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# ESD Report

1005279 161 Sussex Street Redevelopment

Prepared for:

## GL Investment Co Pty Ltd ATF GL No1 Trust

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The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

# Contents

# Executive Summary

This report outlines the energy and water efficiency issues as part of the proposal for the 161 Sussex Street redevelopment project in Darling Harbour, Sydney.

The project consists of a new 25 storey tower with 231 new hotel guest rooms and suites in the lower 14 levels and commercial office space for the top 7 levels, convention space with associated pre function area and refurbishment to back of house areas and new supporting meeting rooms. The land the project is located on is leased from the Sydney Harbour Foreshore Authority (SHFA).

The extension of the existing hotel and addition of 25 storeys of hotel and commercial space is capable of achieving compliance with BCA 2011 and the director general's requirements. The commercial office component will be designed to achieve the equivalent of 4.5 stars NABERS Office Energy for the base building.

The following is a summary of the ESD initiatives that will be incorporated into the extension and refurbishment of the hotel:

- Building fabric will be designed to comply with BCA Section J using a verification methodology, using performance glazing and external shading as required
- Large glazed areas in guestrooms will provide adequate daylight and solar access
- Energy efficient centralised air conditioning
- Efficient CFL or LED lighting in guestrooms and T5 lighting in commercial areas
- Water efficient fittings and fixtures for guestrooms
- Environmentally responsible materials are to be considered during detailed design and waste will be minimised, through recycling, during construction

# 1 Introduction

This report outlines the energy and water efficiency issues as part of the GL Investment Co Pty Ltd ATF GL No1 Trust proposal for the 161 Sussex Street redevelopment project in Darling Harbour, Sydney.

The project consists of a new 25 storey tower with 231 new hotel guest rooms and suites in the lower 14 levels and commercial office space for the top 7 levels, convention space with associated pre function area and refurbishment to back of house areas and new supporting meeting rooms. The land the project is located on is leased from the Sydney Harbour Foreshore Authority (SHFA).

The development will be designed to comply with BCA 2011 Section J for Class 3 (Hotel), Class 5 (Office) and Class 9b (Convention and Function centre). The development will also comply with relevant environmental planning instruments and the Director General's Requirements (DGRs). The commercial office component will be designed to achieve the equivalent of 4.5 stars NABERS Office Energy for the base building. The development shall comply with these requirements as a minimum.

# 2 Hotel Component

## 2.1 General requirements

### 2.1.1 Kitchens

The guestrooms do not contain fully equipped kitchens. Bar fridges within the guestrooms will be specified to be within 1.5 star of the best available of the same type and capacity category with reference to www.energyrating.gov.au. The hotel kitchen will be fitted out with energy efficient appliances such as refrigerators and dishwashers.

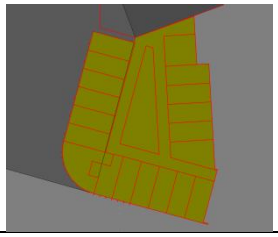
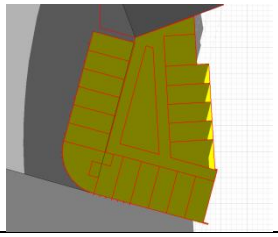
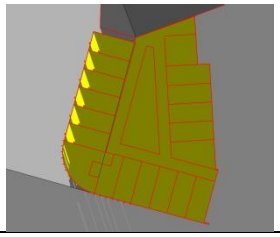
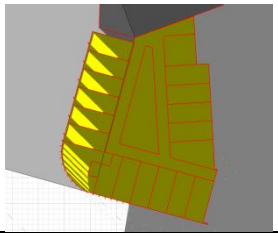
### 2.1.2 Bathrooms, laundries and drying facilities

Bathrooms in guestrooms and common areas do not include washing machines or dryers. General laundry is done offsite.

## 2.2 Passive energy design

### 2.2.1 Solar Access

Solar access on the winter solstice to the guestrooms is shown below for level 4. Overshadowing from buildings opposite have been taken into account.

| June 21 9am | June 21 11am | June 21 1pm | June 21 3pm |
|---|---|---|---|
|  |  |  |  |

Guestrooms on the east receive only 1 hour of direct solar access in winter due to overshadowing of the buildings opposite, while guestrooms on the west get up to 4 hours of direct sunlight in winter. South facing guestrooms do not get any direct sunlight.

