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## **EBA Brief on the Economic Significance of the Delfin Lend Lease Yarrabilba Environmental Business Cluster**

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## Environment Business Australia

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*In our research we could not find an example of a greenfield, place based environmental business cluster. Nor could we find an example of a developer pursuing an industry cluster strategy to create dramatically higher local job densities. Delfin Lend Lease is well positioned to pioneer such a development.*

Environment Business Australia (EBA) is the peak body for the environment and sustainability industry in Australia.

The environment industry supplies technologies, products and services that:

- Prevent, mitigate or reverse negative impacts on the natural environment;
- Reduce ecological and human health risks;
- Improve business and industry efficiency; and
- Reduce business risk, enhance public reputation and build the next competitive edge.

They include cleaner and more resource efficient technologies, products and services, including those, which reduce energy and water consumption, and those which aim to deliver prosperity with minimal negative impact. Services can include finance, research, development, demonstration, and commercialisation, professional practice, teaching and training activities, in the environmental field.

EBA has been asked by Delfin Lend Lease (DLL) to provide advice on their plans for the development of an *Environmental Business Cluster* at Yarrabilba a 2,014-hectare master-planned community, located in Beaudesert Shire in South East Queensland.

The size and complexity of the Yarrabilba development puts it in the category of a new city, equivalent to the scale of places like Rockhampton. This greenfields site, to be managed completely by DLL, provides a chance to redefine the benchmark for urban development in Australia. For example, DLL can, not only protect, but also where possible improve the quality of the natural environment at Yarrabilba. The development can also set new standards for urban design, landscaping, water, energy, materials, waste, building and transport efficiency.

Yarrabilba has the potential to create a major ready market for providers of sustainable urban development solutions, driving down the price of more sustainable technologies, products and services. In addition, Yarrabilba can create a hot bed for innovation, a demonstration site for new technologies, and an education hub for growing the much needed skills, knowledge and experience required for more sustainable building, living and working.

In our research we could not find an example of a greenfield, place based environmental business cluster. Nor could we find an example of a developer creating an industry cluster to facilitate dramatically higher jobs densities, while placing high quality jobs creation front and centre as a strategy for the development. Delfin Lend Lease is well positioned to pioneer these aspects at Yarrabilba.

Our research suggests that Yarrabilba's '*environmental business cluster strategy*' has the potential to add an additional 1500 on-site jobs, and 2250 additional jobs to the Logan/ Beaudesert/ North Gold Coast Region. This is in addition to the original jobs target set for the development of 17,000 on-site and 26,000 in the sub-region.

Yarrabilba provides a unique opportunity to mainstream sustainable building, living and working by building a sustainable city from scratch.

## Yarrabilba

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*Yarrabilba is uniquely positioned to make sustainable building, living and working, mainstream, affordable and accessible*

The Yarrabilba project in southeast Queensland will be DLL's flagship master-planned community, comprehensively designed from the outset to express their commitment to sustainable urban development.

Construction of Yarrabilba is expected to begin in 2008 subject to approval by Beaudesert Shire and State Government deliberations. It will be developed over a 30 year period and eventually be home to approximately 52,000 people in approximately 23,000 homes, a new community similar in size to Rockhampton.

Yarrabilba is a 2014-hectare site in the northeastern corner of Beaudesert Shire located in a major growth corridor:

- 40km south east of Brisbane CBD
- 35 km north west of Southport
- Adjacent to the Brisbane-Gold Coast corridor
- 40 minutes from the Brisbane international Airport
- 15 minutes from the Gold Coast Motorway
- 15 minutes from regional centres - Beenleigh, Yatala and Logan

Formerly pine forest, the site was recently included within the urban footprint of the South East Queensland Regional Plan, positioning Yarrabilba to assist with the sustainable management of growth in the most rapidly developing region in Australia.<sup>i</sup>

DLL has a national reputation for developing master planned communities based on social, economic and environmentally sustainable principles. DLL is planning for Yarrabilba to be a world showpiece for affordable and accessible sustainable building, living and working including:

- Approximately 20% of the site will be dedicated to green and open space
- A further 10%, or some 199ha, will be set aside for jobs-generating uses in all forms
- A special *Sustainability Covenant* to preserve native flora and fauna, conserve water, electricity and other valuable resources
- Attractive streetscapes and environmentally sustainable homes to suit a wide variety of homeowner needs and budgets
- Sustainable design to reduce the amount of electricity needed for heating, cooling and lighting
- A comprehensive water cycle management program will be developed with world experts to save up to 70% in potable water usage compared to a typical land subdivision
- Reticulated gas and solar hot water systems to reduce carbon dioxide emissions by up to 75,000 tonnes per year compared to typical land subdivisions
- Sewerage will be treated on site and recycled and used for irrigation
- Public transport will be delivered from day one and an integrated travel demand program will remove many of the existing barriers to greater use of public transport

Yarrabilba is uniquely positioned to make sustainable building, living and working, mainstream, affordable and accessible.

## The Environment Industry

*“This is a period of unprecedented growth and opportunity for the Queensland environment industry.”*

*Hon. Anna Bligh Deputy Premier,  
Treasurer and Minister for State  
Development, Trade and  
Innovation 23 May 2006*

The environment industry, estimated to be worth \$1 trillion globally<sup>ii</sup> is growing at an estimated 12% per annum<sup>iii</sup> in response to challenges such as water shortages, deforestation, desertification, the need to eliminate waste and pollution, energy security (including claims that we have reached peak oil production), and the threats of global climate change.

Queensland is extremely well positioned to capitalise on the growth of the environment industry. There is already a robust and growing environment industry base in Queensland. There is also strong state government support for the sector, including an investment of more than \$80 million dollars in sustainable industry practice and innovation since 1990.<sup>iv</sup>

The *Queensland Government Smart State Strategy* identifies the Environment Industry as a priority sector that is, “globally focused, provides highly skilled, well-paid jobs, supports the competitiveness of mainstream industry and enables sustainable economic development”.<sup>v</sup>

The Queensland Government understands the sector having recently surveyed the environment industry in the State. The survey, to which 808 Queensland businesses responded, found that the sector generated revenues in 2003/04 of more than \$1.3 billion and directly employed over 10,000 skilled people in Queensland.<sup>vi</sup>

The South East Queensland (SEQ) region is Australia’s fastest-growing region, attracting on average 55,000 new residents each year over the past two decades.<sup>vii</sup> It is not surprising then, that *Land Development and Construction* is the largest client group of the Queensland Environment Industry.<sup>viii</sup> Queensland has a unique opportunity to leverage its rapid growth to innovate and implement sustainable urban development solutions to meet current and future, local and export market demand.

