

Climate resistance planting in urban settings

Amy Lodge

### **Acknowledgement**

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### **Introduction about me and the aims of my trip**

My name is Amy and for as long as I could remember I have always loved plants. I initially started out a florist but like most others switched to horticulture in 2020. Over the years my interest has been swayed towards the awareness of climate change. Growing up in a city environment, I have seen the rising temperatures, prolonged drought, and extreme weather and how it is reshaping our urban landscapes. In our summers becoming hotter and drier, I saw the parallels between the cities of Melbourne and Sydney. I wanted to see plants in a garden setting which have adapted to such extreme weather conditions and gain more experience working in a variety of gardens.

Through this project, the gardens on which I gained more experience were botanical, community led and public. I also wanted to expand my ecological knowledge that support my long – term goal of designing climate- resilient, biodiversity rich landscapes in the UK.

### **Purpose**

By 2050 London predicted to have the same climate as Barcelona. We need to transition to plants able to withstand these conditions. How can I plan for city design for a future so different to what I am being taught now? For me, it is vital to understand the behaviour of plants in our future climate. Through this project I will explain the history of each organisation and place of why I chose to go there and describe the work experience I did, plant highlights and recorded conversations I had with people.



### **October 2nd: Gardens by the Bay**

It was like stepping into a futuristic show of what a city garden could be when you walked into Gardens by the Bay. The walkways, plants, and tall buildings were all clean. From the observatory platform, I could see the two domes, the Supertrees, the ponds around them, and the paths that went around them. It was beautiful, but it looked a little fake.

As part of Singapore's plan to become a "City in a Garden," Gardens by the Bay opened in 2012. The Flower Dome and Cloud Forest are two of the biggest glasshouses in the world. Each one has about 30,000 plants growing in a climate that is very carefully controlled. The Flower Dome is like a Mediterranean climate, and the Cloud Forest is like a cool, misty tropical mountain. It was dramatic and immersive to walk through the Cloud Forest, which was full of mist and waterfalls.

I was aware of the environmental cost of these fake ecosystems: they need a lot of water, energy, and upkeep. Rainwater harvesting, solar panels on the Super trees, and cooling systems are all great ideas, but I wondered if these kinds of environments can really be called sustainable. The Super trees themselves, which acted as vertical gardens, ventilation shafts, and rainwater collectors, were amazing examples of how creative people can be in urban gardening.

### **3 October—Botanic Gardens in Singapore**

After the man-made beauty of Gardens by the Bay, walking into the Singapore Botanic Gardens felt like a breath of fresh air. The air got cooler under the thick canopy, and the noise of the city faded away. It showed me how green spaces can naturally control microclimates, making the rhythms softer than in controlled environments.

The Botanic Gardens were built in 1859 by British colonists to study crops like rubber. They are now a UNESCO World Heritage Site. Today, they are a centre for plant science, education, and conservation. This place shows how old landscapes can change with the weather, showing that tradition and sustainability can live together.

Biodiversity and resilience help people deal with the tropical heat and rain that comes and goes, which is made worse by global warming. Swales lined with stones collect rainwater from higher ground and move it downhill so it can be used again. Carpet grass (*Axonopus compressus*) makes a lawn that can grow in any weather, and big rain trees give you shade and coolness. Ponds and rain gardens help wildlife and keep stormwater from running off. Plants can handle heat and humidity, and the gardens naturally attract pollinators. This is very different from the controlled domes at Marina Bay.

I saw *Arundina graminifolia* (Bamboo Orchid) standing tall with straight stems and bright flowers. I also saw *Ficus kerkhovenii* (Strangler Fig), which starts in the canopy and sends roots down to wrap around its host. Deadwood was kept on purpose to

show how things break down, how fungi grow, and how insects move from the forest floor to the canopy. The Evolution Garden showed off ferns and plants from the past, giving visitors a glimpse into the earliest stages of plant evolution. Stone "reels" controlled rainwater and showed how sustainability can be used in real life.

The designed collections in the garden were just as inspiring. Seasonal displays like the "Swedish Alpine Experience" in the Flower Dome change every two to three months, so they need to be planned carefully. Rooftop gardens have layers of alpine plants and ornamental grasses, with *Bougainvillea* as an accent. Pergolas provide shade and make cool microclimates, and generators painted moss green blend in with the landscape. Gardeners worked under shaded paths below *Cissus nodosa*, also known as "Prince's Vine," to show how much care tropical gardens need all the time. Swinging chairs among *Plumeria* species, like my favourite *Plumeria obtusa* 'Dwarf Singapore Pink,' gave people places to relax and get lost in. A smart way to deal with tropical rain is to put the cactus collection in a greenhouse with open sides and good ventilation.

The Bamboo Garden with reflexology stone paths, the Leaf and Texture Garden that showed off the differences in foliage, and epiphytic ferns like *Pyrrhosia eleagnifolia* and *Platyserium spp.* mounted on bark were some of the other things that stood out. The National Orchid Garden had *Dendrobium "Serene Chang"* and *Heliconia rostrata*, and the paths were made to look like leaves to fit the plant theme. The open lawns served as performance spaces, showing how the garden was important to the community and the culture.

I was able to see how the gardens changed with the seasons and how they adapted to the weather from October to December. I learned that sustainability doesn't always mean using technology or being perfect. It can also mean choosing plants that can survive, using water wisely, and letting ecosystems work naturally. Kids played under rain trees, animals moved around freely, and orchids bloomed all over the place, showing how well people, plants, and the weather worked together.

### **Thoughts and Things I've Learned**

These months at the Singapore Botanic Gardens taught me how landscapes can bring people, nature, and the weather together. Sometimes, real sustainability means being patient, watching, and working with natural processes instead of just relying on technology. I learned more about how to design gardens that can withstand bad weather by seeing how plants do well in heat, humidity, and rain, and how water is collected and reused.

Layering is important in landscape design because canopy trees, understory plants, ground cover, and epiphytes create cooler microclimates, support biodiversity, and make the experience better for visitors. Learning about culture, education, and

recreation helped me see that gardens are not only places where plants grow, but also places where people and cultures come together.

It was helpful to see the difference between engineered landscapes, like Gardens by the Bay, and adaptive, ecologically resilient gardens, like the Botanic Gardens. Both are great, but I really love working with ecosystems that change on their own. This experience has made my career goal of designing landscapes that are beautiful, strong, useful, and in harmony with their surroundings even stronger.

- exploring singapore



to the right *Aglagonema* sp, in the middle *Philodendron* sp, on the left I think *Ficus* spp.



In the middle of the airport, dragonflies decorated in mainly *Semepriverins* succulents hanging above *Sansevieria trifasciata* 'Laurentii' rainforest scenario.



Mixture of *Phalaenopsis* orchids, *Philodendron*, and *Tillandsia* in a controlled misted display case.



Vegetable plantings integrated alongside buildings on the way into the city.



My first time seeing a *Strelitzia* being used as part of the landscape design.



*Gomphrena celosoides* climbing over stairs, showing a different perspective on microclimatic conditions in the city.

## - Marina bay gardens



A bird's-eye view of Gardens by the Bay.



Swedish Alpine Experience:

### The Flower Dome

Inside the Flower Dome at Gardens by the Bay, there is a seasonal display called "Swedish Alpine Experience."

The themed installations change about every 2 to 3 months. This shows how much planning, logistics, and horticultural management it takes to keep the visitor experience fresh.



Layered succulent planting arranged in front of mature structural trees,



A coordinated colour palette

featuring *Delphinium elatum* (white delphinium), *Hydrangea macrophylla* (blue hydrangea), *Vinca minor* (periwinkle), *Rosa spp.* (white rose), *Eustoma grandiflorum* (yellow lisianthus), and *Hosta spp.*



Interior of the Cloud Forest waterfall

The central waterfall inside the Cloud Forest dome recreates a misty mountain climate through controlled temperature and humidity systems.



The Supertrees illuminated after dark, transforming functional environmental structures into theatrical light installations and reinforcing the garden's fusion of sustainability and spectacle.



