

# Liv Apartments One Planet Action Plan

DHA Fremantle Apartments



**CUNDALL**

**liv** APARTMENTS

**DHA**  
Defence Housing Australia

---

## Message from Defence Housing Australia

### Why Defence Housing Australia believes this community will demonstrate national leadership:

- Our Liv Apartments One Planet Action Plan has been recognised by Bioregional as demonstrating National Leadership in One Planet Living in 2017.
- We believe that the Liv Apartments development will show national leadership as not only does it demonstrate its commitment to environmental and financial sustainability, but also its determination to improve the health and wellbeing of its residents and staff of the building.

- All the residential units comprising Liv Apartments will feature environmental, energy and water saving initiatives intended to reduce household bills and energy consumption. These include solar PV panels, edible gardens, landscape irrigation, a waste reduction strategy, energy saving ceiling fans and public plaza space with lawn. These initiatives are expected to reduce household bills and energy consumption at the apartment development.

- Liv Apartments would be one of only a handful of endorsed One Planet Communities across Australia and one of fewer than 20 worldwide. To us this demonstrates real leadership and shows that by using the OPL Framework DHA's Liv Apartments development is at the forefront of community and sustainable living.

### Cade Taylor

Defence Housing Australia  
Senior Development Manager



## Message from Cundall, One Planet Integrator

### Why the OPI believes this community will demonstrate national leadership:

Liv Apartments will show national leadership as it is a development that has been designed to create a community with a diverse range of healthy and sustainable living options within the existing Fremantle suburban area. Through the 10 Principles within the One Planet Living framework it has taken the standard of living in the area to a new level by incorporating a number of initiatives across the development that encourages its residents to lead happy, healthy and sustainable lives. Some of the initiatives include, but are not limited to:

- Circa 10,000 recycled bricks from demolition for use in the landscaping design;

- Organic waste placed into the community GAIA dehydration machine;
- Art installation by local artists to demonstrate and inspire the sustainable nature of the development;
- Minimum 6-star NatHERS, Average 7.5-star NatHERS achieved for the apartments;
- 80kWp of PV panels installed on the roof of the development;
- Welcome packs given to all residents to encourage planting and growing edible foods, healthy living, reducing energy and water, recycling and/or community living.
- An online web and app for the development to outline the OPL principles, allow residents to monitor their energy and water use, advertise community events, recommendations for reducing waste and much more.

Whilst many similar developments continue to operate a business-as-usual approach to residential building, Liv Apartments has stepped out of the developer comfort zone and shown courage and leadership to design a development that stands out. Hopefully one day this becomes the minimum benchmark for all new residential and community developments in the future.

### Oliver Grimaldi

Cundall  
Associate, One Planet Integrator

**CUNDALL**

# CONTENTS

---

<b>About the project</b>	<b>1</b>
<b>What is One Planet Living</b>	<b>2</b>
<b>One Planet Action Plan</b>	<b>4</b>
<b>Liv Apartments - 10 Principles</b>	<b>5</b>
<b>Health and Happiness</b>	<b>6</b>
<b>Equity and Local Economy</b>	<b>7</b>
<b>Culture and Community</b>	<b>8</b>
<b>Land and Nature</b>	<b>9</b>
<b>Sustainable Water</b>	<b>10</b>
<b>Local and Sustainable Food</b>	<b>11</b>
<b>Travel and Transport</b>	<b>12</b>
<b>Products and Materials</b>	<b>13</b>
<b>Zero Waste</b>	<b>14</b>
<b>Zero Carbon</b>	<b>15</b>
<b>Closing statement</b>	<b>16</b>



# What is One Planet Living

## Background

On average, each person requires the equivalent of 1.7 earths to provide the resources necessary to maintain our current rate of resource consumption and waste production, while in Australia this figure reaches as high as 4.1 earths.<sup>1</sup>