The communal facilities consist of the lobby, all day dining, meeting and function rooms on the ground floor. Due to the constraints on the site the external areas are largely overshadowed by surrounding buildings to the north and east, while the all day dining area is internal.

Although there is very little direct solar access, daylight levels are predicted to be sufficient due to the amount of glazing present in the design.

### 2.2.2 Daylight

Large clear glazing provides daylight and views to the hotel rooms while high performance glazing properties and external shading will minimise glare and solar heat gains through the glazing.

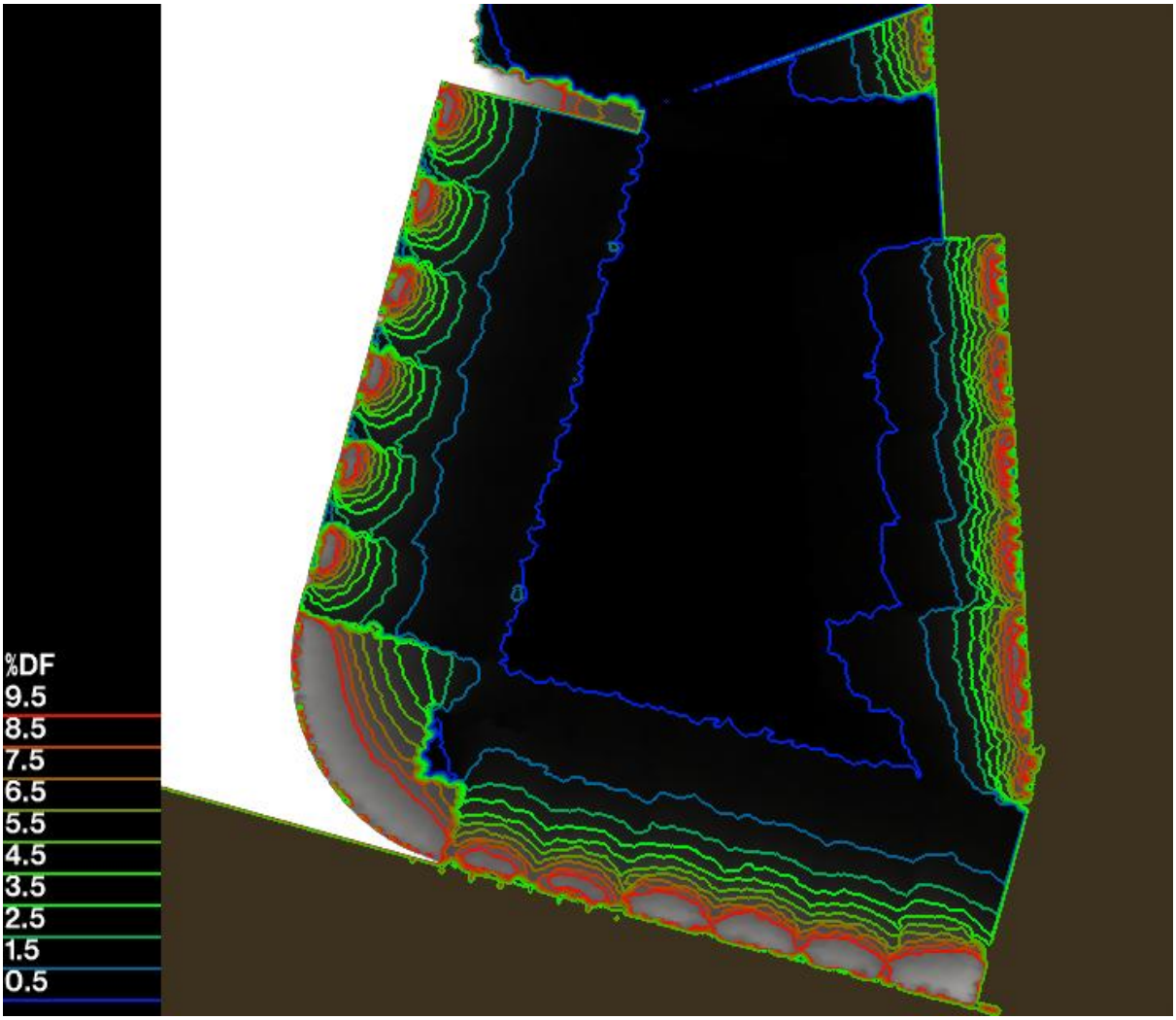



Figure 1 Daylight factor contours showing good levels of daylight in guestrooms

Where roof lights are present, they should not account for more than 5% of the floor area of the served zone and shall have performance of U=3.4W/m²K, SC=0.39 as a minimum.

Typical west-facing rooms are predicted to have highest daylight levels particularly in the afternoon, with high performance glazing and shading to be provided to minimise glare and discomfort within each room. Shading will comply with BCA section J2.

### 2.2.3 Ventilation

As the design does not include operable glazing and a deep floor plate exists, cross-ventilation will not be suitable as a ventilation strategy. Mechanical ventilation will be designed in compliance with BCA sections J3 and J5.

### 2.2.4 Construction

Insulation for the hotel will be in accordance with the requirements of BCA section J1.

Performance double glazing will be used in the extension of the hotel for thermal performance and acoustic reasons. The façade will be sealed to minimise infiltration to reduce the load on the air conditioning system. The façade in the extension is to be designed in compliance with BCA section J3. Preliminary analysis with respect to compliance with section J2 has shown that the current design has the potential to comply through JV3 verification.

## 2.3 Active Energy Design

Specific consideration will be made to ensure energy efficiency best practice occurs in the development. The ability to individually record energy consumption of AC, lighting, appliances, hot water, transport devices and other ancillary plants will be provided.

### 2.3.1 Hot water system

The domestic hot water system for the hotel is proposed to be a centralised gas fired system.

