

Private Plan Change 57 – Calcutta Farms Ltd

Transition Matamata submission, 7 November 2022

“Climate Resilient Development means reducing exposure and vulnerability to climate hazards, cutting back greenhouse gas emissions and conserving biodiversity are given the highest priorities in everyday decision-making and policies on all aspects of society including energy, industry, water, food, urban development, housing and transport.”

– [Intergovernmental Panel on Climate Change \(IPCC\)](#)

Current and future development in Matamata – industrial, commercial and residential – should be done within the context of a growing climate crisis.

To properly address the crisis, IPCC scientists say it will not be possible to keep global temperatures at safe levels without transformative changes in the way the world produces food and manages land. Necessary changes, they say, include a significant shift to plant-based farming.

This has implications for our dairying-dependent local economy: Diversification would be a positive thing, and industrial development can support this.

Clearly, the proposed industrial site, if approved, will take out of production some of the very land needed (and currently used) for plant-based farming. While it may be equally fertile land, property neighbouring the existing industrial area would preferably be the site of further industrialisation (through an extension of existing services). Having said that, the applicant is to be commended for considering a number of aspects of development that impact the environment.

Thoughts and suggestions for new industrial land

Water supply, wastewater and stormwater. Swales and wetlands will help capture stormwater. Council has noted that water supply and wastewater management are not as easily addressed. (Water supply is considered below.)

Walking and cycling. It is nice to see off-road paths connecting the planned development to nearby residential areas and on to other current and proposed paths. Off-road paths alongside SH24 from town to the industrial area would provide a safe, direct route for active commuting to work.

Overall site design. There are many examples overseas of thriving sustainably-designed *industrial* properties. The supporting document (‘The Case for Green Business Parks’) notes some of these. Any new industrial land in Matamata should be fashioned along these lines and would serve as a sustainability model and showpiece for the country.

Buildings on site. Similarly, there are many innovations in sustainably-designed industrial and commercial *buildings*. The second supporting document (‘The Case for Green Buildings’) discusses these. See particularly the summary of features of the FiL New Zealand building at Mt Maunganui. The New Zealand Green Building Council (www.nzgbc.org.nz) offers a wide range of resources and support. Prospective tenants should be encouraged to take advantage of this. Benefits include cheaper running costs.

Power supply. Plan Change 57 refers to ‘overhead powerlines’ and discussions with PowerCo/Northpower. No consideration is given to solar/batteries. Harmony Energy NZ is developing a solar farm in Te Aroha West to serve residential properties. Ideally, a similar set-up would serve tenants in any new industrial park *and* would be added to the existing industrial area.

Tenant mix. A sustainably designed industrial park would attract innovative businesses looking to help create a bright future through how they operate and the products they offer or services they deliver. These businesses could provide attractive, high-skill jobs, drawing more families to Matamata.

Water supply is a crucial issue for this and all other developments now and in the future in Matamata. In a Private Plan Change 57 document online (Appendix D – ‘Infrastructure Report’), council notes the need to upgrade the existing network, confirming they “do not have additional supply capacity available to service the plan change site.” Developers note there are several bores on site that could provide water.

If council needs more water in the future, it has indicated that drilling another bore is an option. If the bore is in the vicinity of the new industrial land, it may well tap into the aquifer serving existing bores on the property in question. What will the health and capacity of this aquifer be in the decades to come?

Changing climate and weather patterns (lower rainfall levels, more frequent and more prolonged droughts) will impact the surface water we rely on (and bore water through reduced groundwater recharge). Facing this uncertainty, NIWA is beginning to examine the impact of climate change on water supply.

Given current, planned, and possible future residential development and desired industrial growth, is council certain there will be sufficient water to supply the entire community’s needs over the long term?

Recommendations

Council should examine extension of the current industrial area as an alternative to the development proposed by Private Plan Change 57.