Looking up into the Supertree canopy during daylight, revealing the vertical planting structure and integrated irrigation systems that support epiphytic species.

# Singapore botanic garden



**Water management swales**  
Stone-lined swales designed to collect rainwater from higher ground and channel it downhill for recycling. These systems demonstrate how the garden works with Singapore's heavy rainfall to reduce runoff and support sustainable irrigation.



**displays**  
Every space, every window was adorned with plantings



**Rooftop garden planting**

A fully planted rooftop garden layered with alpine species and ornamental grasses, accented by vibrant *Bougainvillea* cascading over structures. The pergola provides extensive shade, reducing heat gain while creating a cooler microclimate beneath.



**Maintenance in shaded pathways**

A gardener clearing fallen leaves beneath the shade of *Cissus nodosa* ("Prince's Vine"). This image highlights the constant maintenance required in tropical gardens and the importance of vine-covered structures for cooling pedestrian routes.



**Swinging chair within the Frangipani collection**  
Seating positioned among *Plumeria* (Frangipani) species, encouraging rest and immersion within the scented collection. The integration of seating enhances visitor engagement with planting design.



*Plumeria 'Dwarf Singapore Pink'*  
 My favourite specimen,  
*Plumeria obtusa 'Dwarf Singapore Pink'*, valued for its compact habit, glossy evergreen foliage, and highly fragrant pink-edged white flowers. Its dwarf form makes it especially suitable for urban gardens and small spaces in tropical climates.



#### Open-air cactus greenhouse

An open-sided glasshouse with overhead fans designed specifically for the cactus collection. Unlike fully sealed temperate glasshouses, this structure allows airflow while protecting plants from excessive tropical rainfall — essential in Singapore's humid climate.



#### Ventilation and pathway design

Detail of the overhead fan system paired with a light-coloured pathway to reflect heat and improve thermal comfort within the cactus house.



#### Bamboo Orchid – *Arundina graminifolia*

The Bamboo Orchid is notable for its upright, reed-like stems and ability to flower continuously in tropical climates. Its vertical structure contrasts beautifully with the surrounding foliage.



#### Tropical rainforest interpretation zone

A representation of Singapore's original lowland tropical rainforest. The feeding table (used at certain times) encourages wildlife interaction, helping visitors connect with native biodiversity.



Inside the Glasshouse

Tour of the glasshouse facilities, observing plant collections and controlled growing environments supporting coastal and ornamental species.



Meadow Outside the Nursery

Native meadow planting located outside the nursery area (not open to the public), demonstrating informal, biodiverse planting styles suited to coastal conditions



Entrance to the St Kilda Building

Arrival point to the St Kilda environmental precinct, framing the transition from urban promenade to managed coastal landscape.



### Performance lawn landscape

An interactive lawn space designed for music and theatre performances, showing how botanical gardens can function as cultural as well as ecological spaces.



**Bamboo Garden – reflexology path**  
Stone pathways designed to mimic reflexology foot therapy. This interactive element combines wellness with landscape experience.



**Strangler Fig – *Ficus kerkhovenii***  
A remarkable strangler fig that begins life in the canopy, sending aerial roots downward, which eventually envelop and replace the host trunk. This species demonstrates competitive survival strategies in tropical forests.



**Urban planting observations**  
Residential balconies planted thoughtfully with palms positioned centrally and shielded from strong winds — an example of applied horticultural planning within dense city living.

## Leaf Shapes & Textures



### Leaf and Texture Garden

A planting scheme focused on foliage contrast rather than flower colour, emphasising shape, scale, and surface variation.



*Johannesteijsmannia perakensis*, with *Anthurium decipiens* and *Aglaonema costatum* adding layered texture within the understory.



Staghorn fern – *Platycerium* spp.  
Epiphytic fern attached to bark, showcasing its shield fronds and antler-like fertile fronds.



Epiphytic fern – *Pyrrosia eleagnifolia*

Growing mounted on bark, demonstrating adaptation to life above ground level in humid tropical environments.



*Begonia luzonensis* is used as a groundcover.



*Delonix floribunda* in bloom  
A flowering specimen of *Delonix floribunda*, adding seasonal colour and canopy structure.



*Lagerstroemia langkawiensis*



Entrance to Orchid Collection  
Formal entry into one of the world's most significant orchid collections.



*Heliconia rostrata*  
Known as the Hanging Lobster Claw, valued for its dramatic pendulous bracts and tropical impact.



*Dendrobium 'Serene Chang'*  
A cultivated hybrid reflecting Singapore's orchid breeding excellence.



Leaf-printed pathways  
Paths adorned with leaf imprints, subtly reinforcing botanical identity through hard landscaping design.



Evolution Garden signage  
Interpretation panels explaining plant evolution through geological time.



Prehistoric plant collection  
Ferns and ancient plant species representing some of the earliest life forms, offering visitors a journey through botanical history.

## **Melbourne botanic gardens tour**

The tour began with an Acknowledgement of Country to the Wurundjeri Woi Wurrung people, the Traditional Owners of the land where the gardens now stand. It was a grounding way to begin. A quiet reminder that landscapes carry stories long before they become designed spaces.

We started at the Ian Potter Foundation Children's Garden, created from a child's perspective. Instead of traditional play equipment, the garden encourages sensory engagement. There are no swings or slides. Children explore vegetable plots, splash through interactive water jets in summer, and wade in a shallow pond built for discovery. A Bottle Tree, *Brachychiton rupestris*, anchors the space with its swollen trunk that invites touch. Nearby, an ancient fossil tree, a Wollemi pine or a petrified log, adds a sense of time and mystery. *Aspidistra* fills the shaded understory with texture. A labyrinth of *Stipa gigantea* sways gently in the breeze, proving that even simple grass planting can feel playful and alive.

As we moved into the Australian Forest Walk, we traced the evolution of the space. It was once divided by geography, but now it blends species naturally along the southern bank of the gardens. One standout was the Coral Tree, *Erythrina*, surrounded by layered underplanting that added depth and structure.

Climate change was a recurring theme. A fallen English oak, *Quercus robur* 'Fastigiata,' once proud and towering, had collapsed from age and environmental stress. Rather than removing it, the team repurposed its branches as natural seating. It now serves as a living memorial, surrounded by recolonised grasses. New oaks have been planted nearby, *Quercus lobata* and *Quercus rusifolia*, chosen for their resilience in Melbourne's warming climate. The design still honours William Guilfoyle's vision. Enclosed, immersive spaces open suddenly into broad, framed vistas. Overhanging branches are left to grow freely, deepening the sense of enclosure rather than trimming it away. One plant highlight here was the Rock Orchid, *Dendrobium speciosum*, an Australian native epiphyte thriving on its host.

The Australian Drylands Garden tells a story of survival and adaptation. It showcases how native species endure with minimal water and thrive through ecological processes like fire regeneration and smoke water germination. Fire is not seen as destructive here. It is essential, both ecologically and culturally, woven into Indigenous land management practices that have shaped Australia's ecosystems for thousands of years.

One of the most striking areas was Guilfoyle's Volcano. This restored 19th-century reservoir was once used for water storage and as a fashionable Victorian landscape feature. Today it has been transformed into a dramatic display garden. Bluestone and rubber line the edges. Floating islands drift across the surface. Planting mimics lava flows, with silver-foliaged *Lotus berthelotii* adding a surreal touch. It is a beautiful blend

of heritage and contemporary ecological storytelling. Sustainability runs deep throughout the gardens. All green waste is reused. Wood is sourced and crafted on-site. Fertiliser use is minimal because the soil systems are mature and self-sustaining. Displays of rare and threatened Australian species are organised by region, offering visitors a chance to learn about conservation horticulture. Among these is *Acacia phlebophylla*, a rare species with both scientific and symbolic importance.

In the Fern Gully, a raised boardwalk now winds through the canopy to protect the root systems of mature Montezuma Cypress, *Taxodium mucronatum*. The area was once heavily damaged by Grey-headed Flying Foxes and has since been restored. Outdated deterrents such as harp traps were replaced with humane measures, including timed noise and light systems. These protect both the plants and the bats. Possums, however, remain an ongoing challenge.