Like any sector, the Queensland environment industry faces some key challenges. The industry is highly fragmented, comprised largely of smaller businesses, with a broad range of capabilities, functioning independently and largely self-funding growth, research and development.<sup>ix</sup>

The environment industry also has a tendency to be supplier and technology focused rather than customer focused. In other words, it pushes products out to the market place instead of concentrating on predicting and meeting current and future customer needs.<sup>x</sup>

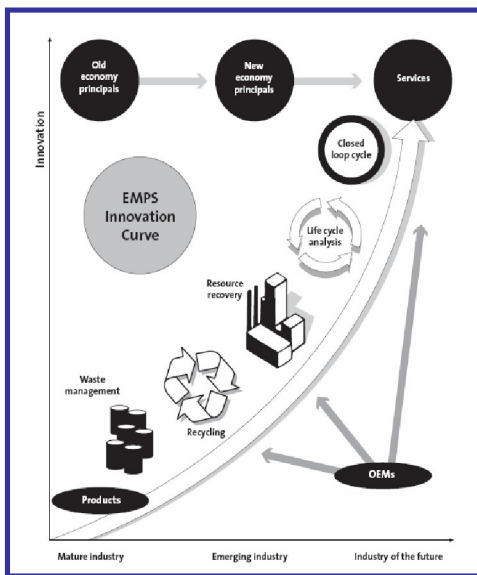
Respondents to the recent Queensland Environment Industry Survey<sup>xi</sup> identified the following impediments to the growth of their businesses:

- Lack of skilled personnel
- Financial constraints including a lack of seed, commercialisation and expansion capital for environmental technologies
- Lack of export development capabilities and overseas market linkages
- Lack of enabling framework from government
- Lack of marketing and business development skills
- Innovation gaps including low IP commercialisation rates and poor linkages between industry and research institutions

Queensland understands its environment industry, particularly the barriers to growth. Yarrabilba is well positioned to help businesses overcome these barriers by incubating, developing, challenging, growing, using and exporting local environmental goods and services.

## Environment Industry Evolution

Source South Australian Business Vision 2010



The environment industry is evolving rapidly in response to global and local environmental, social and economic challenges and opportunities.

As we move from a product dominated **old economy** towards a service dominated **new economy** the environment industry is evolving along a pathway from:

1. **Waste management** - clean up after the event
2. **Recycling** - separate out the valuable stuff, make new stuff and take advantage of embodied energy
3. **Resource recovery** - make the processes cleaner, less energy intensive and more efficient
4. **Life cycle analysis and materials stewardship** – measure and reduce the impact from the extraction of resources, through production, distribution, consumption and disposal
5. **Closed loop cycle** – eliminated the need for extraction and disposal by 'mining' waste streams for resources, creating new materials, self-sufficiency in power and water, reclaiming wastewater, reducing fossil fuel use and offsetting carbon and other impacts in the transition by purchasing credits from people able to reduce their impacts more quickly or affordably.

Consequently, the capabilities of the environment and sustainability industry are evolving across four main market segments:

1. Pollution and waste management
2. Sustainable technologies, products and services
3. Natural resource management
4. Environmental 'pricing' markets and *Cleantech* investment

"*Pollution management*" remains the largest market segment accounting for 57% of industry revenues in Queensland in 2003-04, while "*sustainable technologies, products and services*" accounted for 32% and natural resource management 9%.<sup>xii</sup>

"*Environmental 'pricing' markets*", not surveyed by the Queensland Government in 2005, are the most recent segment to emerge globally. Environmental 'pricing' markets are created by government regulations capping discharges, usage or emission levels. The resulting new market-based trading mechanisms enable businesses that can reduce emissions, pollution discharges and water consumption to exchange these savings with firms that are less able to do so. Trading these savings becomes both a means of funding investment in cleaner technology and a trading commodity in its own right.<sup>xiii</sup> The recent *Queensland Environment Industry Profile and Trends Report 2006* identifies attracting businesses with these capabilities as an emerging opportunity for Queensland.<sup>xiv</sup>

Yarrabilba has the opportunity to trial new market based mechanisms, attract Cleantech investment and make demonstrable progress towards the "closed loop cycle" end of the industry evolution continuum. Feedback loops, including new levels of monitoring, research and development, can also be built in and adaptation to new ways of doing things will be possible given the long timeframes and resources associated with the total development process.

## Environmental Business Clusters

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*Business clusters are “geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example universities, standards agencies, and trade associations) in particular fields that compete but also co-operate.”*

*Source: Porter, 1998*

The concept of business clusters was popularised by Michael Porter in his book *Competitive advantage of nations*.<sup>xv</sup> Business clusters centre around a geographical concentration of industries that gain “collaborative advantage” through co-location or connection.

All clusters are different but a number of common features stand out as underpinning the development of successful clusters throughout the world.<sup>xvi</sup> Of these the three critical success factors, according to the UK Department of Trade and Industry, are:<sup>xvii</sup>

1. The presence of functioning networks and partnerships
2. A strong innovation base with supporting R&D activities
3. The existence of a strong skills base

There are numerous examples of business clusters with more than thirty countries having implemented cluster programs and policies around the world. Development agencies and other organisations that promote and support cluster based economic development include: World Bank, Agency for International Development, OECD, European Union and many others. Many countries including Finland, Sweden, Northern Ireland, The Netherlands and Mexico have established cluster programs and US States such as Arizona and Connecticut, have passed legislation to promote and support cluster development.<sup>xviii</sup>

In his business cluster meta study of 2002 Dr Claas van der Linde of the Institute for Strategy and Competitiveness at Harvard Business School<sup>xix</sup> identified some 800 business clusters across a wide variety of industries. Included in the study were four Australian clusters namely; Defense Equipment (North Adelaide), Heavy Industry (Hunter Region), Information Technology Services (North Sydney) and Tourism, Arts, Sports (Canberra).

When referring to clusters Silicon Valley in the US is one of the most talked about success stories. Centered on Stanford University and extending along a corridor from San Francisco to San Jose it is home to more than 7000 software and electronics companies who, in 1999, had a combined market value of some \$450 billion.