For *any* new industrial land:

- A specialist in green business parks/green buildings should be retained by developers to guide the planning/development process.
- All stakeholders should work together to ensure a sustainably-designed site is provided for prospective tenants.
- A solar specialist should be retained to examine options for solar/battery power.
- Tenants should be encouraged to seek NZ Green Building Council guidance and build to appropriate standards.
- Future-focused, innovative businesses should be sought as tenants.
- To serve existing/new industrial land on SH24 in particular, an off-road walking/cycling path along SH24 should be developed.
- **Council should examine the long-term/big picture aspects of water supply and be required to provide evidence that sufficient supply will be available to serve the *entire* community over the long term.**

In summary

Industrial, commercial and residential development in Matamata (and throughout the district) should be consistent with, and contribute to, New Zealand’s international obligations and commitments to greenhouse gas emission reductions. Properly addressing the issues raised here would help contribute to this goal.

Careful, long-term thinking and leadership on council’s part could be a catalyst for innovative industrial land development and affordable, sustainable housing, while minimising the loss of productive farm land. A win all around.

– **Martin Louw, coordinator, on behalf of Transition Matamata**

The Case for Green Business Parks

A green business park is a real estate enterprise developed and managed to strive for high environmental, economic, and social benefits as well as business excellence.

Green business parks are a logical and natural extension of green buildings. They can address sustainability via design and layout of the land site as well as through the ongoing operation of businesses located there.

Green business parks can be developed in urban or rural areas. They can include a range of heavy industries, a mixture of business types, or a focus on one industry sector. They can be developed with varying degrees of public sector support and community involvement. Every situation is different and needs to be assessed on its own merits.

“The building industry has a key role to play in the creation of a sustainable society... What makes the need for change in the building sector so urgent is that buildings last a long time. Once a structure is completed, it is harder and less economical to reduce its energy and water use and to improve its air quality than it is to design from scratch for efficiency and health”.

– Worldwatch Institute

Features

Green business parks differ from traditional industrial parks in four ways. They strive to:

- protect the natural features and landscape of the site
- incorporate green design in the park's individual buildings/facilities *and* in the park overall (including innovative infrastructure and sustainable transportation options)
- promote 'eco-industrial networking' amongst businesses resident in the park, and
- pursue other cooperative efforts beneficial to businesses.

Eco-industrial networking was an early focus, with closely-located businesses cooperating to minimise resource use and reduce waste. This has been described as 'applied industrial ecology' – where businesses try to mimic nature, or 'close the loop'. Practical applications include cogeneration, water reuse, and material and by-product exchanges. Eco-industrial networking in Kalundborg, Sweden (begun in the 1960s) is often cited for its economic and environmental benefits and as a simple example of how things can work.

As green business parks evolved, other cooperative efforts of resident businesses have been realised, including in purchasing, transportation, marketing, information systems, human resources, and environment, health, and safety actions. These have led to operating efficiencies and cost reductions.

Sensitive site design and layout *and* sustainability features of the buildings and facilities serve as a strong base for overall park operations.

Benefits

Going green in business park development has multiple benefits – economic, community/social, environmental *and* as a real estate enterprise. Sample benefits are noted below and in the accompanying table.

Business efficiency and productivity. The Kalundborg 'ecosystem' involves six main partners: a power station, oil refinery, biotech company, plasterboard manufacturer, soil remediation operation and the city. Eighteen by-product exchanges between participating partners costing a total of \$75 million are estimated to have saved \$160 million. Payback for the projects has been less than five years on average.¹

Eco-industrial networking in Campbell Industrial Park in Hawaii has demonstrated similar benefits. By-product and 'waste' exchanges have led to annual economic benefits (after set-up costs) of some \$2.73 million through cost reductions (including lower landfill fees) and \$350,000 in added revenue.²

Simpler transactions (or cooperative efforts) can reap important benefits as well. One report³ cites a firm in a U.S. park turning a \$1/gallon cost to dispose of a liquid waste into 50¢/gallon revenue by selling it to a recycler.

