

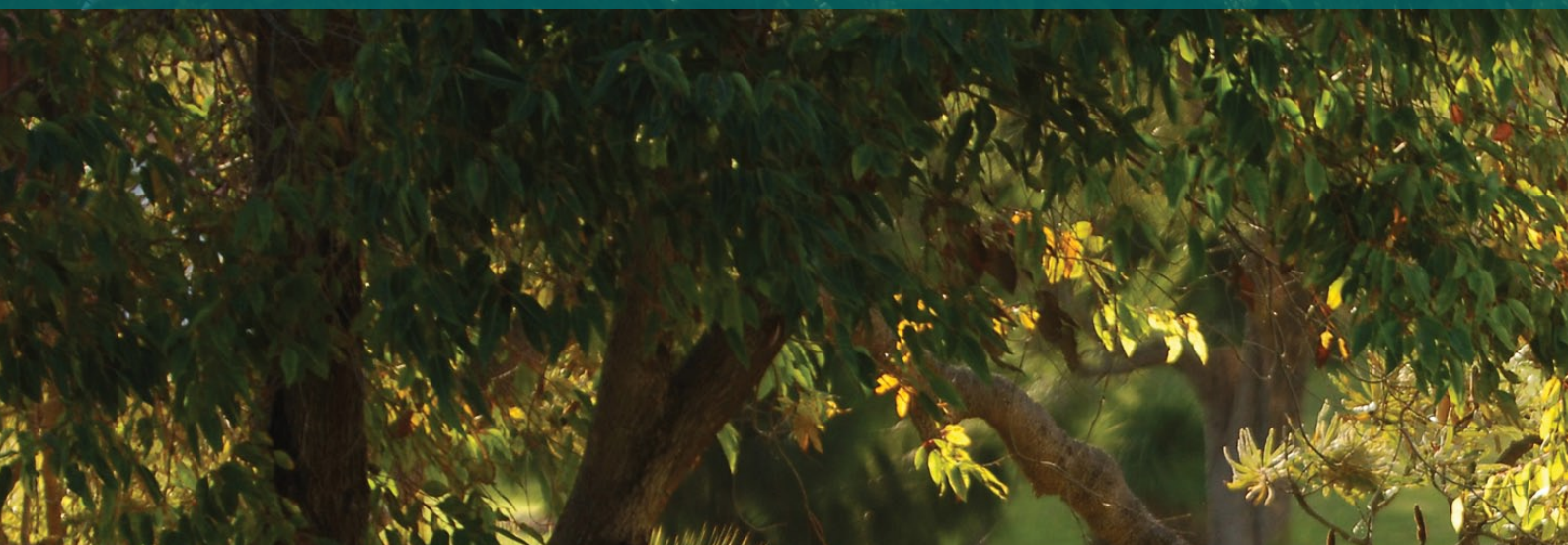
# Carbon Disclosure Project 5 (CDP5) Greenhouse Gas Emissions Questionnaire Response



May 2007

# Carbon Disclosure Project 5

## Greenhouse Gas Emissions Questionnaire Response



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# Foreword



Climate change has real potential for impact on the global environment and its economy. Mainstream media images of recent unprecedented extreme weather events ranging from hurricanes in the United States, to severe drought in Australia and Africa, have reinforced this impact potential.

Such events mean that investment risks and returns are already, and will increasingly be, impacted directly through the physical effects of climate change or indirectly through emerging regulatory and fiscal measures to limit carbon emissions. Logically, prudent investors with an interest in long term performance will continue to seek to invest in those companies that openly position against the impacts of climate change.

Mirvac has again participated in the International Carbon Disclosure Project (CDP) at the invitation of the Investor Group on Climate Change. Our previous response to CDP4 in 2005 was an important start to increasing focus on the potential impacts of climate change. I was particularly delighted that the detail provided in Mirvac's CDP4 report gave rise to recognition on the Australian and New Zealand Climate Leadership Index and for this latest CDP5 report the same level of detail and transparency has been applied. The response has raised a number of internal challenges in data recording across Mirvac's diversified and evolving portfolios.

For Mirvac the ability to quantify and understand those aspects of Mirvac's business, which produce greenhouse gas emissions, has begun to materialise as a competitive advantage with social, economic and environment benefits. Energy efficiency programs continue to be refined across Mirvac portfolios and new investment streams in low emission technology development have begun with realisation of immediate cuts in emissions.

Overall, participation in the CDP has emerged as a global standard for corporate disclosure of climate risk. The project is also a key indicator to institutional investors that climate-related risks are quantifiable, and that those well positioned against the impacts of such risks can benefit from the shift to a lower carbon economy.

A handwritten signature in black ink, appearing to read 'Greg Paramor', written in a cursive style.

Greg Paramor

# Introduction



## The Mirvac Group

Mirvac is a leading integrated real estate group, listed on the ASX with more than \$24.7 billion of activities under control across the real estate funds management and development spectrum.

Mirvac's Funds Management division manages approximately \$12.3 billion, \$4 billion through Mirvac Property Trust, and \$8.3 billion on behalf of more than 40,000 institutional and retail investors in three key areas: real estate equity - listed and unlisted funds and mandates, real estate debt - debt funds and infrastructure - listed and unlisted funds and mandates.

Mirvac Property Trust, part of the stapled entity Mirvac Group, owns more than 60 investment grade properties including commercial, retail, industrial, hotels and carparks leased to quality tenants. Mirvac Real Estate Services provides property and facilities management services to all properties across the Group.

Mirvac Hotels & Resorts part of which is listed with the Funds Management division, has approximately 5,000 rooms under management across 38 properties in Australia and New Zealand, making it one of the largest Australian-owned hotel groups.

The Group's Development division is responsible for some of Australia's best residential projects and currently has over 30,000 lots under its control that will be progressively developed over the next 8-10 years.

An undisputed leader in its field, Mirvac is committed to the provision of exceptional service, outstanding developments, and sound investment opportunities, all of which carry that highly respected Mirvac 'Mark of Quality'.

## Mirvac and Sustainability

Mirvac considers itself a leader in corporate social responsibility, specifically in addressing issues that relate to social, economic and environmental sustainability. Mirvac has a strong sense of responsibility to the people with whom we do business as well as the broader community in which we operate. At Mirvac, sustainability is considered a journey, not a destination.

Mirvac's approach and commitment to sustainability received considerable third party endorsement throughout 2006. Mirvac was one of only 24 Australian companies and 726 worldwide, that met globally recognised corporate responsibility standards to achieve listing on the United Kingdom's FTSE4Good Global Index. Mirvac was also

# Introduction



included in the Australian SAM Sustainability Index (AuSSI), which includes only the top sustainability-driven companies within specified sectors covering the entire Australian economy.