Our final stop was the Grey Garden, home to rare cycads and plants adapted to rocky, arid conditions. The slope is steep and horticultural staff often abseil to maintain it, a vivid reminder of the physical commitment behind landscape care. This garden also reflects the legacy of colonial plant collecting, inspired by institutions like Kew, where early horticultural exchanges helped shape these living collections.

The Royal Botanic Gardens Melbourne operates under a Living Collections Strategy through to 2030 with a clear focus on climate adaptation, sustainability, and biodiversity. The gardens are also part of the Climate Change Alliance, a global network of more than five hundred members working to build urban and ecological resilience.

This tour was a powerful reminder that gardens are never static. They adapt, evolve, and respond, just as we must, to the shifting pressures of climate and culture. There is beauty not in permanence but in resilience.



Just outside the gates, sculptural creatures formed from woven metal and *Muehlenbeckia curiosity*. The pathway curves in a gentle spiral that moves both inside and beneath the structures. *Asparagus densiflorus* is underplanted to create a dense sea of green, softening the hard edges of the metal and grounding the installation within the landscape.



The stone paving in a maze shape makes people want to move slowly and explore. The *Brachychiton rupestris* in the middle has a swollen trunk that draws the eye. The rough bark makes you want to touch it, which adds to the sensory experience.





During the summer vacation period, water is gently sprayed from hidden grey-lined channels, making a cool mist. The whole water feature works on a closed-loop system that uses recycled water. This shows how play areas can be environmentally friendly without making the experience less fun.

This "*Brachychiton rupestris*", which is thought to be over 60 years old, is next to a bench where families sit. Its mature form holds the space together, providing shade and a sculptural presence. This shows how important it is to plan for trees in public gardens for the long term.



A long-dead red gum stump from the Murray River system has been placed in a spot where kids can crawl under it and play. Instead of being shown as a static object, it becomes part of imaginative play, which lets kids physically connect with Australia's long geological and ecological history.



*Banksia ericifolia*\* bends over the pond, which is part of the garden's system for using recycled water. Water lilies (*Nymphaea* spp.) and other aquatic plants are planted in the pond to help with natural filtration and habitat creation. This layering helps keep the water clear while also supporting a wide range of plants and animals.



Clare Trent leads us on the Australian Forest Walk, where she talks about how the planting has changed over time because of climate change while still staying true to the original design goals.



*Dendrobium speciosum*\* (Rock Orchid) growing epiphytically on its host tree shows how native Australian plants can do well in forest systems that are vertical. It is placed in a way that shows off biodiversity without hurting the tree.



The bright Coral Tree (*Erythrina*\* spp.) stands out against the *Clivia miniata*\* that is planted in layers below it. The bright orange flowers draw the eye up, and the clivia makes a thick evergreen ground cover. In the foreground to the right, similar underplanting techniques show how subtropical layering can add depth and seasonal interest



The preserved *Quercus robur* 'Fastigiata' now serves as a meeting space, showing how adaptive management can help with climate change. The tree was under a lot of stress because of the severe drought and lack of water. By turning it into seating, the material stays in the landscape cycle, which cuts down on waste and shows that it is adapting instead of losing it. This choice is in line with the gardens' overall plan: to respond to environmental pressures while keeping cultural and design integrity.



Dryland meadow planting featuring *Rhodanthe chlorocephala* subsp. *rosea*, *Xerochrysum bracteatum*, and *Craspedia canens*. These species provide seasonal bursts of colour while tolerating low-fertility soils and limited water. Their papery flowers and silvery foliage create softness without compromising resilience.

*Senna artemisioides* adds structural form to the meadow with its fine, glaucous foliage and bright yellow flowers. Its drought tolerance and ability to thrive in poor soils make it a valuable species for climate-adaptive planting schemes.



*Leucochrysum albicans* contributes a low-growing, silvery groundcover that reflects sunlight and reduces soil moisture loss



*Soleirolia soleirolii* (Req.) Dandy provides a contrasting soft green carpet in more protected pockets. Although not a true dryland native, its use in shaded or sheltered areas demonstrates how microclimates within a garden can support different planting layers.



*Plectranthus bellus* offers dense groundcover and seasonal flowering, demonstrating how adaptable understory species can respond to fluctuating rainfall patterns. Its ability to cope with heat while still providing ornamental value makes it relevant in discussions around climate-responsive planting.



*Eucalyptus petraea* planted within a stone setting as part of an experimental approach to establishment in harsh conditions. The surrounding rock moderates soil temperature and reduces evaporation, testing how trees might be successfully established in increasingly arid urban environments.



A fire pit with seats made from fallen trees from the gardens is a place for people to gather and learn about different cultures. It pays respect to the Wurundjeri Woi Wurrung people of the Kulin Nation, who are the land's Traditional Owners. The fire stands for cultural burning practices—ceremonies and ways of managing land that have been used for thousands of years to take care of the land, promote regeneration, and keep the ecosystem in balance. The fact that it is in the Drylands Garden makes it clear that fire is not just a destructive force, but also a cultural and ecological tool.



Floating islands move across the top of Guilfoyle's Volcano reservoir, softening the edges of the historic bluestone. These vegetated platforms contribute to water filtration, create habitat, and add movement to what was once purely functional infrastructure, demonstrating how heritage structures can be ecologically reimaged.



A Purple Swamphen mother bird and her young are hiding in the plants around the water, which shows how this restored reservoir now provides a great place for city wildlife to live. The calm water and layered plants make a safe place in the city, which shows how important botanic gardens are for supporting biodiversity.



Lotus berthelotii Mas drips down the side to represent lava from the volcano f



A raised boardwalk winds its way through the canopy. It was carefully made to protect the root systems of the mature trees below. By raising foot traffic above ground level, soil compaction is lessened and sensitive understorey planting can grow back without being disturbed. This shows how infrastructure can help keep ecosystems healthy over the long term.



Clare Trent led me through Fern Gully and told me how it works as a cool, shady microclimate in the gardens. The thick canopy and layered planting make the temperature drop noticeably in the summer. This gives visitors a break from the heat and helps plants that need a lot of moisture to thrive in Melbourne's climate.



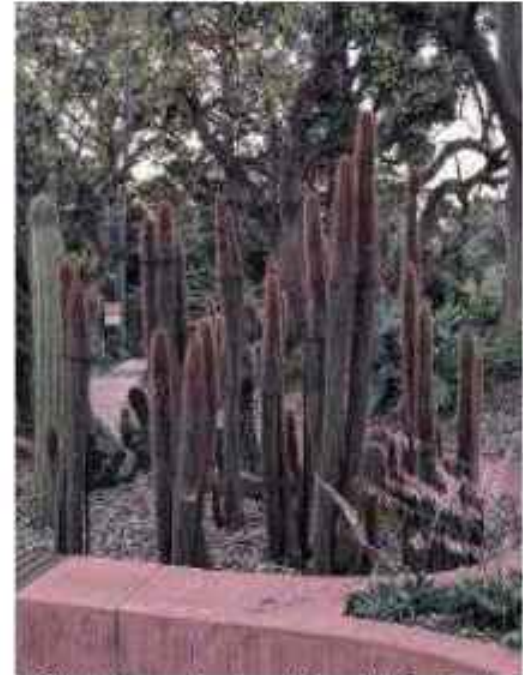
Every available surface, even vertical space, is used wisely. *Dendrobium speciosum*, also known as the Rock Orchid, grows high up on a host tree and does well as an epiphyte without hurting the tree it is on. This method of planting in layers maximises biodiversity and shows how even trunks and branches can be part of the living collection.



Steps going up to Guilfoyle's Volcano mark the start of the Grey Garden boundary. Here, *Agave americana* L. makes a strong architectural edge. The sharp lines of the steps stand out against the sculptural, spiky foliage, which makes the transition from lush planting to dry form very clear.



Cacti and rocky gardens look out over the city skyline, with Melbourne in the background. The arrangement of arid-adapted species in a naturalistic way, with stone, gravel, and open space, shows how dryland ecology works while softening the urban background.