Cooperation on emergency response efforts amongst eight firms in a business park in Sarnia, Ontario (catering to firms in the same industry) have led to better overall capacity at 35% lower cost. In another arrangement, 14 companies have collaborated with the local polytech on course planning. Companies report this has led to a better supply of well-trained staff, higher productivity amongst workers and an improved safety record. It has also created opportunities to involve co-op students in their businesses and resulted in lower overall training costs.⁴

Community strength and amenity. Beyond the businesses directly involved, communities that develop green business parks stand to benefit as well. As a point of competitive advantage, a green business park has the potential to attract innovative businesses,⁵ leading to both more jobs and a larger tax base.⁶

Green business parks, by their nature, help to protect quality of life in the community. Through appropriate design, infrastructure

needs will be more modest and the potential impact of such things as traffic congestion and air and water quality can be efficiently addressed. Green business parks can reduce or end what is often thought of as a 'conflict' between the economy and the environment. Quite simply, green business parks can be easy neighbours to live with.

Environmental stewardship. Direct environmental benefits from inter-firm sharing are clear and unequivocal. Efforts in Kalundborg, for example, show reductions in resource use and waste emissions into the tens of thousands of tonnes per year – 175,000 tonnes of CO₂ emissions alone.⁷

Exchange arrangements between firms in the industrial park in Hawaii cited above have led to annual CO₂ emissions reduction of some 2,800 tonnes (from avoided cement production), 3,500 tonnes of avoided virgin sand extraction and landfill space saving of more than 50,000 cubic metres.⁸

The Burnside Industrial Park in Halifax, Canada, has evolved over the years, with a range of firms now involved in recovery, rental, remanufacturing, repair, recycling, and reuse activities.⁹

Every time resources or materials are used instead of going to waste – or used more than once before being discarded or needing treatment – the environment benefits.

Real estate enterprise. Developers and property investors are not left out of the benefits equation when a green approach to business park development is followed. Environmental/natural features of parks can play a part in decisions regarding business (re)location.¹⁰ Green buildings and facilities have their own inherent benefits as detailed in *The Case for Green Buildings*.

There are also potential cost savings in site preparation through careful planning. Using natural features of the site to help manage stormwater, for example, can reduce infrastructure needs. Opportunities for solar and micro wind technology are also worth exploring. Examining potential networking and cooperation of park residents in the early planning stages can lead to other economies. Roading and parking space, for example, was reduced from 12% to 7% of the total area in the Innovista Industrial Park.¹¹ This saving is consistent with projections by Cohen-Rosenthal in *Eco-Industrial Strategies*.¹²

Business networking and cooperation. Any exchanges or arrangements amongst park businesses are obviously voluntary. As one proponent notes, "Eco-industrial networking creates its own value-added connections. Participants form those that make sense, demur from those that don't, and create specific processes between themselves which mine, extract and use productively what is possible".¹³

Potential Benefits of Green Business Parks ...

... for Business	... for Communities	... for the Environment
Reduced operating costs (energy, water, materials)	Expanded local business opportunities	Protection of the local environment via site design
Reduced disposal costs	Recruitment of higher quality companies	Reduced use of resource materials in construction
Income from sale of by-products	Good jobs, larger tax base	Efficient energy use in operations → reduced emissions
Improved environmental performance	Partnership with businesses	Efficient water use → protection of freshwater resources
Business efficiencies	Minimise impact on infrastructure	Sensitive stormwater management → reduced risk of erosion and flooding
New initiatives possible	Enhanced quality of life in areas near the development	Efficient movement of people and goods → lower emissions and congestion
Positive impact on employee health and productivity	Generally improved environment and landscape	By-product exchange and reuse → lower draw on natural resources and less waste to landfill
Enhanced corporate image	Community pride	Provision of reserves, tracks, etc.

Steps to Success

Design and development of green business parks is more complicated than it is for green buildings. There are more elements to consider and, likely, more partners and stakeholders involved. The following checklist – drawing on experiences of the overseas examples – can serve as a guide.

- ✓ Consider the ecological characteristics of the site with respect to functional use *and* protection of natural features.
- ✓ Involve the full range of building and landscape professionals – all with a passion for sustainable design – to cover the many facets of development.
- ✓ Involve potential park residents in discussions from the outset to explore networking and cooperative opportunities.
- ✓ Let the potential networking/co-operative opportunities inform design and layout of the park.
- ✓ Explore energy, water, and waste management opportunities at the *site* level.
- ✓ Promote benefits of the green design approach to the community to gain early support.
- ✓ Promote the park to complementary businesses to maximise eco-efficiency and sustainability benefits when operating.
- ✓ Establish an association of park businesses once it is operational to enhance communication and increase cooperation.
- ✓ Strive for public-private cooperation regardless of who owns the park.