Based on the 2005 CDP4 response, Mirvac was included in the Climate Leadership Index (CLI) – Australia and New Zealand for the Real Estate Investment Trusts sector. The CLI recognises those companies best positioned to adequately address key areas of climate change risk and opportunity that have the potential to affect their business. Mirvac was also awarded the 2006 Department of Energy, Utilities and Sustainability (NSW) Premier's Sustainability Excellence Award.

Another important milestone for Mirvac in 2006 was the publication of its first public Sustainability Report ([http://www.mirvac.com.au/about/PDF/media/GRP\\_Summer\\_2006\\_Sustainability\\_Report.pdf](http://www.mirvac.com.au/about/PDF/media/GRP_Summer_2006_Sustainability_Report.pdf)) detailing Mirvac's sustainability initiatives and sense of focus on social, economic and environmental sustainability.

Mirvac continues to progress the development of a balanced and achievable sustainability strategy in line with overarching future business goals. The strategy will deliver clear sustainability performance objectives, targets and performance measures and will provide the necessary mechanism and structure for the Group overall as it moves forward. A Group Sustainability Manager has recently been appointed to further drive this process.

# Section A

## Section A

# 1 Climate Change Risks, Opportunities and Strategy

## A Risks

### **What commercial risks does climate change present to your company including, but not limited to, those listed below?**

The commercial risks of climate change to Mirvac include those of direct climate change and climate variability impacts, the impacts of direct regulation and new markets, and the secondary market effects of those primary impacts.

#### **I. Regulatory risks associated with current and/or expected government policy on climate change e.g. emissions limits or energy efficiency standards.**

Mirvac expect that a suite of government policy initiatives will continue to emerge to define the mechanism for greenhouse gas (GHG) emissions abatement. How policies are implemented will define the extent of risk to Mirvac, yet we expect that ongoing commitment to energy efficiency measures, and stakeholder dialogue, will mean that Mirvac is well positioned to contend with change. In particular, change relating to appliance standards, building codes, and carbon trading schemes and taxes will be influential factors.

Building efficiency has been identified as a key opportunity for emissions reduction, with the Intergovernmental Panel on Climate Change (IPCC) reporting that around 30% of projected GHG emissions in the building sector can be avoided, with net economic benefit, through energy efficiency initiatives by 2030<sup>1</sup>. The property sector is likely to be subject to increased interest from regulators seeking to realise this opportunity.

The operations of Mirvac are currently exposed to one mandatory GHG emissions program only - the NSW Greenhouse Gas Abatement Program. Mirvac do not have any obligations under this trading scheme. However, as stated in Mirvac's CDP4 response, the trading scheme does present opportunities for built assets in NSW. As such, Mirvac has generated credits through building efficiency improvements, and include a consideration of these additional financial revenue streams in building improvement process.

A task force commissioned by the Federal Government will report on options for a national Emission Trading Scheme (ETS), with submission due on the 31st May 2007. It is anticipated that there will be strong support for an ETS that will place a price on carbon and provide a level of certainty for future industrial markets. While the exact structure of an emissions trading scheme is to be determined, a cap and trade structure is considered likely.

The price placed on carbon is estimated from a range of sources to be in the order of \$10 to \$25 per tonne of carbon dioxide emitted.

A change in Government at the next federal election would almost certainly guarantee that Australia will sign the Kyoto Protocol. Importantly, this would secure Australia's place in negotiations for a post-2012 international climate change agreement. In addition, the Australian Labor Party are committed to 60% CO<sub>2</sub> emission reductions by 2050. Whilst such a target focuses on power generation in particular, the implications of such a policy are expected to be far reaching. The property sector is likely to experience rapid change with a transformation to low carbon buildings for new building stock and retro-fitting of energy efficiency or low emission technologies to existing buildings.

<sup>1</sup> Intergovernmental Panel on Climate Change (IPCC), 2007: Summary for Policymakers. In: Climate Change 2007: Mitigation of Climate Change. Contribution of Working Group III contribution to the the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.



Mirvac is also currently determining its exposure to the Federal Energy Efficiency Opportunities Act and its potential impact. The Act requires large energy users (more than 0.5 Petajoules) to identify, evaluate and report publicly on cost effective energy savings opportunities. Mirvac has registered as a participant, but has not yet determined if the participation threshold (0.5 Petajoules) has been triggered.

Mirvac will continue efforts to reduce resource use and monitor its ongoing legislative requirements.

## **II. Physical risks to your business operations from scenarios identified by the Intergovernmental Panel on Climate Change or other expert bodies, such as sea level rise, extreme weather events and resource shortages**

Mirvac is aware of the need to address the physical risks associated with climate change and climate variability. The detailed findings within IPCC assessment reports confirm much of the science and thinking about climate change impact. The IPCC also reaffirms the extent of effort required to reach atmospheric GHG concentration levels that do not lead to dangerous climate change.

The IPCC concluded that most of the observed increase in global average temperatures since the mid-20th century is very likely (90 - 99% probability) due to the observed increase in anthropogenic GHG concentrations, a notable increase in certainty from the previous report<sup>2</sup>.

Warming of the climate is now unequivocal, evidenced by observations of increased global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea levels<sup>3</sup>. Eleven of the last twelve years (1995-2006) rank among the 12 warmest years on the instrumental record of global surface temperature (since 1850)<sup>4</sup>.

### **Properties**

Of note to the property industry, the IPCC concluded that it is likely (66-90% probability) that future tropical cyclones will become more intense, with larger peak wind speeds and heavier precipitation. While demographic trends are the dominant cause of increasing damage by tropical cyclones, any significant trends in storm activity would compound such trends in damage<sup>5</sup>. The IPCC also concluded that it is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent<sup>6</sup>.

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<sup>2</sup> IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

<sup>3</sup> *ibid.*

<sup>4</sup> *ibid.*

<sup>5</sup> World Meteorological Organization's Commission For Atmospheric Sciences (WMO/CAS) Tropical Meteorology Research Program, Steering Committee for Project TC-2: Scientific Assessment of Climate Change Effects on Tropical Cyclones, Statement on Tropical Cyclones and Climate Change, WMO, Geneva, Switzerland, 2006.

<sup>6</sup> IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.

## Section A

# 1 Climate Change Risks, Opportunities and Strategy

Further, a report commissioned in 2006 by the Australian Business Roundtable on Climate Change concluded that Australia's settlements are moderately vulnerable to climate change. This is largely due to the potential impacts posed by extremes of temperature and precipitation<sup>7</sup>.

Impact assessments indicate that just a 1°C increase in average temperatures would be sufficient to increase peak energy demand in Adelaide and Brisbane, and reduce transmission efficiency. For higher levels of warming, electricity demand in Brisbane, Melbourne, and Adelaide increases, while demand in Sydney remains at slightly lower levels than present<sup>8</sup>.

