9 December 2008

Chris Ritchie
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Major Development Assessment
NSW Department of Planning
GPO Box 39
Sydney NSW 2001

Attn: Megan Webb

Dear Megan,

Re: Australian Red Cross Medical Research and Development Project Application Number 08_0137 – Greenhouse Gas Emissions

Goodman received a letter from the Department of Planning dated 29 October 2009 which contained a number of submissions during the exhibition period for the above project.

In accordance with Section 75H(6) of the *Environmental Planning and Assessment Act* 1979, the following is a response to the issues raised by the Department of Planning with respect to the following:

- Greenhouse gas emissions of the project.

The Department of Planning raised the following response to the Greenhouse Gas emissions for the project:

- *The greenhouse gas assessment provided included very little detail on the energy requirements of the project and feasible options to minimise greenhouse gas emissions. Please provide further details of the greenhouse gas emissions of the project and the feasibility of options to reduce or manage emissions, such as photovoltaic cells.*

INTRODUCTION:

ARCBS is a not-for profit organization which performs the vital community function of supplying blood and blood related products to those in need. The primary function of the ARCBS national principal site therefore is to ensure the safe and reliable transportation of blood and blood related products to hospitals and medical centres. These products are highly sensitive and must be kept at the appropriate temperature at all times to ensure they do not perish.

Accordingly, the following is a discussion of the Greenhouse gas abatement strategies for the proposed facility:

GREENHOUSE GAS ABATEMENT

1) Benchmarking:

The ARCBS NAPS is classified as Class 8 under the Building Code of Australia (BCA). Unlike NABERS Energy for commercial buildings (Class 5) there is currently no rating system developed for laboratories to benchmark performance against. This is mostly due to the high level of

variance in the specific functions of individual laboratories. Accordingly, in the absence of an appropriate benchmark it is difficult to provide some measurable standard by which to quantify likely reductions in greenhouse gas emissions. This is particularly the case at this stage in the design development process since specific plant and equipment selections are yet to be finalized (note that most ratings cannot be achieved until after 12 months of operation). Notwithstanding this however, ARCBS are using a 4.5 star NABERS energy (ABGR) base building rating as a theoretical criteria for implementing more efficient solutions with respect to each aspect of the facility. A 4.5 star building is generally considered to have a 35% improvement in efficiency compared to a standard building.

2) Purpose Built Facility:

The central aim of the proposed facility is to consolidate the existing operations which currently occur across three different facilities, into a single, optimally located, purpose built facility. In doing so this would result in significant operational efficiencies. Indeed this was the essential requirement in developing a business case for the new facility. It must be noted that by identifying the most efficient location for the site based on minimizing transportation emissions demonstrates a more complete holistic assessment of delivering reductions in greenhouse gas emissions which is not usually fully considered in the typical assessment of buildings.

3) Transportation:

Location: The site has been selected based on modeling of transportation scenarios for each of the short-listed site locations. This was done by analyzing the time taken for the supply route (from collection points to the facility) and the distribution route (from the facility to the hospitals and medical centres). The site location affords the greatest efficiency in terms of distances traveled and time taken to travel to and from the facility for both supply and distribution. All major destinations are within 30 minutes travel time. This reduces fuel consumption and emissions from transportation vehicles. In addition the site is located in close proximity to public transport being within 300m of the Green Square Train Station and with close proximity to bus services in Bourke and Botany road. This will help ensure that public transport is readily available to and from the site and therefore minimize the need for private vehicle use.

Travel Access Guide: A Travel Access Guide will be prepared which will contain information of local public transport services to help encourage use of public transportation, cycling and walking. Once staff behaviour patterns are known a mode share target could be set to further increase public transport use. This could be encouraged via a range of incentives.

Bicycle facilities: 12 internal bicycle spaces and conveniently located lockers and change rooms will be provided within the basement to encourage use of bicycles as a mode of travel to and from the site. In addition 4 bicycle spaces will be provided on the street for other visitors such as couriers.

Car Parking: the council car parking rate under DCP No.11 is comparatively low with 1 space every 125m2. This results in a provision of 88 staff car spaces for an expected working population of approximately 500 people. This is a very low provision and will ensure that private car use is minimized.

