Four Points Hotel and Commecial Development

GL InvestmentCo Pty Ltd

8th February 2013

161 Sussex Street Redevelopment

ESD Strategies DA Report - Rev 02

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Prepared for

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00	5-Feb-2013	For review	Lester Partridge Industry Director	LEP
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02	8-Feb-2013	Issued for Council Approval	Lester Partridge Industry Director	LEP

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Executive Summary

This report presents the Ecologically Sustainable Development (ESD) options proposed in order to meet the ESD requirements set out in the Department of Planning + Infrastructure (DOPI) response to the development approval submitted for the 161 Sussex Street development.

As part of the submission to the DOPI, an ESD report prepared by Cundall dated 5th June 2012, and a Multi-discipline Engineering Report prepared by Aurecon dated 6th June 2012, were issued for approval.

Initial comments from DOPI have highlighted that the current submission does not demonstrate an adequate response to the requirements for Ecologically Sustainable Development (ESD). This report provides a list of proposed and potential ESD strategies that will be incorporated into the development to demonstrate the contribution the development will make to the ESD policy targets of the various authorities.

The initiatives outlined in this report are designed to address the specific policy and targets that the DOPI has highlighted in their response to the Project Application as indicated in the summary table at in Section 4.

The specific policy targets on which the strategies are based on include:

- Sydney Harbour Foreshore Authority Sustainability Policy Targets
- City of Sydney Draft DCP 2012
    - Section 2.4 ESD
    - Section 2.5 Waste
    - Section 2.6 Water
- City of Sydney's reference to Green Star Ratings
- City of Sydney's reference to NABERS Ratings
- Starwood Groups Global Citizenship Environmental Initiatives.

The strategies proposed either meet one or a number of these various policy targets. The overall recommended strategies include:

- Achieving a 5 Star NABERS Energy rating for the commercial office component of the development.
- Incorporating a combination of either cogeneration and/or solar hot water to displace the consumption of non-renewable energy resources and promote the use of renewable and clean energy.
- Incorporating rainwater harvesting to reduce the use of potable water and contribute to SHFA's Sustainability Policy Targets.
- Adopting a number of the general principles of the Green Star Public Buildings (Pilot) rating tool for the hotel without specifically seeking a Green Star rating.

These strategies are proposed to demonstrate environmental responsibility for the development by reducing in greenhouse gas emissions and potable water consumption and the adoption of good practice environmental initiatives.

1.0 Introduction

The 161 Sussex Street development has been issued to the DOPI for development approval. As part of the submission, an ESD report prepared by Cundall dated 5th June 2012, and a Multi-discipline Engineering Report prepared by Aurecon dated 6th June 2012, were issued for approval.

Initial comments from DOPI has highlighted that the current submission does not demonstrate an adequate response to the requirements for Ecologically Sustainable Development (ESD). This report provides a list of ESD strategies that will be incorporated into the development to demonstrate the contribution the development will make to the ESD policy targets of the various authorities.

The hotel complex will be a 4.5 Star facility totalling approximately 1000 rooms when completed. The development will include 231 additional hotel rooms to augment the existing 736 guestrooms.

The new development will also include the refurbishment of the ground level hotel public areas including, reception, dining, commercial kitchen, the addition of new extended meeting rooms on the ground floor, and function rooms on the mezzanine level. Levels 16 to 22 will be developed to accommodate commercial office space.

The project involves the expansion of the current Four Points Hotel to include the following:

- Twenty five Storey Tower – consisting of
  - New Hotel Rooms and Suites in the lower 14 levels
  - Commercial Office Space for the 7 levels above the Hotel levels;
- Convention space with associated Pre Function Areas;
- New Meeting Rooms, acting as breakout venues serving the Convention/ Ballroom Functions
- New breakout areas and dining venues to accommodate the increase hotel accommodation
- New / Upgrade Back of House areas to serve these new convention / ballroom venues;
- A heritage interpretation strategy to reinforce the historical fabric of the site (trade and maritime uses);
- A direct, safe through site link to Darling Harbour

The response from the DOPI was to request that the development address the following:

- Sydney Harbour Foreshore Authority (SHFA) Sustainability Policy targets
- Section 2.4 ESD draft City of Sydney Development Control Plan 2012
- Starwood Group's Global Citizenship Environmental Initiatives policy
- DECC NABERS Energy rating for Commercial Office development
- Comparison with the Green Building Council Green Star – Public Buildings (Pilot) rating tool
- Provide greater clarity on the use of environmentally responsible materials and waste.

