

To	<b>Frasers Greenclyff</b>	Date	<b>9 April 2009</b>
Attention	<b>Nicholas Wolff</b>	Email	<b>nwolff@frasersgreenclyff.com</b>
From	<b>Ross Harding</b>	Project No	<b>ADV080450C</b>
Project	<b>Frasers Broadway</b>	No. of pages	<b>5</b>
Subject	<b>Clinton Climate Initiative</b>	Copies	<b>Matthew Payne Ché Wall</b>

Dear Nicholas,

The following is aimed at providing a summary of the sustainable design features of Frasers Broadway to explain how the site is pushing the boundaries of sustainable development.

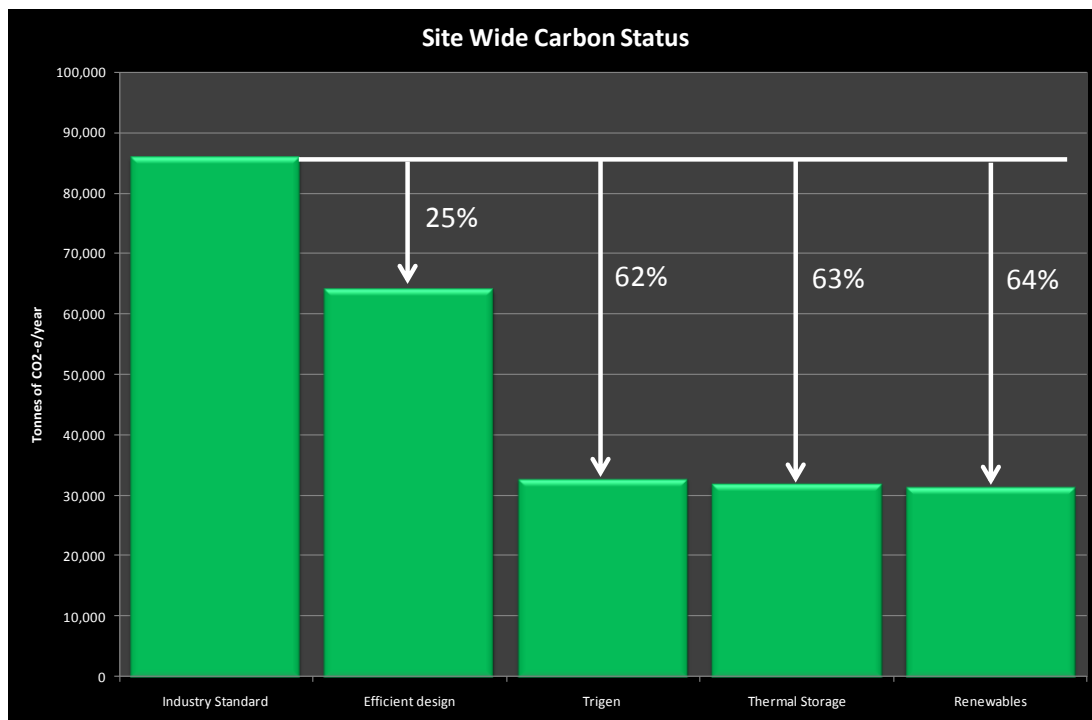
The Frasers Broadway development has set itself ambitious and groundbreaking targets in terms of environmental sustainability. Two key targets initiated by the Institute for Sustainable Futures are:

- minimise the greenhouse gas emissions attributable to the site's operations,
- to achieve water neutrality.

A suite of initiatives is targeted to achieve these site goals, involving specific waste and transport strategies.

**Carbon:**

The fundamental first step of the site carbon reduction strategy is the minimisation of energy demand through efficient building design. The strategy then moves to minimising the carbon impact of the energy supply.