4) Building Form:

Compact Built Form: The proposed facility has a compact, regular building form to maximize the efficient use of space and has been developed to ensure maximum flexibility for any changes to use over time.

Solar Calculated window shading: Shading to the east and west facades to minimize heat loads on the building while still maximizing opportunity for natural lighting in lieu of artificial lighting. The Laboratories cannot receive direct sunlight so these areas will be shaded via external window shading and in doing so the solar heat loads on the building will be reduced.

5) BCA Section J:

Section J regulations provide minimum energy performance requirements for: Building fabric, glazing performance, building sealing, air movement, efficiency of air-conditioning and ventilation systems, efficiency of artificial light and power (internal and external/security) and efficiency of hot water supply. Maintenance provisions are also included to ensure that services and equipment are able to be accessed and that they operate in an efficient manner. A Section J compliance assessment of the building will be undertaken and submitted in order to obtain the Construction Certificate. Where possible these requirements will be exceeded particularly with respect to the building fabric and glazing.

6) Power:

Base Load Power: Blood and blood related products supplied by ARCBS must be kept at specific temperatures at all times. These products are highly sensitive to any variance in temperature in order to not perish. ARCBS must therefore have the most secure and reliable form of base load power available. Therefore the primary source of power is to be electricity from the grid via a new chamber substation.

Emergency Back-up Power: Because of the sensitive nature of the products it is also essential for ARCBS to have a reliable back-up source of power in the event of a failure in the primary power source. This emergency shut down provision must be for a minimum of 96 hrs. While it is acknowledged that Gas would have been a more environmentally efficient option for back-up power (Gas has a 30% reduction in greenhouse gases), piped gas of the requisite capacity is not available in the immediate vicinity of the building and therefore cannot be implemented as the back-up solution. Accordingly, diesel generators have been selected as the preferred emergency power provision to be provided in lieu of gas.

Green Power: Purchase of renewable energy for a portion of the site's electricity use removes the greenhouse gas emissions associated with that portion of electricity consumption. ARCBS is currently calling for tenders for energy supply and in doing so will request tenders for the provision of 10% renewable energy. While it is not possible at this stage to confirm that this will be adopted, it is an initiative that is being actively pursued. It is also worth noting that while this is a good initiative it would still be better to create a lesser overall energy requirement via energy efficient solutions.

Solar Power: The facility has an estimated maximum demand of 2.5 – 2.6MVA. If solar power were to be provided on the roof of the facility there would be an available area of approximately 830m² located on the top of the rooftop plant since the remainder of the roof area would be in shade for much of the day. If this area was to be used for solar panels it would be possible to provide approximately 555 1.5 x 1m panels. This would provide approximately 110 kVA for

approximately 4 hours per day. Accordingly, this would satisfy only 4% of the total power requirement. Therefore the remaining 96% of the power required would be required from the grid and an emergency back up provision. The capital costs of providing solar power of this quantum would be in the order of $1.1 million. However, considering that the substation would still be provided and have the space capacity to provide the total requisite power requirement (a new substation is likely to have a capital cost of approximately $300,000). Therefore the net result would be an expensive duplication of power supplies for a minimum net tangible benefit. A facility of this scale therefore does not achieve the economies of scale necessary to make solar power a viable option. Rather a more effective implementation of solar power would be as part of a precinct based solution servicing a number of buildings. In doing so the requisite economies of scale would be easier to achieve. Notwithstanding this, solar power is still appropriate for ancillary uses such as solar hot water heating and solar powered external lighting. A solar hot water heating system (with Gas supplementation) will be installed. This system will supply the hot water requirement for showers, taps, processing activities etc. on the site. In addition, solar powered external lighting is being considered.

Co-generation: While Co-generation appears to offer opportunities for an improved environmental outcome, its ultimate viability depends on the relationships of numerous heating and cooling load characteristics of the building. Co-generation introduces complexities into the control and operation of the building's power supply system and its technical viability is compromised if a building has a limited demand for the raw heat by-product. This is why co-generation is typically more appropriate for buildings such as manufacturing facilities which have a steady base load requirement for heating. In this case of this facility there is little demand for the raw heat by-product. To offset this it is possible to replace one of the normal chillers with an 'absorption' chiller to create a beneficial need for the raw heat by-product however the net benefit is often very marginal particularly at such a small scale. Co-generation is more appropriate as part of a precinct based approach where a plant was servicing a number of buildings which had a steady base load requirement for heating as well as cooling. In addition, co-generation becomes a more efficient option when the power can be supplied back to the grid. However, the energy provider does not have the appropriate infrastructure in place to receive this.