This report addresses these issues and provides a strategy for developing a design which meets the intent of the DOPI requirements.

2.0 Policy and Targets

This section summarises the policy and target issues highlighted in response to the Development Application.

2.1 Sydney Harbour Foreshore Authority Sustainability Policy Targets

The sustainability targets set by SHFA applies to not only their own operations but also to everyone in the precincts which they have jurisdiction over. The SHFA Green Building User Guide directly assists and incrementally works towards the achievement of the following strategy targets:

- By 2020, SHFA precincts will have a reduced carbon footprint of 80 per cent from a 2000 baseline; with a 20 per cent reduction by 2012.
- By 2020, SHFA precincts will have reduced consumption of potable water of 80 per cent on a 2000 baseline; with a 20 per cent reduction by 2012.
- By 2020, 80 per cent of waste generated precinct-wide will be diverted from landfill for recycling and composting.
- By 2020, 80 per cent of products and materials procured within both SHFA owned operations and precincts will be derived from recycled materials or from other sustainable sources.

Whilst the Four Points development project is not required to meet these exact targets, the project will demonstrate how it intends to contribute towards SHFA's targets.

2.2 City of Sydney Draft DCP 2012

2.2.1 DCP section 2.4 'ESD' states:

- Council generally encourages all applicants to implement the principles of Ecologically Sustainable Development (ESD) in the proposed development. Implementing the principles of ESD means that the development will be designed and constructed so that:
  - Greenhouse gas emissions will be reduced.
  - The use of cogeneration and tri-generation systems will be increased.
  - Low carbon and renewable energy use will be increased.
  - Potable water use will be reduced.
  - Development can adapt to climate change.
  - Waste will be reduced.
  - Recycling of waste and use of products from recycled sources will be increased.
  - Indoor environmental quality will be improved.
  - The environmental impact from building materials will be reduced through reduction, reuse and recycling of materials, resources and building components.
  - The biodiversity value of the land will be improved.
- Where an applicant voluntarily proposes achieving a Green Star or other building tool rating Council will apply a condition of development consent that requires the development to obtain the certified rating that was nominated by the applicant.
- Car parking areas should be designed and constructed so that electric vehicle charging points can be installed at a later time.
- Paints and floor coverings with low levels of volatile organic compounds (VOC) and low formaldehyde wood products are to be used where applicable and possible:
  - Use building materials, fittings and finishes where possible that:
  - have been recycled; are made from or incorporate recycled materials; and
  - have been certified as sustainable or 'environmentally friendly' by a recognised third party certification scheme.

2.2.2 DCP section 2.5 'Waste' states:

- A waste management plan detailing how waste is to be minimised within a development is to be submitted with the Development Application. The waste management plan will be used to assess and

monitor the waste management process within a development. The waste management plan is to be consistent with the City of Sydney Code for Waste Minimisation in New Developments 2005.

- For new buildings and major renovations, the total percentage (by weight) of construction and demolition waste (for example, bricks, concrete, roof tiles) that is reused on site or diverted for reuse or recycling is to be at least 80% with receipts sufficient to demonstrate that the target will be achieved.

2.2.3 DCP section 2.6 'Water' states:

- Rainwater tanks should be installed for all non-residential developments and major alterations and additions that have access to a roof form from which rainwater can be feasibly collected.
- All new fittings and fixtures for amenities in all non-residential development, the public domain, and public and private parks are to be installed to the minimum Water Efficiency Labelling Scheme (WELS) standards below:
  - **Showerheads** The highest WELS star rating available at the time of development.
  - **Water Tap Outlets** The highest WELS star rating available at the time of development.
  - **Urinals** The highest WELS star rating available at the time of development.
  - **Toilet Cisterns** The highest WELS star rating available at the time of development.