*Cleistocactus buchtienii* Backeb. shines in full sunlight, and its ribbed stems and fine spines catch the light. The vertical shape looks great next to the wider agaves, which adds to the textural variety in the Grey Garden's dry colour scheme.



*Agave americana* L. — The size of this plant really amazed me. This was the first time I had ever seen plants this big in person. The mature rosettes were huge, showing how time and patience can turn structural plants into strong focal points.



\**Eucalyptus viminalis*\* is on high ground with a view of the Melbourne skyline. The Wurundjeri Woi Wurrung people of the Kulin Nation, who are the Traditional Custodians of this land, have cultural ties to this species. Its placement brings together modern planting with Indigenous ecological knowledge, reminding people that these landscapes were cared for and understood long before colonial garden design. The tree frames both the country and the city, showing that there is a connection between the past and the present.



An older couple sitting by the pond, enjoying the sun in peace. This picture shows that the gardens are not only a place to see plants, but also a place to relax and socialise. The design encourages people to be quiet, think, and use it with people of all ages, which shows how important it is for the public to have well-maintained green infrastructure.



Bamboo along the path that has been damaged is a clear sign of the problems that public spaces have to deal with. Damage to living collections shows how important it is to teach people about and get them involved in caring for shared green spaces.

## **Melbourne pollinator corridor**

Melbourne pollinator corridor is an inner-city wildlife corridor. The first of its kind in Australia to transform public verges with indigenous flora to support native pollinating insects. Once completed it will be 8km – long and connect Birrarung (Yara river, Westgate Park and Royal Botanic Garden Melbourne. (Insert aerial picture of it). Although it currently consists of around fifty-three gardens, the project has already made a noticeable difference in improving habitat connectivity and awareness of urban biodiversity. Here I particularly wanted to learn about management of this space and what it takes to upkeep and understand. So, to achieve this, I had a one-to-one interview with Emma which can be found here and spent two weeks with her guards and volunteers on how to achieve this.

## **Climate change in Australia**

Symptoms of climate change in urban ecosystems can be seen through rising temperatures, more frequent and intense heatwaves, and changing rainfall patterns. These stressors negatively impact both vegetation and the insects and birds that depend on them by altering seasonal behaviour, disrupting growth cycles, and reducing habitat quality. Where there is such little space for greenery and plants, human activities topple the chain through buildings, pavements with this heat – absorbing building material which contribute to urban heat as there is nowhere for it to escape. Green infrastructure such as vegetated corridors, street trees and native plantings can help mitigate this effect and support biodiversity under future climatic conditions (Australian Conservation Foundation 2025; CRC for Water Sensitive Cities 2025; Pfautsch et al. 2025).

Pollinator corridors help address these challenges by reconnecting fragmented habitats and allowing species to move, adapt, and survive as conditions change. Fragmentation restricts pollen transfer and reduces floral diversity, which can limit pollinator abundance and resilience in urban contexts (Journal of Infrastructure Preservation and Resilience 2021). Projects that link green patches with native, climate-adapted plants—like Melbourne’s Pollinator Corridor—enhance habitat connectivity and provide drought-tolerant resources for pollinators. By improving habitat continuity and incorporating species suited to hotter, drier conditions, such corridors function not only as biodiversity networks but also as climate adaptation **strategies** that support ecosystem services under future climate pressures

The reason I chose to volunteer with this project was to see indigenous plants used in a public urban setting and to understand, from the ground up, what it takes to secure a space, design it, build it, and maintain it. This included learning how plants are sourced, planted, and cared for, as well as how people interact with these spaces. Being involved at this level showed that urban ecological projects are not just about planting, but about long-term stewardship, community participation, and education.

Carefully selected native plants used in the corridor function as both ecological infrastructure and climate-resilient urban design elements. These species support

pollinators, improve soil health, contribute to urban cooling, and increase the city's capacity to cope with heat and extreme weather. Together, they demonstrate how planting design can deliver both environmental and social benefits.

To better understand its potential, I walked the length of the proposed corridor to observe its current state and future possibilities. This highlighted how even small, fragmented patches of planting can begin to function as "stepping stones" for pollinators moving through the city, and how much impact coordinated urban greening can have at a landscape scale.

The reason I volunteer here was because I wanted to see indigenous plants in a public urban setting and see from the ground up what it takes to secure a space, build a space and learn how plant, source and interact with said plants. Plants I wanted to highlight here.

Melbourne Pollinator Corridor (MPC): Street Garden within Foundry Park Site

<https://maps.app.goo.gl/deMtNG3vZWTQJ1U1A>

Melbourne Pollinator Corridor (MPC): Park towers reserve

<https://maps.app.goo.gl/yXpXVfBuCZrSityb7>

This was the first garden out of three chosen as each garden had a different benefit to being seen. The challenges of this garden were the wind tunnel caused by the high flats and the ground was particularly dry by the surrounding park space and trees. This garden particularly gives space for the locals to enjoy in. Today's agenda was to maintain the space by weeding, worm feed, and mulch. On average Emma can expect 5 – 7 people to help maintain the space by having a document which is live for people to sign up so she knows who is coming. This garden is ( how many years old ) Plant highlights for this garden : The MPC garden at Foundry Site Park got a spruce up yesterday...quite hidden, this small garden is super valuable as a stepping stone to 2 of our larger gardens.

### **3- Pet shop verge-** <https://maps.app.goo.gl/qcBgrzo6BM3d98DVA>

I went to an area near a local pet shop where the council owns and manages the public verges. The property owner can have this space as a garden if it follows the council's guidelines. With Emma, I learned how a garden is built from the ground up, including sourcing plants, budgeting, and planning the layout.

This site presented so many challenges. The soil was very clay-heavy due to previously disposed rubble, and the area was overrun with weeds. Together with Emma and the other volunteers, we cleared the space completely. Using a pickaxe and my hands, I experienced some physically demanding work under the hot sun—a true "welcome to Australia" moment!

We planted species suitable for both wet, muddy conditions and periods of drought. One challenge was selecting plants that could thrive alongside existing street trees, including an Angophora and a Eucalyptus. This required careful planning to ensure the new plants would compete successfully while maintaining biodiversity.

To support the garden, we visited Westgate Park Biodiversity Garden Centre (<https://maps.app.goo.gl/Y9xWWFR4J4U4hgoY6>), an indigenous plant nursery. We also added logs from local trees to create a more engaging, interactive space. In such a small garden, these features help make a noticeable impact and invite the public to connect with the environment.

Through this experience, I gained practical skills in hard landscaping, plant selection, and ecological planning. It also showed me how urban gardens can transform underused spaces into valuable habitat for pollinators while providing meaningful interaction for the community. Emma gave me insight into her design method and being playful was here key.

St Martin's Place is one of the larger sites for Melbourne Pollinator Corrido site I visited, it forms part of St Martin Youth Arts Centre. The garden covers more than 400 m<sup>2</sup> and came to life after staff asked Emma to transform the area into a space where they could take break and spend time outdoors with youths of the centre. Emma collaborated with Fiona Brockhoff (@brockstar64) and her husband's company to redesign the site into something that feels both practical and ecologically meaningful.

As I walked through the garden, the contrast between two planting styles caught my attention. It is a familiar sight in Australia, European – style gardens reminiscence of Victorian style gardens. This made me think more deeply about what contrast means in a country where there is such distinctive native flora. While both styles can offer ecological value, it was clear that Emmas's design leans heavily into supporting native insect biodiversity. From this thought, I learn the lessons of layered and dynamic planting, with multiple strata and wide variety of flowering species that provide resources throughout the year. In comparison, the European style section felt more controlled and uniform, with narrower colour palette and structure. It attracted fewer insect species, often favouring generalists or even invasive ones.

Our work today was all about maintaining the garden. We cleared rubbish and dog waste, cut back the ipomoea that was creeping in from next door, and brushed back the hakea to improve airflow and light. These were simple tasks but shows how much of difference can make, it made me release the how much of ongoing aftercare is needed and how quickly ecological balance can shift without it.

