WHITE GUM VALLEY, PERTH

Project description

The White Gum Valley (WGV) development is an infill development located approximately 3km inland from Fremantle in Western Australia. The site was previously a special school that closed in 2008. The development includes more than 85 residential dwellings on a 2.3ha site and is classified as a medium-density infill development.

A precinct design process was undertaken by the developer in order to gain support from the City of Fremantle council and local community for climate responsive, higher density and more diverse housing. The local community further supported innovation to demonstrate lower energy and water use, while increasing biodiversity and tree retention. LandCorp (now Development WA) responded to these expectations by investing in White Gum Valley as a demonstration project to try innovation and new models of sustainable living.

Image: Evermore, White Gum Valley. Source: Rob Frith

Project drivers

For this project there was an alignment of drivers from the full range of stakeholders:

1. Community

It has been said that the broader White Gum Valley community is a well-informed, environmentally conscious community with very strong local government representation. This

interest led to the community playing an ongoing role in process of design, refinement, and community consultation.

2. The City of Fremantle

Council has committed to be One Planet Living (OPL) council, and LandCorp saw this was an opportunity to apply the same sustainability principles at a residential precinct level. WGV contributed to council's efforts towards maintaining their international certification level. Under the OPL framework, WGV received national, and then international certification as a 'One Planet Community'.

3. Western Australian Department of Water and Environmental Regulation (DWER)

Greg Claydon from DWER stated that:

"There was a mutual desire between the Department of Water, LandCorp, and Water Corporation to get better water sensitive urban developments happening … recognising our respective and comparative risk profiles, we can consider putting ourselves further out at the leading edge with these types of opportunities."

Stakeholder and community engagement

When the site was earmarked for development, a traditional 'top down' approach to community engagement was not considered acceptable by the community, and a Local Council Precinct Group was the main vehicle for engagement and as a conduit to the broader community. A precinct design process was subsequently undertaken with the local community which highlighted a strong desire for tree retention. Through an education process the community was shown by LandCorp that the site was capable of delivering more diverse housing types to suit people at different stages of their lives, and to demonstrate what could be done in terms of energy use, water use, biodiversity and tree retention. LandCorp selected White Gum Valley as a site to demonstrate innovation and more diverse, higher density living.

- The key stakeholder agencies and collaborators for WGV were:
- Land Corp (Now Development WA) – Western Australian Government's land and development agency.
- The City of Fremantle who now manage and maintain the public realm and community bore system in the WGV development and is the planning authority for the site.
- Water Corporation is a project partner that has utilised WGV as a waterwise development exemplar.
- Cooperative Research Centre for Water Sensitive Cities (CRC WSC) is a project partner, providing support for ongoing monitoring of the site and dissemination of lessons.
- Department of Water and Environmental Regulation (DWER) is responsible for water supply licensing, development of stormwater management guidelines and the facilitation of necessary approvals for non-drinking water supplies.

- Cooperative Research Centre for Low Carbon Living (CRCLCL) is a project partner that provided support for renewable energy initiatives, monitoring and communication activities.
- Josh Byrne & Associates (JBA) were the landscape architects, urban water and sustainability consultants for WGV and also coordinated the 'Waterwise Development Exemplar' communication and industry engagement program on behalf of the project partners.

Image: Gen Y Living, White Gum Valley. Source: Rob Frith. Image: Ringnecks, White Gum Valley. Souce: Mandy Bamford

Outcomes sought

The critical IWM Outcomes for the project were:

Outcome 1a – Connection with water and water literacy – Citizens actively participate in IWM processes because they have adequate knowledge of water cycle, water sector and current state of water affairs.

Outcome 1b – Shared ownership, management & responsibility – Citizens are active participants in creating, operating and maintaining relevant water system and its infrastructure.

Outcome 2c – Constructive organisational culture – Employees in all organisations are empowered and inspired to work in a collaborative and interdisciplinary manner to achieve IWM outcomes.

Outcome 3b – Cross-sector institutional arrangements and processes – Urban planning processes are coordinated and collaborative, involving the consideration of all long-term planning options and where stakeholders have clearly defined roles and responsibilities.

Outcome 3c – Public engagement, participation and transparency – Inclusive and representation of relevant different perspectives and meaningful involvement and empowerment of citizens in decision-making.

Outcome 6a – Activating connected green – blue space – The presence of many, distributed and well-connected green spaces and water assets. Green spaces can include

formal or informal parkland, and public realm open space that is designed and maintained as a shared/accessible green landscape e.g. streetscapes.

Outcome 6b – Infrastructure elements functioning as part of the urban water system – Adequate urban space and built form functions as an integral part of the water system. For example, raingardens, rainwater and stormwater harvesting, flood storage and conveyance, and water sensitive landscaping (pervious surfaces, heat mitigation), green roofs and walls that capture and treat rainwater or greywater.

Outcome 6c – Urban heat mitigation – Water systems are incorporated into the design of urban precincts in a way that reduce urban heat impacts through shading by trees and evapotranspiration (tree canopies, vegetation cover and soil moisture).

