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CONSTRUCTION

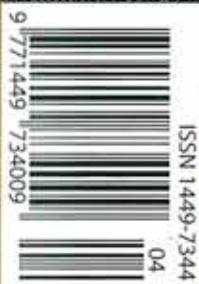
MAJOR PROJECT REVIEW

GROCON'S

1 BLIGHT STREET

ENLIGHTENS NSW

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I BLIGH STREET

MAIN CONSTRUCTION COMPANY : Grocon

CLIENT : DEXUS Property Group, DEXUS
Wholesale Property Fund & Cbus Property

COMPLETION : July 2011

SURVEYOR : WT Partnership

ARCHITECTS : Architectus Sydney, Ingenhoven

PROJECT END VALUE : \$270 Million

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GROCON'S GREAT LEAP FORWARD

Nothing like Six Star Green Star project 1 Bligh Street has ever been constructed before in Australia. With the extraordinary level of innovation in design, materials and methods, bringing it all to completion for the client, DEXUS Property Group, was an ongoing series of challenges for Grocon and its team.

A major advance in information technology (IT) was key to completing the vision. Custom designed Building Information Management (BIM) software was created for DEXUS by Autodesk, which provided detailed 3D modelling of every aspect of the building, including structure, facade and building services. This gave Grocon a complete and incredibly detailed overall picture of the project, allowing all buildability issues to be resolved before construction commenced, so Grocon and its team could focus their talents on facing the series of challenges ahead.

The BIM also integrated with the site's ACONEX construction communications, was the platform for collation of O&M data, and forms the basis for the whole project's cutting edge BIM system, with an open network communication protocol established via an optic fibre loop throughout the entire building.

"The ongoing complexity of 1 Bligh Street was very challenging - we didn't have any easy stages," said Grocon Project Manager, Bruce Jones.

"Exposure to weather was an issue because of the open atrium, the complexity of the roof and the detailing of the roof level. That stage was very slow, as the weather was a constant challenge. Some rectification and rescheduling was required, so we were sometimes undertaking works out of sequence. At one stage there was a backlog of works around the atrium, but it was unavoidable due to safety issues.

"We were at one stage working 24 hour days, five days a week, and moved to seven day weeks closer to completion to mitigate those time pressures caused by weather affecting the program."

At the peak of works, Grocon had up to 150 direct staff on site, including supervisory staff, formworkers, construction staff and labourers. A team of 15 different engineering consultants was on the consultant team, and approximately 80 different subcontractors worked on site, with a peak of 675 persons in the combined daily workforce. Almost two million man hours have been worked to turn the design into reality.

1 Bligh Street's unique double skinned facade design was developed further by Grocon into a working facade system, with Grocon having considerable input into the final design specifications for the facade manufacturer. The outside skin of curtain wall was constructed first, then the inner skin of window wall, with the void between the two holding a total of 18,000 venetian blinds for solar glare control. Where normally one subcontractor works the building perimeter, Grocon had three to coordinate – the facade contractor, the waterproofer and the blinds contractor.

The level of detail in this project is intense: where generally a facade system might use around 40 dies, 1 Bligh Street's double skin facade system had more than 100 dies for the aluminium profiles.

"It was extraordinarily difficult as Project Manager, keeping track of all the materials and details and the levels of on-shore procurement

and offshore procurement. This project was highly bespoke, there was nothing standard," said Bruce Jones.

"1 Bligh Street is another milestone for Grocon, and takes our construction abilities in high rise to a new level. This is the most complicated project we have ever built and it has been built to a very high standard.

"The best achievement for us has been reaching our sustainability goals, while also achieving the design outcomes. This project has scored five out of five innovation points for Green Star, which is very impressive."

Two of the key sustainability innovations are the tri-generation plant and the blackwater treatment system. The tri-generation plant includes solar tubes on the roof, which boost the efficiency of the HVAC system chillers. These will be fully commissioned next summer, and a complete set of seasonal data put into the Building Management System.