Plants to highlight is *Myoporum parviflorum*, *Correa glabra*, and *Xerochrysum viscosum*.

Talking with the volunteers added another layer to the experience. They told me how much they value not just the gardening itself, but the social connections and learning that come with it. It reminded me that spaces like this operate on multiple levels—they

support biodiversity, but they also foster community, curiosity, and a shared sense of responsibility.

Port Melbourne primary site- <https://maps.app.goo.gl/4xzqQkm8cmCNUu8R7>

The port Melbourne primary school site was created as an outdoor classroom in mind; it has been designed to help young students learn about natives' insects and other small animals. Knowing this purpose made the space more engaging to me in terms of how it was spaced. Circles of mulch and been left to fit small children in at children sized container gardens within. The area had been a typical school lawn verge for people to park on but instead of removing it with chemicals, the team cardboard mulched the space. The project cost \$30,000, involved planting 2,000 plants, and required more than twenty truckloads of mulch. Hearing those figures made the scale of the transformation feel tangible. Knowing figures behind a space put into perspective for me in my career to see how much budget can go. It helped me appreciate the amount of planning, labour and resources needed to create a function ecological garden.

Two species that caught my attention were *Poa labillardierei* and *Atriplex cinerea*. The *Poa* adds structure and habitat throughout the garden, while *Atriplex cinerea*, a tough coastal plant, seems perfectly suited to the site's conditions.

Our work on the day focused on maintenance and fine-tuning. We tended to the recycled-metal container gardens, weeded, fed the soil with worm castings, and gave the site a deep watering. We also cut back the *Atriplex cinerea*, which had started to overshadow the pelargonium. It was a good reminder of how quickly certain species can dominate if they are not managed thoughtfully. Maintenance is not just about tidiness, it is about guiding the balance between plants, so the design and ecological function stay intact.

The reason I chose to volunteer with this project was to see indigenous plants used in a public urban setting and to understand, from the ground up, what it takes to secure a space, design it, build it, and maintain it. This included learning how plants are sourced, planted, and cared for, as well as how people interact with these spaces. Being involved at this level showed that urban ecological projects are not just about planting, but about long-term stewardship, community participation, and education.

Carefully selected native plants used in the corridor function as both ecological infrastructure and climate-resilient urban design elements. These species support pollinators, improve soil health, contribute to urban cooling, and increase the city's capacity to cope with heat and extreme weather. Together, they demonstrate how planting design can deliver both environmental and social benefits.

To better understand its potential, I walked the length of the proposed corridor to observe its current state and future possibilities. This highlighted how even small, fragmented patches of planting can begin to function as "stepping stones" for

pollinators moving through the city, and how much impact coordinated urban greening can have at a landscape scale.

The reason I volunteer here was because I wanted to see indigenous plants in a public urban setting and see from the ground up what it takes to secure a space, build a space and learn how PlantSource and interact with said plants. Plants I wanted to highlight for wind tunnel proofing are: !!!!

Lessons learnt for future career and to take away.

None of the remarkable pollinator supporting projects in the UK are as extensive, continuous, or ambitious as Melbourne's Pollinator Corridor. Insects live in a more connected environment. For example, similar concepts in the UK are Bug life's national B lines network, community driven urban pollinator pathways in cities like Bristol and Manchester and the growing trend of wildflower- managed road verges. Another example is the Thamesmead Pollinator corridor in London which combines in the creation of meadows with community engagement and education. Although the objective of these initiatives is similar connecting disparate habitats, enchainning urban biodiversity, and fighting back the symptoms of climate change.

### **Example Australian-Harvard References for your bibliography**

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South Melbourne, Victoria  
Google Street View  
July 2024 See more details



### Site One: The Foundry; Site Context

The Foundry site is surrounded by tall buildings, which create strong wind tunnel effects that affect the choice of plants and their layout. A Google Maps aerial photo from August 2024 shows the area before any work was done, next to the finished raised planting beds.

### Plan for Design

A layered native scheme was put in place to give structure, protect against wind, and add value to biodiversity. Callistemon on the upper floor blocks some light, while *Westringia fruticosa* on the middle floor is strong and durable. *Poa labillardierei*, *Lomandra longifolia*, and *Myoporum parvifolium* are some of the groundcovers and grasses that keep weeds from growing and cover the ground all year. Flowering plants like *Chrysocephalum apiculatum* make it easier for pollinators to find food. Recycled logs give the area a more natural look and feel.





## Soil and the Environment

Worm castings from another site were used again as organic fertiliser, which helped the soil biology and the growth of plants.



Close-up pictures show clear edges on the lawn and hand-weeding that was done recently. Keeping clear boundaries helps with intentional design, makes people respect the space more, and stops bad behaviours like littering and dog fouling.



Planters for the community  
Raised beds make it easier for people to get to and encourage them to get involved in the community. Aerial and close-up views show how design can help people get along with each other and with the environment.

Prunus (Cherry)

## Plant to highlight



*Podolepis linearifolia*



*Wahlenbergia* spp.  
*Brachyscome basaltica*

*Tetragonia tetragonioides*



#### Site Introduction

The school verge demonstrates transformation from underutilised turf into biodiverse native planting. Multiple angles illustrate the scale and context of the intervention.



### European Turf vs. Native Verge

A visual difference between the manicured tennis court turf and the native-planted verge shows how different people think about landscapes. Turf looks neat, but it doesn't help the environment much. The native verge is home to pollinators, adds structural diversity, and makes the soil stronger.



Pictures of Emma and volunteers working with recycled pots and hoses show a low-cost, community-based way of doing things.



*Atriplex cinerea*



*Dianella caerulea*



*Wahlenbergia* spp. (Bluebell)



*Poa labillardierei*



*Goodenia ovata*



*Pelargonium australe*



### How to Build a Garden

Step-by-step instructions for making the garden, including raking and levelling the soil, putting in recycled stumps, and getting the planting areas ready.



The garden was set up in a cost-effective way by planting small tube stock plugs. The soil was hard and had a lot of stones in it, which made it hard for water to drain. I used a pickaxe to break up the hard ground and make it easier to plant.



These pictures show two different ways of looking at the same landscape. The manicured European-style grass looks neat and uniform, which fits with traditional ideas of order and control. It looks neat, but it doesn't provide much ecological value because it doesn't have many places for pollinators and other wildlife to live, eat, or find different kinds of structures.

The Australian native verge planting, on the other hand, uses a layered structure and changes with the seasons. Different kinds of plants provide pollinators with nectar, pollen, and shelter, and deeper root systems make the soil healthier and more resilient. The native verge has a lot more ecological function than turf, even though it doesn't look as uniform. This shows how public spaces can put biodiversity and community engagement first.





Enclosed Tropical Garden

An enclosed garden space filled with tropical species — a personal highlight of my visit due to its immersive planting style and strong sense of enclosure.



A 2019 Google image showing the site before development, compared with its current transformation into a biodiverse community space.



### Recycled Log Break Area

Seating area constructed from recycled logs, providing space for rest and discussion. This area includes *Myoporum parvifolium*, *Correa glabra*, and *Xerochrysum viscosum*. Emma and I discussed the long-term vision of the project here.



### Circular Garden – Before & After

Before and after images of the circular planting area, demonstrating the visual and ecological transformation.



Eucalyptus Planting  
– Before & After  
Before and after  
images showing the  
establishment of a  
Eucalyptus tree and  
its contribution to  
structure, shade, and  
habitat within the  
site.





Homemade Insect Hotel

Insect habitat constructed from recycled bricks, granite, and timber stumps, providing shelter for invertebrates and contributing to on-site biodiversity.



Signage

Clear, informative, and budget-friendly signage is used to educate the public and explain the purpose of the planting scheme.



Funding & Long-Term Vision

Invitation to attend a conference on securing funding and the development of the 15-year Melbourne Pollinator Corridor project, demonstrating the importance of strategic planning and community engagement.