Mirvac is not aware of any detailed modelling incorporating specific climate change scenarios undertaken in relation to Australian building design, but is aware of the long-term potential for adverse climate change to affect asset value. Mirvac awaits issue of a report by the Australian Greenhouse Office National Climate Change Adaptation Programme on climate change impacts and adaptation to buildings to guide its thinking.

Furthermore, Mirvac expect in the medium term issues such as indoor environmental quality, and planning restrictions relating to climate change, to be issues pertinent to the company.

### Funds Management

Within Funds Management exposure in a wide range of areas exists, including increased demand for disclosure of risk management practices and direct and secondary impact on infrastructure assets. The Australian & New Zealand Sustainable Investments Fund (ASIF & NZSIF) and the JF Infrastructure Sustainable Equity Fund (SEF), focus on forest products and are designed to reduce GHG emissions.

However, given their nature, they are potentially at risk from:

- changed weather regimes, water security and drought;
- changed growth regimes;
- long-term auditing and verification of carbon benefits;
- impacts from disease and pathogens; and
- fire damage and loss of assets and carbon benefits.

This area of Mirvac's business provides new opportunities relating to Land Use, Land Use Change Forestry (LULUCF) project development and management.

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<sup>7</sup> Preston, B.L. and Jones R.N., Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions: A consultancy report for the Australian Business Roundtable on Climate Change, CSIRO, Victoria, Australia, 2006.

<sup>8</sup> ibid



## Hotels and Resorts

Output from the Australian tourism industry is currently estimated at \$32 billion or 4.2 per cent of GDP. The tourism industry is heavily reliant on the environment, with nature-based tourism or eco-tourism forming a key component of tourism within Australia<sup>9</sup>.

The effects of adverse climate change on the tourism industry may include:

- increased sea temperatures resulting in coral bleaching;
- increased adverse weather events, such as cyclones, causing damage to infrastructure; and
- rising sea levels impacting on beaches and estuaries. The coastline may retreat horizontally by 50 to 100 times the vertical sea level rise, which could imply a recession of sandy beaches by 4.5 to 88 metres by 2100 under certain climate change projections<sup>10</sup>. Studies by the University of Sydney Institute of Marine Sciences show that beach recession could be almost twice that indicated in the Allen Group Report for the same climate-change projections<sup>11</sup>.

In addition to affecting natural tourist attractions, climate change could impact on the profitability of the industry through increasing temperatures resulting in increased energy use. Roughly 50 per cent of all energy consumption in hotels is attributed to air-conditioning; therefore rising temperatures may impact on the bottom lines of operators in many areas of Australia<sup>12</sup>.

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<sup>9</sup> Allen Consulting Group, *Climate Change Risk and Vulnerability: Promoting an efficient adaptation response in Australia* - Australian Greenhouse Office, Canberra, Australia, 2005

<sup>10</sup> Greve, C.A., P.J. Cowell and B.G. Thom, 'Application of a Geographical Information System for Risk Assessment On Open Ocean Beaches: Collaroy/Narrabeen Beach, Sydney, Australia - an example', *Environmental Geosciences*, 7, 2000, pp 149-161.

<sup>11</sup> 'Sydney scientists find serious errors in Government environmental report', University of Sydney, 2005, <http://www.usyd.edu.au/news/84.html?newscategoryid=15&newsstoryid=624>, viewed 30 April 2007.

<sup>12</sup> P. Bohdanowicz and I. M. Martinec, 'Thermal Comfort and Energy Savings in the Hotel Industry', Proc. 15th Conference on Biometeorology and Aerobiology, Kansas City, Missouri, 28 Oct.-1 Nov 2002: American Meteorological Society, Boston, MA, 2001, pp 396-400.

## Section A

# 1 Climate Change Risks, Opportunities and Strategy

### III. Other risks including shifts in consumer attitude and demand

Climate change and climate variability has, and will continue, to influence consumer and client preferences. Already in Australia, extensive drought, water scarcity, and higher awareness amongst the public and corporations means that the market has expectations concerning corporate activity relating to climate change.

The importance of addressing risks associated with climate change is receiving increased exposure in the media, through films such as 'An Inconvenient Truth', books such as Tim Flannery's 'The Weather Makers', as well as the political forum, where climate change is emerging as a likely key issue for the upcoming Federal election. Companies are at risk of losing their social 'licence to operate' if shareholders and the community alike cannot see strategic action against climate related risks.

Both the community and Mirvac employees expect business to lead the market with innovative solutions to critical issues. Mirvac will continue working with its stakeholders to raise understanding, and generate solutions to contribute to GHG emissions abatement, and pre-empt the impacts of climate change.

For example, a cost on carbon might see a transition in leisure patterns with an increasing emphasis on local holiday destinations involving smaller travel distances and costs. Hotels and holiday facilities that service large population centres within short travel distances are likely to prosper under such a shift. Similarly, domestic air travel may prosper over long-haul international flights. However, a decline in overall air travel could be expected as a direct consequence of rising costs.

A further consideration for property owners and developers is societal response to the consequences of Peak Oil. One likely scenario is changing patterns of employment which place more emphasis on working from home to reduce non-essential travel. If adopted widely, this practise could potentially lead to a reduction in the demand for commercial office space in major cities.

Such reactions would place increasing energy and water demands on the residential sector due to increased hours working at home. This may lead to run-on impacts in the residential property sector, such as changing expectations of building design to conform to new needs.

## B Opportunities:

### What commercial opportunities does climate change present to your company for both existing and new products and services?

Mirvac is committed to industry leadership in sustainable development. Innovation and engagement with stakeholders, including customers, clients, government and industry bodies is at the forefront of the Mirvac sustainability journey. As such, Mirvac is able to protect its brand value, and the value of assets through proactive issue management. The diversity of Mirvac's skill base, and its early movement in terms of market involvement and solution generation, mean it is well positioned to expand its product offering and market.

Already, through JF Infrastructure Pty Limited, Mirvac has experience in international carbon markets through the Australian Sustainable Investments Fund (ASIF) which holds Kyoto-compliant forestry assets. This early experience in carbon markets continues to afford learning opportunities to expand such activities, and contributes materially to investment profitability in spite of a potentially increasing price on carbon. The recently announced support for forestry plantations in the Australian budget confirms that Mirvac's institutional investors are: the natural long-term owners of sustainable forestry plantations; that plantation forestry has an important role over the longer term in addressing climate change; and that JF Infrastructure is well placed for any future emissions trading scheme. In February 2007, ASIF transacted its first sale with 15,000 tonnes of voluntary credits sold to the government of Victoria.