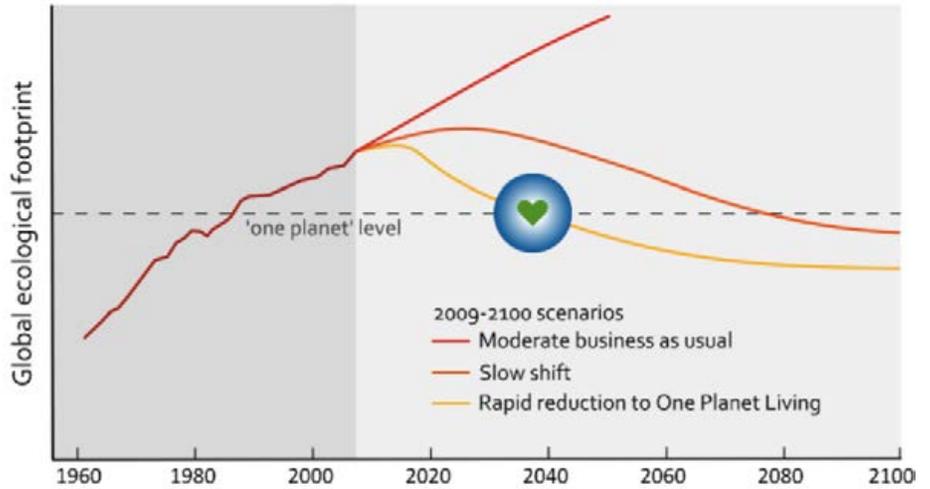
Today, the world's population is consuming naturally renewing resources and polluting the planet at a rate 50% higher than what the earth can replenish or absorb. Global levels of biodiversity are falling with the Living Planet Index (WWF 2016) declining by over 58 percent between 1970 and 2012, with freshwater species declining by 81 per cent between 1970 and 2012. Unless action is taken now we could see a two-thirds decline in biodiversity in half a century from 1970 to 2020.

The Living Planet Report (WWF 2016) indicates humans are now exceeding the world's capacity to regenerate natural resources by 50% faster than can be replenished. If our demands on the planet continue at the same rate, by 2030 the equivalent of two planets' worth of resources will be needed to maintain our lifestyles, critically limiting the capacity for future generations to access resources on earth.

## One Planet Living

One Planet Living is a vision of a sustainable world, in which people everywhere can enjoy a high quality of life within the productive capacity of the planet, while leaving space for wilderness and wildlife. It uses ten principles of sustainability as a framework with a headline target for each principle that is linked to the environmental limits of the planet.

One Planet Living is an initiative of Bioregional and its partners to make truly sustainable living a reality. One Planet Living uses ecological and carbon foot printing as its headline indicators. It is based on ten guiding principles of sustainability as a framework.



The concept of One Planet Living builds on sustainability work carried out over the past few decades with the additional that to achieve sustainability, the concepts need to be easy, attractive, and affordable for people everywhere to lead a whole sustainable lifestyle. Not just in terms of green buildings, but wider infrastructure, products and services all wrapped up in a simple and clear story which people can understand.

## 10 Principles

The One Planet Living framework is divided into ten easy-to-grasp principles which aim to make it easier and more attractive for all individuals to lead a happier and healthier life within the environmental limits of the planet.

Adjacent is a summary of the ten principles.

<sup>1</sup>Global Footprint Network, National Footprint Accounts, 2018, based on 2014 data.

## Ecological Footprint

Ecological footprint analysis is at the heart of One Planet Living as the overarching indicator of what constitutes a sustainable level of consumption, measuring our consumption of natural resources in global hectares of land and sea.

Ecological foot printing shows that if everyone in the world consumed as many natural resources as the average person in Western Europe, three earths would be needed to support human needs, where If everyone consumed as much as the average Australian, more than four earths would be needed. In Africa the overall average is just under one planet, however this figure disguises considerable variations between regions and lifestyles.

Over 150 Heads of State attended the opening of the Conference of Parties in Paris in December 2015, where the goal of limiting global temperature increase to well below 2 degrees Celsius was reaffirmed, with an aim for no more than a 1.5-degree Celsius rise. This is despite average global temperatures already increasing by over 0.8 degrees Celsius.

To avoid a two degree, rise global greenhouse gas emissions need to be reduced by 50% from 1990 levels by 2050. For this to happen CO2 emissions will have to be no more than 0.8 tonne per person per annum by 2050. This requires staged planning for the transition. The time to act, to reduce emissions and increase ecosystem services and biodiversity, is now.