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### Energy Demand

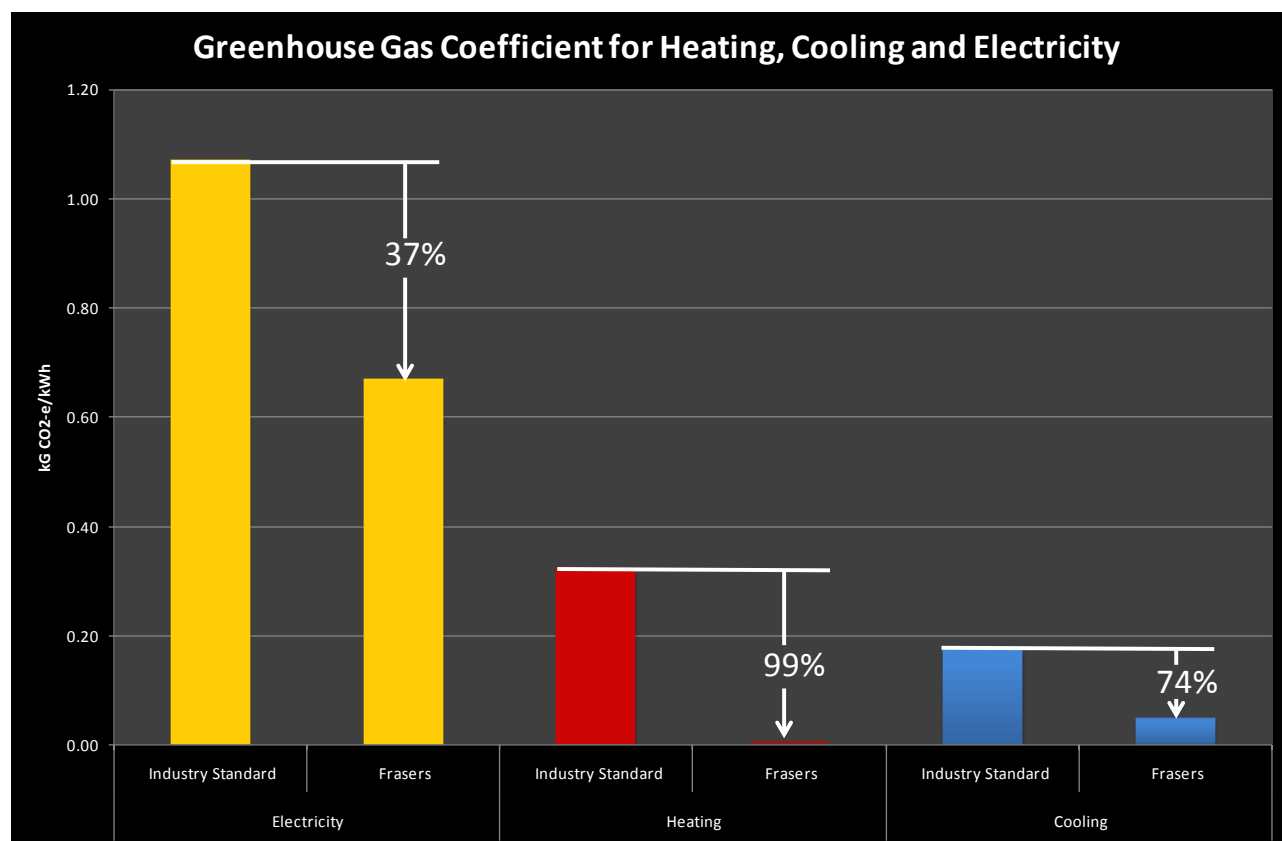
The buildings are being designed to minimise energy demand via the following initiatives:

- Façade optimisation via shading and glazing to maximise natural light and thermal comfort while minimising energy consumption,
- Lighting efficiency optimisation to minimise electrical demand, internal heat gain and over-lighting while providing occupants with sufficient lighting levels to maintain their comfort,
- The most efficient mechanical systems have been selected to minimise energy consumption while providing a comfortable environment for the occupants,
- Passive design solutions have been used to avoid energy consumption as much as possible.

Demand minimisation targets have been set for each building to establish a ceiling of energy demand across the site. Demand levels of the precinct design are managed via limitations on the cooling, heating and electricity demands of each building on site.

### Low Carbon Energy Supply

Low carbon energy is provided to the site via onsite trigeneration and thermal plant. This centralized infrastructure provides energy in the forms of electricity, hot water and cold water. The hot and cold water is distributed via a district heating and cooling loop that supplies the site's buildings. The carbon reduction for each energy service can be observed below.



The energy supply of the site's electrical and thermal energy is being designed to achieve a 64% reduction in site operational greenhouse gas emission from a base of coal fired generated grid electricity (with gas for heating purposes).

The central electrical and mechanical services are targeting the above ratings via the implementation of the following technologies;

- Natural gas fired trigeneration plant (including double stage absorption chillers)
- Thermal storage
- Solar thermal (Solar Hot Water Facades)
- Solar power (Photovoltaic Cells)
- Biogas energy generation from organic waste via anaerobic digestion

Greenhouse gas reduction targets are aimed at being maintained via a strict metering and energy management strategy that is an integral component of the site wide infrastructure design. Instant feedback on environmental performance for the site will facilitate ongoing tuning and monitoring. The performance of the site will be communicated to the public via a large vision screen.