Options assessed

The options developed to meet the desired outcomes include:

1. Design guidelines and a sustainability upgrade package to make greener living easy for residents.

LandCorp developed design guidelines that amongst other things provides for a package to allow residents to achieve One Planet Principles. The package includes:

- Roof top PV system upgrade from the mandated 1.5kW to 3.5kW to make the detached homes achieve 'Net Zero Energy' status.
- A plumbed rainwater tank – the supply and installation of an above-ground plumbed rainwater tank (minimum 3,000L) with pump and accessories. This augments the mandated rainwater-ready plumbing.
- Shade tree – the supply and planting of a large (100L pot size) deciduous shade tree. This augments the recommendation for the inclusion of deciduous shade trees on the northern side of houses, and contributes to the precinct's tree canopy target of 25 per cent.

2. Rainwater supply and water efficiency measures.

WGV homes are targeting a 60-70 per cent reduction in mains water consumption across the various typologies. Key mains water saving initiatives include a community bore irrigation supply for use in both public and private gardens, as well as lot scale rainwater harvesting systems for toilets and washing machines. In addition, internal water fixtures were required to exceed the WELS rating currently required under the Building Code of Australia.

3. Passively irrigated trees and water efficient landscapes.

Water sensitive landscaping features have been integrated into the public and private realm across the site, including:

- Waterwise trees, shrubs, and lawn varieties incorporated into public areas
- Four passively irrigated street trees were trialled where stormwater was directed from the road to the root zone. Lessons learned from these prototypes have informed next generation designs on other Development WA projects.

- A list of suitable waterwise plants is provided to residents within the WGV Design Guidelines to assist residents with their own gardens, as well as in the public realm and street verges.
- Guidance is provided for water efficient planting techniques, irrigation and creation of permeable surfaces.
- As part of the sustainability package, homeowners were also offered a large (100L pot size) semi-mature shade tree for their backyard which will be managed for the first year.
- Communal bore for garden and open space irrigation.

A major innovation for the site was the creation of a community bore for irrigation of public and private green spaces. Whilst the use of groundwater from the superficial aquifer is common in Perth for irrigation of pubic open space, the servicing of private green space under a shared scheme is less common. What was unique with this scheme is that the City of Fremantle operate the system, with an option for the community to take over management in the future. Water use is separately metered at each lot to monitor water use. The City recover their operating costs via a special area rates scheme.

4. Landscaped infiltration basin and onsite stormwater retention.

Stormwater runoff from a 12ha catchment (excluding the WGV site) previously drained to an infiltration basin or sump located adjacent to the WGV site. Infiltration basins are common features in the Perth urban landscape, but unfortunately these assets often become maintenance burdens for councils and unsightly blights on the landscape for local communities.

The infiltration basin alongside the WGV site became a key water management feature for the site, even though it doesn't manage stormwater from the site itself. Instead, the WGV development includes retention of a 20 year ARI storm on-lot and infiltration galleries within the street network to manage a 100 year ARI event.

Following a proposal from the project team, LandCorp and the City of Fremantle co-funded the redevelopment of the sump to become a community asset with multiple benefits, including passive recreation and high biodiversity value, while maintaining its current drainage function.

Evaluation and financing

WGV has been recognised as an industry leader in sustainability, attracting visitors from across Australia and around the world to see first-hand how the challenges of sustainable development have been addressed.

The successful implementation of precinct-scale initiatives has demonstrated that sustainable developments can deliver strong social, environmental and economic dividends; it has provided a roadmap for a range of new, diverse opportunities in Western Australia and elsewhere; and highlighted the demand for innovative, sustainable housing product.

While financial factors were not the primary driver for WGV, the project has delivered sound returns.

All lots at the estate are sold out, with an average rate of one settlement every two months – including 23 single residential lots and five multi-unit sites.

One multi-unit site has been retained by Development WA for the development of a demonstration Baugruppe project in partnership with the University of Western Australia.

The three ground-breaking Gen Y apartments all settled within a six-month period following construction and their exhibition period of six months.

The return to Development WA was on par with a private developer's expected market return and was well in excess of Development WA's statutory hurdle rate, required by government to ensure no project undertaken achieves less than a defined rate of return.

Reflections and lessons learned

WGV has been the subject of detailed water use monitoring to understand the impact of the various water efficiency and alternate water source initiatives put in place at the site. Overall a 65 per cent[1] reduction in mains water use was achieved across the various typologies, including 51 per cent in the detached homes, 73 per cent in the attached homes and 75 per cent in the apartments.

From a hydrological perspective, the landscaped infiltration basin at WGV is performing well, overcoming early concerns from stakeholders regarding public risk. Results from monitoring has demonstrated that shallow surface water appears in extreme events only (50 year ARI or greater) and subsides within a few hours. The waterwise landscaping has also established successfully across the precinct, presenting a high level of amenity and providing valuable urban habitat. Other local government authorities are now looking at what has been achieved at WGV as a successful case study.

The story of WGV has been widely shared with industry and the broader community through various engagement activities, and it continues to be used as an example of how medium density development can lead to improved urban water management and liveability outcomes. Experience from WGV has been taken into subsequent infill projects by Development WA including East Village at Knutsford (also within the City of Fremantle) and the redevelopment of the former Hamilton Senior High school site (City of Cockburn). These 'next generation' projects are looking to scale-up what has worked at WGV and improve on lessons learned with the aim of progressing the vision for a waterwise Perth.[2]

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[1] When compared with Water Corporation's 2008/09 Perth Residential Water Use Study benchmark of 106kL per person per year.

[2] https://dwer.wa.gov.au/sites/default/files/Waterwise%20Perth%20Action%20Plan.pdf