

## *115 Batman Street, West Melbourne, Victoria*

### *Building Profile*

<b>Building</b>	115 Batman Street, West Melbourne, Victoria
<b>Construction date</b>	1920
<b>Refurbishment date</b>	2007 - 2008
<b>Owner</b>	Batman & Robyn Pty Ltd
<b>Building Size</b>	2,130 m <sup>2</sup> (NLA) / 4 Storeys
<b>Refurbishment Team</b>	Norman Disney & Young (NDY) Construction Engineering E + Architecture A.E.Smith Winward Structures
<b>Building Management</b>	Norman Disney & Young (NDY)
<b>Ratings</b>	5 Star Green Star Office Design v2 5 Star Green Star As Built v2 5 Star Green Star Office Interiors v1.1

### *Summary*

115 Batman Street was originally a machinery factory, constructed in 1920 and abandoned in the 1980s. The building was purchased in early 2007 by Norman Disney & Young (NDY) and redeveloped to accommodate its corporate headquarters and Melbourne office. The property owner wanted to provide a quality work environment and optimise the building performance by incorporating passive design principles and energy efficient design elements, and so the building refurbishment focused on these goals.



(Image courtesy of NDY)

A Building Management System was installed and is used to generate monthly energy consumption reports to track consumption and identify potential issues. A detailed training program was also developed to improve occupants' knowledge and understanding of the Building Management System. The office has achieved a trio of Green Star ratings: 5 Star Green Star Office Design v2, 5 Star Green Star Office As Built v2, and 5 Star Green Star Office Interiors v2. The building has also achieved high operational performance, estimated to be performing approximately 11 per cent above a 5 Stars NABERS Energy benchmark.<sup>1</sup>

<sup>1</sup> City of Melbourne (2011) 115 Batman Street Case Study, 1200 Buildings Program, Melbourne, Australia, online: [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

## *Design Elements*

### *Monitoring and Control Technology*

The refurbishment included a comprehensive Building Management System (BMS) that controls the HVAC systems and facilitates fine tuning and optimisation of energy consumption.<sup>2</sup>

### *Lighting*

Energy efficient fluorescent luminaries and high frequency ballasts are used throughout the building. A smart lighting control system, including photoelectric and occupancy sensors, has been installed to turn the lights off when not in use. Base building lighting systems use less than 2 watts per m<sup>2</sup> per 100 lux. The building also has good natural light and external views in addition to high efficiency luminaries.<sup>3</sup>

### *Heating, Ventilation and Air conditioning*

The HVAC system uses an adiabatic condenser and an energy efficient high speed compressor chiller in combination with a wetted-pad heat rejection system to reduce water consumption, improve energy efficiency and eliminate legionella risk.<sup>4</sup> This system was modelled to achieve a comfortable temperature within Predicted Mean Vote levels of -0.5 to +0.5.<sup>5</sup>

A passive chilled beam system provides cooling for the ground, first and second floors. This provides efficient space cooling while eliminating draughts. The efficiency of the system is reliant on an efficient façade to reduce heat gain, and good design has ensured the chilled beam system responds well to changes in the ambient conditions. It provides balanced cooling during peak summer time and occupants have found that it copes well with high temperatures and even heat waves.<sup>6</sup> The ventilation system supplies outside air at a rate of 2 litres/m<sup>2</sup>, double the minimum code requirements as set out in AS 1668.2-1991.<sup>7</sup>

A separate variable air volume system with economy cycle is installed on the upper floor, as passive chilled beams were deemed unsuitable due to excess heat load.<sup>8</sup> The building also uses a high efficiency gas-fired boiler, feeding hot water radiators and convectors to provide heating.<sup>9</sup>

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<sup>2</sup> GBCA (2011) *115 Batman Street, Green Building case studies*, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>3</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

<sup>4</sup> GBCA (2011) *115 Batman Street, Green Building case studies*, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>5</sup> GBCA (2012) *115 Batman St: Office As Built v2 - Category Achievements*, Green Building Council of Australia, online: [www.gbca.org.au/project-directory.asp#627](http://www.gbca.org.au/project-directory.asp#627)

<sup>6</sup> NDY (n.d.) *Project Review: 115 Batman Street, Melbourne*, Norman Disney and Young, online: [www.ndy.com/sites/default/files/115\\_Batman\\_Street\\_Project\\_Review.pdf](http://www.ndy.com/sites/default/files/115_Batman_Street_Project_Review.pdf), accessed 4/09/2012.