Frasers Broadway further plans to engage with neighbouring sites by exporting excess carbon free waste heat. The design response from Frasers Broadway aims to respect the collective energy requirements of itself and its neighbours by sharing resources with the surrounding community.

#### **Water:**

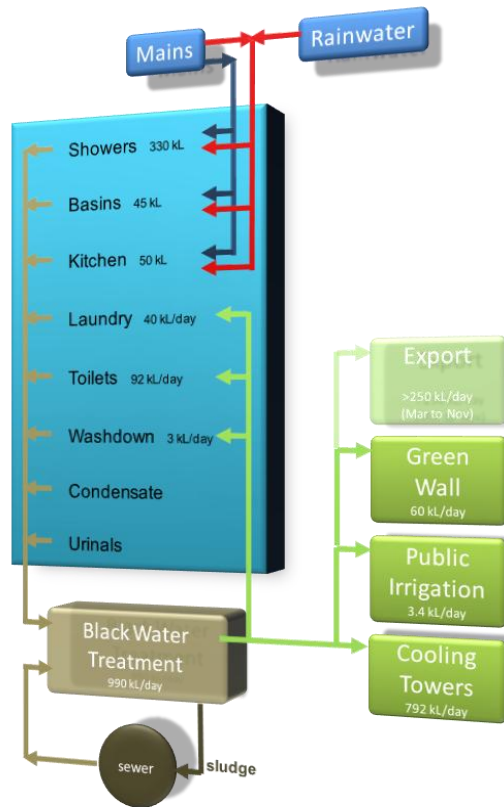
The vision for the site's water consumption is to achieve water neutrality. Water neutrality is achieved by exporting sufficient non-potable Grade A water to offset the import of potable mains water.

Similar to the carbon strategy, the site water strategy begins by minimising water demand as the first priority. The design places limitations on the peak and annual consumption of potable and non-potable demands for the site. It further identifies the following as required demand side initiatives:

- Low flow fixtures and fittings;
- All non-potable uses in buildings are required to use the site Grade A supply. Non-potable uses include;
  - Toilet flushing
  - Irrigation
  - Hard surface wash down
  - Cooling tower makeup (central plant)
- Rainwater must be collected, treated and reused

The supply of potable water will be from Mains water. However, Grade A water is supplied for all non-potable water activities from the onsite black water treatment plant. The black water treatment plant will treat the site's own waste water and will also mine the sewer main for additional waste water. This water is converted into usable Grade A water for reuse on site in toilet flushing, irrigation and hard surface wash down. Additional Grade A water will also be available in varying quantities during the year, as available water for export to other locations or entities.

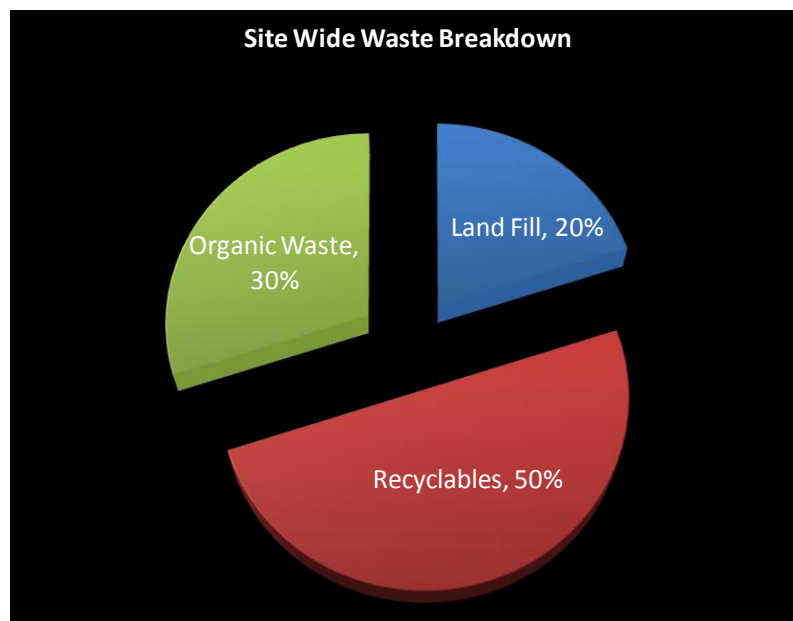
The blackwater treatment plant has been sized to enable the site to export more water than it imports, making the site not just water neutral, but net water positive. The figure below summarises various water demands on site.



