ² of NLA for workers and 1 space per 1000m ² NLA for visitors.

2.5 WASTE AND MATERIALS

Deliverable	Criteria
Sustainable Supplier	<p>It is a brief requirement that the design should demonstrate innovation in the selection and use of construction materials and products, which minimise the use of materials that deplete natural resources or create toxic pollution in their manufacture. Materials with potential for end of life recycling or that contain or are manufactured with high levels of recycled or waste materials should be encouraged.</p> <p>The following strategies are to be considered for materials selection:-</p> <ul style="list-style-type: none"> • Timber and composite timber products used in the building and construction works sourced from either a combination of post-consumer re-used timber; or Forest Stewardship Council (FSC) certified Timber. • PVC products to meet 'Best Practice Guidelines for PVC in the Built Environment' where appropriate. • Thermal insulants and refrigerants that avoid the use of ozone-depleting substances in both manufacture and composition. • Wall, ceiling, carpet and floor finishes, and adhesives and sealants that are low-VOC emitting (EN 13419) • Composite wood product used, including joinery and loose furniture with low emission formaldehyde (rated E0) • Manufactured materials from suppliers with ISO14001 certification and EMPs in place. • Materials sourced locally where practical. • Other materials can also be reused (from the existing building or any other building) for example joinery, windows and doors, or have a post-consumer recycled content of at least 20%, such as carpet and underlay, ceilings, and vehicle stops. • Reduction of Portland cement in all concrete mixes across the project.

2.6 MANAGEMENT

Deliverable	Criteria
Environmental Management Plan.	A comprehensive, site specific Environmental Management Plan is to be provided
Building Users' Guide	A Comprehensive Building User's Guide is to be provided, based on information from all design consultants and incorporating operating instructions and benchmarks for consumption and usage.
Waste Management Plan	Waste Management Plan is to be provided, outlining benchmarks for recycling and waste management both during construction and on an ongoing basis.
Commissioning, Data Collection and Monitoring	Design team are required to monitor and verify the commissioning of services in the development. Design team to review commissioning results as part of 12 month defects liability period.

SECTION 3.0 SUMMARY OF PASSIVE DESIGN MODELLING

3.1 RESIDENTIAL NATHERS MODELLING

3.1.1 Compliance Requirements

The following preliminary modelling inputs, required by AccuRate as part of the modelling process, have been entered for all apartments, in order to obtain a preliminary QDC compliant analysis.

Minimum Requirements		Performance Value
External Walls	100mm Concrete/ 13mm Plasterboard	R-value: 0.30 m ² K/W Colour: Medium
Podium 1 and 2 External Walls	100mm Concrete/ R1.5 Insulation/ 13mm Plasterboard	R-value: 1.80 m ² K/W Colour: Medium
Internal Walls Between Apartments	13mm Plasterboard/ 200mm Concrete/ 13mm Plasterboard	R-value: 0.45 m ² K/W Colour: Medium
Internal Walls Within Apartments	Plasterboard on Studs	R-value: 0.44 m ² K/W Colour: Not Specified
Floor To Ceiling Height	2650mm	
Window Properties	Aluminum Frame Single Glazed	System U-value: 6.70 W/m ² K System SHGC: 0.70
	Aluminum Frame Laminated Glazed	System U-value: 4.60 W/m ² K System SHGC: 0.36
	Aluminum Frame Double Glazed	System U-value: 3.40 W/m ² K System SHGC: 0.33
	Draught seals	
Window Width	As per drawings	
Floor Between Apartments	Carpet + Felt Underlay/ 200mm Concrete	R-value: 0.57 m ² K/W
	Ceramic Tile/ 200mm Concrete	R-value: 0.30 m ² K/W
Podium 1 Floor Slab	Carpet + Felt Underlay/ 200mm Concrete/ R1.0 Insulation	R-value: 1.57 m ² K/W
	Ceramic Tile/ 200mm Concrete/ R1.0 Insulation	R-value: 1.30 m ² K/W
Roof	200mm Concrete/ R2.5 Insulation with Reflective Foil/ 13mm Plasterboard	R-value: 4.39 m ² K/W Colour: Light
Ceiling Fans	Yes	
Downlights (Sealed)	Yes	
Exhaust Fans (Sealed)	Yes	
Eaves	Balcony overhangs as noted on the drawings	

3.1.2 Results – Targeted Minimum Rating 5 Stars Average 6 Stars

The following additional sustainable strategies which have been incorporated targeted in order to achieve a minimum 5 star rating per apartment and 6 star average;

- Ceiling fans with a 1200mm diameter in the living/kitchen and bedroom.
- R1.5 insulation to Podium 1 and 2 external walls,
- R1.0 insulation to the podium 1 floor slab and level 3 floor slab above the carpark,
- R2.5 reflective insulation to the roof,
- Aluminium frame with laminated glazing with an indicative performance System U-value (glass and frame) 6.70 W/m²K, SHGC 0.70,
- Laminated glazing for specified apartments (refer below table) with an indicative system performance System U-value (glass and frame) 4.60 W/m²K, SHGC 0.36.
- Double glazing with an indicative system performance System U-value (glass and frame) 3.40 W/m²K, SHGC 0.33.