2.2.4 Council requirement for Green Star Rating

- The City of Sydney Council requires that where an applicant voluntarily proposes achieving a Green Star or other building tool rating Council will apply a condition of development consent that requires the development to obtain the certified rating that was nominated by the applicant.

2.3 City of Sydney

The City of Sydney promotes the establishment of high performing buildings within the CBD. The many new commercial office buildings are required to meet a minimum of 4.5 Stars in accordance with the NABERS Energy rating scheme.

The latest Property Council of Australia (PCA) Office Quality Guide Matrix requires that all new Premium Grade commercial office buildings be constructed to achieve 5 Star NABERS Energy ratings and new A Grade commercial offices be constructed to achieve 4.5 Star NABERS Energy rating.

2.4 Starwood Groups Global Citizenship Environmental Initiatives

Starwood is committed to doing more to consume less and caring for our planet. Their environmental policy addresses six areas of opportunity, and their initial worldwide focus is on energy & water with a commitment to reducing energy consumption by 30% and water consumption by 20% by the year 2020 (from a 2008 baseline).

These goals are the beginning of an ongoing strategy toward environmental sustainability; Starwood also focuses on guidance for minimizing and reducing waste and emissions, examining their supply chain and enhancing indoor environmental quality.

3.0 Option Analysis

3.1 Proposed ESD Strategy

To meet the DOPI requirements, it is proposed that the Four Points development incorporate a number of ESD strategies which will demonstrate the development's contribution to meeting the range of Council's and other associated organisation's sustainability policy targets.

The proposed strategy includes:

3.1.1 Commercial Office - 5 Star NABERS Rating

The development is currently being designed to achieve a 4.5 Star rating in accordance with the NABERS Energy Rating scheme. The commercial office component of the building will be designed to achieve a 5 Star NABERS Energy rating and enter into a Commitment Agreement with the OEH.

In order to achieve a 5 Star NABERS Energy rating the following systems will be assessed to serve the commercial office component of the development. The final combination of strategies to meet 5 Star NABERS will be determined in design documents:

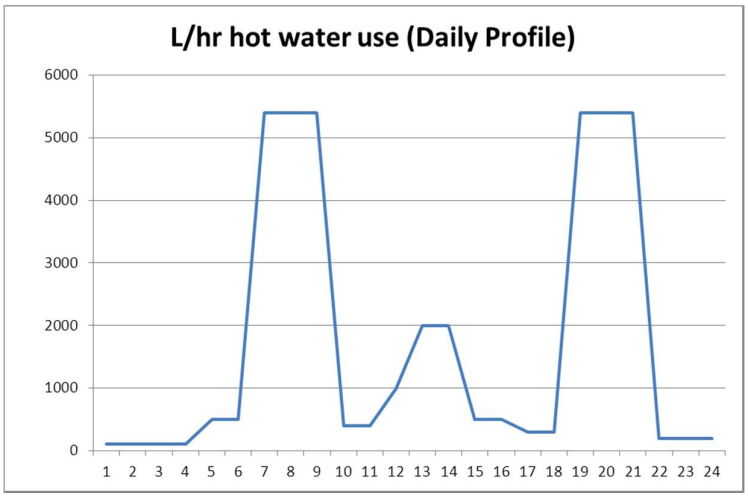
- Active Chilled Beam perimeter with Low Temperature Variable Air Volume Centre zone air conditioning system.
- High efficiency chiller system incorporating primary variable speed pumping
- Thermal energy metering of chilled and heating water serving the commercial office component and hotel component of the development
- Dedicated cooling towers to serve the commercial office chilled water system. This is standard good practice.
- Dedicated tenant condenser water pump to serve the commercial office component of the development. This is standard good practice.
- High efficiency modular boilers to provide heating hot water.
- Dedicated lift systems serving the commercial office component of the development.
- Lifts to be provided with regenerative braking.
- Low pressure air handling systems incorporating low face velocity coils and filters.
- Low energy lighting system to meet levels of 6 W/m^2 throughout the commercial office space.
- Dedicated toilet exhaust systems to serve the commercial office.
- Provision of high performance façade to serve the commercial office component of the development. A high performance façade can be achieved through high performing glass or a combination of high performing glass and external shading.
- Provision of small co-generation system to generate hot water for the hotel component of the building and generate electricity for the commercial office base building. Refer to the following section regarding details of the Co-generation system.