	<b>Health and happiness</b>	Encouraging active, social, meaningful lives to promote good health and wellbeing
	<b>Equity and local economy</b>	Creating safe, equitable places to live and work which support local prosperity and international fair trade
	<b>Culture and community</b>	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living
	<b>Land and nature</b>	Protecting and restoring land for the benefit of people and wildlife
	<b>Sustainable water</b>	Using water efficiently, protecting local water resources and reducing flooding and drought
	<b>Local and sustainable food</b>	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein
	<b>Travel and transport</b>	Reducing the need to travel, encouraging walking, cycling and low carbon transport
	<b>Materials and products</b>	Using materials from sustainable sources and promoting products which help people reduce consumption.
	<b>Zero waste</b>	Reducing consumption, re-using and recycling to achieve zero waste and zero pollution
	<b>Zero carbon energy</b>	Making buildings and manufacturing energy efficient and supplying all energy with renewables

<sup>2</sup>BioRegional, One Planet Living, 2016

# One Planet Action Plan



## Barriers

### Rainfall Capture for Landscape Irrigation

Due to the volume and timing of rainfall, Perth presents a difficult climate for rainwater capture and reuse for landscape irrigation. Only 5% of annual rainfall is captured during summer when it is most required, while 55% falls during winter months.<sup>3</sup>



## Methodology

To determine the best approach for achieving One Planet guidelines for the development, a One Planet Analysis was first conducted. This assessment aimed to identify potential improvements in the current design to set realistic and achievable targets that benefit the Liv Apartments occupants and the wider community.

The One Planet Action Plan extends upon the One Planet Analysis by including additional information related to how initiatives assisting to achieve each of the targets will be rolled out during the design, construction and operation of the project. Details related to the best methods to measure and monitored key performance indicators were explored to allow the ongoing holistic performance of the building to be tracked during operation.

## Project Visioning

Based on project visioning and research into how to best utilise the development for One Planet principles, the Liv Apartments Fremantle development aims to achieve the following overarching goals:

- Bringing together community – creating an inclusive social environment while maintaining and improving local community
- Encouraging economic and social diversity – support equity, local employment and a diverse range of occupants
- Efficient water and energy use – reduce consumption through efficient strategies and renewable technologies
- Alternative transport options – provide easily accessible alternatives to car transportation
- Healthy local food and active living – promote sustainable food choices and healthy lifestyle choices
- Reduce waste and material use – reduce waste generation, reuse where possible and recycle to avoid adding to landfill

## Energy Use in Residential Buildings

In traditional residential apartment buildings tenants are responsible for sourcing their own electricity provider. Liv Apartments includes a tenant embedded network which covers all energy and water use across the development. Tenants are invoiced by strata which allows for 100% GreenPower to be purchased in addition to reducing electricity rates through bulky buying principles.

## Gas for Retail Tenancies

Although gas will not be required for residential apartments, food and beverage outlets forming part of the retail tenancies will require gas for cooking purposes while the organic waste dehydration unit also requires gas to operate.

<sup>3</sup>Bureau of Meteorology, Climate Statistics for Australian Locations, Perth Metro

# Liv Apartments - 10 Principles

The following table outlines the goals and targets identified for the Liv Apartments Fremantle development based on the One Planet Action Plan:

Principle	Goal	Target
<b>Health and Happiness</b>	Number of neighbours known by name	Greater than 15
	% people talking on regular basis	Greater than 50%
	% of residents involved in active activities	Greater than 50%
<b>Equity and Local Economy</b>	Housing adaptability	Greater than 50% of apartments designed with accessibility in mind
	Housing affordability	Greater than 35% of apartments available to low-med income earners
	Support of Small and Medium Enterprises (SMEs)	All retail providers SMEs
<b>Culture and Community</b>	Participation rates in a minimum one event	Greater than 20%
	Number of cultural events per year	Greater than 2 events
<b>Land and Nature</b>	% increase in site biodiversity	Greater than 50%
	Balcony space provided to all residents	100% of apartments
<b>Sustainable Water</b>	% reduction in potable water consumption	Greater than 20%
	% of stormwater detained on site	90% water detained
<b>Local and Sustainable Food</b>	% of landscaping edible	Greater than 10%
	% apartments have access to food growing space	Greater than 75%
	Number of vegetarian and/or healthy menu items	Greater than 5 per venue
<b>Travel and Transport</b>	% residents using sustainable transport options	Greater than 40%
	% small trips taken on foot	Greater than 20%
<b>Materials and Products</b>	% reduction in embodied energy (compared to standard building)	Greater than 25%
	Identify key materials for improvement	Greater than 5
<b>Zero Waste</b>	% of total waste diverted from landfill	Greater than 95%
	% of organic waste diverted from landfill	Greater than 60%
	% reduction in waste during construction	Greater than 20%
<b>Zero Carbon Energy</b>	% increase in energy efficiency over minimum compliance	Greater than 25%
	% site electricity from onsite renewable energy generation	Greater than 10%
	% renewable energy for residents	100% renewable



# Health and Happiness

Individuals who have access to an active, social and meaningful life are likely to experience better health and wellbeing than their counterparts. Currently however, on average over 65% of Australians experience little or no activity during their everyday lives.