7) Electrical metering and monitoring:

A network of electrical energy meters is being provided so that point and time of bulk uses can be monitored and recorded and thus providing for subsequent analysis of consumption and facilitating ongoing interactive improvements in energy use

8) Building Management System:

A Building Management System (BMS) will be used to monitor whole of building energy use. The BMS will perform two functions to improve efficiency and reduce energy requirements: 1) automatic adjustment of services to optimize efficiency; and 2) provide constant monitoring of performance to allow building managers / users to improve performance manually.

9) Heating, Cooling and Ventilation:

The most efficient system will to be selected based on user requirements.

Heating / Cooling: Screw chillers are to be selected these have much finer incremental changes than centrifugal or reciprocating chillers and are therefore more efficient.

Ventilation: VAV-type systems are being investigated. These systems reduce the amount of air being circulated to control temperatures and there use less fan energy.

Air quality: Air quality sensors are to be located in the basement which will be linked to variable speed controls to ensure energy use is minimized when providing mechanical ventilation to basement

10) Lighting:

Natural lighting and views are to be maximized particularly with the internal atrium via the following initiatives:

- Built elements on the office floor plate are contained, against or in alignment with base building (existing) structures reducing obstructions against windows
- Material with a high degree of transparency and visibility will be used to encourage natural daylighting and views
- Workstations are located closest to the building perimeter (low level, mobile structure)
- Low height workstation partitioning is recommended to increase natural spread of daylight enabling it to reach further across the floor plate
- Natural light preferred over artificial lighting (where possible)

In addition lighting power requirements will be reduced by the following initiatives:

- T5 fluorescent lights will be used as these use 35% less energy
- Motion Sensor lighting is encouraged and are to be automated with a manual override – general lighting hours to be determined by BMS
- Specification of high frequency ballasts (to avoid low frequency flicker fluorescent lighting) is recommended
- Task lighting in open plan office areas

Other options which will be explored in design development are:

- Use of decorative, low voltage downlights and instead achieve a decorative outcome using compact fluorescents
- More advanced reflectors in light fittings
- More advanced diffusers on light fittings
- Dimming system to dim or extinguish lights when areas are unoccupied or when incoming daylight is sufficient
- Subdivision of large areas off one light switch into multiple zones off their own local switch enabling most of the lights to be extinguished and energy to be saved when only part of the floor needs lighting

CONCLUSION

In summary a range of greenhouse gas abatement initiatives are proposed to be implemented. While the likely amount of the reduction in greenhouse gas emissions is difficult to quantify at this time, the proposed initiatives will no doubt ensure that the proposed development would result in

significantly less emissions than the conventional approach. This is particularly with respect to the following key initiatives:

- Purpose built facility;
- Minimising transportation emissions;
- Exploration of purchasing renewable energy;
- Solar calculated external shading;
- BMS to automatically optimise performance;
- Selection of efficient mechanical systems;
- Minimising energy requirements for lighting; and
- Solar hot water heating.

OTHER ESD INITIATIVES

A range of other ESD initiatives will also be implemented, particularly with respect to the fit-out. These are as follows:

1) Water:

Rainwater harvesting: A 10,000L rainwater tank will be installed to collect rainwater for storage and re-sue for non-potable applications such as landscape irrigation, flushing toilets and car wash by in the car park

Water efficient Tapware: Water efficient tapware, toilet cisterns, showerheads and dishwashers will be installed. Low flow urinals (0.8L cube Caroma) will be installed

Fire Hydrant testing: Water flushed though the testing apparatus during regular fure hydrant tests will be re-directed to the storage tank thereby conserving water

2) Materials Selection:

Materials are selected based on the following criteria:

- Where possible natural with long life and low maintenance properties
- Selected for natural finish to avoid the use of applied finishes
- Use of local materials and recyclable materials (materials containing recycled content and/or can be recycled at the end of it's life)
- Products and materials manufactured according to ISO 14001, manufactures with an Environmental Management Strategy and/or certified by reputable trade resources such as Eco Specifier and GECA
- Sustainable timber selection – FSC timbers and engineered timber products to be specified where possible
- E0 or E1 (no or low formaldehyde emission) MDF to all joinery, tables and workstations
- No or low VOC materials (carpets, paints and adhesives)