The blackwater treatment system forms part of the project's water efficiencies and incorporates eventual harvesting of the CBD sewerage system. This system will also be commissioned post-construction, so the full building sewerage load can be assessed and the blackwater plant seeded with treatment agents. The sewerage harvesting requires an extensive assessment and approval process, including independent building auditing, assessment by IPART and formal Ministerial approval from the New South Wales Government.

Other aspects of construction which scored Green Star points included the exclusive use of FSC Certified timbers; all low VOC paints, floorcoverings, glues, varnishes and fixatives; and an incredibly effective site waste management program which saw over 93 per cent of construction waste, approximately 40,000 tonnes, recycled.

"It was our task to convert the design by Ingenhoven and Architectus into reality, and DEXUS is delighted with the result," said Bruce Jones.

Grocon is currently nearing the end of another very special Sydney project, Common Ground at Camperdown, an environmentally sustainable, affordable housing project to benefit some of Sydney's long term homeless. The company is also currently constructing an office tower at 161 Castlereagh Street.





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1,774 motorised 80 mm external venetian blind systems are integrated within the custom design ventilated double skin façade, controlled by an advanced system consistent with the unique circular design of the building. The blinds operate automatically within the outer and inner cavities of the ventilated facade.

Horiso's control system for the blinds is based on an intelligent motor controller pre-programmed with all the building's control requirements – including both the geographical location and physical orientation of the building's circular shape. It will operate in conjunction with sun-tracking software that enables individual blinds to react to the variations of the sun's angle of incidence throughout the year. In addition, the blinds will also react to external light levels. This ensures that the blinds are always at their optimum tilt position to meet the client's light penetration and glare control requirements.

The design of the blind pelmets allows airflow from the back of the blind to travel over the custom-curved head section. Airflow between the double layers of glass will assist in maintaining a constant average temperature within the building, dramatically reducing the reliance on HVAC systems to maintain a comfortable working environment.

"The focus is on maximum natural light all year round with performance glazing for controlled admission of natural light into a space through windows to reduce or eliminate electric lighting. To provide a direct link to the dynamic and perpetually evolving patterns of outdoor illumination, 'daylighting' helps create a visually stimulating and productive environment for building occupants while reducing as much as one-third of total building energy costs. It is not merely a mood but the physical effect of wellbeing and calm restored by the effects of being in harmony with the elements," said Horiso General Manager, Bruno Seguin.

"The impetus driving façade innovation is solar control technology. The key objective is to maximise the use of natural daylight without the problems of glare or excessive solar heat gain to optimise the occupants' wellbeing and comfort. This is underpinned by energy saving efficiencies that make environmental as well as economical sense."

"The future path of façade innovation leads to three ground-breaking areas set to become world-class practices in commercial projects: the double skin ventilated façade with external operable and retractable venetian blinds; the double skin ventilated façade with split control external venetian blinds; and the high Visual Light Transmittance glazing façade with a combination of specialty internal shading systems."

Horiso's state of the art integrated technology solar control systems have also recently been installed in two other world-leading Six Green Star projects, the Christchurch Civic Centre and Darling Quarter in Sydney's Darling Park. Their talents are also highly appreciated offshore, with the company working collaboratively on major projects in Europe, North America and Asia.

An Australian owned manufacturer of solar control systems and specialty blinds since 1995, Horiso ® creates internal and external solar control solutions for the commercial, hospitality, institutional, and residential sectors. The company's focus is on research, development and manufacture - creating innovative products which can achieve Green Star outcomes and meet any architectural, design and engineering requirement.



In constructing Australia's first double skin ventilated facade tower at 1 Bligh, achieving the Six Green Star outcome, DEXUS and Grocon envisaged thermal and energy efficiency as the key requirements. An integral part of the solution is a leading edge solar control system designed and manufactured by Horiso, which gives the building's skin an ability to dynamically and automatically respond to external conditions.

In their design for 1 Bligh, Architects Ingenhoven and Architectus specified venetian blinds which could provide complete control of sun glare and reduction of thermal load, while still allowing the sweeping views and high natural light levels which make the column free interior spaces of each floor so distinctive. The blinds designed and manufactured by Horiso respond to the exact position of the sun throughout the day, and also facilitate natural airflow through the ventilated facade.