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Apartment	No.	Results	Compliance
Building 16A			
L1_A.06	1	7.2	✓
L1_A.07	1	7.9	✓
L1_A.08	1	5.6***	✓
L1_A.09	1	5.4	✓
L1_A.10	1	5.7***	✓
L2_A.06	1	5.7*	✓
L2_A.07	1	6.2	✓
L2_A.08	1	5.2***	✓
L2_A.09	1	5.2	✓
L2_A.10	1	5.3***	✓
L3_A.01	1	7.6	✓
L3_A.02	1	8.6	✓
L3_A.03	1	7.4	✓
L3_A.04	1	5.2	✓
L3_A.05	1	7.4	✓
L3_B.01	1	5.1	✓
L3_B.02	1	5.9	✓
L3_B.03	1	7.3	✓
L3_B.04	1	7.0	✓
L3_B.05	1	5.2	✓
L3_C.02	1	5.1*	✓
L4_A.01, L5_A.01, L6_A.01, L7_A.01, L8_A.01, L9_A.01, L10_A.01, L11_A.01, L12_A.01, L13_A.01, L14_A.01, L15_A.01, L16_A.01, L17_A.01	14	8.3	✓
L4_A.02, L5_A.02, L6_A.02, L7_A.02, L8_A.02, L9_A.02, L10_A.02, L11_A.02, L12_A.02, L13_A.02, L14_A.02, L15_A.02, L16_A.02, L17_A.02	14	9.4	✓
L4_A.03, L5_A.03, L6_A.03, L7_A.03, L8_A.03, L9_A.03, L10_A.03, L11_A.03, L12_A.03, L13_A.03, L14_A.03, L15_A.03, L16_A.03, L17_A.03	14	7.9	✓
L4_A.04, L5_A.04, L6_A.04, L7_A.04, L8_A.04, L9_A.04, L10_A.04, L11_A.04, L12_A.04, L13_A.04, L14_A.04, L15_A.04, L16_A.04, L17_A.04	14	5.4	✓
L4_B.01, L5_B.01, L6_B.01, L7_B.01, L8_B.01, L9_B.01, L10_B.01, L11_B.01, L12_B.01, L13_B.01, L14_B.01	11	5.7	✓
L4_B.02, L5_B.02, L6_B.02, L7_B.02, L8_B.02, L9_B.02, L10_B.02, L11_B.02, L12_B.02, L13_B.02, L14_B.02	11	6.8	✓
L4_B.04, L5_B.04, L6_B.04, L7_B.04, L8_B.04, L9_B.04, L10_B.04, L11_B.04, L12_B.04, L13_B.04, L14_B.04, L15_B.04, L16_B.04, L17_B.04	14	7.4	✓
L4_C.01, L5_C.01, L6_C.01, L7_C.01, L8_C.01, L9_C.01, L10_C.01, L11_C.01, L12_C.01, L13_C.01, L14_C.01	11	6.4	✓
L4_C.02, L5_C.02, L6_C.02, L7_C.02, L8_C.02, L9_C.02, L10_C.02, L11_C.02, L12_C.02, L13_C.02, L14_C.02	11	5.5*	✓
L4_C.06, L5_C.06, L6_C.06, L7_C.06, L8_C.06, L9_C.06, L10_C.06, L11_C.06, L12_C.06, L13_C.06, L14_C.06, L15_C.06, L16_C.06, L17_C.06	14	7.5	✓
L15_C.03, L16_C.03, L17_C.03	3	5.9	✓
L15_C.04, L16_C.04, L17_C.04	3	7.7	✓
L15_C.05, L16_C.05, L17_C.05	3	5.3	✓
L18_P.0A	1	6.9	✓