Existing business clusters are generally categorised as either:

- **Geographical:** those based in the same geographic location or region such as the media cluster in Oxford (UK) or the advanced engineering and metals cluster in South Yorkshire (UK); or
- **Industrial:** those based around industry rather than geography such as the biotechnology cluster (Qld), chemical industry clusters (UK, Holland, France)

Depending on the nature of integration within the cluster they may be:

- **Vertically integrated,** i.e. made up of industries that are linked through buyer seller relationships such as the transport and electronics cluster (Wales) or
- **Horizontally integrated,** i.e. made up of industries, which might share a common market for the end products, use a common technology, require similar labour force skills or require similar natural resources such as the famous Silicon Valley Information Technology Cluster (USA).

## *The business cluster opportunity*

*Significant potential exists for Yarrabilba to build, from the ground up, a closely coupled, geographic, industry cluster that includes businesses that are vertically linked through buyer seller relationships, share a common market for end products, use common technologies and labour force skills and require similar resources and infrastructure including training, research and development*

Business clusters typically seek to map and leverage activities that have an existing presence in the local economy and tend to be facilitated by government or not for profit associations or a combination of both.

Most existing clusters focus on bringing smaller businesses together, building their capacity, providing shared infrastructure, strengthening supply chains and creating an easier access point for the market. They are seldom purpose built from the ground up and rarely lead by industry for industry.

While existing clusters bring many advantages to participating businesses they are often constrained by the established nature of their coexistence. There would appear to be significant advantages to be gained from developing a purpose designed and developed business cluster from the ground up.

Based on our research for this report such a cluster would be one that incorporated most of the features of the existing cluster types. In other words a closely coupled, geographic, industry cluster that includes businesses that are vertically linked through buyer seller relationships, share a common market for end products, use common technologies and labour force skills and require similar resources and infrastructure including training, research and development.

The features of such a cluster would include:

- early planning, design and strategy ensuring that commercial opportunities are built in from the outset
- lead by industry for industry with appropriate policy support from government
- geographically concentrated
- located in close proximity to major population and distribution centres
- a mix of smaller and larger businesses
- shared infrastructure including state of the art telecommunications, research, training and innovation support
- a focus on specific market outcomes
- create its own substantial supply capacity
- establish itself as a globally recognised brand
- attract the best companies into the cluster
- become a preferred place for the best talent to work
- provide access to sources of finance
- incubate new businesses
- raise product standards and stimulate demand for new products

Due to the nature and size of the proposed development Yarrabilba provides such an opportunity for the right industry.

The environment industry would appear to be a good choice to cluster at Yarrabilba because it can both support and trade upon the branding of Yarrabilba, particularly if it was to be positioned as Australia's first sustainable city. The recent survey of the Queensland industry suggests that there are local capabilities to support a development of the size, scale and scope of Yarrabilba and that the industry is likely to significantly benefit from and grow in capabilities, size and scope should the proposed environmental business cluster come to fruition.

## Environmental business clusters

*There is a significant opportunity to create the world's first place based environmental business cluster, which includes features of the existing types of environmental business clusters and has a market focus on sustainable urban development.*

*A place based environmental business cluster might include:*

- *shared infrastructure*
- *waste and by-product exchanges*
- *sustainability covenants on development and activities*
- *shared market focus*
- *supply chain depth and breadth*
- *collaboration to improve the natural environment*
- *networking to push thinking on sustainable development*
- *working together to promote local employment and skills development*
- *partnering to pursue business opportunities and joint ventures*
- *research, development, education and training support services*
- *new technology and business incubator*
- *collective voice to influence government policy*

Interest in the development of environmental clusters is growing internationally as evidenced by such publications as the “*Creating the California Cleantech Cluster*” a discussion document published in 2004 on the potential benefits to California from such an initiative.

Research suggests that there are six types of environmental business clusters:

**Environment Business Incubators:** where new companies are supported which develop products or services that will have a positive impact on the environment. San Jose, California, USA, is one such example; it has assisted more than 85 businesses in its 10-year history.<sup>xx</sup>

**Environmental Technology Clusters:** where businesses providing environmental technologies are mapped into clusters, as in the state of Arizona USA<sup>xxi</sup> which has 200 environment businesses providing services, equipment and resources located around the state's three research universities. Germany and Japan also have successful solar and wind energy clusters.<sup>xxii</sup> A variation on this approach is one that sets out to establish a support network of existing businesses within a regional area for example, the South Australian Environment Industry Cluster<sup>xxiii</sup> and the Gold Coast Region Environment Industry Association.

**Natural Resource Based Clusters:** where business use natural resources as a focus for clustering such as the *Italian Ceramic Tile Cluster*, the *Finish Forestry Cluster*, the *Norwegian Marine Cluster*, *Danish and Dutch Dairy and Livestock Cluster*, the *Dutch Flower Cluster* and many others. In these clusters, long-term benefits are gained not from the presence of natural resources themselves but from the activities that occur around them such as development and export of local machinery, equipment, services and complex value added products.

**Sustainable Business Clusters:** although no Sustainable Business Clusters exist to date, the concept is one where businesses work together to improve their own sustainability performance.<sup>xxiv</sup>

**Industrial Ecology Clusters:** where businesses are co-located to reuse each other's by-products or residual 'waste' and take advantage of embodied energy, or pool their demand for resources. For example at Denmark's Kalundborg industrial park a coal-fired power station and oil refinery, exchange waste steam, waste heat, waste water and waste gas amongst themselves and neighboring industries, saving thousands of tonnes in greenhouse gas emissions per year and reducing water consumption by 25 per cent. The Kwinana Industrial Area just south of Perth in Western Australia has 47 industrial synergies in place including 32 by-product synergies, involving the reuse of solids, liquids or gasses, and 15 involving the shared use of utility infrastructure.<sup>xxv</sup>

**Place based environmental business clusters:** where businesses are co-located because the “place” is associated with a market for the goods they supply and there is a high degree of synergy between the characteristics of that place and the activities of the co-located firms.

Our research could not locate a purpose built *place based environmental business cluster*. Yarrabilba is well positioned to become the world's first *place based environmental business cluster*, which includes the successful features of the existing types of environmental business clusters and has a market focus on sustainable urban development.

## Yarrabilba Economic Benefits

*International experience suggests that the deeper the cluster, the more firms located within it, the higher the economic value a region can capture*

Delfin Lend Lease's proposal to establish a place based environmental business cluster within Yarrabilba offers significant benefits to the Queensland economy.