## **St Kilda botanic gardens**

My time at St Kilda Botanic Gardens and the nearby St Kilda EcoCentre was shaped by environmental practices led by the community. The work here showed that ecological restoration and climate resilience can be done on a neighbourhood level through volunteer work, education, and local stewardship. This is different from what larger botanical institutions do.

The EcoCentre is all about finding real-world ways to help the environment, like making pollinator corridors, fixing compost systems, restoring coastal plants, and teaching people about marine pollution. These projects showed how grassroots environmental efforts can make ecological ideas real in a city.

The St Kilda coastal breakwater and dune restoration area is one of the most obvious examples of this. *Disphyma crassifolium* and *Atriplex cinerea* are two hardy native coastal plants that grow well in sandy, salty conditions. These plants help keep the dunes stable, stop erosion, and give local animals a place to live, like the growing colony of *Eudyptula minor* (Little or Fairy Penguins).

I helped water new coastal plants that Westgate Biodiversity Nursery (Bili Nursery) sent us. They specialise in plants that are native to Melbourne. This made it even more clear how important it is to use plants that come from the area when doing ecological restoration projects.

The penguin colony at St. Kilda has grown a lot in the last few years, going from about 60 birds to about 1,400. This success is a big step forward for conservation, but it has also made it harder to manage plants. To keep penguins out of nesting areas, penguin-proof fencing has been put up around them. Before they were established, some young plants had been disturbed, probably because birds were collecting nesting material or because of wind and people being able to get to them.

The coastal environment itself makes things even harder. The sandy soils are not stable, and the tides can cause small amounts of erosion along the rock edges. Rock fill has been used in some places to fill in gaps and stop more washout. To help new plants grow in open areas, protective guards were put up around them. However, these guards need to be watched as the penguin colony grows.

In addition to my conservation work, I also volunteered to help with marine pollution issues. At the EcoCentre, I helped sort and weigh plastic trash that had been picked up from the beach. This exercise showed me how much plastic pollution is getting into oceans and introduced me to the problem of microplastics, which are tiny pieces of plastic that stay in oceans and get into marine food chains. Volunteers led educational sessions on recycling systems and ways to get the public involved in reducing plastic waste that ends up in coastal ecosystems.

The EcoCentre puts a lot of emphasis on teaching people about the environment. While I was there, I joined a volunteer group that taught me about waste management, ocean health, and community-led sustainability projects. These sessions showed that

education and public involvement are important parts of successful environmental projects.

The botanic garden nearby also showed how to plant in a way that works with the climate. Native meadow planting outside the nursery showed how to plant in a way that works well in coastal areas and with a lot of different plants. *Doryanthes excelsa* and *Doryanthes palmeri* are examples of structural species that made strong architectural points in the landscape. *Xerochrysum viscosum* and *Solanum laciniatum* are examples of hardy coastal plants that added habitat value and seasonal colour.

I really liked planting combinations that mixed ornamental and structural plants. One example is planting *Bartlettina sordida* next to *Clivia miniata*, which made a beautiful contrast between purple and orange tones. Another interesting contrast was the use of *Yucca rostrata* planted among roses, which combined a dry architectural style with traditional ornamental planting.

We also saw *Chamelaucium uncinatum*, which can grow in dry, well-drained soils, and *Viola hederacea*, which is a groundcover that was used to soften edges and add plants to the understorey.

The gardens also had sheltered plant collections, like the Mangrove Fan Palm (*Licuala spinosa*), which grew in a protected microclimate. This shows how different types of plants can be used in urban botanical landscapes.

I learned about the geological and cultural history of St Kilda Beach and why it is still important to the environment on a coastal history tour. The site has both native and non-native coastal plants, which shows how hard it is to manage urban coastlines. We saw *Spinifex sericeus*, which is an important dune stabiliser, as well as invasive plants like *Cakile maritima* (European Sea Rocket) and *Hypochoeris radicata*. This showed that there needs to be a balance between planting trees to restore the area and getting rid of invasive weeds.

The visit ended with a tour of the St Kilda Community Garden, which showed how people can grow food in cities and get involved in their communities while also protecting the coast. The garden was a great example of how people in a community can take part in sustainable land management.



*Bartlettia sordida* combined with *Clivia miniata*.

I was particularly drawn to this planting combination for its contrasting foliage textures and complementary purple and orange tones.



*Chamelaucium uncinatum*

Example of Western Australian species adapted to dry, free-draining soils within ornamental coastal beds.



Fern Texture Against Glasshouse

Contrasting soft fern foliage against the structured glasshouse framework, highlighting interplay between architecture and planting.



Mangrove Fan Palm

*Licuala spinosa* positioned within a sheltered microclimate, demonstrating the diversity of species grown within protected environments.



*Viola hederacea*

Low-growing native groundcover used for soft edging and understory planting.



**Structural Planting Contrast**

*Yucca rostrata* planted amongst roses, demonstrating an intentional contrast between arid architectural form and traditional ornamental planting.



*Doryanthes palmeri*

Bold, structural foliage providing strong vertical interest.



*Doryanthes excelsa*

Architectural focal species reinforcing Australian identity within the planting palette.



Volunteer Penguin Day  
Participation in a volunteer day focused on the Eudyptula minor (Fairy Penguin) colony.



Penguin Habitat Tour  
Guided tour of nesting habitat areas, understanding conservation strategies and vegetation management around breeding zones.



*Carpobrotus rossii*



*Salicornia quinqueflora*



*Dracophyllum trimorphum*



*Disphyma crassifolium*



*Disphyma crassifolium*

*These species contribute to dune stability, habitat structure, and coastal ecosystem function.*



### *Watering Newly Installed Plants*

*Watering of recently planted stock supplied by Westgate Biodiversity nursery (Bill Nursery), which specialises exclusively in Melbourne indigenous plant species. A tour of the nursery reinforced the importance of local provenance in restoration projects.*



*Hypochoeris radicata* (introduced species)



Sweet Melilot (*Melilotus indicus*)

*Spinifex sericeus* (dune stabiliser)



European Sea Rocket (*Cakile maritima*) – invasive coastal species

*Coastal History Tour*  
*Philip provided a detailed explanation of the geological and cultural history of St Kilda Beach, outlining how the coastline formed and why it remains ecologically and socially significant.*



**St Kilda Community Garden Tour**

*Visit to the local community garden, demonstrating grassroots environmental engagement and urban food production alongside coastal conservation efforts.*

## **Cranbourne Royal Botanic Gardens**

Cranbourne Gardens is a great example of how to use Australian native plants in modern landscape design while still being able to withstand harsh weather. One of the most interesting things about the gardens was how the Australian plants were arranged in planting plans that were similar to those used in English cottage gardens. This new way of planting shows how climate-adapted plants can add colour, structure, and biodiversity value even in dry, sandy soils and climates that are getting hotter.

The planting shows how Australian plants might help change what a "cottage style" garden might look like in a warmer climate. Designers here have used native plants that can handle dry conditions and thrive in the Australian environment to make displays that are full of colour and texture, instead of relying on European plants that need a lot of water.

I was able to help with a number of hands-on gardening tasks while learning about the design philosophy behind the Australian Garden during my placement.

When I drove the club car across the site, I could immediately see how big Cranbourne Gardens was and how much planning it took to keep such a big area running smoothly. When working on a site this big, it's important to move materials, plants, and tools quickly.

I helped with one project that involved putting in irrigation in the grey-toned part of the Colour Specification Garden. Before planting, the irrigation tubing was carefully put in place, connected, and tested. Before the soil could be replaced, any problems had to be found and fixed. This showed how important it is to be accurate when putting in infrastructure, since irrigation systems are hard to get to after planting is done.

I also helped plant in the Grey Garden by putting in plants that can survive without water and add to the design's monochromatic colour scheme. The club car was used to move soil and planting materials, showing how well the team worked together and how smoothly things went during the installation of the landscape.

While working on this project, some plants stood out more than others. These include *Conostylis candidans*, *Leucophyta brownii*, and *Acacia melanoxylon*, all of which add unique texture and colour to dry-climate planting plans.

Walking around the garden's outer bushland areas gave me a new view of the site. Kangaroos were all over the landscape, and dead trees were left standing to give animals a place to live. This shows that botanical gardens can be more than just places to look at plants; they can also be places to protect plants.

