

High Performance Building Study

REPORT ADDENDUM

PREPARED FOR

City of Parramatta

VERSION

1.0

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BACKGROUND

As part of City of Parramatta's review of the CBD planning framework, Kinesis were commissioned to analyse and provide recommendations to deliver more sustainable infrastructure, affordability and environmental outcomes.

This work recommended the implementation of high performance building standards to position Parramatta as a global leader in sustainable planning, attract A-Grade office development, ensure resource and infrastructure efficiency and future proof the city against emerging technologies and investment.

The *High Performance Building Study* (26 February 2016) analysed the feasibility of a policy which linked high performance building standards to a 0.5 FSR floor space bonus. The Study modelled the cost effectiveness of residential development (between 10:1 and 15:1 in the B4 zone) to deliver higher energy and water targets than the base case BASIX targets. The State Environmental Planning Policy BASIX allows for incentives for the adoption of measures beyond those required by BASIX.

The study recommended the following standards for new residential buildings:

- BASIX Energy +10 above current compliance
- BASIX Water +10 above current compliance

Council adopted the Parramatta CBD Planning Proposal on 11 April 2016, which endorsed draft LEP provision, namely the "High Performing buildings bonus FSR" which applies to sites (subject to certain minimum site width and size) within the B4 Mixed Use zone that have Incentive Floor Space Ratio of 10:1. A 0.5:1 FSR bonus (on top of the Incentive Floor Space Ratio) that can be achieved provided energy and water targets (above BASIX requirements) are included.

ISSUE

Since the initial *High Performance Building Study* (26 February 2016), two key policy changes have occurred:

1. The City of Parramatta has adopted at its meeting on 10 April 2017 to lower car parking rates in the Parramatta CBD in line with Sydney Central CBD and this be reflected in the Planning Proposal for the purposes of public exhibition, The Council resolution reads as follows: "that Council endorses the action recommended by the Parramatta CBD Strategic Transport Study to reduce maximum car parking rates to levels currently used by City of Sydney CBD and that the Parramatta CBD Planning Proposal be amended to reflect this prior to public exhibition."
2. The NSW Department of Planning and Environment is set to increase BASIX Energy Target from 1 July 2017. This means for residential flat buildings over 6 storeys within the Parramatta CBD must meet BASIX Energy 25.

Both policies affect the ability of new residential buildings to achieve BASIX Energy +10 above current compliance. Lower parking rates will reduce energy demand in buildings from car park lighting and ventilation and the revised BASIX targets will increase requirements in the Parramatta CBD from BASIX Energy 20 to BASIX Energy 25.

This addendum reviews the feasibility of the BASIX +10 requirements in the High Performance Building Policy (whereby a 0.5:1 FSR Bonus is offered for mixed use developments over 10:1) under these new policy settings.



ANALYSIS

Analysis was undertaken on a typical mixed use building with the Parramatta CBD, using the same parameters as the *High Performance Building Study* (Table 1).

Compared to the feasibility analysis undertaken in the original study, two key changes were observed:

1. Under the new BASIX Energy targets, to meet the requirements of the High Performance Building policy and achieve the 0.5 FSR floor space bonus, the building will be required to achieve BASIX Energy 35 (up from BASIX Energy 30).
2. Under the proposed revised parking rates for new residential development, the mixed use building is estimated to achieve approximately 3 additional BASIX Energy points due to the lower energy demand requirements for car parking lighting and ventilation.

B4 MIXED USE DEVELOPMENT PARAMETER ASSUMPTIONS

Development Parameter	Assumptions for 10:1 FSR
Lot Area	5,100 m ²
Total Floor Area (with FSR Bonus)	52,550 m²
Residential	331 dwellings
3-bedroom	40 (8%)
2-bedroom	322 (64%)
1-bedroom	141 (28%)
Retail	2,140 m ²

Table 1: Development parameters assumed for example Mixed Use (B4 Zone) typology in the Parramatta CBD

REQUIREMENTS TO ACHIEVE HIGHER BASIX ENERGY TARGETS

Various scenarios were tested and costed to achieve BASIX Energy 35. The expected requirements to achieve this outcome is shown in Table 2. Each scenario was compared to the new Base Case which meets the new BASIX Energy targets and incorporates the proposed Parramatta CBD parking rates. These scenarios highlight the following:

- BASIX Energy +10 can be achieved with relatively low cost, high energy efficiency strategies including 6.5-star NatHERS (average), efficient A/C, efficient appliances and LED lighting (Scenario 1).
- 6.5-star NatHERS (average) requires dwellings to increase their thermal performance (energy required for heating and cooling a dwelling). This generally includes strategies such as building orientation, Low E/double glazing, improved wall insulation, and shading through awning/design elements.
- If solar PV is incorporated, more expensive and challenging energy efficiency strategies (such as 6.5 star NatHERS) are not required to achieve BASIX Energy 35 and the total additional cost per m² is reduced. Scenario 2 shows the expected list of strategies if 50w of solar PV per apartment is incorporated (equivalent to approximately 10% of the building's roof space or 165 m²) while Scenario 3 shows the expected list of strategies if 100w of solar PV per apartment is incorporated (equivalent to approximately 20% of the building's roof space or 325m²).



ENERGY AND WATER TECHNOLOGY ASSUMPTIONS

	Original Base Case (BASIX Energy 20)	New Base Case (BASIX Energy 25)	BASIX +10 Scenario 1	BASIX +10 Scenario 2	BASIX +10 Scenario 3
Energy					
NatHERS	5-star average	6-star average	6.5-star average	6-star average	6-star average
Hot Water	Centralised Gas	Centralised Gas	Centralised Gas	Centralised Gas	Centralised Gas
Space Heating	2 Star A/C	2 Star A/C	5 Star A/C	5 Star A/C	5 Star A/C
Space Cooling	2 Star A/C	2 Star A/C	5 Star A/C	5 Star A/C	5 Star A/C
Lighting	Standard Lighting	Standard Lighting	LED Lighting	LED Lighting	Standard Lighting
Solar	-	-	-	50 watts/apartment	100 watts/apartment
Appliances	1.5-star Dryer 2-star Dishwasher	1.5-star Dryer 2-star Dishwasher	1.5-star Dryer 4-star Dishwasher 5-star Clothes washer	1.5-star Dryer 4-star Dishwasher 5-star Clothes washer	1.5-star Dryer 4-star Dishwasher 5-star Clothes washer
Water					
Fixtures	3+-star showerhead 5-star tap fittings 4-star toilet	3+-star showerhead 5-star tap fittings 4-star toilet	3+-star showerhead 5-star tap fittings 4-star toilet	3+-star showerhead 5-star tap fittings 4-star toilet	3+-star showerhead 5-star tap fittings 4-star toilet
Appliances	2-star dishwasher	2-star dishwasher	5-star dishwasher 5-star clothes washer	5-star dishwasher 5-star clothes washer	5-star dishwasher 5-star clothes washer
Water reuse	None	None	None	None	None
Transport					
Average parking rate Central Sydney (Sydney LEP 2012)	1 spaces/dwelling	0.6 spaces/dwelling	0.6 spaces/dwelling	0.6 spaces/dwelling	0.6 spaces/dwelling
Results					
Cost per m2 (of whole building)	\$0	\$0	\$28	\$17	\$13

Table 2: Technology assumptions for residential scenario analysis

COMPARISONS TO LAND LIFT

When compared to the expected land lift created by the 0.5 FSR bonus, Figure 1 shows the following:

- All three scenarios tested are estimated to cost less than the expected land lift under most Base FSR ranges.
- Without solar PV (Scenario 1), the additional estimated capital costs to achieve BASIX Energy +10 are lower than the expected land lift up to a base FSR of 13:1.
- Above a base FSR of 13:1, a small amount of solar PV is expected to be incorporated to achieve BASIX Energy +10 at a cost less than the expected land lift generated from the 0.5:1 FSR bonus under the High Performance Building Policy (see Scenarios 2 and 3).