While it is difficult to quantify the increased economic benefit to be gained from cluster development we note that it is widely accepted that a key element to competitiveness in the global economy is the ability to support and enhance the growth of the interrelated industries in order to foster wealth creation in a region.

Porter<sup>xxvi</sup> argues that clusters increase economic growth through:

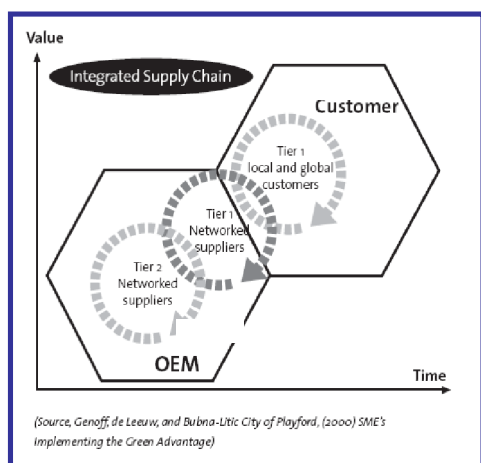
- **Raising productivity** by allowing access to specialised inputs, employees and enhancing access to information, institutions and public goods
- Increasing **capacity for innovation** by diffusing technological knowledge and innovations more rapidly
- **Stimulating higher rates of new business formation** as entrepreneurial employee's spin-off new ventures.

In principle the deeper the cluster, that is the density of firms located in a particular geographical area, the higher the economic value a region can capture.

Our analysis of Yarrabilba's potential economic benefits has focused on the following key areas:

1. The environment industry supply chain and likely market segment mix
2. The types of businesses likely to be attracted to the Yarrabilba environmental business cluster
3. Direct and indirect employment created at Yarrabilba and adjacent areas as a consequence of the cluster's establishment
4. Range of occupations likely to be attracted to the cluster
5. New businesses likely to be created through the environmental business incubator
6. Possible export opportunities likely to be generated
7. Creation of demand for specialised research services
8. Creation of demand for specialised training services
9. Attraction of capital to support new businesses and the expansion of existing ones

## Environment Industry Supply Chain



An analysis of the potential economic benefits of the proposed environmental business cluster at Yarrabilba requires an understanding of the supply chain. The publication *“Environment Industry Cluster Development: the South Australian Experience”* suggests that to assess the impact of the environment industry, *“an industry which contributes to broader economic benefits and productivity gains”*, a whole of industry perspective needs to be taken consisting of:

- **End Markets:** representing the final users of the environmental product or services
- **First Tier Products and Services:** This tier is most likely to deal with the end users - they add value to second tier products and services and by exporting products and services nationally and internationally they have the potential to expand the wealth of the local economy
- **Second Tier Products and Services:** this tier is made up of small localised firms who supply goods and services to the first tier
- **Economic Infrastructure:** This tier comprises support for the first and second tiers in education and training, regulatory compliance, marketing, business development and a host of other support services

Given the nature of the proposed development the opportunity exists for Yarrabilba to develop an integrated and networked supply chain between first tier and second tier suppliers. This is likely to lead to higher diffusion and deployment of new technology and production processes. In addition it will build knowledge and skill in the environment industry to add value to their products and services, adding wealth to the local economy.

In addition to these traditional supply chain considerations the focus and branding potential of the cluster will also influence the make up of businesses likely to be attracted to the environmental business cluster at Yarrabilba.

Our research suggests that the success of industry clusters is related to the strength of their brand in the marketplace. Given the strong potential for Yarrabilba to become a global hub for sustainable urban development solutions, it is likely to be an extremely attractive market and location for environment businesses with a focus on technologies, products and services designed to help us tread more lightly as we live, work and play. For example construction of buildings consumes 32% of the world's resources<sup>xxvii</sup> so in order to dramatically reduce the resources impact of Yarrabilba unique opportunities for the environment industry will emerge to develop new technologies, products and services.

Given the transition towards a new economy based on services, and the evolution of the environment industry towards higher technology, knowledge intensive *“environmental design”* services, it is likely that sustainable technologies, products and services will dominate the market segment mix. These are likely to be followed by *“front of the wave”* pollution management providers and a higher than average focus on natural resource management. Yarrabilba could also become Queensland's first hotbed for emerging environmental 'pricing' markets and *Cleantech* investment.

## **Businesses likely to be attracted**

*More than 70 businesses across the following market segments have already expressed an interest in locating within the Yarrabilba environmental business cluster*

<b>Business Type</b>
Solar energy solutions
Water technologies
Industrial automation
Consulting engineers
Eco furniture, fixtures, fittings
Sustainable building products
Cleantech investment
Information and communications technologies and service provision
Sustainable white goods
Academic institutions
Eco-friendly plastics
Verification and testing facilities
Utilities
Water tanks
Sustainable transport solutions
Peak industry bodies & other NGOs
Water management solutions
Waste management solutions
Energy management solutions
Environmental management solutions
Environmental monitoring
Financial institutions
Alternate fuels and energy
Surfacing and stormwater solutions
Smart wiring and monitoring
Sustainable architectural coatings
Research organisations
Sustainable landscaping and design
Sustainable pumps, pipes and fittings

Land development and construction is currently the largest end market for Queensland environmental goods and services. The size and scale of the Yarrabilba development itself will create a ready market for the following environmental products and services:

### **End Market: Land Development and Construction**

#### **First and Second Tier Products and Services:**

- pre-construction
  - surveying and planning
  - environmental auditing
  - environmental impact assessment
  - sustainable landscape design
  - revegetation, land banking and carbon trading
  - sustainable design
- construction
  - sustainable architecture
  - sustainable building products
  - energy efficient construction materials
  - low/zero emission materials
  - sustainable architectural coatings
  - wastewater and sewerage
  - sustainable transport solutions
  - renewable energy solutions
  - solid waste management
  - monitoring and analysis
  - potable water
  - new products from waste/scrap
  - erosion control
  - closed loop production systems
  - environmental monitoring
  - laboratory analysis
- post construction, habitation and demolition
  - site clean-up and remediation
  - eco furniture, fixtures, fittings
  - sustainable white goods

#### **Economic Infrastructure**

- education and training
- environmental management systems
- life cycle/materials stewardship assessment
- research and development
- regulatory compliance
- marketing, research and public relations
- business development
- legal services
- utilities – energy, water, waste, communications
- technical writing, publishing and printing
- software and web developers
- interactive training tools
- *Cleantech* investment
- property energy performance rating
- alternate fuels
- standards, verification and testing

Yarrabilba will generate significant demand for these types of environmental products and services and has already attracted expressions of interest from more than 70 businesses with these capabilities.