As a follow on from increased interest by regulators, Mirvac anticipates the increasing availability of Government grants / funding to support a broad range of energy efficiency initiatives in both the commercial and residential sectors.

Mirvac also expects a rating tool to be developed to address the environmental performance of hotels. Such a tool will likely emphasise energy efficiency, water conservation and waste minimisation. This will be a further incentive to improved performance across this sector.

In the residential sector further environmental standards will likely be enforced for new builds, expanding on current initiatives such as the NSW Building Sustainability Index (BASIX). As with the commercial property sector, it is hoped government support via grants and tax concessions are more readily available to drive this change.

By taking a proactive approach to sustainability and climate change risk management, Mirvac seeks to minimise downside risk, advance its competitive position, and develop new products and new markets.

## C Strategy:

**Please detail the objectives and targets of the strategies you have undertaken or are planning to take to manage these risks and opportunities.**

A formal strategy to manage the risks and opportunities of climate change is an important element of Mirvac's overarching sustainability strategy development. The strategy will deliver clear sustainability performance objectives, targets and performance measures and include a continued focus on best-practice design and asset management. The current significant increase in human resources focussed on sustainability within Mirvac will further enhance Mirvac's ability to manage, at both strategic and operational levels, the risks and opportunities related to climate change and sustainability.

Specific targets and initiatives of Mirvac delivered to date are detailed in Section B-4 Greenhouse Gas Emissions Management.

# Section A

## 2 Greenhouse Gas Emissions Accounting

### A Methodology

#### I. The accounting year used to report GHG emissions.

The accounting year for data is 1 January 2006 - 31 December 2006.

#### II. The methodology by which emissions are calculated.

##### Data Collation and Report Coverage

Information reported in this response covers:

- electricity purchased, use of gas and fuel, refrigerants, generation of waste, recovery of recyclables and efficiency initiatives for properties managed by Mirvac Real Estate Services including commercial, retail, industrial, hotels and carparks;
- electricity purchased and fuel use for Mirvac Development;
- employee vehicle travel across the Group; and,
- air miles across the group except the Hotels & Resorts Division, where consolidated data is not yet available.

Mirvac has worked to address some of the data coverage deficiencies identified in the Mirvac CDP4 response. Table 1 details the expanded coverage for CDP5.

Table 1: Activities included in Mirvac CDP4 and CDP5 responses

Emission Source	2005	2006
<b>Scope 1 - Direct Emissions</b>		
Natural Gas - Properties*	√	√
Refrigerants - Properties*	√++	√
On-site fuel use - Properties*		√
On-site fuel use - Development**		√+
<b>Scope 2 - Indirect Emissions</b>		
Electricity - Properties*	√	√
Electricity - Development**		√+
<b>Scope 3 - Other Indirect GHG Emissions</b>		
Electricity*** - Properties*		√
Gas*** - Properties*		√
Vehicle miles - Group	√	√
Air miles - Group (except Hotels & Resorts)	√	√
Waste disposal - Properties*		√

\*Properties managed by Mirvac Real Estate Services \*\*Development construction activities in 2006 \*\*\*Includes fuel extraction, production, transport and transmission loss +Approximate figures. ++Approximate Inventory only. No CO<sub>2</sub>-e calculations performed.

### Certainty of Data

Data on electricity purchased, use of gas and fuel, refrigerants, generation of waste, recovery of recyclables and efficiency initiatives from properties managed by Mirvac Real Estate Services was self-reported by property managers and other relevant staff. Data from Mirvac Development was generated from account records in each State. Data on vehicle use and air miles was supplied by relevant service providers.

This decentralisation of data collation does create a level of uncertainty around the data that must be acknowledged. Implementing a centralised data capture and reporting system is a priority of the Mirvac sustainability strategy.

### Calculation of Emissions

The approach for calculating emissions from each source is detailed where reported. The following tools and resources were utilised:

- GHG Protocol CO<sub>2</sub> emissions from mobile combustion calculator. (Version 1.3, January 2005)
- GHG Protocol revised tool for direct emissions from stationary combustion. (Version 3.0, October 2006)
- GHG Protocol HFC and PFC emissions from the manufacturing, installation, operation and disposal of refrigeration and air-conditioning equipment. (Version 1.0)
- GHG Protocol Indirect CO<sub>2</sub> emissions from the consumption of purchased electricity, heat, and/or steam. (Version 1.2, January 2007)
- Australian Greenhouse Office Factors and Methods Workbook. (December 2006)

### III. Whether the information provided has been externally verified or audited.

This report was produced with the assistance of Hyder Consulting who undertook data analysis to determine emissions from data supplied by Mirvac. The data itself has not been externally verified.

# Section A

## 2 Greenhouse Gas Emissions Accounting

### IV. An explanation for any significant variations in emissions from year to year, e.g. due to major acquisitions, divestments, introduction of new technologies, etc.

A comparison of Mirvac 2005 to 2006 emissions across Scope 1, 2, and 3 is presented in Table 2.

There has been a 50% increase in Scope 1 emissions and a 16% decrease in Scope 2 emissions. Scope 3 emissions have increased 15 fold.

Table 2: Mirvac 2005 and 2006 emissions under Scope 1, Scope 2 and Scope 3

	2005	2006
Emission Type	tCO <sub>2</sub> -e	tCO <sub>2</sub> -e
Scope 1	4,475	6,743.5
Scope 2	104,078	86,860.7
Scope 3	2,743	30,238.9
Total	111,296	123,843

These variances can be attributed, in part, to the following:

#### 1. Change in property holdings

Between 2005 and 2006 there were over 20 disposals and a number of acquisitions. These changes impacted directly on the Mirvac emissions profile and make comparisons problematic. The introduction of intensity measures such as tCO<sub>2</sub>-e/NLA (per m<sup>2</sup>) in this response will improve the ability for future performance comparison.

#### 2. Decreased property portfolio coverage

Data reported for this year comprised 63 (66%) of the 95 Mirvac Real Estate Services managed properties. Coincidentally, this is the same number of properties as 2005, however the mix between commercial, retail, industrial, hotels and carparks changed significantly.

#### 3. New emission sources included

Emissions from electricity purchased fuel use by Mirvac Development, use of refrigerants and waste generation were included for the first time.

Mirvac will continue to expand reporting to include all relevant emission sources, particularly Scope 3 sources.

#### 4. Improved calculation methods

For 2005 Mirvac adopted different emission factors for a number of sources where this provided increased accuracy.