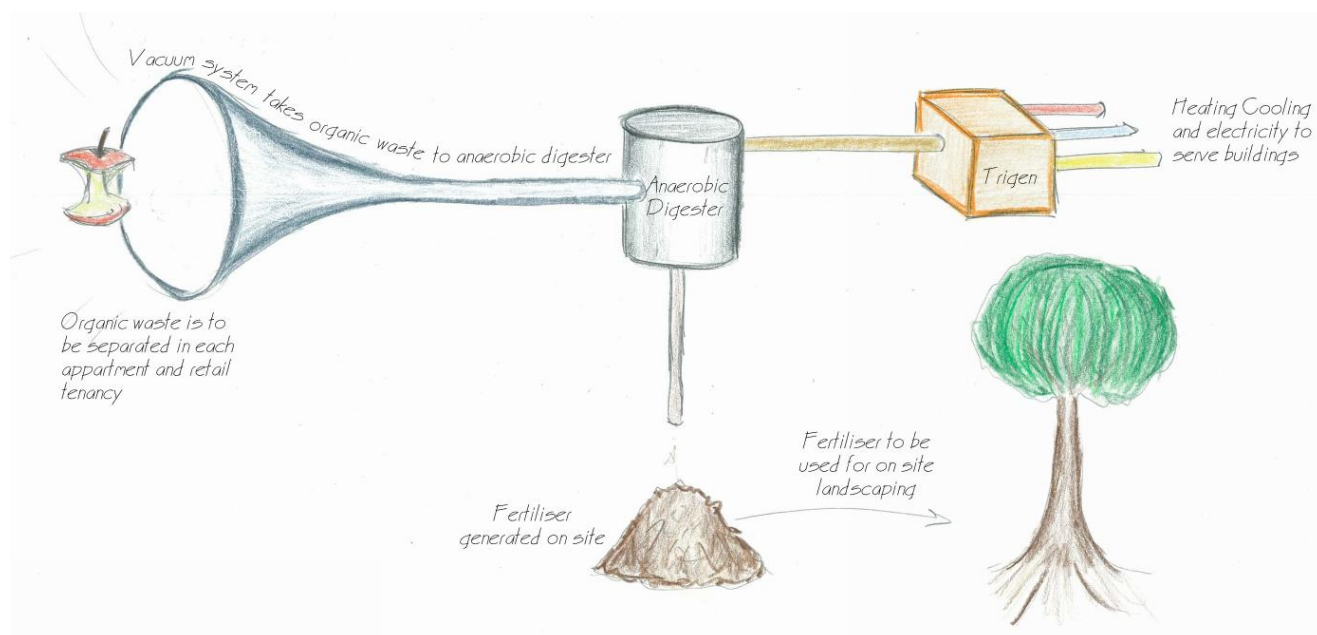
Not only is Frasers Broadway achieving water neutrality on site, but the site plans to engage with neighbouring sites by exporting treated water to surrounding buildings and community uses to give something back to the community.

**Waste:**

A site wide waste management strategy is planned to reduce waste to landfill by 80%. The figure below indicates that 30% of waste from the site is expected to be organic waste while 50% of the waste is expected to be recyclable. A vacuum waste collection system is currently being investigated for use on site to help separate the waste at the point of the source to minimise recyclable and organic waste going to landfill.



The organic waste is designed to be separately collected and digested on site to produce biogas and fertiliser. This biogas is to be reticulated to the trigeneration plant to be mixed with the natural gas to lower the sites carbon footprint. The fertiliser is designed to be used on site for native flora. In an effort to engage with the surrounding community the sites excess fertiliser is planned to be used on a number of parks and garden in the near.



#### **Transport:**

Transport strategies for the site are in place with the intent of minimising the greenhouse gas emissions for residents and workers commuting to and from the site. These strategies include the site's close vicinity to the Sydney's central train station, on site electric car charging facilities, car share facilities and bicycle facilities. All buildings on site are designed to provide robust bicycle facilities to promote the site's residents and workers to commute to and from Frasers Broadway in a carbon free manner. The transport facilities are yet another way in which Frasers Broadway is engaging and giving something back to the surrounding community.

#### **Communication and education:**

The site wide infrastructure and building performance data is planned to be displayed on a large screen on the most prominent façade of the site to demonstrate to the public the level of carbon and water reductions achieved on site.

The site's design included an in depth investigation of a wide range of potential renewable energy technologies. The decision of which technologies to use was not only a question of carbon reduction but also a question of communicating the suitability on site. One building has 50% of its façade covered in solar hot water to make a statement to demonstrate sustainability and that environmental outcomes can look great too. Another building on site is covered in native Australian Flora.

The site also seeks to achieve a 6 Star Green Star Precinct Design Pilot rating when the rating tool is developed and released by the GBCA.

Regards

Ross Harding  
Environmental Design Consultant