The lakes that are connected to each other in the garden give animals places to drink and also serve as structural landscape features in the design. This combination of water bodies shows how landscape features can be useful for both the environment and the way they look.

From a higher vantage point, I could see the suburban housing developments around the garden getting bigger. This made Cranbourne even more important as a place for biodiversity in a region that is quickly becoming more urban.

I saw many native plant species that had adapted to these environments in the gardens, such as *Lepidosperma* spp., *Isotoma fluviatilis*, and different types of *Eucalyptus*.

During a demonstration called "How to Catch a Snake in Three Easy Steps," trained staff showed how to safely handle snakes. This was an unexpected but useful learning experience. This showed how important it is to be safe at work when you work in Australian landscapes where animals are common.

The Australian Garden's landscape design has strong cultural and visual elements. Seven round shapes set in red sand at the Desert Entrance stand for gathering circles, which are like Indigenous meeting places and links to Country.

*Austrocallerya megasperma* and other climbing vines frame views across hedged *Grevillea* plantings, showing how to layer plants vertically. Along the river corridor, structured mounds of *Westringia* interplanted with grasses add rhythm and texture. Architectural plants like *Doryanthes excelsa* add strong vertical accents.

In another part, *Xanthorrhoea australis* was used to frame perennial-style borders. This made a striking contrast between the dry Australian plants and the European-inspired garden structures.

There were also a lot of animals in the gardens. Some of the species seen were kangaroos, *Myrmecia impatremata* (bull ants), *Plectiscia nearctica*, *Malurus cyaneus*, *Phylidonyris novaehollandiae*, *Zanda funerea*, *Telopea speciosissima*, and *Anthochaera chrysoptera*.

The perennial arid beds were one of my favourite ways to plant. *Xerochrysum viscosum* in the front, *Anigozanthos* (Kangaroo Paw) in the back, and *Ammobium alatum* on the left made these beds look different. The colour harmony and plant forms that can survive in dry conditions made a strong and unified composition.

*Xerochrysum bracteatum*, *Poa labillardierei*, *Scaevola aemula* 'Alba', *Pycnosorus globosus*, *Chrysocephalum apiculatum*, *Brachyscome multifida*, and *Dampiera diversifolia* were some of the other plants that stood out in these beds. These species show how Australian natives can be used together to make planting plans that need little watering once they are set up.

I learned how to propagate and grow plants by working in the nursery. Cleaning moss off of young plants, repotting stock, and learning about agar-based propagation media used for sensitive species were some of the tasks. I also looked at how different potting mix compositions affect plant growth by comparing them.

One of the best parts of working in a nursery was getting to grow *Grevillea repens*. Before putting the cuttings into a perlite-based propagation mix to keep them from

getting dirty, the roots were carefully cleaned. This process helped me learn more about sterile propagation methods and the science behind growing plants.

I also helped trim *Melaleuca* in a planting area with a coastal theme. The pruning was meant to make the area look like it had been blown by the wind, which fit in with the coastal design story. We found a bird's nest in the planting while we were working on it, which shows how important these structured plantings are for wildlife. To help the plants grow and stay healthy, organic fertiliser and soil amendments were added.

Another great thing was the tour of the orchid nursery, which taught me about conservation horticulture and the special conditions that native orchids need to grow. The species that were seen were *Caladenia longicauda*, *Caladenia infundibularis*, *Pterostylis basaltica*, *Diuris parvipetala*, *Prasophyllum albovirens*, *Diuris punctata*, and *Diuris sulphurea*. This experience showed me how important it is to protect threatened plant species outside of their natural habitat.

Overall, my time at Cranbourne Gardens helped me learn more about how to design plants that can survive in different climates, how to propagate plants in a nursery, and how important it is to include biodiversity in landscape architecture. The garden shows how Australian native plants can be used in creative ways to make beautiful, ecologically strong landscapes that work well in hotter and drier climates.



**Irrigation Installation – Grey Colour Garden**  
The staged process of installing irrigation within the grey-toned section of the Colour Specification Garden. Tubes were connected, tested, and faults identified before being backfilled with soil and planted



Planting - Grey Garden  
Planting of drought-tolerant species within the grey palette, with the club car used to transport materials and soil

## Plant highlight from grey garden



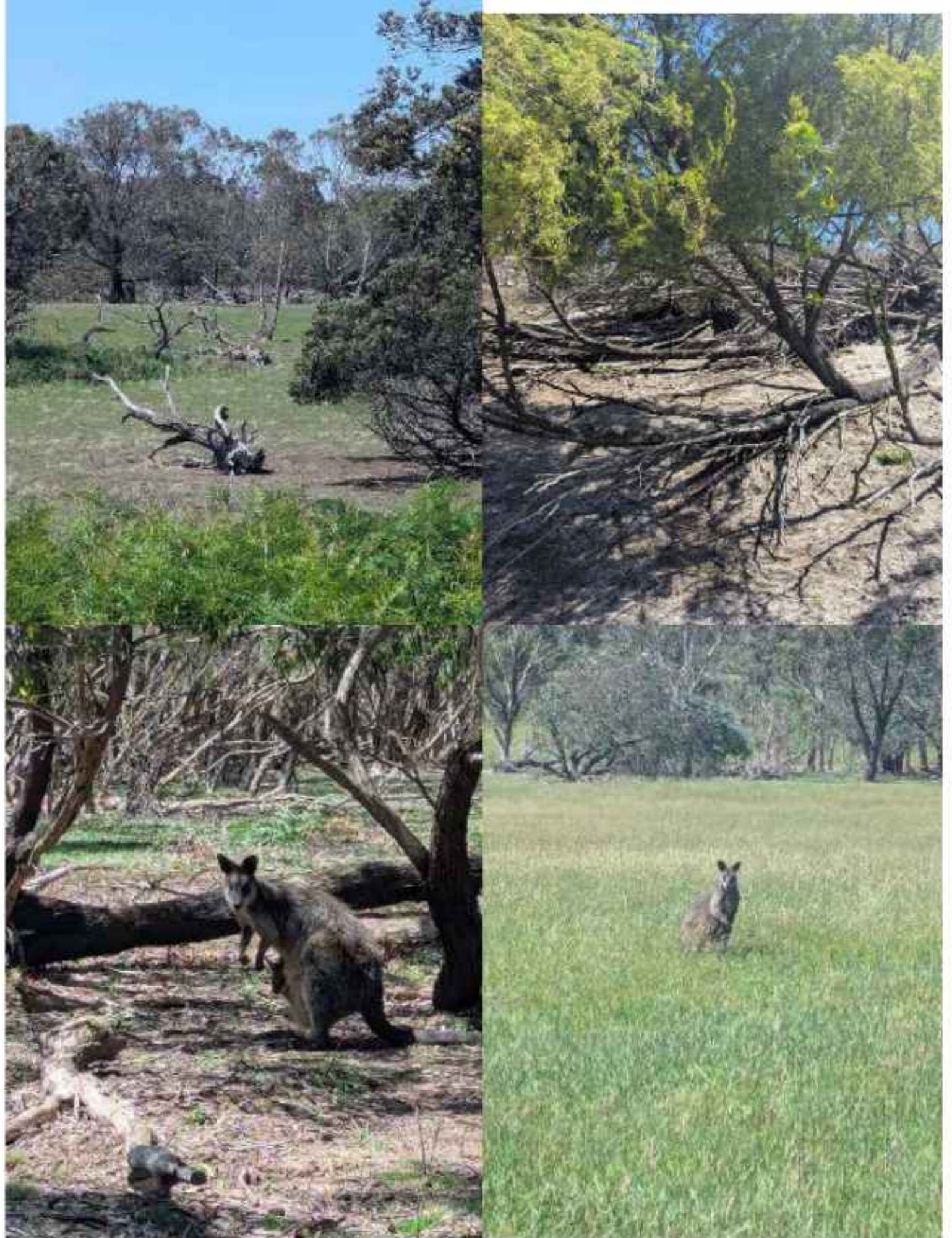
*Conostylis candicans*



*Leucophyta brownii*



*Acacia melanoxylon*



#### Outer Bushland Tour

Exploration of the outer bushland areas, observing kangaroos and retained dead trees used for habitat. This demonstrated how botanical gardens can function as ecological reserves, not just display spaces.