### 2.3.2 Air conditioning

The air conditioning will be provided by a centralised chilled water system serving individually controllable fan coil units in the guestrooms, which may need an economy cycle. Heating will be provided by a centralised gas-fired hot water system serving coils within the fan coil units.

Internal room units will be controlled by key tag switching to prevent them operating when the guestrooms are unoccupied, and the system shall be designed to thermostatically control conditions in each guestroom. Temperature will be capable of being controlled differently for sleeping periods.

### 2.3.3 Lighting

Energy efficient compact fluorescent or LED lighting will be used in the guestrooms and bathrooms. Lighting used in the corridors will have a lighting power density no greater than 3W/m² and in the reception area no greater than 10W/m². There will be limited use of dimmable halogen down lights in the ground floor lobby area.

Lighting in the guestrooms will be controlled by key tag switching and lights will be on different circuits for individual switching.

External illuminated signage to be LED and emergency signage also to be LED

## 2.4 Potable water supply reduction

### 2.4.1 Bathrooms

Showerheads in the guestroom bathrooms will be 3 star rated under the WELS scheme. All toilets will be dual-flush and rated at a minimum 3 stars. Hand basin taps in the guestroom bathrooms will have a minimum 6 star rating.

All common area toilet facilities and staff facilities will also have a minimum 6 star rating for hand basins and 3 star dual-flush toilets.

### 2.4.2 Rainwater collection

At this stage rainwater collection is not being considered as the area of roof is limited and there is minimal landscaping.

## 2.5 Materials and Waste

### 2.5.1 Building materials

Consideration will be made to utilise environmentally responsible materials where possible, including timber, PVC, furniture and low emission finishes aiming towards targets in line with SHFA Green Building Guide.

### 2.5.2 Recycling Facilities

A recycling storage area will be provided in the garbage room.

### 2.5.3 Construction Waste

During construction, include measures for waste minimisation during demolition, construction and operation, including reuse and recycling of materials where possible.

# 3 Commercial Office

### 3.1.1 Solar Access

The commercial space, occupying floors 16 through 21 of the new tower, has good access to solar radiation. The existing obstructions on the north and east will provide some overshadowing in the morning and during winter; however this is not predicted to affect daylight levels significantly.