## B Scope 1 and 2 of GHG Protocol

### Scope 1 - Direct Emissions

Mirvac has identified the following sources of Scope 1 emissions across the Group:

- emissions from on-site gas consumption;
- emissions from hydrofluorocarbons (HFCs) from the use of refrigeration and air conditioning equipment;
- emissions from the combustion of fuel from company owned plant and equipment; and
- emissions from standby diesel generators (used sporadically for back-up power in the event of power failures to buildings).

### On-site Natural Gas Consumption

Total natural gas consumption for 2006 was 94,009,239 MJ, resulting in 4878 tonnes of Scope 1 emissions as detailed in Table 3. Scope 3 emissions from fuel extraction, production, transport and transmission loss are reported separately.

**Table 3: Emissions from On-site Natural Gas Consumption**

Year	tCO <sub>2</sub> -e
2006	4878
2005	4,475
2004	3,133
2003	2,623
2002	2,204

For the Australian properties emissions were calculated using GHG coefficients from the Australian Greenhouse Office Factors and Methods Workbook, December 2006. This allowed a more detailed breakdown of emissions, on a state-by-state level. The GHG Protocol Revised Tool for Direct Emissions from Stationary Combustion (Version 3.0), October 2006 was applied for properties in New Zealand.

# Section A

## 2 Greenhouse Gas Emissions Accounting

### Refrigeration Equipment

Across the property portfolio Mirvac maintains a substantial number of refrigeration and air-conditioning units. This equipment is serviced and maintained in compliance with the Montreal Protocol, with refrigerants gradually replaced with appropriate alternatives that have a lesser ozone depletion and global warming potential.

In the CDP4 response, Mirvac was unable to calculate GHG emissions from refrigeration equipment, and provided estimated refrigerant inventory figures only.

For this response, refrigerant data was captured from 52 out of 95 properties. The inventory of refrigerants is presented in Table 4. Based on this inventory, emissions of 1,441tCO<sub>2</sub>-e were determined.

**Table 4: Inventory of Refrigerants Reported**

Refrigerant	2005* (kg)	2006 (kg)
R-11	2,719	-
R-12	700	1014
R-22	12,364	7580
R-123	3,255	-
R-404a	-	227.6
R-407a	-	18.8
R-407c	-	388
R-410a	85	151
R-134a	3,992	5,365

\*Estimated figures. Does not include small packaged units

Default loss values from the AGO Factors and Methods Workbook, December 2006 were applied for refrigeration and air-conditioning units. The global warming potentials of refrigerants were determined from the GHG Protocol Calculation Tool for HFC and PFC Emissions, the AGO Factors and Methods Workbook, December 2006 and the IPCC Special Report on Emissions Scenario, 2000.

The changes in refrigerant totals from 2005 and 2006 can be attributed to gaps in reporting coverage and changes in portfolio holdings.

## On-Site Fuel Use

### Development

Mirvac maintains a range of plant and equipment, principally in the Development Division. This includes air compressors, hoists, tower cranes, forklifts - gas driven and hand driven, sweeping machines, generators, Manitou, loaders, lifts and mobile cranes.

Fuel consumption from Development is tracked via accounts. To determine fuel consumption, an average fuel price from the Australian Institute of Petroleum was applied on a state-by-state basis. Accordingly, consumption figures are approximate only. See Table 5 for details.

**Table 5: On-Site Fuel Use by Developments and GHG Emissions**

State	Expenditure \$	Fuel Price \$	Total Fuel Use	tCO <sub>2</sub> -e
NSW	\$40,132	\$1.319*	30,426	81.5
QLD	\$63,864	\$1.211*	52,737	141.3
VIC	\$76,110	\$1.265*	60,166	161.2
WA	\$1,102	\$1.377*	800	2.1
Total	\$181,208		144,129	386.1

\*Average Diesel price. Source <http://www.aip.com.au/pricing/retail/diesel/index.htm>, (18/5/2007)

### Properties

Total reported on-site fuel use from 30 managed properties was 13,597 litres resulting in 38.42tCO<sub>2</sub>-e of emissions. The breakdown of fuel use is presented in Table 6.

**Table 6: On-Site Fuel Use by Properties**

Fuel	Total (L)
Distillate Oil No 1	6028
Motor Gasoline / Petrol	4061
LPG	2202
Distillate Oil	1123
Kerosene	183

# Section A

## 2 Greenhouse Gas Emissions Accounting

### Scope 2 - In-Direct Emissions

#### Electricity Purchased

A total of 94,999.3 MWh of electricity purchased was reported for 2006 resulting in 86,860.7tCO<sub>2</sub>-e emissions. GHG emissions from purchased electricity for the years 2002 to 2006 are presented in Table 7. Scope 3 emissions from fuel extraction, production, transport and transmission loss are reported separately.

Purchased electricity information applies to the base building only and does not include tenant consumption, which is metered separately.

Electricity purchased by properties managed by Mirvac Real Estate Services was reported in MWh. Development data was tracked via expenditure with a \$0.10/MJ price applied to estimate the total purchased.

Table 7: GHG Emissions from Purchased Electricity 2002-2006

	2006	2005	2004	2003	2002
tCO <sub>2</sub> -e	86,860.7	104,078	85,833	75,204	34,564

### C Scope 3 - Other Indirect Emissions

Mirvac is committed to expanding its coverage of Scope 3 emissions. The CDP4 response included employee vehicle use and air travel. This response adds to that baseline by including; emissions from extraction, production, transport and transmission loss for electricity purchased and natural gas consumption; and waste and recycling from properties.

#### Vehicle Use

Mirvac holds a company fleet of 420 vehicles leased from two suppliers. At present, the fleet is sourced approximately 50/50 from the two suppliers.

Mirvac benefits from the GHG programs of one supplier, Lease Plan, which participates in the Greenfleet Australia program. This program offsets the GHG emissions from Mirvac vehicles leased through Lease Plan.

For 2006, a total of 7,888,570km was travelled, resulting in consumption of 739,986 litres of petrol, 30,447 litres of diesel and 23,131 litres of LP gas. This includes all travel by vehicles under a company lease plan irrespective of business or private use. The GHG emissions from this travel were 1,882.8tCO<sub>2</sub>-e. A comparison of 2005 to 2006 is presented in Table 8.



**Table 8: Fuel Use and GHG Emissions from Mirvac Vehicle Use 2005-2006**

Fuel Type	2005		2006	
	Litres	tCO <sub>2</sub> -e	Litres	tCO <sub>2</sub> -e
Petrol	745,921	1,748	739,986	1,762.8
Diesel	Not reported		30,447	83.6
LPG	189,812	303.7	23,131	36.4
Total		2051.7*		1882.8

\*Updated to correct calculation error from CDP4.

### Air Travel

For this response, Mirvac was able to capture complete details for all air travel with the exception of travel undertaken by the Hotels and Resorts Division which is not purchased centrally. Flight details, including air miles travelled, were provided by corporate travel providers.