<sup>7</sup> GBCA (2011) *115 Batman Street, Green Building case studies*, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>8</sup> NDY (n.d.) *Project Review: 115 Batman Street, Melbourne*, Norman Disney and Young, online: [www.ndy.com/sites/default/files/115\\_Batman\\_Street\\_Project\\_Review.pdf](http://www.ndy.com/sites/default/files/115_Batman_Street_Project_Review.pdf), accessed 4/09/2012.

<sup>9</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, online: [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

### *Other Plant and Equipment*

Solar hot water panels provide heating for the domestic water system, further reducing energy consumption.<sup>10</sup> A 15,000 litre tank stores rain water that is used for toilet flushing and for the air conditioning wetted pad condenser, and high efficiency fixtures and fittings reduce water consumption.

### *Building Fabric*

The existing 470 mm thick brick walls were retained to provide good insulation and high thermal inertia,<sup>11</sup> and extra insulation was added between the basement and first floor. An additional two levels were added above the original structure, constructed using vitrapanel clad with rock wool insulation, and corrugated iron with high performance 50 mm aluminium fibreglass insulation.<sup>12</sup>

High performance double-glazed windows reduce heat gain while providing excellent natural daylight and reduced reliance on electric lighting. Windows on the south and east facades have a 0.27 shade coefficient, while those on the north and west have a 0.23 shade coefficient. The west and north windows of the building are externally shaded to a depth of 900mm to avoid the intense peak summer and afternoon sunlight.<sup>13</sup>

### *Tenancy Design and Fit Out*

The tenancy design and plan form facilitates utilisation of daylight throughout most of the space. The first three floors are open plan form, while the upper level consists of enclosed offices. Light palette colour schemes have been chosen for the interior to maximise internal reflection and utilisation of daylighting. All furnishings are either certified by a recognised product certification scheme or reused from NDY's previous office.<sup>14</sup> Additionally, indoor plants are distributed throughout the building with an average of two succulents per staff member, with the intention of absorbing CO<sub>2</sub> in the building.<sup>15</sup> The fit-out received Green Star points for low-VOC and low-formaldehyde products, such as composite wood products and carpets, which improves indoor environment quality.<sup>16</sup>

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<sup>10</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

<sup>11</sup> GBCA (2011) *115 Batman Street*, Green Building Case Studies, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>12</sup> NDY (n.d.) *Project Review: 115 Batman Street, Melbourne*, Norman Disney and Young, online: [www.ndy.com/sites/default/files/115\\_Batman\\_Street\\_Project\\_Review.pdf](http://www.ndy.com/sites/default/files/115_Batman_Street_Project_Review.pdf), accessed 4/09/2012.

<sup>13</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, online: [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

<sup>14</sup> GBCA (2011) *115 Batman Street*, *Green Building case studies*, Green Building Council Australia, Australia, [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>15</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, online: [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

<sup>16</sup> GBCA (2012) *115 Batman St: Office As Built v2 - Category Achievements*, Green Building Council of Australia, online: [www.gbca.org.au/project-directory.asp#627](http://www.gbca.org.au/project-directory.asp#627)

## ***Building Management***

### *Monitoring and Reporting*

115 Batman Street has a comprehensive Building Management System that facilitates optimisation of building systems, such as the HVAC system. The BMS is used to monitor energy consumption, which is accumulated on a monthly basis and reported to building management in order to track energy use and identify issues.<sup>17</sup>

### *Commissioning and Tuning*

The Green Star Rating Tool has facilitated excellent building management practices that contribute to the building's high performance. Green Star points were awarded for the following commissioning and tuning practices:<sup>18</sup>

- Man-1: A Green Star Accredited Professional is a principle participant in the project team and provides advice on the Green Star aims and processes from design through to the delivery.
- Man-2: Comprehensive pre-commissioning, commissioning and quality monitoring for all building services.
- Man-2: The design team and contractor transfer information and documentation to the building owner upon completion.
- Man-3: A contracted 12-month building tuning period after handover, including quarterly reviews and final re-commissioning.
- Man-4: Appointed an independent commissioning agent to verify commissioning of building systems.
- Man-5: Developed and made available a comprehensive yet simple-to-use Building Users' Guide.
- Man-6: Implemented a project-specific Environmental Management Plan (EMP) accordance with Section 4 of the NSW Environmental Management System Guidelines.