## Direct and indirect employment

*“A cluster puts a face on an industry, unifying often disparate corporations into a coherent entity to which industry outsiders can relate. This “face is important – it helps brand an industry, raising its profile and helping investors, entrepreneurs and consumers better understand the industry’s significance.”*

*Creating a California Cleantech Cluster September 2004*

Economic analysis by SGS and Core Economics suggested that Yarrabilba was likely to create 26,000 jobs in the sub-region, with two thirds of these, 17,000, on site by 2026. Which, based on the population estimates of 52,000 people, equates to a jobs density of 326 on-site jobs per 1,000 inhabitants.<sup>xxviii</sup>

This analysis is based on the types and quantities of jobs that would normally be created in a development of this scale and location without a strategic intervention to create higher jobs densities through the creation of the environmental business cluster.

Yarrabilba is well placed to attract a significantly more direct and indirect jobs to the development through applying the following strategies:

- leverage the benefits of **deep industry clustering** as a mechanism for creating critical mass
- include a **new business incubator** within the development to create new jobs through the development of new businesses
- focus on the **environment industry** which has an inherently high density of highly skilled jobs
- increase the **density of home based businesses** in the development
- create a **landmark development** to attract international attention, high quality employment opportunities and high quality businesses

### Strategy 1 - Deep Industry Clustering

Global experience suggests that industry clusters are playing an increasingly important role in driving the growth of regional economies for example:

- Collectively, 18 industry clusters in the USA provide 54% of employment for their respective locations.<sup>xxix</sup>
- The nine key clusters that make up the Massachusetts Technology Collaborative represent about a quarter of all jobs in that State.<sup>xxx</sup>
- The Cambridge cluster in the UK is reported to have created as many as 40,000 jobs in the region: although the cluster was initiated by graduates of the University, this is no longer the predominant source of labour supply as many skilled people have moved to the area to be part of the cluster.<sup>xxxi</sup>

Other research in the UK has shown in other cases the proportion of a regions employment accounted for by clusters ranges from 43% in London to 15% in the North West.<sup>xxxi</sup>

In addition to the jobs created by first and second tier products and services, cluster development encourages the development of a supporting infrastructure of professional, legal, financial and other specialist services. Clusters aggregate demand for business management capabilities such as management skills for business leaders, entrepreneurship for graduates, management and production techniques, leadership skills, mentoring/coaching and personal development skills.<sup>xxxii</sup>

## Direct and indirect employment

*Delfin Lend Lease's Varsity Lakes development on the Gold Coast has shown that master planned communities are attractive places for home based businesses while the home based business owners themselves tend to contribute significantly to building the local social fabric.*

### Strategy 2 – Business Incubator

Yarrabilba intends to develop a new business incubator within the environmental business cluster. International experience suggests that incubators can also generate new jobs through the commercialisation of new technologies and the development of new businesses. For example, the Cambridge cluster creates an estimated 25 new high tech businesses every month.<sup>xxxiv</sup>

### Strategy 3 – Environment industry focus

DLL strategy to focus on creating an environmental business cluster has the potential to contribute to higher than average direct and indirect employment because the environment industry has an inherently high jobs density, for example:

- In California, the environment industry supports an estimated 180,000<sup>xxxv</sup> jobs
- The US renewable energy sector, including solar, wind, geothermal and biomass, currently directly employs approximately 115,000 people<sup>xxxvi</sup>
- The US air pollution control industry employs an estimated 160,000 people, including 18,000 in California<sup>xxxvii</sup>
- The remanufacturing industry (recovering, disassembling, reusing and recycling waste products) employs 480,000<sup>xxxviii</sup> people in the US
- The US water and liquid waste treatment industry employs 99,000 people.
- By comparison, the entire US coal industry only employs 83,000 people.<sup>xxxix</sup>

The survey of the Queensland Environment Industry found that the 808 responding firms directly employed 10,000, highly skilled employees in 2003-04.<sup>xi</sup> This is comparable to the Queensland Information, Communication and Technology (ICT) sector, which employed 56,000 people in 3,733 ICT firms in the state in 2002.<sup>xii</sup>

### Strategy 4 – Home based business (HBB) density

Higher jobs densities can be achieved through attracting and fostering the development of home based businesses (HBB). HBB owners also tend to be more active in local communities contributing to the strengthening the social fabric.

Master planned communities also offer significant advantages for HBB including the availability of local commercial spaces when needed; the availability of support services and infrastructure such as high speed broadband which are already present in the development to support mainstream commercial activities; the availability of local markets, business connections and networks; and the attraction of like minded people due to particular features of the development such as Bond University at Varsity Lakes. 12% of residential dwellings at Delfin's own "Varsity Lakes" development on the Gold Coast have HBB activities, anecdotal evidence, however, suggests that this figure might actually be closer to 20%.<sup>xlii</sup>

## Direct and indirect employment

*Yarrabilba's 'environmental business cluster strategy' has the potential to add an additional 1500 on-site and 2250 additional jobs to the Logan/ Beaudesert/ Northern Gold Coast Region*

### Strategy 5 - Landmark development

The potential for Yarrabilba to be branded as Australia's first purpose built sustainable city would likely generate significant international attention. Including a deep industry cluster, a new business incubator and focusing on a growing sector like the environment industry further enhances the ability for the development to create high quality employment opportunities and attract high quality businesses.

Such a comprehensive strategy to increase job densities is also likely to hasten the critical mass and speed up the job creation process.