Approximately 60% of Australians aged 18 or over are classified as either overweight and obese. Furthermore, around 70% of people in the same demographic are exposed to some form of psychological distress, with roughly 10% experienced this at high levels.<sup>4</sup>

## Key Strategies

- Community space accessible for all residents provided within the central courtyard of Liv Apartments. The podium area in the private communal area will be used for hosting communal BBQs and other resident gatherings.
- Liv Apartments is adjacent to safe pedestrian walking paths which lead into and around Fremantle, including to Fremantle city centre, the coast and nearby beach and nearby parks. The development site is also less than 400m to popular cycling routes and paths leading into and around Fremantle, but also leading north to Perth city and south to open / countryside areas.
- Communal EOT Facilities are for the use of residents and also staff of the commercial / retail units.
- Each residential unit has their own store room which are to be used for storing bicycles.
- There are also a number of visitor bicycle racks located around the site, and on the streets of both sides of the development.
- Gym/pool facility membership offerings to a portion of tenants at discounted or complimentary rates.
- Liv Apartments site is close to many exercise and active lifestyle classes for the residents.



	Goal	Target	Baseline
HH1	Number of neighbours known by name	Greater than 15	2 neighbours
HH2	% people talking on regular basis	Greater than 50%	25% of residents
HH3	% of residents involved in active activities	Greater than 50%	15% of residents

## Measuring and Monitoring

As most of the targets related to health and happiness relate to the community's outcomes, surveys can be conducted to address the ability for the initiatives to meet the project goals for this principle.



<sup>4</sup>Australian Bureau of Statistics, 4364.0.55.001 – Australian Health Survey: First Results, 2011-12

# Equity and Local Economy

For its size, Fremantle is an diverse city consisting of a population is made up of approximately 62% people born in Australia of which 1.6% are Indigenous Australians. The largest overseas-born groups are from England (8.6%), Italy (4.4%), New Zealand (2.2%), Scotland (1.4%) and Portugal (1.0%).<sup>5</sup>

In terms of economics, the City of Fremantle includes a large mix of professions with over 2,000 registered businesses, many of which are Small and Medium Enterprises (SMEs) with 75% employing less than five people.<sup>6</sup>

## Key Strategies

- Accessible site, oversized corridors, on grade balcony and shower mediums, accessible end of trip and public toilet facilities.
- Grants/allowances available for apartment buyers who require greater levels of accessibility (hand rails and assistance aids).
- Liv Apartments includes a large amount of diverse apartment types.
- The NBN network allows for faster internet connections for residents, which can facilitate working from home if required or necessary.
- Construction development will lead to an increase in community employment. New development will increase employment during operation through retail and tenant offerings when compared to the previously unused warehouse.
- Main contractor to source 11% apprentices for construction works when applicable. By comparison, 2.3% of Australian workers are employed as an apprentice or trainee.



	Action	Target	Baseline
EQ1	Housing adaptability	Greater than 50% of apartments designed for accessibility	n/a
EQ2	Housing affordability	Greater than 35% of apartments available to low-med income earners	n/a
EQ3	Support of Small and Medium Enterprises (SMEs)	All retail providers SMEs	n/a
EQ4	Apprentices employed on site (limited by practical availability)	11% apprentices employed during construction	5% apprentices

## Measuring and Monitoring

The diversity and equity of Liv Apartments will be assessed based on the ability of individuals and business able to utilise the facilities compared to the Fremantle average. Affordable housing is to be built into Liv Apartments design and sales strategy, while the number of SMEs will be tracked based on the diversity of the retail tenancies.



<sup>5</sup>Australian Bureau of Statistics, 2006 Census Data

<sup>6</sup>City of Fremantle Economic Profile, <http://economy.id.com.au/fremantle/home>

# Culture and Community

Fremantle is known for its wide variety of culture and community offerings including a variety of dining options, small art galleries, music venues and nightlife. The city has indigenous and colonial historical ties, in addition to a vibrant tourism and life style presence.

## Key Strategies

- Community space accessible for all residents provided within the central courtyard of Liv Apartments.
- The podium area in the private communal area will be used for hosting communal BBQs and other resident gatherings. This area also includes edible gardens which will be looked after by residents.
- Public art to be provided from by local artists and to feature sustainability theme.
- The Placemaker will also nominate individuals from the community to champion 10 principles.
- The online website / app for the development will include a 'noticeboard' for Liv Apartment community activities

## Measuring and Monitoring

The number of cultural and community related events offered and attended will be tracked using attendance sheets and surveys with building tenants.