Local authorities can help by creating an environment that encourages environmentally sustainable design (ESD). This can include ensuring eco design principles are adequately provided for within the planning framework, streamlining approval processes for applications incorporating ESD, and making sure development contribution fees take into account the environment/infrastructure benefits that green business parks provide.

More Info

This summary is based on the report *Green Buildings & Green Business Parks: Striving for Sustainability through Design & Operations*. It provides detailed information on features, benefits and costs along with a reference list and appendices noting a wide range of sources, resources and case studies. The report is available on the Priority One website (www.priorityone.co.nz).

The New Zealand Green Building Council (NZGBC) aims to accelerate the development and adoption of market-based green building practices. The current focus is on setting standards via Green Star rating tools, education and training, and access to resources and information. For details and membership information: www.nzgbc.org.nz, nzgbc.support@nzgbc.org.nz or (09) 379 3996.

The **Sustainable Business Network** in the Bay of Plenty is working with NZGBC to promote green building design and practice. For information on workshops and resources, check out www.sustainable.org.nz/bayofplenty, e-mail bop@sustainable.org.nz or ring (07) 574 7713.

Best Practice Examples

Case studies in the *Green Buildings & Green Business Parks* report demonstrate a variety of approaches to green business park development and factors that contribute to success. Following are some highlights. (See the report for full details.)

Crewe Business Park, United Kingdom

- Land owned by Council, long-term leases
- Ecological policy protects natural features of the site
- Assistance from a local conservation trust to assess site and devise the policy
- Native plantings to enhance natural features (brook, pond, grassland and an ancient hedgerow)
- Businesses landscape in keeping with overall plan
- Businesses attracted to the park because of the strong environmental component
- Winner of Millennium Marque for Environmental Excellence in 2000

Devens Community Development, United States

- Land is former Fort Devens army base, owned by the state government
- Listed as a U.S. Superfund site, clean-up/reclamation part of development process
- One-stop (streamlined) process for permits and consents
- Grant up to 15% of permitting fee (\$10,000 maximum) for any building achieving certification under the U.S. Green Building Council LEED rating scheme
- Eco-industrial networking within the park and nearby towns
- EcoStar environmental achievement and branding programme
- Public-private partnership
- State of Massachusetts Sustainable Development Award in 2005

Naroda Industrial Estate, India

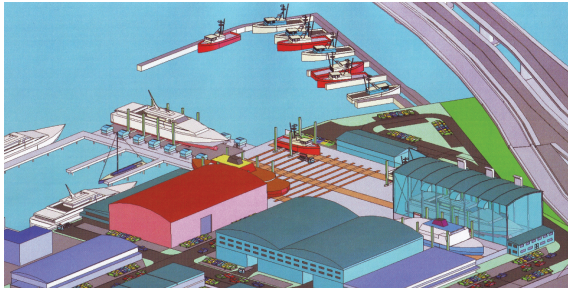
- Older park (est. 1967) with more recent 'greening' initiatives
- Wide range of industry clusters
- Local (Gujarat) and federal financial support for baseline survey of networking opportunities
- Common effluent treatment plant and solid waste site, plus Naroda Enviro Networking Centre
- Strong industry association in the park (also runs a charitable trust hospital and a bank offering loans to small businesses)

Innovista Industrial Park, Canada

- First Greenfield eco-industrial park development in the country
- Buildings/facilities in three (staged) clusters
- Protects significant portion of the site, including wildlife corridors and existing recreational trails
- Natural and constructed wetlands for stormwater management
- Reduced roading through careful design and planned shared services
- Federal government funding support (grant and low-interest loan)

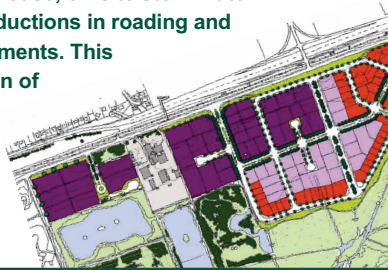
Marine Precinct

The planned Harbour Central marine cluster in Sulphur Point offers tremendous opportunities for green design and for eco-industrial networking of closely-related businesses.