International examples support DLL five-pronged strategy to increase job densities at Yarrabilba. For example the authors of "*Creating the California Cleantech Cluster*" predict that, with a focused injection of venture capital investment, somewhere between 52,000 and 114,000 jobs can be created and \$11-25 billion in annual revenue in California by 2010, with most jobs high-paying, skilled positions.<sup>xiii</sup>

The Huggins Report<sup>xiv</sup> provides a snapshot of employment densities in various industry sectors throughout the world and gives some indication of the kinds of job densities possible with clustering strategies:

- **IT and computer manufacturing:** Throughout the world three regions dominate the field. The highest ranked is Austin (567.1 jobs per 1000 inhabitants), second is San Francisco (372.3), which includes the famous Silicon Valley cluster of IT and computer firms. Third is the Kanagawa (228.4) region of Japan.
- **High-Tech Service Sectors:** The top ranked regions are San Francisco (179.5) followed by Washington DC (173.7) and Tokyo (170.8).
- **Instrumentation and Electrical Machinery Sectors:** leading regions are Germany's Bayern (250.9) and Baden-Wurttemberg (236.1).
- **'Traditional' Knowledge-Based Sectors:** automotive and high-tech mechanical engineering sectors, highest ranked region Germany's Baden-Wurttemberg (295.8), and followed by Philadelphia (267.4).

If Yarrabilba were to achieve densities comparable to those in San Francisco or Austin, anywhere between 2,300 and 12,000 additional on-site jobs could theoretically be created. (off the existing base predictions of 326 jobs per 1000 inhabitants)

However, these additional jobs would need to be accommodated within the development and hence job density per unit area of land would likely become a constraining factor. International data on jobs densities per unit of land area suggests, for non-cluster based developments, a range from 20 – 30 jobs per hectare.

For example in San Diego where there is a large concentration of knowledge workers, average densities of 25 jobs per hectare are achieved.

While some additional land may be required for jobs generating activities, we believe that at least an additional 1500 jobs could be created and accommodated onsite, which would support a total of 2,250 additional jobs in the sub-region.

## Range of occupations

*The environment industry provides high quality jobs in engineering, management, trades, science, sales and marketing*

The environment industry provides high quality jobs in a range of occupations.

The 808 businesses who responded to the Queensland Environment Industry Survey<sup>xiv</sup> directly employed over 10,000 highly skilled employees in 2003-04, with almost half the businesses taking on new staff that same year. The survey showed the following range of occupations in the Queensland Environment Industry:

1. Engineers, 16.7%
2. Management, 13.9%
3. Trades people, 12.7%
4. Scientific professionals, 9.8%
5. Sales and marketing, 9.1%
6. General business, 8.3%
7. Financial and accounting, 6.1%
8. Drafters, 5.2%
9. Architects/planners, 4.8%
10. Information technology, 3.1%
11. Other, 10.3% (education professionals, non-skilled and other)

Almost one third of businesses surveyed reported that their main activity was “*engineering and scientific consulting*” (34%) the next most common activity was manufacturing (16%). This strong focus on manufacturing by the environment industry supports Yarrabilba’s target to create 1,520 manufacturing jobs by 2026.

The top 12 business capabilities (by revenue) of those surveyed included:

1. Wastewater, stormwater and sewerage, 42.6%
2. Sustainability goods and services (e.g. energy efficiency, water efficiency, ecological design, landscape services), 34.5%
3. Environmental management services (environmental audits, impact assessments etc), 31.1%
4. Solid or liquid wastes, 24.0%
5. Environmental monitoring and/or laboratory analysis, 22.4%
6. Soil erosion and stabilisation, 19.9%
7. Remediation and clean-up of soil and/or water, 17.3%
8. Air pollution management, 15.7%
9. Natural resource management, 15.4%
10. Treatment and/or supply of potable mains water, 13.0%
11. Noise and vibration management, 11.3%
12. Generation or collection of energy from renewable sources, 9.9%

‘Wastewater and sewerage’ the most significant capability accounted for 16% of total employment (1,600 people) and 21% of revenues (\$262 million) in 2003-04. While ‘Sustainability goods and services’, including businesses involved in a range of activities such as sustainable housing, energy and water efficiency, employed almost 1,100 people and earned \$131 million in revenue.

These two most significant capability areas of the Queensland Environment Industry are likely to be equally well represented in the development of Yarrabilba and hence environmental goods and service providers with these capabilities would be among those most likely to be attracted to the environmental business cluster. This is demonstrated by the types of business that have already expressed an interest in locating to Yarrabilba.

## *New business incubator*

*A dedicated environmental business incubator could contribute significantly to the growth of the Queensland Environment Industry*

DLL intends to develop a new business incubator at Yarrabilba to support the growth of the environmental business cluster and create additional jobs.

Incubators simplify the experience of running a business for new start-ups, offering a sheltered environment in which to grow. UK business incubation experience suggests successful incubators:

- Enable the development of ideas, minimising physical and organisational barriers and allowing entrepreneurs the freedom to innovate
- Nurture people with ideas, supporting the innovator by providing time and resources to develop the idea
- Formalise the development by creating a business unit, a new company or defining company structures and producing business plans and budgets
- Support and assist new businesses with investment, finance, marketing and sales, law, recruitment, ICT and facilities<sup>xlvi</sup>

Having a business incubator located within an industry cluster is likely to bring an additional range of benefits to individual firms and the wider economy including:

- The ability of firms to draw together complementary skills in order to bid for large jobs for which they would be not be competitive as individuals
- The potential for economies of scale to be realised by further specialising production within each firm, by joint purchasing of common raw materials to attract bulk discounts or by joint marketing
- Strengthening social and other informal links leading to the creation of new ideas and new businesses
- Improved information flows within a cluster to spread the word on new opportunities
- Enabling the development of an infrastructure of professional, legal, financial and other specialist services<sup>xlvii</sup>

The San Jose environment business incubator has assisted more than 85 businesses in its 10-year history<sup>xlviii</sup> while the Cambridge cluster creates an estimated 25 new high tech businesses every month.<sup>xlix</sup>

*The Queensland Environment Industry Survey* identified that while 81% of respondent businesses carried out some form of innovation, research and development activities during 2003-04, most of it was self-funded. The survey also highlighted a mismatch between the focus of industry R&D activities and those of the research sector.

This suggests that innovation is important to the industry but that it is not currently drawing on the kind of support that is available to incubate new business opportunities from research and other intellectual property. A dedicated environmental business incubator could contribute significantly to the growth of the Queensland environment industry.