3) Indoor Air Quality:

Consideration of indoor air quality during all phases of project is to be realised by:

- Minimising VOC's (Volatile Organic Compounds)'s in specified materials (carpets, paints, adhesives)
- Using water based paints and coatings
- Where practical expose substrate and avoid painting.
- Consideration to the construction program (ie installation of carpets should be at the end of the construction process to avoid absorption of toxins during construction)
- Indoor Planting
- Tenant exhaust riser to remove indoor air pollutants from printer and photocopy areas

4) Glare Reduction:

The following strategies have been employed to reduce the incident of glare on computer screens and work surfaces:

- High level planting as screens
- Installation of internal blinds for occupant comfort (automated with manual overide)
- Matt surface finishes and neutral palette scheme with minimal contrasting colours
- Workstation layout perpendicular to the windows where possible so screens are side on to direct light source

5) Furniture Selection:

The preliminary furniture selection (FF+E Schedule) provided to the ARCBS includes products that meet the following criteria: *(identifiable on the schedule by a green star and notation as to their accreditation or environmental properties.)*

- Products with improved environmental performance and/or
- Quality products that will surpass the demands of their environment and therefore have a longer lifespan
- Certified by GECA (Good Environmental Choice Australia) or Ecospecifier
- Modular furniture, flexible for churn management (expansion or downsizing)
- Lifespan and guarantees on products that ensure re-using, relocating and reconfiguring furniture in lieu of disposal
- Manufacturing have ISO 14001 accreditation and an EMS
- Suppliers with take back schemes that reuse and recycle componentry for a cradle to cradle approach

The workstation system to be specified must meet the following criteria:

- Modular workstations system with standard componentry with the ability for 'add-ons or accessories' as required
- Height adjustable work top
- Have a minimal environmental impact, designed for disassembly and reuse

- All desk tops to be laminate finished E0 or E1 MDF
- Workstation screens are to be Echo panel (made from 100% recycled PET)or similar – dependent on workstation system specified
- Screen heights are to be lower than 1200mm to cater for optional screen mounted workstation accessories
- Screens will be held 300mm off the floor to maintain good air circulation
- Frames are to be powdercoated steel

Integrated wire management system designed to manage and conceal wires and cables below the work surface

6) Furniture Re-use:

- A full audit of existing equipment and furniture is to be completed to identify re-useable equipment/furniture (warranties should be considered)

Where existing furniture requires refinishing improved and quality finishes should be used ie: environmentally improved powder coating or commercial grade fabrics that can sustain projected traffic and usage.

7) Recycling & Waste Storage:

In order to reduce waste going to landfill:

- Adequately sized and dedicated storage area for the separation and collection of waste is to be provided

8) Designed for Dis-assembly:

Furniture, office and lab joinery is designed for ease of disassembly to promote re-use with the following features:

- minimal standardised componentry for ease of repair and flexibility in configuration of the furniture elements
- designed of free standing elements in order to prevent damage to base building when relocated
- individual componentry are be extracted where possible for recycling or reuse

9) Dematerialisation:

Standard detailing should be used during the documentation of the project in minimising material content and material wastage wherever practical. This means:

- Designing to standard sheet size to reduce off cuts or use off cuts in other design elements
- Deleting applied finishes so the exposed function and structure becomes the design aesthetic
- Consolidating built elements, services and finish selections where possible
- Using demountable partitions where possible

10) User Education Strategies:

- Education and protocol for staff promotes best 'use' of a building and is integral to the maintenance of a workplace
- Involvement of staff throughout the design process helps to promote a sense of ownership and therefore responsibility and pride in their new accommodation
- Education on the operation of the buildings facilities/utilities is integral to prevent misuse
- involvement of staff with building assessment promotes understanding of workplace health and safety, sustainable processes and ARCBS protocol

Sincerely,

Richard Seddon

Planning Manager

Encl.

- ***Attachment A: ESD Report prepared by SBE dated September 2008***
- ***Attachment B: Letter from Australian Red Cross Blood Service regarding green power, dated 2 December 2008***