Site Design

Large business land sites provide opportunities for innovative infrastructure development. Possibilities include solar and micro-wind technologies, energy cogeneration, water reuse, on-site stormwater management and reductions in roading and parking area requirements. This can lead to protection of important natural features of the land and could allow space for walking and cycling paths.



Hi-Tech

Overseas experience shows that many hi-tech firms look to locate in business parks with a natural look and pleasant environment.



Local Model

The new FiL New Zealand building in Portside Drive, Mount Maunganui is a model for an office and manufacturing plant as a standalone facility or part of a green business park.

It doesn't have to be new to 'go green'

Any business looking to renovate or upgrade an *existing* facility can 'go green' through retrofits and new technology. Energy Options, a specialist company in the Bay of Plenty helping homeowners and businesses with energy efficiency audits and installations, is doing just that with the makeover of a 1960s single-storey concrete block structure in Whakatane.

Similarly, businesses in *developed* industrial areas can explore eco-industrial networking opportunities with others located nearby. Efficiencies and cost savings await successful efforts. A study¹⁴ of the Tilbury Industrial Area (830ha comprising 620 businesses in Delta, British Columbia), for example, found the following potential annual reductions: 26% of natural gas use; 37% of electricity; 25% of potable water use/wastewater generation, and 25% in truck trips (equivalent to 200,000 trucks entering/leaving the area). Natural gas and electricity reductions would save more than \$6 million annually and, overall, there would be a 15,000-tonne reduction in CO₂ emissions per year.

References

Website sources for references are included in the *Green Buildings & Green Business Parks* report.

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3. Canadian Eco-Industrial Network (2003) "Benefits of Eco-Industrial Networking".
4. Ibid
5. Crewe and Nantwich Borough Council (2007) "Crewe Business Park – History".
6. Devens Enterprise Commission (2007) "Devens Sustainability Project".
7. Kalundborg (see #1 above)
8. Campbell Industrial Park, Hawaii (see #2 above)
9. Côté, R P and P Crawford (2003) "A case study in eco-industrial development: The transformation of Burnside Industrial Park", in *Eco-Industrial Strategies: Unleashing Synergy Between Economic Development and the Environment*. Sheffield, UK: Greenleaf Publishing.
10. Crewe Business Park (see #5 above)
11. Eco-Industrial Solutions Ltd. (2007) "Hinton Eco-Industrial Park".
12. Cohen-Rosenthal, Edward (2003) "Real Estate and Eco-Industrial Development: The Creation of Value", in *Eco-Industrial Strategies: Unleashing Synergy Between Economic Development and the Environment*.
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14. Eco-Industrial Solutions Ltd. (2007) "Tilbury Eco-Industrial Partnership Project".



The Case for Green Buildings

A green building incorporates design, construction, and operational practices that significantly reduce or eliminate the negative impacts of development on the environment and occupants¹

The built environment has a profound effect on the natural environment. Commercial buildings and business parks play a part in this – both in the natural resources required for their construction and in their ongoing impact in operations.

Globally, buildings and construction activity consume about 30% of the planet's raw materials and 20% of land use.² In New Zealand, commercial buildings account for about 8% of our annual energy consumption and 5% of our CO₂ emissions.³

Features

Green buildings generally include strategies and features to address:

- energy efficiency and greenhouse gas emission abatement
- water conservation
- waste avoidance, reuse and recycling
- pollution prevention – noise, water, air, soil and light
- enhanced biodiversity, reduced natural resource consumption
- productive and healthier environments, and
- complementary sustainable transportation options.⁴

Benefits

Green buildings compete well with standard buildings on a construction cost basis, but it is less and less common to evaluate them solely on these terms. Whole-of-life costs and benefits – economic, environmental *and* social – all need to be weighed up in decision-making.

Studies show positive health and productivity effects for occupants of green commercial buildings. This benefits owner-occupiers and tenants alike. Reduced operating costs accrue to these groups as well, and any rent premium as a result would benefit property owners. Enhanced asset value of green buildings further benefits developers, property investors and businesses owning their own premises.