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Apartment	No.	Results	Compliance
L18_P.0B	1	5.9*	✓
L18_P.0C	1	6.0*	✓
L19_P.0A	1	5.8	✓
L19_P.0B	1	5.1*	✓
L19_P.0C	1	5.1***	✓
Building 16B			
L1_A.06	1	7.1	✓
L1_A.07	1	7.6	✓
L1_A.11	1	5.7***	✓
L1_A.12	1	5.3***	✓
L1_A.13	1	5.1	✓
L2_A.06	1	6.0*	✓
L2_A.07	1	5.2	✓
L2_A.11	1	5.1*	✓
L2_A.12	1	5.8***	✓
L2_A.13	1	5.4	✓
L3_A.01	1	8.3	✓
L3_A.02	1	7.4	✓
L3_A.03	1	8.4	✓
L3_A.04	1	5.4	✓
L3_A.05	1	6.9	✓
L3_B.01	1	5.4	✓
L3_B.02	1	5.8	✓
L3_B.03	1	5.9	✓
L3_B.04	1	5.9	✓
L3_B.05	1	5.3**	✓
L3_C.02	1	5.5*	✓
L4_A.01, L5_A.01, L6_A.01, L7_A.01, L8_A.01, L9_A.01, L10_A.01, L11_A.01, L12_A.01, L13_A.01, L14_A.01, L15_A.01, L16_A.01	13	9.2	✓
L4_A.02, L5_A.02, L6_A.02, L7_A.02, L8_A.02, L9_A.02, L10_A.02, L11_A.02, L12_A.02, L13_A.02, L14_A.02, L15_A.02, L16_A.02	13	8.1	✓
L4_A.03, L5_A.03, L6_A.03, L7_A.03, L8_A.03, L9_A.03, L10_A.03, L11_A.03, L12_A.03, L13_A.03, L14_A.03, L15_A.03, L16_A.03	13	9.3	✓
L4_A.04, L5_A.04, L6_A.04, L7_A.04, L8_A.04, L9_A.04, L10_A.04, L11_A.04, L12_A.04, L13_A.04, L14_A.04, L15_A.04, L16_A.04	13	6.1	✓
L4_B.01, L5_B.01, L6_B.01, L7_B.01, L8_B.01, L9_B.01, L10_B.01, L11_B.01, L12_B.01, L13_B.01	10	6.3	✓
L4_B.02, L5_B.02, L6_B.02, L7_B.02, L8_B.02, L9_B.02, L10_B.02, L11_B.02, L12_B.02, L13_B.02	10	6.7	✓
L4_B.04, L5_B.04, L6_B.04, L7_B.04, L8_B.04, L9_B.04, L10_B.04, L11_B.04, L12_B.04, L13_B.04, L14_B.04, L15_B.04, L16_B.04	13	6.2	✓
L4_C.01, L5_C.01, L6_C.01, L7_C.01, L8_C.01, L9_C.01, L10_C.01, L11_C.01, L12_C.01, L13_C.01	10	5.4	✓
L4_C.02, L5_C.02, L6_C.02, L7_C.02, L8_C.02, L9_C.02, L10_C.02, L11_C.02, L12_C.02, L13_C.02	10	5.4	✓
L4_C.06, L5_C.06, L6_C.06, L7_C.06, L8_C.06, L9_C.06, L10_C.06, L11_C.06, L12_C.06, L13_C.06, L14_C.06, L15_C.06, L16_C.06	13	6.4*	✓
L14_C.03, L15_C.03, L16_C.03	3	5.5	✓
L14_C.04, L15_C.04, L16_C.04	3	7.8	✓
L14_C.05, L15_C.05, L16_C.05	3	6.2	✓

Apartment	No.	Results	Compliance
L17_P.0A	1	7.4	✓
L17_P.0B	1	5.3	✓
L17_P.0C	1	5.9	✓
L18_P.0A	1	6.8	✓
L18_P.0B	1	5.4*	✓
L18_P.0C	1	5.2*	✓
AVERAGE ENERGY RATING	318	6.9	✓

* Curtain wall glazing require laminated glazing (refer to Results column).

** Curtain wall and balcony glazing require laminated glazing (refer to Results column).

*** Curtain wall and balcony glazing require double glazing (refer to Results column).

3.2 NON RESIDENTIAL AREAS

A Section J-JV3 modelling approach is to be adopted for non-residential areas of the project. Below are listed the thermal properties for the building fabric elements expected to be required for the Class 2 common areas and Class 6 areas of the building to provide an improvement above the Deemed to Satisfy requirements of the BCA for passive design.

DESCRIPTION	PROPOSED CONSTRUCTION VALUE	Note
Roof: Concrete slab	$R_{TOTAL}=4.2$ $R_{INSULATION}=3.0$ Solar Absorbance ≤ 0.6	Possible insulation material:- Bradford Gold Ceiling Batts R3.0
Shading	As per current architectural scheme	
External walls 200mm concrete wall	$R_{TOTAL}=0.55$ No insulation required	Insulation not required – removed by JV3 method.
All Glazing (Windows and Doors)	Anticipated Glazing Whole of window performance $U=6.5$ (or lower); $SHGC=0.69$ (or lower)	Example Glazing type: GJames 6mm EnergyTech Clear, or GJames 10.76mm Optilight HL119 Laminate. Standard aluminium framing.