### 3.1.2 Daylight

Large areas of glazing provide daylight and views to the commercial space while high performance glazing properties and external shading will minimise glare and solar heat gains through the glazing.

The high penetration of glazing is shown to achieve good daylight levels for the commercial space. The allowance of glazing to provide daylight also increases the amount of views from the space.

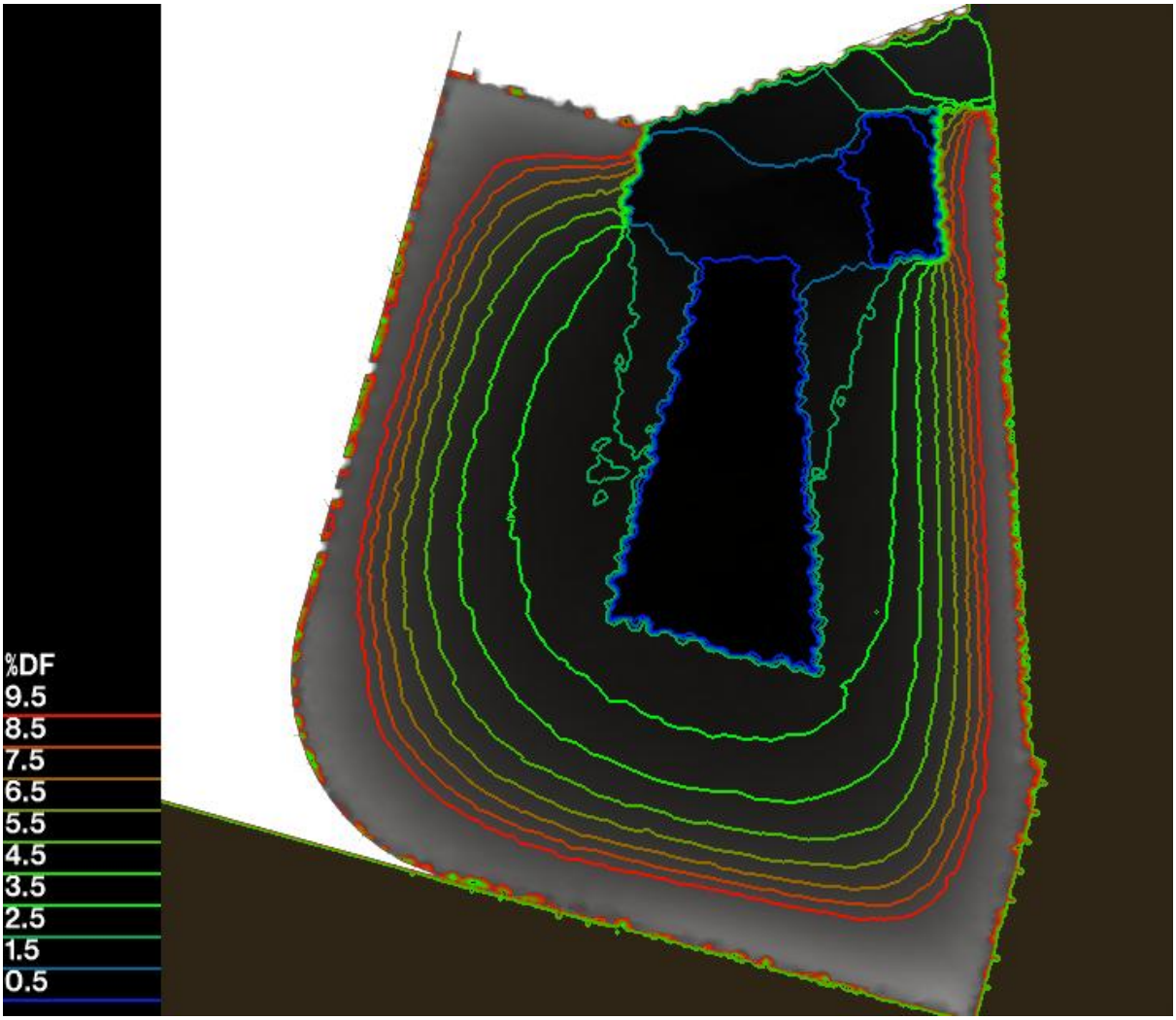



Figure 2 Daylight factor contours showing good levels of daylight on a typical commercial floor

### 3.1.3 Ventilation

As the design does not include operable glazing and a deep floor plate exists, cross-ventilation will not be suitable as a ventilation strategy. Mechanical ventilation is to be designed in compliance with BCA sections J3 and J5.