Following are sample benefits as cited in the *Green Buildings & Green Business Parks* report (see 'More Info ...' for details).

Employee health. A large U.S. study⁵ concluded that improvements to indoor environments common in green buildings could reduce worker losses from:

- communicable respiratory diseases by 9-20%
- allergies and asthma by 18-25%, and
- non-specific health and discomfort effects by 20-50%.

Absenteeism is similarly affected. U.S.⁶ and Swiss⁷ studies put absenteeism at 35% and 15% lower (respectively) for employees occupying a green building compared to an older existing building.

Productivity. One database of studies⁸ showed the impact on individual productivity of increased occupant control of:

- temperature – 13 studies, productivity increases 0.48 to 11% (average 1.8%)
- ventilation – seven studies, productivity increases 0.2-3 % (average 1.2%), and
- lighting – eight studies, productivity increases 3-15% (average 7.1%).

Another study⁹ found similar benefits in productivity through increased natural light, decreased glare from windows and overall comfort conditions. A further study¹⁰ estimated that workers with control of temperature conditions might show performance increases of 7% for clerical tasks, 3% for skilled manual work and over 8% for rapid manual work.

“Green is not simply getting more respect; it is rapidly becoming a necessity as corporations – as well as home builders, retailers, health care institutions, governments, and others – push green buildings fully into the mainstream over the next five to ten years”.

– Harvard Business Review, June 2006

Operating costs. Green building benefits can include lower energy, waste disposal, and water costs and reduced maintenance costs.

The Value Case for Sustainable Building in New Zealand,¹¹ which includes detailed case studies of five buildings, concluded:

- For owner occupiers, a 20-year whole-of-life cost view indicates the marginal cost increase of green building is likely to be repaid between five and six times by operating cost savings alone.
- For tenants, the probable 20-year rental premium for green buildings is likely to be repaid by a factor of approximately three from operating cost savings alone.

Energy cost savings are a significant part of this. In the case study buildings in the report noted above, costs are 50-65% below those for similar conventional buildings. FiL New Zealand's new facility in Mount Maunganui is anticipated to reduce energy use by as much as 80% compared to a traditional building of the same size.

Asset value. The New Zealand *Value Case* report includes a residual land value analysis showing a green office building may have a true worth of nearly 40% more than a conventional building.¹² The concept of 'worth' properly reflects the broad

benefits of green buildings, including corporate/tenant identification with environmental issues, improved rental values, better technical performance and improvements in productivity and other building occupant advantages.

An independent study by The Registered Institute of Chartered Surveyors¹³ examining green buildings in Canada, the U.S. and the UK also concluded that green buildings improve asset value, noting they can:

- secure tenants more quickly
- command higher prices or rents
- enjoy lower tenant turnover
- cost less to operate and maintain in most cases, and
- improve business productivity for occupants.

Costs

Case studies in the *Value Case for Sustainable Building in New Zealand* show that to achieve the various benefits noted above, the difference in capital cost of green buildings compared to conventional good quality buildings varies from 15% less to 11.5% more, with sustainability features initially costing an average of 2-6% more.¹⁴ This is in the range experienced in other countries, with green buildings costing a premium of 2-4% in Australia, 1-7% in the U.S. and 10% in the U.K.

A U.S. study¹⁵ examining 33 green buildings noted a cost premium of 2-6%. It cites a similar study done a few years earlier putting the cost premium of green buildings at 5-15% (The reduction is attributed to increased availability and lower costs of green building materials, mechanical systems and furnishings).

Thus, for a possible modest premium in capital costs, a range of potential benefits arise as highlighted above and summarised in the accompanying table. The benefits cover economic, social, and environmental factors, with building developers, owners and occupants all standing to gain in the process.

Beyond the specific benefits described here, building green responds to a number of imperatives for New Zealand in the twenty-first century. These include a drive toward sustainability (even carbon neutrality), lessening our impact on the *local* environment, and ensuring we deserve and protect our 'clean, green' image.