	Action	Target	Baseline
CC1	Participation rates in a minimum one event	Greater than 20%	n/a
CC2	Number of cultural events per year	Greater than 2 events	1 event



# Land and Nature

Liv Apartments resides in the east end of Fremantle in a previously industrial area, with the site itself located on a previously run-down former car yard.

## Key Strategies

- The existing site contained warehouses and industrial / retail units with no biodiversity / vegetation site.
- An edible garden space is allocated for the residents to grow edible vegetation.
- Placemaker engaged to encourage increase and engagement with land and nature within Liv Apartments
- Balcony space is provided to residential units to allow for and encourage planting.
- Compost bags are to be given to each new resident as part of the 'starter kit' for living within Liv Apartments. Following this compost bags will then be made available by the building manager.
- Each resident will receive a gardening kit with seedlings to grow herbs and vegetables as part of the 'starter kit'.
- The starter kit will include information on the One Planet Living principles and how to live 'sustainably'.



	Action	Target	Baseline
CC1	% increase in site biodiversity	Greater than 50%	10%

## Measuring and Monitoring

Most the benefits related to land use and wildlife are intrinsic to the design and site, therefore no monitoring is required beyond maintenance of the current design.



# Sustainable Water

The average Perth household uses approximately 277 kilolitres of water per annum which equates to 106,000 litres per person. Approximately half of this water use is consumed inside the house, with 44% used outdoors and 4% from pipe leakage.<sup>7</sup>

## Key Strategies

- The new landscaping that is to be installed is to be classed as native or xeriscape. This means that the landscaping will require minimal irrigation and hence a reduced water consumption.
- All the landscaping is to be supplied with a drip irrigation, instead of spray irrigation which will further reduce water consumption for the landscaping.
- All stormwater discharged through infiltration sumps to superficial aquifer.
- Each apartment will have a water sub-meter and water consumption is to be conveyed on the online app / web.
- Tenant water consumption for all apartments is metered with tenants having access to a portal to monitor usage



	Action	Target	Baseline
SW1	% reduction in potable water consumption	Greater than 20%	15% reduction
SW2	% of stormwater detained on site	90% water detained	n/a

## Measuring and Monitoring

The annual water consumption associated with Liv Apartments will be tracked by investigating utility bills.



<sup>7</sup>Perth Residential Water Use Study – 2008/2009

# Local and Sustainable Food

Food has a large impact on our health in addition to our individual environmental footprint. Only around 6% of Australians adults consumed an adequate amount of fruit and vegetables daily<sup>8</sup>, while 69% of Australians reported to have bought one or more certified organic product in the past 12 months.<sup>9</sup>

Approximately 18% of global greenhouse gases are associated with livestock production such as meat and dairy.<sup>10</sup> Currently, 56% of Australians currently report all evening meals containing some form of meat<sup>11</sup> with only 5% of Australians identify themselves as vegetarian.<sup>12</sup>

## Key Strategies

- In the northern section of the communal garden there will be an edible garden for the residents to use and cultivate for themselves. This will provide locally sourced food but also a communal activity for the residents within Liv Apartments. There is also a communal BBQ area for residents to convene and interact communally.
- Balcony space is provided to residential units to allow for and encourage planting.
- Liv Apartments is within close walking distance to the largest food market in the state of WA. The Fremantle Markets are renowned for its fresh food and is only 1.3km (15min) walk away. <https://www.fremantlemarkets.com.au/>
- Placemaker engaged to incorporate programs involving elements of healthy living and productive gardening.
- Food and beverage outlets to contain options which are local, nutritious, organic, and vegetarian/vegan
- Compost bags are to be given to each new resident as part of the 'starter kit' for living within Liv Apartments. Following this compost bags will then be made available by the building manager.



	Action	Target	Baseline
LSF1	% of landscaping edible	Greater than 10%	5% edible
LSF2	% apartments have access to food growing space	Greater than 75%	50% apartments
LSF3	Number of vegetarian and/or healthy menu items	Greater than 5 per venue	3 per venue

## Measuring and Monitoring

The percentage of tenant utilising food from either the on-site edible garden or balcony roof space will be tracked using occupant surveys. Food and beverage menu options will be assessed to determine the number of suitable sustainable food options.