The final selection of which of these strategies will be adopted into the design will be dependent upon the conclusion of detailed energy modelling demonstrating the anticipated performance of the development.

3.1.2 Hotel Facility – Energy and Water Consumption

The sustainability initiatives being considered for the hotel include the reduction of the hotel's domestic hot water and kitchen demand. It is proposed to supplement the hotel's hot water demand with a combination of solar thermal hot water and/or small co-generation.

Hotels typically have two peak domestic hot water demands, these being early morning and early evening. This demand is due to occupants showering and the preparation of food in the various kitchens. Consequently the typical daily profile of the hotel would be similar to that shown below.



Typical Hotel Hot Water Daily Demand profile for 231 room hotel

To deliver hot water to the hotel rooms and kitchens to meet this profile it is necessary to install gas hot water heaters which have the required capacity to meet the peak loads. However the provision of hot water storage allows two technologies to be adopted to assist in reducing peak demand and energy consumption, these include:

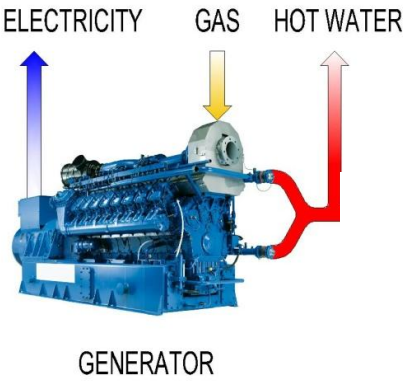
- Co-generation and/or
- Solar hot water collectors

The final system arrangement will be subjected to detailed demand modelling of domestic hot water and electrical energy.

Cogeneration

A co-generation system to serve this system selection could provide 2500 L/hr of hot water and be in the order 150 kW.

The benefit of the co-generation system is that as a by-product of producing hot water, the engine turns an alternator which generates electricity on site. It is proposed that the electricity be directed to the commercial office component to assist in achieving a high NABERS 5 Star rating.



Typical cogeneration system arrangement

This initiative will contribute to SHFA's overall sustainability policy target for reducing carbon footprint by 80% by 2020 on a 2000 baseline.

The estimated total net reduction in GHG emissions for this capacity system by installing this initiative would be in the order of 80,000 $kgCO_2$ for the development. This net reduction in GHG emissions can be apportioned by applying 360,000 $kgCO_2$ generated by burning Natural Gas to the Hotel and subtracting 440,000 $kgCO_2$ from the office component of the development due to the less GHG intensive onsite generation of electricity. In this way the GHG emissions displaced by the co-generation system can be maximised to benefit the office component.

The required floor area of the cogeneration plant will be in the order of 30 m^2. The maximum hot water storage capacity is anticipated to be in the order of 20 kL which translates to a volume of approximately 20 m^3 or a tank 7m^2 x 3m high. The final capacity of the storage tank would be subject to spatial constraints on the site.

The final system arrangement will be subjected to detailed demand modelling of domestic hot water and electrical energy.

Solar Hot Water

Solar collectors usually only provide approximately 50% of the hot water demand as a result of variable weather conditions. There are two types of solar collectors, these being flat plate and evacuated tube. Flat plate collectors are less efficient have a lower cost, however to achieve an equivalent amount of hot water more collectors are required than the more efficient evacuated tube collectors.

Solar hot water collector technology

A solar hot water system size for this application would be in the order of 500 m^2 for a flat plat system and 240 m^2 for an evacuated tube collector system. It is proposed that this technology will be located on the roof above the function areas.

The summary below outlines the two options available.