Data from Mirvac's Western Australian operations was available only in aggregate form, which did not allow breakdown into short-, medium-, and long-haul flights. All flights from this sector were assumed to be medium-haul. Emissions were calculated using the GHG Protocol Calculator for CO<sub>2</sub> Emissions from Mobile Sources.

For 2006 Mirvac travelled a total of 6,796,377 km resulting in 827.5 tCO<sub>2</sub>-e. This is an increase from 2005, but likely attributable to more comprehensive data and increased staff numbers. A comparison of 2005 to 2006 is presented in Table 9.

**Table 9: Mirvac Air Travel and GHG Emissions 2005-2006**

Flight type	2005		2006	
	Kilometres	Tonnes CO <sub>2</sub>	Kilometres	Tonnes CO <sub>2</sub>
Short-haul <452 km	88,325	15.9	118,030	21.2
Medium-haul 452-1600 km	2,314,523	291.63	4,478,445	564.3
Long-Haul >1600 km	3,450,122	379.51	2,199,902	242.0
Total	5,852,970*	687.0	6,796,377	827.5

\*Estimated via expenditure

# Section A

## 2 Greenhouse Gas Emissions Accounting



### Waste Disposal

Recognising the environmental and commercial benefits of avoiding the disposal of waste to landfill, Mirvac has set an ambitious target of 50% diversion of all waste to landfill by 30 June 2008. Mirvac is currently seeking to engage a single national waste management service provider.

Property managers reported a total of 60,555.8m<sup>3</sup> of waste generated from Mirvac properties in 2006 resulting in 10,938.2tCO<sub>2</sub>-e. No waste disposal figures were available for New Zealand holdings or Mirvac's Development Division.

The majority of this waste is generated by tenants, not Mirvac. Mirvac has calculated the emissions from this waste, but has not been included these emissions in the Mirvac total emission figure.

Emissions from waste disposal were calculated for Mirvac's Australian portfolio using the AGO Factors and Methods Workbook, December 2006.

### Recycling

Many Mirvac properties have a range of recycling initiatives in place. These initiatives vary depending on available services and relevant site activities. Most sites have programs in place to recover co-mingled, dedicated office paper, dedicated cardboard and combined office paper streams. A limited number of sites have also introduced recycling schemes for green waste, food scraps and motor oil.

Property managers reported a total of 23,187.6m<sup>3</sup> of resources being diverted from landfill, saving 2,253tCO<sub>2</sub>-e. No waste disposal figures were available for our New Zealand holdings or Mirvac's Development Division.

As the majority of these recyclables are generated by tenants, savings in emissions have not been included in the Mirvac total emission figure.

### Extraction, Production, Transport and Transmission Loss for Electricity Purchased and Natural Gas

Applying the AGO Factors and Methods Workbook, December 2006, Mirvac has calculated Scope 3 emissions from fuel extraction, production, transport and transmission loss of purchased electricity and natural gas consumption.

For 2006, 26,027 tCO<sub>2</sub>-e were generated from electricity purchased and 1,501.6 tCO<sub>2</sub>-e were generated from natural gas consumption.

# Section B

## Section B

# 3 Additional Greenhouse Gas Emissions Accounting

### A Countries

Mirvac has Australia wide property holdings with increasing global reach into New Zealand, the USA and the UK.

With the exception of three hotels in New Zealand, these properties are not managed by Mirvac Real Estate Services, as such, Mirvac is currently unable to report their GHG emissions.

Data from two of the three New Zealand hotels were captured for reporting and resulted in the following emissions profile. These figures have been included in Mirvac's total emission profile.

Emission Type	Source	tCO <sub>2</sub>
Scope 1	Natural gas	0.01
	Refrigerants	0.13
	On-site fuel use	0
Scope 2	Electricity	453
Total		453.14

### B Facilities

Mirvac does not have any facilities covered by the EU Emissions Trading Scheme.

### C EU ETS impact

Mirvac does not have any operations covered by the EU Emissions Trading Scheme (ETS).



# Section B

## 4 Greenhouse Gas Emissions Management

### A Reduction programmes

Mirvac has set the following environmental performance targets across the portfolio managed by Mirvac Real Estate Services:

- Include building assets over 5000m2 gross floor area in Mirvac Efficiency Program.
- Achieve an average Australian Building Greenhouse Rating (ABGR) of 3 Stars on all base building properties across the portfolio by 30 June 2008.
- Achieve an average Australian Building Greenhouse Rating (ABGR) of 4 Stars or better for new developments included in the program.
- Achieve 5% renewable energy sources across the portfolio by 30 June 2008.
- Implementing the Mirvac Efficient Appliances Now (MEAN) Program for residential development.
- Achieve 50% waste diversion across the Mirvac Group by 30 June 2008.

A number of specific property-level initiatives targeting GHG emissions reductions have been implemented encompassing three main areas:

- Retro-fitting of buildings for greater efficiency, such as replacing inefficient lighting equipment, with low-energy use alternatives.
- Operational changes to bring about significant savings, such as adjusting lighting regimes according to demand.
- Programs to focus on creating a culture of change, to encourage awareness and responsibility among users, such as implementing 'lights-off' programs.

A summary of estimate GHG savings from initiatives implemented or identified is presented in Table 10. These estimates have been self reported by property managers and not independently verified. Continued roll-out of the Mirvac Efficiency Program will refine these figures, including cost, for future reporting.

**Table 10: Summary of estimated GHG savings from properties**

Status	Focus	Saving	tCO <sub>2</sub> -e
Identified Initiative	Electricity	6779 MWh	9765
	Gas	194,265 MJ	13.8
Implemented Initiative	Electricity	596 MWh	700
	Gas	100,000 MJ	7.1
<b>Total</b>	Electricity	7,375 MWh	<b>10,485.9</b>
	Gas	294,265 MJ	

## Section B

# 4 Greenhouse Gas Emissions Management

Mirvac also drives a number of broader initiatives focused on achieving reductions in GHG emissions including:

- **Efficiency Program for Managed Properties**  
A national approach to energy, water and Australian Building Greenhouse Ratings (ABGR) is now formalised. The entire commercial property portfolio has been assessed in 2006 and provided with a preliminary ABGR and a National Australian Building (NABERS) water rating together with action plans to improve the performance of each resource.
- **Energy Monitoring Program (EMP)**  
The EMP is a software package to aid in building management by providing a portal to a range of data via the introduction of high level and sub metering protocols and reconciliation of energy purchases. This enables building managers to maintain a focus on energy use, the key to improving energy efficiency and environmental outcomes.
- **Mirvac Efficient Appliances Now (MEAN)**  
Designed to encourage energy/water efficient appliance choices, MEAN provides Mirvac residential customers with the opportunity to purchase a high quality, energy and water efficient appliances package for their Mirvac properties at discounted wholesale prices available to Mirvac.
- **Mirvac and Tenant Environmental Sustainability (MATES) Program**  
MATES seeks to engage individual tenants in energy efficiency improvement by simply tailoring an individual improvement program to cut energy use, related energy costs and deliver subsequent reductions in energy related GHG emissions.
- **Flagship Developments including Orion Springfield (QLD)**  
In south east Queensland, Orion Springfield Town Centre has been designed to reflect world's best practice in sustainable development. Orion Springfield uses just over half of the energy of a similar sized shopping centre reducing CO2 emissions by around 5,000 tonnes/yr. This is the equivalent of removing about 1,300 vehicles from the roads each year. Innovative water management initiatives achieve 62% reductions in potable water use.
- **Bond University School of Sustainable Development**  
Bond University and Mirvac have formed a partnership to establish a School of Sustainable Development on the University's Gold Coast Campus in Queensland. The brief for the project is to provide a facility which demonstrates world's best practice sustainability holistically addressing energy, environment, social and economic issues. The School will be a focal point for sustainability programs and education and will be designed as a living breathing example of sustainability in action.
- **Australian and New Zealand Sustainable Investments Fund (ASIF & NZSIF) and the JF Infrastructure Sustainable Equity Fund (SEF)**  
Mirvac's wholesale environmental investment funds are designed to reduce GHG emissions. Establishment of ASIF, NZSIF and SEF was prompted by demand for institutional investment products in the area of forestry and related environmental services, and the desire to bring together investors that share a common view towards environmental sustainability and ethical investment.

Full details on all initiatives are provided in the Mirvac Sustainability Report 2006, available on-line: [http://www.mirvac.com.au/about/PDF/media/GRP\\_Summer\\_2006\\_Sustainability\\_Report.pdf](http://www.mirvac.com.au/about/PDF/media/GRP_Summer_2006_Sustainability_Report.pdf).

## B Emissions Trading

Refer to Section A, Climate Change Risks, Opportunities and Strategy for details of Mirvac's position on emissions trading and emissions trading activities.

## C Emissions Intensity

From data captured by this response, Mirvac has calculated emission intensities as detailed in Table 11. The intensity measures are indicative only and will be further refined in future reporting.

A further breakdown by property type and geographical location is presented in Appendix 5.2.

Table 11: Mirvac Emissions Intensity Measures

Area	Metric	Estimate
Commercial Properties	tCO <sub>2</sub> -e/NLA Area (m <sup>2</sup> )	0.114
Retail Properties	tCO <sub>2</sub> -e/NLA Area (m <sup>2</sup> )	0.123
Industrial Properties	tCO <sub>2</sub> -e/NLA Area (m <sup>2</sup> )	0.0006
Hotels	tCO <sub>2</sub> -e/hotel room	16.317
Development Activities	Not yet identified	

## D Energy Costs

Mirvac does not report on energy costs as it is not considered a meaningful performance measure. This is due to the influence of contract timing and peak/off peak factors which distort any attempt at cost comparisons.

## E Planning

Mirvac is addressing the challenges of climate change and continues to integrate climate change considerations into the core operations of the Group.

Mirvac has not yet forecast specific future emissions from planned business activities. Over the next 12 to 24 months, as the Group sustainability approach is increasingly embedded across the organisation, Mirvac will be well placed to map future emission impacts in the business planning process.

# Section B

## 5 Climate Change Governance

### A Responsibility

During 2006 Mirvac further enhanced its development of sustainability outcomes and reporting across the Group. The Group Sustainability Committee (GSC) consisting of senior management across all divisions continued with its overall strategy for sustainability across Mirvac Group including GHG management and climate change strategies.

The GSC is supported by the activities of Sustainability Committees in each State or region of operation. This ensures that State and regional issues are considered in organisational planning. The GSC reporting structure is outlined in Figure 1.

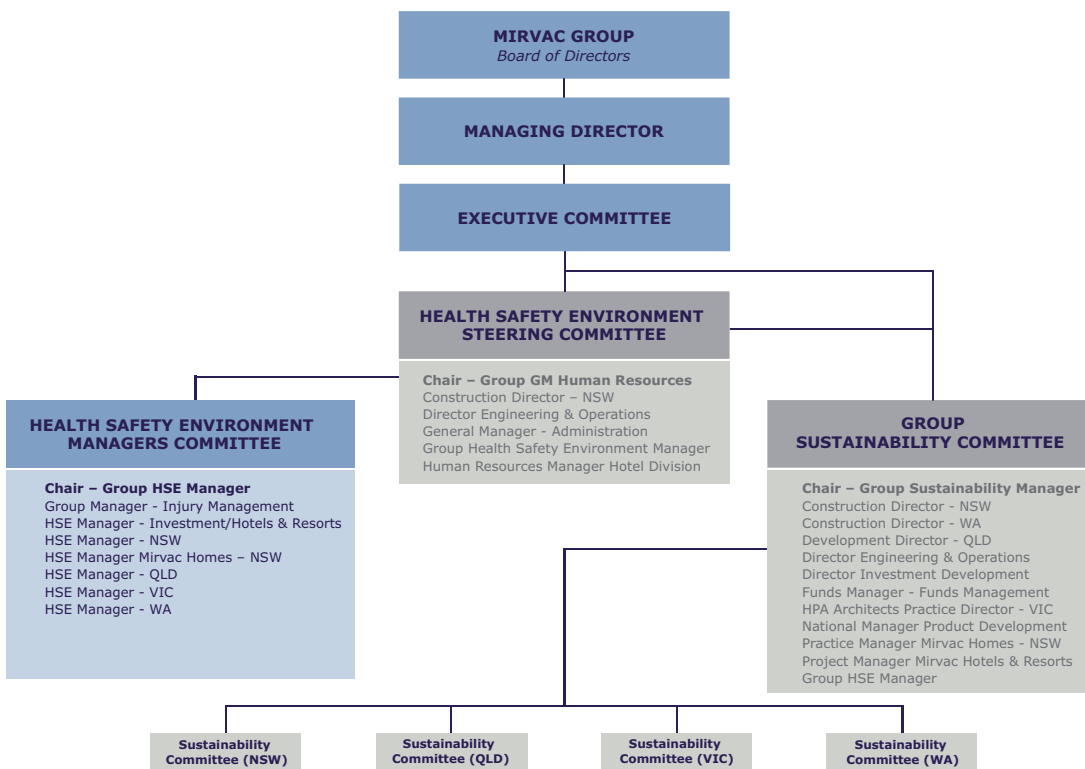


Figure 1: Mirvac Sustainability Reporting Structure

The GSC reports to the National Health Safety Environment Steering Committee which advises the Executive Committee, Managing Director and Board of Directors on sustainability practices, innovation, strategy, and performance targets and achievements.