<sup>8</sup>Australian Bureau of Statistics, 4364.0.55.001 – Australian Health Survey: First Results, 2011-12

<sup>9</sup>Australian Food News, Australia's Appetite for Organic Foods at Record Levels

<sup>10</sup>David Suzuki Foundation, Food and Climate Change

<sup>11</sup>Sanitarium Vegetarian Study (Newspoll), 2000

<sup>12</sup>The Vegetarian/Vegan Society of Queensland Incorporated (VVSQ), A Pound of Flesh

# Travel and Transport

The Liv Apartments site is located approximately 1.2km from the Fremantle city centre and Fremantle markets. The Fremantle train station is within a 10-minute walk while bus stops are situated close to the Queen Victoria Street entrance.

Many amenities are located within a 5-minute walking distance from the site including food and beverage offerings within Liv Apartments itself. The site is adjacent to a well-connected pedestrian and bicycle network.

## Key Strategies

- The site design maintains good connections to public transport networks, including train and bus routes. The site is located within 1km of the Fremantle train station connecting it to Perth and other areas around Perth. The site is also located within 1km of two bus stops which provide free bus services around Fremantle.
- Cycling facilities for Liv Apartments include;
  - Bicycle store per residential unit
  - Bicycle hanging racks permitted on adjacent walls to car bays
  - Visitor bicycle racks located around site
- The basement car park includes small car space and motorcycle spaces, to encourage the use of low-emitting and low fuel consumption vehicles.
- Basement car park includes allocation for electric car charging bays.
- Bicycle retailer in the commercial units, to organise communal bike rides, a bike doctor for residents and bike hire for the local / wider community. The details are to be confirmed.



	Action	Target	Baseline
TT1	% residents using sustainable transport options	Greater than 40%	25% residents
TT2	% small trips taken on foot	Greater than 20%	15% residents

## Measuring and Monitoring

Tenant use of sustainable transport options (including small trips completed on foot) will be tracked using occupant surveys.



# Products and Materials

Buildings account for around 39% of the annual mineral depletion and 42% of solid waste impacts. In general, concrete, steel, aluminium and brick have the most significant impact on the environment.<sup>13</sup>

## Key Strategies

- Liv Apartments to re-use circa 10,000 recycled bricks, 700m of timber rafters and 80 ceiling tiles from demolition in reconstruction.
- The following materials / equipment / actions were incorporated to further improve the overall LCA assessment:
  - Single to double glazed windows
  - Improved thermal performance (6 to 7.6 stars)
  - Lighting: Increase natural lighting (Multi-Res)
  - Appliances: High Efficiency
  - Provision of ceiling fans
  - Efficient water appliances
- All timber materials or composite materials used in the building and construction works shall meet Forest Stewardship Council (FSC) certified or Post-consumer re-used or recycled timber.
- There will be an online web and app for the development which will include recommendations for reducing waste and recycling.



	Action	Target	Baseline
PM1	% reduction in embodied energy (compared to standard building)	Greater than 25%	n/a
PM2	Identify key materials for improvement	Greater than 5	n/a

## Measuring and Monitoring

Most initiatives related to this principle occur during the design and construction phases of Liv Apartments. As such, no monitoring requirements are applicable.



<sup>13</sup>RMIT University, Scoping Study to Investigate Measures for Improving the Environmental Sustainability of Building Materials, 2006

# Zero Waste

Approximately 1.5 million tonnes of waste go to WA landfill each year, of which roughly 50% is from construction and demolition.<sup>14</sup> Western Australian households produce just under 2.5 tonnes of waste per person per year<sup>15</sup> of which nearly 47% is organic waste and 23% is paper and cardboard.<sup>16</sup>

## Key Strategies

- An on-site dehydration unit will be used for handling food waste, which includes food waste from residents and from the commercial and retail (food and beverage) units on ground floor.
- The waste store room on the ground floor has been adequately sized for Liv Apartments to store recycled waste (comingled, glass, compost etc.) as well as non recyclable waste.
- Liv Apartments to re-use circa 10,000 recycled bricks, 700m of timber rafters and 80 ceiling tiles from demolition.
- Of the demolished materials removed from the site, up to 96% has been recycled off site thus far.
- Online and mobile app to update on waste consumption rates, useful tips and other relevant information
- Residents will be encouraged to separate organic waste from their recyclable/non recyclable waste and place in specialist bio-degradable bags
- Compost bags are to be given to each new resident as part of the 'starter kit' for living within Liv Apartments. Following this compost bags will then be made available by the building manager.