Solar Collector System	Roof Area Required (m^2)	Annual $kgCO_2$ GHG saved
Flat Plate	400	50,000
Evacuated Tube	300	50,000

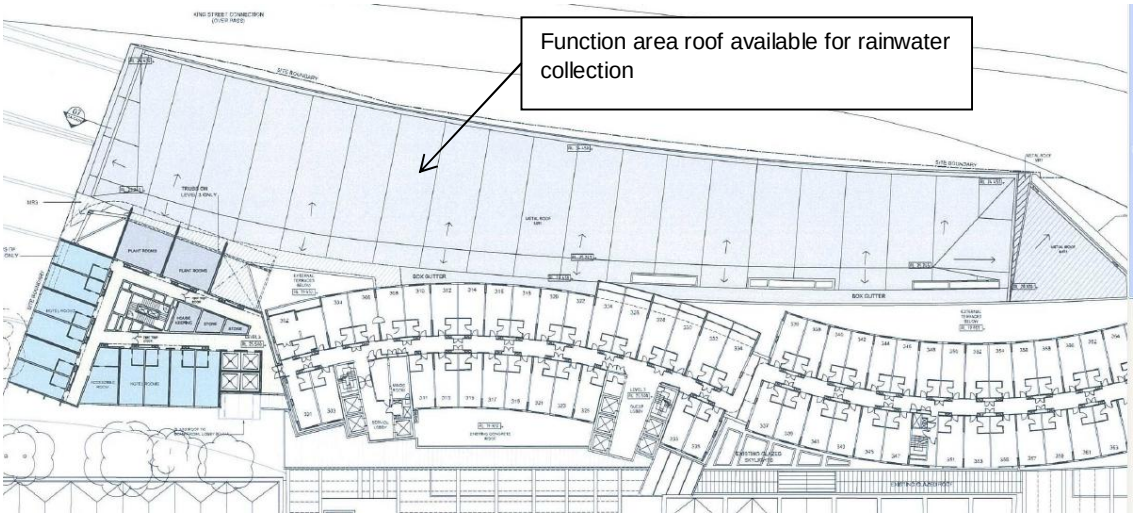
The hot water storage requirement would be in the order of magnitude to that for the Co-generation system.

Should a combined co-generation / solar system be installed, the solar hot water system can be reduced in size to serve a reduced capacity. A single 20 kL hot water storage tank will be required to serve the combined systems.

The final system arrangement will be subjected to detailed demand modelling of domestic hot water and electrical energy.

Rainwater Collection

Given the extensive roof area of the function rooms, rainwater harvesting is proposed for cooling tower make-up and toilet flushing. Based on using the 2,800 m^2 function space roof to collect Sydney's annual rainfall of 1574 mm, it is estimated that the amount of rainwater that can be collected would be in the order of 4,400 KL per year.



The final rainwater storage capacity will be maximised within the spatial and structural constraints of the site spanning over a major arterial road. Depending on the final storage capacity, the total reduction in potable water use could be up to 15% for the new hotel.

This initiative will contribute to SHFA's sustainability policy target for reducing potable water by 80% by 2020 on a 2000 baseline.

3.1.3 Green Star – Public Building (Pilot)

There is no Green Star rating to for Hotels as yet. There is however a Public Building Pilot tool.

The Four Points development will not be seeking to pursue a Green Star rating as it is acknowledged that there is currently no specific completed tool available suited for a hotel operation. Notwithstanding this, the development will be designed to demonstrate the pursuit of sustainability initiatives based on key strategies outlined in the Green Star Public Building Pilot rating tool. Strategies that will be adopted include:

- Where feasible, there will be the provision of 20% of all aggregate used for structural purposes to be recycled (Class 1 RCA in accordance with HB155-2002) or slag aggregate; and no natural aggregates are used in non-structural uses (e.g. building base course, sub-grade to any car parks and foot paths, backfilling to service trenches, kerb and gutter)
- Recycled Steel will be selected where feasible
- The minimisation of PVC use according to the GBCA PVC Best Practice guidelines where feasible
- FSC or PEFC timber will be selected where feasible over the function areas would provide a demonstrable use of timber within the facility and will be considered further.
- Low VOC paints, sealants, flooring and fitout items will be selected where possible
- Low formaldehyde emission engineered wood products will be selected where possible

The conference and function components will implement the following Green Building design criteria where feasible:

- Furniture, assemblies and flooring will have a reduced environmental impact ranging from re-used items, product stewardship program products, latest GBCA recognised product certified assemblies or recycled content assemblies or the supplier has an Environmental Management System
- Low VOC paints, adhesive, sealants, flooring and fitout items will be selected
- Low formaldehyde emission engineered wood products will be selected

Other Green Star initiatives which will be incorporated include:

Management Items

- Undertake Building Tuning
- Create a Building Users' Guide with information for building occupants, sub-tenants and a Building Maintenance Guide
- Implement of a Waste Management Plan and re-use and/or recycle 80% by mass of all demolition and construction waste

Indoor Environment Quality

- Installation of a carbon dioxide monitoring and control system for major function areas capable of adjusting the outside air rates
- Reduce glare from sunlight through all viewing facades across the usable floor area (excluding secondary spaces, outdoor spaces, corridors and rooms that for function reasons require the exclusion of daylight) through a combination of blinds, screens, fixed devices or other means.
- For 95% of the usable floor area (excluding rooms that, for functional reasons, have specific lighting requirements), the lighting system is flicker free and has a maintained illuminance of no more than 25% above those recommended in: For circulation and other general areas, Table D1 of AS1680.2.1:2008 and for workspaces and other activities not covered by the above, Table 3.1 of AS1680.1:2006.

Transport

- Provide cyclist facilities for hotel and commercial office staff including showers, lockers and bike parking.

4.0 Summary of Options

Option Description	Environmental Benefit	Addresses Policy Target	Proposed	Extent Subject To Detailed Design
NABERS Energy 5 Star Commercial Office	Reduction in GHG emissions	SHFA Sustainability Policy. Assists NABERS Office Energy Rating.	✓	
Combination of Co-generation and/or Solar Hot Water for Hotel	Reduction in GHG emissions	SHFA Sustainability Policy Starwood Environmental Initiative	✓	✓
Rainwater Harvesting for Hotel	Reduction in potable water	SHFA Sustainability Policy Starwood Environmental Initiative City of Sydney DCP	✓	✓
Dedicated commercial office toilet exhaust system	Reduction in GHG emissions	SHFA Sustainability Policy. Assists NABERS Office Energy Rating.	✓	
Daylight to Function Rooms & Lobbies	Reduction in GHG emissions through reduced electric lighting	SHFA Sustainability Policy. Assists NABERS Office Energy Rating.	✓	✓
Use of recycled produce in Steel and Concrete where feasible	Sustainable Material selection	SHFA Sustainability Policy City of Sydney Reference to Green Star Public Building (Pilot)	✓	✓
Low VOC products, paints, sealants and flooring where feasible	Improved Occupant Health benefits	City of Sydney DCP section 2.4 City of Sydney Reference to Green Star Public Building (Pilot)	✓	✓
Building Tuning	Efficient Building operation resulting in a reduction of GHG emissions and water consumption	SHFA Sustainability Policy. Assists NABERS Office Energy Rating. Starwood Environmental Initiative City of Sydney Reference to Green Star Public Building (Pilot)	✓	

Option Description	Environmental Benefit	Addresses Policy Target	Proposed	Extent Subject to Detailed Design
Target recycling of 80% of demolition waste	Reduced landfill impacts	SHFA Sustainability Policy City of Sydney DCP section 2.5 City of Sydney Reference to Green Star Public Building (Pilot)	✓	✓
Create Building Users Guide	Identifies sustainable building initiatives and encourages sustainable behaviours by staff, visitors and building management.	City of Sydney Reference to Green Star Public Building (Pilot)	✓	
CO_2 monitoring	Improved Occupant Health benefits Reduction in GHG emissions	SHFA Sustainability Policy. Assists NABERS Office Energy Rating. City of Sydney Reference to Green Star Public Building (Pilot) Starwood Environmental Initiative	✓	
Capture and Reuse fire test water subject to spatial and structural considerations	Reduced water use	SHFA Sustainability Policy City of Sydney Reference to Green Star Public Building (Pilot) Starwood Environmental Initiative		✓
Provide Cyclist Facilities	Encourages Cycling for staff and visitors	City of Sydney requirements		✓
Investigate the use of best practice PVC	Reduces proliferation of pollutant materials	City of Sydney Reference to Green Star Public Building (Pilot)	✓	✓
Low WELS rated taps, urinals and toilet cisterns	Reduced water consumption	SHFA Sustainability Policy Starwood Environmental Initiative City of Sydney Reference to Green Star Public Building (Pilot) City of Sydney DCP section 2.6	✓	