### *Management Personnel, Communication and Education*

A detailed training programme for the Building Management System was developed to improve understanding of the functioning of the BMS. Good knowledge transfer and documentation practices occurred during the refurbishment through the use of the Green Star Rating tool, which requires extensive and accurate documentation to be maintained. A significant milestone of this project was the close cooperation with contractors and subcontractors to achieve Green Star ratings, which included holding workshops for them and providing them with documentation templates. These contractors were often initially

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<sup>17</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

<sup>18</sup> GBCA (2012) 115 Batman St: Office As Built v2 - Category Achievements, Green Building Council of Australia, online: [www.gbca.org.au/project-directory.asp#627](http://www.gbca.org.au/project-directory.asp#627), accessed 24/08/2012

unfamiliar with the Green Star rating tool and did not understand the importance of keeping accurate records.<sup>19</sup>

## ***Agreements and Culture***

### *Communication and Education*

There is no dedicated building management team for the building, so staff in the NDY office operate the Building Management System. A detailed training programme for the system was developed to improve understanding of its functioning.<sup>20</sup>

### *Commitments and Targets*

An ISO 14001 certified Environmental Management Plan ensures Norman Disney Young continually monitors and improves its environmental performance. These standards help organizations to minimise their environmental impact, comply with applicable laws and regulations, and continually improve their environmental performance.<sup>21</sup>

## ***Occupant Experience***

No formal occupant satisfaction survey has been conducted. However, feedback that NDY has gathered from its staff was reported to be very positive about the work environment. According to Ian Hopkins, "*staff are proud of the building, as it is a more comfortable environment when compared with our previous tenancy. The measures we have provided will help deliver higher employee satisfaction.*"<sup>22</sup>

## ***Indoor Environment Quality***

No indoor environment quality analysis was identified.

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<sup>19</sup> GBCA (2011) *115 Batman Street, Green Building case studies*, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>20</sup> GBCA (2011) *115 Batman Street, Green Building case studies*, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.

<sup>21</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, online: [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

<sup>22</sup> City of Melbourne (2011) *115 Batman Street Case Study*, 1200 Buildings Program, Melbourne, Australia, online: [www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115\\_Batman\\_29\\_7\\_11\\_pdf.pdf](http://www.melbourne.vic.gov.au/1200buildings/CaseStudies/Documents/115_Batman_29_7_11_pdf.pdf), accessed 24/08/2012.

## ***Performance Nexus Summary***

### *Key lessons to inform the Performance Nexus concept*

- Implementation of energy efficient design, focusing first on providing an efficient envelope, then on installing efficient systems, has contributed to energy efficiency outcomes while also providing a comfortable space.<sup>23</sup>
- Good commissioning and knowledge management practices have contributed to improved building performance. NDY has worked closely with contractors and subcontractors to achieve Green Star ratings, including holding workshops and providing contractors with documentation templates to ensure accurate records are kept.<sup>24</sup>
- Workshops were developed as part of an educational program to enhance occupant understanding of the Building Management System and facilitate correct and efficient operation of building systems.
- Regular monitoring of energy consumption data contributes to efficient building operation. Data is accumulated on a monthly basis to track energy consumption and identify any issues that develop.
- Good commissioning practices, guided by the Green Star rating tool, helped to ensure that building systems were operating correctly and efficiently.
- The refurbished building's lighting and HVAC systems interface with the Building Management and Control System (BMCS) to provide a high level of control over systems for efficient operation and occupant comfort. A detailed training program has been developed to improve understanding of the functioning of the BMCS.

### **Acknowledgements:**

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<sup>23</sup> Norman Disney & Yong (n.d.) *Project Review: 115 Batman Street, Melbourne*, Norman Disney and Young, online: [www.ndy.com/sites/default/files/115\\_Batman\\_Street\\_Project\\_Review.pdf](http://www.ndy.com/sites/default/files/115_Batman_Street_Project_Review.pdf), accessed 4/09/2012.

<sup>24</sup> GBCA (2011) *115 Batman Street, Green Building case studies*, Green Building Council Australia, Australia, online: [www.gbca.org.au/green-star/115-batman-street/13621.htm](http://www.gbca.org.au/green-star/115-batman-street/13621.htm), accessed 24/08/2012.