	Action	Target	Baseline
ZW1	% of total waste diverted from landfill	Greater than 95%	90% diverted
ZW2	% of organic waste diverted from landfill	Greater than 60%	30% diverted
ZW3	% reduction in waste during construction	Greater than 20%	10% reduction

## Measuring and Monitoring

Waste removed from site will be weighed separately and reported. Organic waste associated with the dehydration unit will be weighed and audited.



<sup>14</sup>RPS, Waste Generation in the West Australian Home Building Industry, 2007

<sup>15</sup>Australian Bureau of Statistics, 1301.0 – Year Book Australia, 2009-10

<sup>16</sup>Australian Bureau of Statistics, 4602.0.55.005 – Waste Account, Australia, Experimental Estimates, 2013

# Zero Carbon

Buildings are responsible for more than 40% of global greenhouse gas<sup>17</sup> of which approximately half are the results of residential buildings.<sup>18</sup> The average Western Australian household consumes approximately 5,801 kWh per year, the equivalent approximately 5.45 tonnes of CO<sub>2</sub>-e.<sup>19</sup>

## Key Strategies

- Liv Apartments will minimise energy demand, and hence energy costs from each residential apartment. Furthermore, occupant comfort is optimised within each apartment. This will be achieved through enhanced fabric design through increased insulation and enhanced glazing design through the installation of double glazing throughout. This will mean that Liv Apartments will exceed the minimum NatHERS requirements as per the BCA compliance code.
- All white goods appliances will be energy efficient units and have minimum star rating of 5 stars. This will reduce energy consumption from washing, drying clothes, dishwashing and refrigeration.
- All kitchens will install electric cook top and oven.
- The 80kW PV is allocated to reduce the use of overall energy use. This will reduce the peak energy use and is sized to provide all electricity at peak, aiming to drop the energy cost down to zero at peak.
- Online and mobile app to update with ongoing energy consumption data, useful tips and other relevant information
- Tenant energy consumption for all apartments is metered with tenants having access to a portal to monitor usage



	Action	Target	Baseline
ZC1	% increase in energy efficiency over minimum compliance	Greater than 25%	n/a
ZC2	% site electricity from onsite renewable energy generation	Greater than 10%	5% electricity
ZW3	% green power for electricity purchased	100%	10%

- Liv Apartments has been designed to operate as an embedded network. Power received into the site (from external sources) will be purchased by the Strata Company, from a wholesale provider. The strata Company will then on-sell the power at retail rates, to the residential and commercial/retail tenants/owners. The margin will be used to fund sinking fund works and upgrades (i.e., benefits all residents and owners).

## Measuring and Monitoring

The annual energy consumption and percentage GreenPower associated with Liv Apartments will be tracked using by investigating utility bills and annual PV output.



<sup>17</sup> UNEP Sustainable Buildings & Climate Initiative, Buildings and Climate Change: Summary for Decision-Makers, 2009

<sup>18</sup> The Climate Institute, GHG Mitigation in Australia: An Overview of the Current Policy Landscape, 2013

<sup>19</sup> Western Australian Council of Social Services Inc, WA State Election 2013: Cost of Living (Utilities) Facts, 2013

# Closing statement

Liv Apartments by Defence Housing Australia has been recognised by Bioregional as demonstrating National Leadership in One Planet Living in 2017. The One Planet Living recognition is based on the commitment by Defence Housing Australia to:

- Strive to create a community that enables residents to achieve One Planet Living as per the Goals and Guidance for Communities and Destinations;
- Implement the Liv Apartments One Planet Action Plan
- Review and report against the One Planet Action Plan across design, construction and occupancy stages of the community.
- The Liv Apartment One Planet Action Plan outlines the commitment by Defence Housing Australia to support residents to live a happy and healthy one planet lifestyle.