## Export opportunities

*As a hub for sustainable urban development solutions, there is significant potential for Yarrabilba to attract global attention creating export development opportunities not only for cluster members but also for the whole of South East Queensland*

Location	No. Offices
Brisbane City	447
Gold Coast City Part A	63
Beaudesert Shire Part A	5
Caboolture Shire Part A	15
Ipswich City	20
Logan City	9
Pine Rivers Shire	16
Redcliffe City	3
Redland Shire	11
Gold Coast City Part B	47
Sunshine Coast	83
Moreton SD Balance	34
<b>Total SEQ</b>	<b>753</b>

*Queensland Environment Industry Survey 2005 – Office Locations by Statistical Sub-Divisions*

DLL has set a goal for 40% of jobs created to be in enterprises that supply goods and or services to regions outside of Yarrabilba. i.e. they are 'export oriented jobs.'<sup>i</sup>

This goal is supported by the strategy to develop an environmental business cluster at Yarrabilba because the sector is export-oriented. International data also suggests that clustering may aid export generation. For example data from the Cambridge cluster in the UK suggests that up to 40% of revenues are generated from export activities.<sup>ii</sup>

The Queensland Environment Industry is already pursuing export markets, just over half of all environment industry businesses survey exported environmental goods and services to overseas markets or interstate. Almost one-third of the 805 businesses survey reported exports to overseas markets in 2003-04, generating \$82 million, 6% of industry revenues.<sup>iii</sup> Although one third of respondents indicated that they intend to expand their business internationally over the next three years there were some perceived impediments including a lack of export development capabilities and a lack of overseas market linkages. The cluster development at Yarrabilba could help to overcome these issues for member businesses by facilitating joint venture arrangements between businesses to pursue export markets and by providing sufficient local demand to increase the industry's supply capacity from which larger export demands could be met.

Increased urbanisation is driving local and export demand for a broad range of environment industry capabilities including:

- wastewater & sewerage
- air pollution management
- waste management
- noise and vibration abatement
- environmental monitoring & analytical service
- environmental management services
- water supply
- sustainable technologies and products
- sustainable development services

The demand in China for *sustainable urban development* solutions is colossal. More than 10 million people are moving from rural to urban areas in China every year. This equates to more than 190,000 people a week, the equivalent of the entire population of Central Queensland moving to Brisbane weekly. China now builds more residential and office space in a year than the whole of Europe does in a decade.<sup>iii</sup> The Chinese government currently has plans for \$60.5 billion in investment in large sewerage infrastructure (200,000 tons per day) and smaller decentralised options, water supply solutions and waste management services including development of landfills and collection systems.<sup>iv</sup>

As a showcase, "*sustainable city*" there would be significant potential for Yarrabilba to attract global attention, particularly given the growing international demand for sustainable urban development solutions. This is likely to provide export market development opportunities not only for cluster members, but for the whole of South East Queensland, where at least 753 offices of environmental businesses are currently located, a good number of which already export or plan to export in the next three years.

## Research

*Establishing “world-class” “sustainable urban development” research facilities as part of the Yarrabilba cluster is likely to be well supported by Australian and International institutions. Such facilities could also become an important draw card for talented people and an incentive for businesses to locate within the cluster.*

International data suggest that research institutes are critical drivers of cluster development. Research institutes can facilitate, intellectual property generation activities, develop opportunities between firms, between government and firms and between the research sector and firms. Research institutes would also appear to attract skilled people, one of the critical success factors for attracting businesses to the cluster.

There is significant advantage to be gained from the location of a recognised University within the business cluster. The Cambridge Software Cluster, the Massachusetts Technology Collaborative (others) all demonstrate the benefits of co-location with Universities of international reputation. It is estimated that 31% of new firms incubated from the Cambridge cluster have spun out of the university.

42 out of 50 firms in one survey reported free technological advice from University based staff, through formal or informal networks, with 14 reporting this to be critical to the success of the firm.<sup>iv</sup>

The search for research partners need not be limited to Australia. The Harvard Business School Institute for Strategy and Competitiveness for example has an interest in industry clusters. Other “world-class” institutions who have a focus on sustainable development may also have a shared interest in locating research and education facilities at Yarrabilba.

The survey of the Queensland Environment Industry identified insufficient linkages between industry and the research sector as a barrier to commercialising sustainable technologies. While industry was generally not involving others in their R&D processes, ideas being developed by research organisations were not necessarily market driven and the overall R&D effort tended to lack a global focus.

A lack of verification, testing and assessment facilities for new technologies was also highlighted as one of the barriers to commercialisation. For example, there is currently a lack of acoustic testing facilities in Queensland; companies need to send their work for testing in NSW. Vehicle emissions testing capability is also limited in Queensland, holding back the local development of such technologies.

Australian and Queensland government policy on environmental verification and testing (ETV) has been not to replicate the internationally recognised, comprehensive and expensive US and Canadian schemes. However, there is some scope to engage both levels of government in specific ETV processes for a focused group of technologies associated with sustainable urban development.

The Cooperative Research Centre (CRC) for Construction Innovation predicts that the Australian construction industry could become a world leader in sustainable building methods by 2020. Collaboration is seen as the key to this opportunity. The CRC plans to work with industry, to develop a comprehensive set of eco-design tools for all stages of the construction life cycle, to minimise energy use, greenhouse and other forms of waste or pollution.<sup>lvi</sup> The CRC could also be a suitable partner.

Establishing “world-class” “sustainable urban development” research facilities as part of the Yarrabilba cluster is likely to be well supported by Australian and International institutions. Such facilities could also become an important draw card for talented people and an incentive for businesses to locate within the cluster.

## Training

*The capacity of available training infrastructure to respond to employer needs and provide relevant training is critical to the success of industry clusters. Several potential partners could help Yarrabilba hit the ground running on the training front*

Yarrabilba intends to commence development of a small training centre from the initial stages of the development with plans to expand into comprehensive *environmental business training centre* over time.

International research suggests that strategies to achieve sustained economic growth are geared towards establishment of high levels of local skills formation and information exchange across the workforce and the capacity for knowledge spill-over through clustering. These strategies concentrate upon achieving high levels of education and links between knowledge, learning processes and industry.<sup>lvii</sup>

The quality and availability of training can also be a factor contributing to the development of successful clusters. This can apply to the existing workforce as well as to new and potential entrants to the labour market. The capacity of the available training infrastructure to respond to employer needs and provide relevant training is a key factor. The cluster can have an influence on the provider side in terms of encouraging appropriate provision that is flexible and meets with the needs of employers.<sup>lviii</sup>

Accessing and nurturing a strong skills base and a suitably qualified labour force are critical success factors for clusters. This is seen as a key factor in attracting and retaining companies as well as contributing to the successful development of companies within a cluster. The quality and quantity of the available labour force is thus a critical component in the development of successful clusters.<sup>lix</sup>

While the Queensland Environment Industry Survey identified lack of practical skills, knowledge and experience as a barrier to their growth, concerns appeared to focus less around appropriate University training and more around technical training and practical work experience.