Local authorities can contribute to the process by encouraging *and* rewarding environmentally sustainable design (ESD). This can include codes of practice for engineering works that adequately provide for ESD, streamlining approval processes for applications with strong ESD elements, and reducing building impact fees when there are clear environment/infrastructure benefits.

Potential Benefits of Green Buildings	
<p>Initial Streamlined consents and approvals Lower material use Savings in construction waste disposal Savings via smaller mechanical systems Qualify for financial incentives</p>	<p>Health & Productivity Enhanced comfort Improved health Reduced absenteeism Improved productivity</p>
<p>Operating Lower energy and water costs Greater durability, fewer repairs Reduced cleaning and maintenance Reduced waste generation</p>	<p>Environmental Reduced resource extraction impacts Reduced global warming impacts Reduced toxic emissions Minimise ozone depletion impacts Lower air/water pollution impacts Protection of biodiversity</p>
<p>Economic Marketability – more rapid lease out Lower tenant turnover Rent premium Enhanced employee recruiting Reduced employee turnover Increased asset value Future-proofing against costs Protect v building obsolescence</p>	<p>Community & Social Lessens demand on municipal services Reduced stormwater runoff and erosion Reduced automobile use Support for companies committed to sustainable business Corporate image in the business and broader community</p>

References

1. Green Building Council Australia
2. New Zealand Green Building Council
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5. U.S. Department of Energy (2003) *The Business Case for Sustainable Design in Federal Buildings.*
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15. Kats, Gregory (2003) *The Costs and Financial Benefits of Green Building: A Report to California's Sustainable Building Task Force.*

More Info

Green Buildings & Green Business Parks: Striving for Sustainability through Design & Operations –

This report is available on the Priority One website (www.priorityone.co.nz)

New Zealand Green Building Council – www.nzgbc.org.nz, nzgbc.support@nzgbc.org.nz, (09) 379 3996

Sustainable Business Network – www.sustainable.org.nz/bayofplenty, bop@sustainable.org.nz, (07) 574 7713

Sample Green Building Features

All buildings obviously cannot include each of these features, but the extensive list gives some sense of the possibilities.

Location

- Avoid fragile landscapes
- Revitalisation of brownfield sites
- Accessible to public transportation

Site

- Low impact on local ecology, retention of mature vegetation
- Use trees and plants for shading
- Native plantings/low-water-use landscaping
- Stormwater management via holding ponds, natural contouring, rain gardens, porous paving, etc.
- Increased green space (i.e. small building footprint, minimal surface parking)
- Optimal siting of building (re: solar gain in winter and shading in summer)

Other Attributes

- Reuse of existing facades and structures (if available)
- Use of local materials, use of recycled materials (e.g. concrete and steel)
- Materials with low environmental embodied effect
- Minimal/no use of PVC materials
- Construction waste diversion based on source separation
- HVAC systems that limit use of ozone depletion substances
- Rainwater harvesting for landscape irrigation/toilet flushing
- Solar water heating or use heat pumps
- Alternative energy systems (e.g. photovoltaics, wind turbines)
- Purchase energy from a 'green' provider
- Secure area for bicycle storage, plus showers and lockers

Building Management System

- Automatic control of blinds, louvers and opening windows with manual occupant override
- Automatic control of plant and systems
- Ability to measure/optimize system performance over time
- Provide a Building Users' Guide to occupants

Building Exterior

- Highly-efficient building envelope (e.g. thermal mass for temperature control)
- Green roofs to enhance biodiversity/slow rainwater run-off
- Sustainably-sourced timber (e.g. Forest Stewardship Council)
- High-efficiency glazing (solar control or insulating or both)
- Best practice insulation (including underfloor)
- Large roof overhang and window louvers (to control temperature and glare)
- Windows, skylights and light shelves to increase natural light penetration into the space
- Efficient, targeted exterior lighting to minimising light pollution (consider solar)