- Initiatives include:
  - Resident Welcome Pack providing information and resources to encourage residents to live sustainably
  - Online interactive resident information and activities
  - Emphasis on active health, local culture and local enterprises through resident programs, and engagement with the City of Fremantle, a One Planet City
  - Resource and waste minimisation strategy through a range of community reuse programs, waste diversion and resident guide
  - Zero carbon energy strategy with reduced energy demand through high thermal efficiency, onsite solar system, and 100% onsite and offsite renewable energy supply for residents

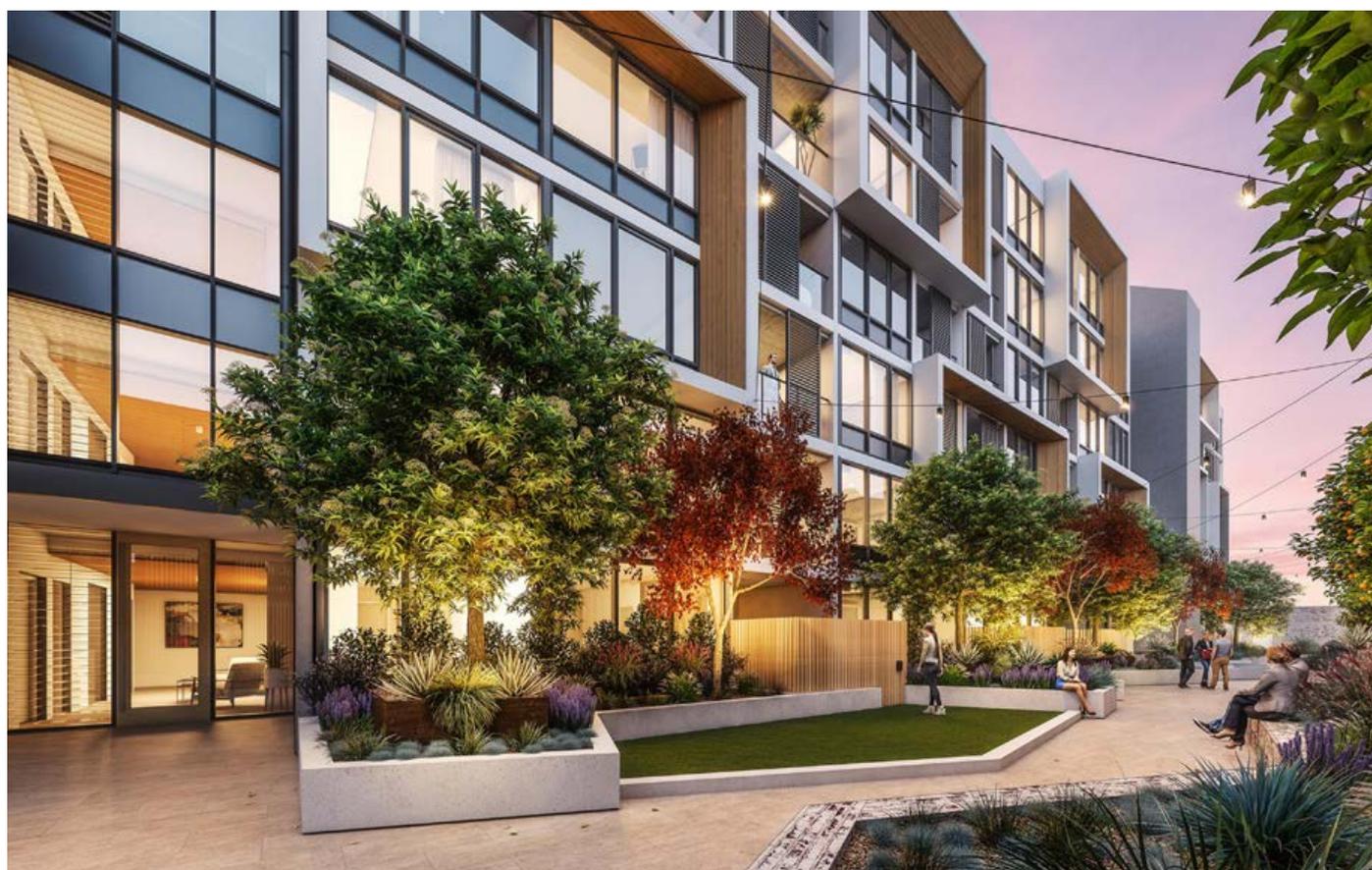
Bioregional looks forward to the continuing evolution towards One Planet Living for the residents and tenants at Liv Apartments, Fremantle.

**Suzette Jackson**  
Executive Director  
Bioregional Australia Foundation



**Defence Housing Australia**  
Level 1, 27-35 William Street  
Fremantle WA 6160  
Tel: +61 (0) 8 9210 3401  
[www.dha.gov.au](http://www.dha.gov.au)

**Cundall**  
Level 1, 1 Howard Street  
Perth WA 6000  
Tel: +61 (0) 8 9421 3700  
[www.cundall.com](http://www.cundall.com)





CUNDALL

**liv** APARTMENTS

**DHA**  
Defence Housing Australia