The skills shortage is also a critical issue for Queensland as a whole, where demand for tradespeople, in particular, is far outstripping supply.

There is an opportunity to form a partnership with a vocational training provider such as TAFE Queensland, which is currently developing a “super campus” at Acacia Ridge with specialist training capabilities in building and engineering trades.

Partnership arrangements could also be formed with the Housing Industry Association that has achieved critical mass in Queensland with its professional accreditation and training program for “*Green Smart Builders*” and the Master Plumbers and Mechanical Services Association that has developed a “*Green Plumbers Network*”, training and accreditation program.

The Queensland Environment Protection Agency also has a successful “*Eco-Biz*” program to assist businesses to save money and capture new opportunities by reducing the environmental impact of their products, processes and facilities. There is some scope to develop a partnership with the EPA to establish “*Eco-Biz*” focused training facilities at Yarrabilba.

The capacity of available training infrastructure to respond to employer needs and provide relevant training is critical to the success of industry clusters. Yarrabilba may be able to draw on partners to create training facilities and capacity quickly in support of the development of the cluster and the attraction of firms to the development.

## Investment attraction

*“Some of the most prescient, influential and aggressive financial decision makers in our economy – entrepreneurs and private equity investors – are beginning to make substantial investments in Cleantech...[if investment levels continue to grow at current rates]... more than \$11 billion of venture capital will be invested in North American Cleantech companies between now and 2010.”*

*Source: Creating the California Cleantech Cluster September 2004*

There is limited international data available specifically on the investment attraction potential of business clusters. However, factors such as providing a focused entry point for investors; the success of business incubators in the US and UK; and the sheer weight of investment that has supported Silicon Valley; do however, indicate the investment attraction potential of business clusters.

One of the most significant indicators for the potential of Yarrabilba to attract investment is the increasing interest by the mainstream finance sector in what analysts are calling “Cleantech stocks” – clean, innovative and competitive technologies, products and services.

The California Cleantech strategy claims, “Some of the most prescient, influential and aggressive financial decision makers in our economy – entrepreneurs and private equity investors – are beginning to make substantial investments in Cleantech”.<sup>ix</sup>

They further claim that if Cleantech venture capital investment continues to grow at its current rate more than \$11 billion of venture capital will be invested in North American Cleantech companies between now and 2010.

At the 2<sup>nd</sup> Australasian Cleantech Finance and Investment Forum in Melbourne in August 2006, the growing market interest in environmentally friendly technologies, products and services was apparent. Australia is seen as a hot bed for the development of Cleantech and is clearly in the sights of investors from the four biggest markets for Cleantech - US, China, Europe and India. \$6.65 billion was invested in 328 Cleantech investment transactions in Australia in 2005.<sup>ix</sup>

Speakers at the forum suggested that investors look for the following characteristics in prospective Cleantech investments:

- Capable management team
- Commercially viable, scaleable technology
- Potential for competitive advantage
- Industry and product in growing market segment

The Yarrabilba environmental business cluster strategy is likely to contribute to these investment factors. Further Peter Castellias, Director of Clean Technology AustralAsia, one of the speakers at the forum, identified the potential for the development of a “*Cleantech cluster*” as an important part of a successful branding strategy for the Australian Cleantech sector.

Almost half of those surveyed for the *Queensland Environment Industry Survey* identified a lack of financing and financial risk as factors that were barriers to their business growth. Only 1% of businesses surveyed had accessed either ‘private equity funding’ or ‘venture capital or business angel funding’. These companies are largely funding their growth with their own working capital. The Yarrabilba cluster offers an opportunity for the local industry to access investment capital currently out of their reach.

While several case studies presented at the 2<sup>nd</sup> Australasian Cleantech Finance and Investment Forum were of Queensland environmental technologies, representatives of international, NSW and Victorian based financial firms dominated the key note speakers and expert panels.

Yarrabilba could jump-start the development of a Cleantech investment base in Queensland by attracting or developing local Cleantech investment funds and firms off the back of the opportunities provided to the local industry by the environmental business cluster.

## Critical success factors

*DLL has the unique opportunity to build a place based environmental business cluster at Yarrabilba and a global hub for sustainable urban development solutions within a development that could be branded as Australia's first sustainable city. There is little doubt that this could provide significant economic, social and environmental dividends for Queensland.*

The analysis in this report is contingent upon a number of critical enabling mechanisms being in place in order to maximise the opportunity for successful cluster development.

Supportive government policy is critical to creating economic opportunities through industry clustering. It is important that the Queensland Government and Beaudesert Shire Council ensure that a supportive, cooperative policy environment exists to facilitate and enhance the development of Yarrabilba.

Identifying clustering opportunities is one of the major priorities arising from the *Queensland Environment Industry: Profile and Trends Report 2006*. Sustainable urban development is a central theme to the report and is likely that any subsequent action plan might involve the development of a sustainable urban development cluster in South East Queensland. Yarrabilba is well placed to be the centre point for such a cluster.

Establishing appropriate success measures is also another important aspect identified as part of this study. While there is a plethora of information on the many industry clusters around the world, there is very limited actual detailed data available. By establishing a comprehensive set of measures from the outset, Yarrabilba would be well placed to create a new benchmark in this area of cluster development. Such measures include<sup>lxii</sup>:

### **Networks & Partnerships**

- Number of partnership arrangements
- Number of co-operation arrangements
- Number of networking events
- Number of joint research activities
- Extent of social capital

### **Innovation and R&D**

- R&D employment
- R&D expenditure
- Number of business spin-outs
- Number of patents applied for
- Number of innovation awards
- Number of new products/process adopted

### **Human Resources**

- Number of vacancies
- Educational attainment rates
- Number of defined qualifications
- Extent of measured skills gaps

### **Economy and Enterprise**

- Net employment change (in sub-region)
- Density of home based businesses
- Increase in GDP
- Growth of existing businesses (in sub-region)
- Number of firms within cluster
- Levels of investment
- Levels of profitability
- Value of exports

DLL has the unique opportunity to build a place based environmental business cluster at Yarrabilba and a global hub for sustainable urban development solutions within a development that could be branded as Australia's first sustainable city. There is little doubt that this could provide significant economic, social and environmental dividends for Queensland.

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