Building Interior & Fit-Out

- Minimal materials (e.g. exposed structural materials)
- Mixed mode natural and mechanical ventilation
- Occupant (local) controlled heating, cooling and ventilation
- Heat pump heating and cooling
- Motion sensors and timers to control artificial lighting
- Low Volatile Organic Compound (VOC) content in carpets, adhesives and sealants
- Environmental Choice products, including paints, flooring and laminates
- 'Floating' floors (i.e. no glues or adhesives)
- Water-saving fixtures (e.g. taps, toilets, showers, low pressure hot water)
- Highly-efficient appliances (e.g. office equipment, fridges)
- Exhaust risers for printing/photocopying areas
- Flexible layouts (e.g. movable walls, raised floors)
- Access to long-distance views, provision of visual connection to the outdoors
- Furniture with recycled content and highly recyclable at end of useful life
- Lease floor coverings, furniture, etc. v purchase (re: producer responsibility)

Local Models

There are some exemplary green buildings in New Zealand, certainly including Meridian Energy's office in Wellington and the Landcare Research facility on the Tamaki Campus of the University of Auckland. There are also fine examples of green design innovation in our own backyard. Key features of four facilities are noted here (with details in the *Green Buildings & Green Business Parks* report).

Energy Options

As a company that does energy audits and sells and installs quality energy-efficiency products, Energy Options has a chance to 'practice what they preach' in their own building retrofit.

Retrofit of a 1960s building in Richardson Street, Whakatane. Completion November 2007



- full insulation in walls and ceilings
- double-glazed windows
- fit out using environmentally-friendly paints, flooring, carpets, etc.
- rainwater collection for toilet flushing (tank located in interior open atrium)
- solar hot water heating
- exploring opportunities for solar heating and cooling
- planned vegetable garden (and worm bin) in second atrium

Papamoa Library & Community Centre

The Papamoa Library and Community Centre includes a wide range of sustainability features – reducing operating costs, increasing comfort of building users and protecting the environment.

Completed June 2006

- East-West orientation (to minimise solar gain) and large roof overhang
- Insulated concrete exterior panels, tiled concrete floor and precast internal panels to moderate temperature fluctuations
- Naturally ventilated with microprocessor-controlled window openers based on wind speed and direction, precipitation and air temperature
- High efficiency glazing and high levels of insulation
- “Intelligent lighting” to maximise use of natural light and T5 lighting (providing high light levels with low heat output)
- “Roof lanterns” to get natural light deep into the library space
- In-floor heating via water pipes and a heat pump
- Solar hot water heating and rainwater tanks for toilet flushing
- Stormwater discharge managed on-site via swales and natural gardens



Illustration courtesy of Chow:Hill

Baywave TECT Aquatic & Leisure Centre

While it is a community facility, Baywave includes a range of sustainability features equally appropriate in commercial facilities.

Completed 2005



Illustration courtesy of Jasmax

- Use of geothermal bore water for most of the heating needs (with reinjection of the water used)
- Ventilation system incorporating run-around coil heat recovery, variable speed fan motor drives and a mixed mode for opening windows to bring in outside air over the summer
- Gym displacement ventilation system to allow the area to be maintained at optimum temperature and ventilation rates with minimum energy consumption
- Artificial lighting on sensors to maximise use of natural light
- Power factor correction at the main switchboard to maximise electrical efficiency

FiL New Zealand

The new FiL New Zealand building is designed for an 80% reduction in energy use (compared to a standard building of its size) and a 95% reduction in use of municipal water supply.

Completion October 2007, in Portside Drive, Mt Maunganui



In the office area...

- an atrium for natural light and ventilation
- concrete slab floors on both levels bringing reduced cooling demand
- fiberglass wall and roof thermal and acoustic insulation
- reverse cycle regenerative heat pumps
- solar hot water heating
- double glazing and window louvres
- compact fluorescent lighting on motion sensors and solar tubes to capture natural light
- light-coloured décor to prevent solar gain
- condensate from the ventilation system to irrigate the atrium gardens
- provision of bicycle parking and showers/service area and reduced car-parking space

In the factory and stores area:

- Alsynite Topglass cool extreme roofing (with underlying insulation)
- Indal highbay T5 lighting system (on sensors)
- process heating met via heat recovery and a waste oil boiler recovering heat content from a product that would otherwise be disposed of in a liquid waste system
- gravity filling system for manufactured product
- collected rainwater filtered to provide process water