## B Individual Performance:

**Do you provide incentive mechanisms for managers with reference to activities relating to climate change strategy, including attainment of GHG targets?**

Mirvac does not currently include incentive mechanisms for managers for activities relating to sustainability performance, including climate change. This approach will be considered as the Mirvac sustainability strategy matures.



# Appendices

## Data Tables

## Appendix 1 - Emission Summary Table

Emission	2006	2005	2004
<b>Scope 1 - Direct Emissions</b>			
On-site gas consumption (tCO <sub>2</sub> -e)	4,878	4,475	3,133
Refrigeration & air-conditioning (tCO <sub>2</sub> -e)	1,441	Not calculated	Not calculated
On-site fuel use (Properties) (tCO <sub>2</sub> -e)	38.42	Not calculated	Not calculated
On-site diesel use (Development) (tCO <sub>2</sub> -e)	386.1	Not calculated	Not calculated
<b>Scope 2 - In-Direct Emissions</b>			
Purchased electricity (tCO <sub>2</sub> -e)	86,860.7	104,078	85,833
<b>Scope 3 - Scope 3: Other indirect GHG emissions</b>			
Electricity , Extraction, transport and transmission loss (tCO <sub>2</sub> -e)	26,027	Not calculated	Not calculated
Gas Extraction, transport and transmission loss (tCO <sub>2</sub> -e)	1,501.6	Not calculated	Not calculated





2003	2002	Calculation Tools and Notes
2,623	2,204	State-by-state emissions for our Australian portfolio calculated using Australian Greenhouse Office Factors and Methods Workbook, December 2006. Emissions from our New Zealand properties calculated using GHG Protocol revised tool for direct emissions from stationary combustion, version 3.0, October 2006.
Not calculated	Not calculated	Global warming potential (GWP) figures obtained from GHG Protocol HFC and PFC emissions from the manufacturing, installation, operation and disposal of refrigeration and air-conditioning equipment, Australian Greenhouse Office Factors and Methods Workbook, December 2006 and IPCC Special Report on Emissions Scenarios. Default loss values obtained via Australian Greenhouse Office Factors and Methods Workbook, December 2006.
Not calculated	Not calculated	GHG Protocol revised tool for direct emissions from stationary combustion. Version 3.0, October 2006
Not calculated	Not calculated	Diesel consumption data tracked via expenditure. Average state pump price obtained via Australian Institute of Petroleum <a href="http://www.aip.com.au/pricing/retail/diesel/index.htm">http://www.aip.com.au/pricing/retail/diesel/index.htm</a> , (18/5/2007). Emissions calculated using Australian Greenhouse Office Factors and Methods Workbook. December 2006
75,204	34,564	State-by-state emissions for our Australian portfolio calculated using Australian Greenhouse Office Factors and Methods Workbook, December 2006. Emissions from our New Zealand properties calculated using GHG Protocol Indirect CO <sub>2</sub> emissions from the consumption of purchased electricity, heat, and/or steam. Version 1.2, January 2007
Not calculated	Not calculated	State-by-state emissions for our Australian portfolio calculated using Australian Greenhouse Office Factors and Methods Workbook, December 2006. Scope 3 emissions not calculated for our New Zealand properties.
Not calculated	Not calculated	State-by-state emissions for our Australian portfolio calculated using Australian Greenhouse Office Factors and Methods Workbook, December 2006. Scope 3 emissions not calculated for our New Zealand properties.

## Appendix 1 - Emission Summary Table

Emission	2006	2005	2004
Waste Disposal** (tCO <sub>2</sub> -e)	10,938.2	Not calculated	Not calculated
Vehicle Use (tCO <sub>2</sub> -e)	1,882.8 (7,888,570km travelled)	2,056 (8,135,713 km travelled)	Not calculated
Air Travel (tCO <sub>2</sub> -e)	827.5 (6,796,378 km travelled)	687 (5,852,970 km travelled)	Not calculated
TOTAL (tCO <sub>2</sub> -e)	123,843	111,296	

\*\* Not included in the total



2003	2002	Calculation Tools and Notes
Not calculated	Not calculated	<p>Emissions from waste disposal calculated for our Australian portfolio using AGO Factors and Methods Workbook, December 2006.</p> <p>No waste disposal figures available for our New Zealand holdings.</p>
Not calculated	Not calculated	<p>Total fuel consumed reported directly via service providers. Distance travelled determined via direct reporting (4,788,844km) and average fuel consumption figures (3,099,726km).</p> <p>Emissions and average fuel consumption calculated using GHG Protocol CO<sub>2</sub> emissions from mobile combustion calculator, version 1.3, January 2005.</p>
Not calculated	Not calculated	<p>Emissions calculated via GHG Protocol CO<sub>2</sub> emissions from mobile combustion calculator, version 1.3, January 2005.</p> <p>Distance travelled reported directly via service providers.</p> <p>Flight type (short-, medium-, and long-haul) reported directly via service providers, except in Western Australia. All flights from this region assumed to be medium-haul.</p>

## Appendix 2 - Breakdown of GHG Emissions and Emissions Intensity

	ACT		NSW		Vic		QLD	
	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>
Commercial	9287.6	0.153	17954	0.101	203.145	0.1242	0	0
Retail	0	0	17498	0.167	2710.8	0.0261	0	0
Industrial	0	0	47.425	0.0006	0	0	0	0
Sub-total	9287.6	0.153	35499	0.0981	2913.9	0.0276	0	0
Hotels	0	0	16193	12.961/ room	18939.9	22.930/ room	22689	21.837/ room
Development	0		95223		175914		145039	
TOTAL	9287.6		51691		21854		22689	

	Tas		WA		SA		NZ	
	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>
Commercial	0	0	0	0	0	0	0	0
Retail	0	0	7637.4	0.441	0	0	0	0
Industrial	0	0	0	0	0	0	0	0
Sub-total	0	0	7637.4	0.441	0	0	0	0
Hotels	40.94	1.253/ room	2286.09	11.044/ room	2619.835	14.395/ room	453.17584	2.546/ room
Development	0	0	97778		0	0	513,954	
TOTAL	40.94		9923.5		2619.835		453.176	

	Total	
	Total tCO <sub>2</sub>	Average Intensity tCO <sub>2</sub> /m <sup>2</sup>
Commercial	27444.3	0.114
Retail	27846.2	0.123
Industrial	47.4	0.0006
Sub-total	55337.9	0.101
Hotels	60601.4	16.317/room
Development	0	
TOTAL	118559.1	



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