### 3.1.4 Construction

Insulation for the commercial floors will be in accordance with the requirements of BCA section J1.

Performance double glazing will be used on the commercial floors. The façade will be sealed to minimise infiltration to reduce the load on the air conditioning system. The façade in the extension is to be designed in compliance with BCA section J3. Preliminary analysis with respect to compliance with section J2 has shown that the current design has the potential to comply through JV3 verification.

## 3.2 Active Energy Design

Specific consideration will be made to ensure energy efficiency best practice occurs in the development. As the building has floor area greater than 2500m$^2$ the facility to individually record energy consumption of AC, lighting, appliances, hot water, transport devices and other ancillary plants will be provided.

### 3.2.1 Hot water system

The domestic hot water system for the hotel is proposed to be a centralised gas fired system.

### 3.2.2 Air conditioning

The air conditioning will share a centralised chilled water system with the hotel rooms, serving a VAV system to the commercial floors with economy cycle. Heating will be provided by a centralised gas-fired hot water system serving the air handling units.

### 3.2.3 Lighting

Energy efficient T5 fluorescent lighting will be used in the commercial space. Lighting used in the office will have a lighting power density no greater than 9W/m$^2$.

Lighting zones will be controlled by motion detectors and daylight sensors where appropriate and lights will be on different circuits for individual switching.

## 3.3 Potable water supply reduction

### 3.3.1 Bathrooms

All toilets will be dual-flush and rated at a minimum 3 stars. Hand basin taps in the bathrooms will have a minimum 6 star rating. Showerheads, where relevant, will be 3 star rated under the WELS scheme.

### 3.3.2 Rainwater collection

At this stage rainwater collection is not being considered as the area of roof is limited and there is minimal landscaping.

## 3.4 Materials and Waste

### 3.4.1 Building materials

Consideration will be made to utilise environmentally responsible materials where possible, including timber, PVC, furniture and low emission finishes aiming towards targets in line with SHFA Green Building Guide.

### 3.4.2 Recycling Facilities

A recycling storage area will be provided in the garbage room.

### 3.4.3 Construction Waste

During construction, measures will be included for waste minimisation during demolition, construction and operation, including reuse and recycling of materials where possible.

# 4 Management

1. Head contractor is required to achieve ISO 14001 environmental management certification prior to issue of construction certificate
2. Project specific Environmental Management Plan for design, construction and operation
3. Operation and maintenance manuals required from subcontractors
4. Install sub meters on all major energy and water uses such as A/C plant to facilitate monitoring
5. Develop and implement a waste management plan (WMP) for the construction and operational phases of the hotel
6. Construction waste will be minimised through recycling and an integrated fitout of the hotel component - 80% construction waste to be recycled

# 5 Conclusion

The extension of the existing and addition of 25 storeys of hotel and commercial space for the 161 Sussex Street redevelopment project is capable of achieving compliance with BCA 2011 and the director general's requirements.

The following is a summary of the ESD initiatives that will be incorporated into the extension and refurbishment of the hotel:

- Building fabric will be designed to comply with BCA Section J using a verification methodology, using performance glazing and external shading as required
- Large glazed areas in guestrooms and on commercial floors will provide adequate daylight and solar access. External shading to the west reduces solar heat gains on summer afternoons
- Energy efficient centralised air conditioning
- Efficient CFL or LED lighting in guestrooms and T5 lighting in commercial areas
- Water efficient fittings and fixtures for guestrooms
- Environmentally responsible materials are to be considered during detailed design and waste will be minimised, through recycling, during construction
- Best practice management during construction and operation