LAND LIFT V HIGHER BASIX TARGET COSTS

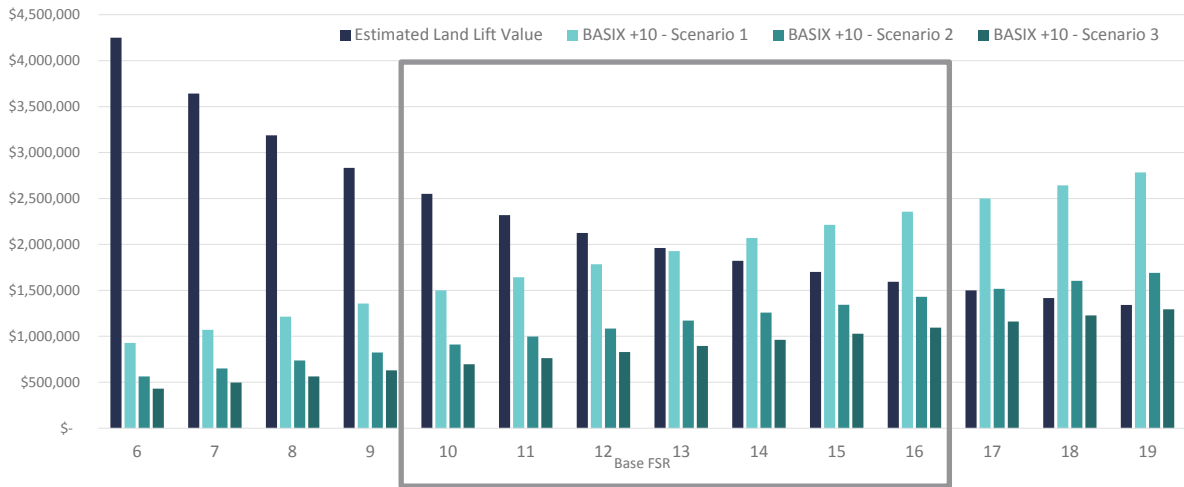


Figure 1: Land Lift compared to marginal cost of higher BASIX targets. For the proposed floor space bonus targets, the land lift is approximately equal to the marginal cost at the upper end of the applicable FSR range.

GREENHOUSE GAS EMISSION SAVINGS

The high performance building policy targets under the original *High Performance Building Study* (26 February 2016) was estimated to achieve an 11% reduction in CBD stationary greenhouse gas emissions compared to BAU Proposed Controls. The revised policy is expected to deliver a slightly higher (13%) reduction in greenhouse gas emissions across the CBD due to the higher BASIX targets and lower parking rates (Figure 2).

CBD GREENHOUSE GAS EMISSION REDUCTIONS

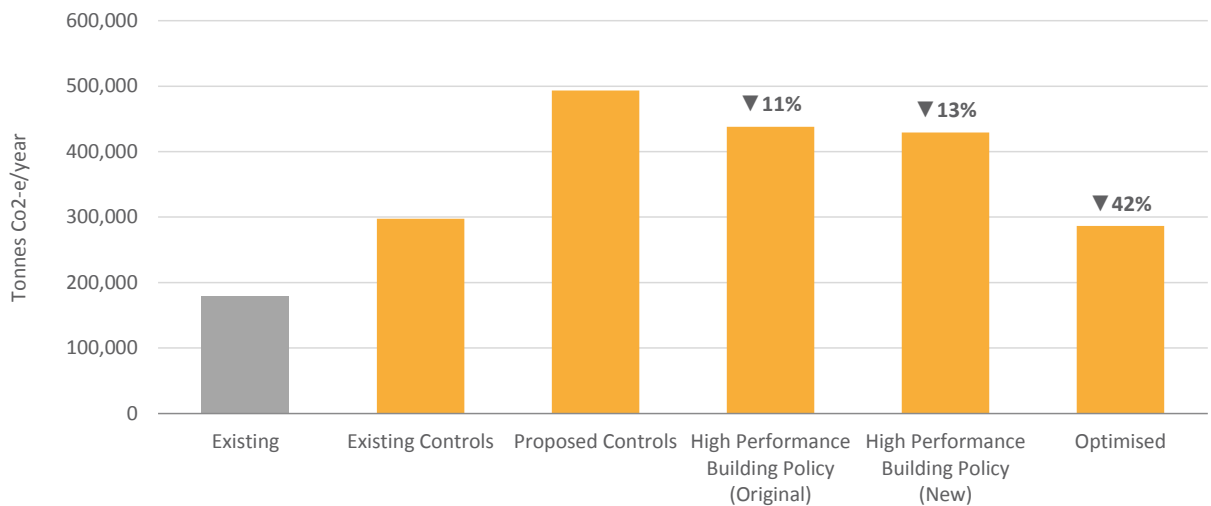


Figure 2: Study area greenhouse gas emissions under various scenarios showing the impact of the high performance building policy.



RECOMMENDATION

Based on the findings of this addendum, it is recommended that the City of Parramatta CBD draft LEP provision, namely the “High Performing buildings bonus FSR” remains as is, noting that a small amount of solar PV may be expected on mixed use buildings with a base FSR of 14:1 and higher.