Lakes & Landscape  
Integration  
Views across the  
interconnected lakes,  
which provide drinking  
sources for wildlife while  
forming key structural  
elements within the  
design.

Aerial View – Urban Expansion  
Elevated view overlooking  
surrounding housing  
developments, highlighting  
Cranbourne’s importance as a  
biodiversity refuge within  
expanding suburban growth.





“How to Catch a Snake in 3 Easy Steps”  
Practical demonstration of safe snake-handling  
procedures by trained staff, emphasising  
workplace safety in Australian landscapes.



### Landscape Viewpoints

Desert Entrance – The seven circular forms set within the red sand represent gathering circles, referencing Indigenous meeting spaces and connection to Country.

*Austrocallerya megasperma* overlooking *grevillea* hedges, demonstrating vertical layering and framing techniques.

Structured mounds of *Westringia* interplanted with grasses, creating rhythm and contrasting texture along the river corridor.

*Doryanthes excelsa* providing strong architectural presence in the background.

Elevated viewpoint framed by *Austrocallerya megasperma*, overlooking hedged planting structures.

*Xanthorrhoea australis* positioned to frame perennial-style borders, contrasting Australian arid planting with European-inspired cottage garden aesthetics.



*kida*



*Myrmecia impatrnata* (Bull Ant)



*Plecia nearctica*



*Malurus cyaneus*- female



*Phylidonyris novaehollandiae*



*Malurus cyaneus* male



*Zanda funerea*



*Telopea speciosissima*  
*Anthochaera chrysoptera*



*Ammobium alatum*



*Xerochrysum bracteatum*



*Poa labillardierei*



*Scaevola aemula* 'Alba'



*Pycnosorus globosus*



*Chrysocephalum apiculatum*



*Brachyscome multifida*

*Xerochrysum viscosum*



*Dampiera diversifolia*



*Westringia fruticose*



*Banksia coccinea*



*Pultenaea pedunculata*



*Chorizema cordatum*



*Juncus kraussii*



*Lechenaultia biloba*



*Telopea speciosissima or oreades*



*Epacris longiflora*



Perennial Arid Beds –



Close-up of my favourite planting scheme within the arid beds.

Foreground: *Xerochrysum viscosum*

Background: *Anigozanthos* (Kangaroo Paw)

Left: *Ammobium alatum*

The colour harmony and drought-adapted structure demonstrated strong design cohesion.



Additional viewpoints of the dry beds provided inspiration for future design work



I also observed the tallest thistle I have seen – taller than my 164cm height .



## Nursery Work

Cleaning moss from young plants

Repotting stock

Introduction to agar-based propagation media

Comparing potting mix compositions



*Caladenia longicauda*



*Caladenia infundibularis*



*Pterostylis basaltica*



*Diuris parvipetala*



*Prasophyllum albovirens*



*Diuris sulphurea*



*Diuris punctata*



*Banksia* - no purple clones  
 - use talc powder or no treat.  
*Acacia* - use peat plugs + purple clones  
*Epacris* - peat plugs / no treatment etc  
*Croton* - no purple clones  
*Prostrata* - use talc powder  
*gardenia*  
*Xanthoxylum brachylobum* - Green clones  
*Leucodermis* - purple clones  
 - peat plugs (less than)  
*Rhododendron* - foliage - Green clones  
 - purple or no treatment



*Nursery Operations Tour  
 Insight into propagation systems and soil science  
 behind successful plant production.*



*Grevillea Propagation*  
Introduction of *Grevillea repens* into a perlite-based propagation mix. Roots were cleaned to reduce contamination, deepening my understanding of sterile technique and plant science principles.



*Melaleuca Pruning & Thematic Design*  
*Selective pruning of Melaleuca to create a coastal, wind-swept aesthetic and strengthen thematic cohesion. A bird's nest was discovered during maintenance, highlighting the habitat value of structured planting. Organic fertiliser and soil amendments were incorporated to improve establishment*



### Design Inspiration

Photographs of colour-driven planting schemes and arid compositions provided strong inspiration for future projects, particularly in balancing aesthetic cohesion with ecological resilience.



## **Sydney botanic gardens**

The Royal Botanic Garden Sydney is in one of the most famous places for a botanical garden in the world. The gardens are right on the harbour and look out over the Sydney Opera House. They are a beautiful mix of culture, landscape design, and plant conservation. From many places in the garden, planting plans frame the Sydney skyline, showing how botanical spaces can coexist with busy city areas.

While I was there, I did some gardening work and went on guided tours that talked about the environmental problems the garden is facing.

Juan led a climate change tour that looked at how rising sea levels and higher salinity are already changing the coastal landscapes in the garden. This was one of the most informative things we did. The historic pond near the edge of the harbour was a major topic of conversation. There are no official records that explain where this pond came from, but staff are now looking into how to change its design to make it less affected by tidal flooding.

Some older trees are already being harmed by higher salt levels in the soil. Limb dieback has been seen starting in the middle of the canopy, which is often a sign of root stress caused by saltwater intrusion. This showed that coastal plantings are vulnerable to climate change over the long term and stressed the need to choose salt-tolerant species for future planting plans.

The Dragon Tree, or *Dracaena draco*, was a unique architectural feature in the landscape. It has a strong visual presence because of its sculptural branching shape and ability to survive in dry conditions.

A tour of the nursery gave us a lot of useful information about how the garden works behind the scenes to support its displays. Staff talked about how to propagate plants, how to manage plant stock, and how to get ready for seasonal planting schemes. While I was at the nursery, I helped with repotting and propagating orchids. This included mounting orchids on moss substrates to help keep moisture in and keep the roots healthy. This work showed how important it is to give epiphytic species special care.

I learned how to keep the right conditions for delicate fern species in the fernery by controlling the humidity, shade, and watering systems. Some of the things that needed to be done here were misting displays, keeping an eye on irrigation systems, and keeping planting areas clean by doing detailed weeding.

Working in the display beds gave me hands-on experience with ornamental horticulture. I helped plant *Petunia* in structured annual planting schemes, making sure the spacing and alignment were right so that the beds looked good. To keep a strong visual impact all year long, these planting layouts use repetition, colour balance, and seasonal rotation.

Mulching beds to keep moisture in and keep weeds down was one of the maintenance tasks. *Agapanthus* served as a structural backdrop for planting plans in some places, while *Brugmansia* added height and dramatic flower displays.

Another part of the job was watching how trees and plants were taken care of. Staff showed how the garden's irrigation systems worked and talked about why some tropical plants, like banana trees, had to be taken out of some areas to make the displays more balanced and less crowded.

The surrounding landscape and buildings frame the planting schemes throughout the garden. The Palm Grove and fern glasshouse make the area around them look lush and green, which is different from the Sydney skyline. This contrast between busy city life and botanical collections shows how important the garden is as a green space in the city.

The garden's coastal areas show some of the clearest signs of climate change. Parts of the lawn that have *Stenotaphrum secundatum* (Buffalo Grass) in them show clear signs of stress when tidal surges hit the lawn. The dried and damaged grass shows how rising sea levels are putting more stress on coastal areas.

Sydney's unique sandstone geology was on display along the harbour foreshore. The long sandstone platforms that run along the water's edge are a defining feature of the coastline. They also affect how the garden drains and how plants are arranged.

Mature trees in the garden are good for the environment and look nice. *Angophora* species are known for their twisting trunks and bark that is not smooth. Large *Ficus* trees are planted in terraced patterns on sloping parts of the landscape. These terraces show how the shape of the land can be used in planting design to make a layered canopy structure.

The garden's character is also shaped by its historical features, like the Victorian-era staircases. Talking about these details with staff member Maddie made it clear how important it is to keep heritage elements while making the garden more suitable for today's environmental problems.

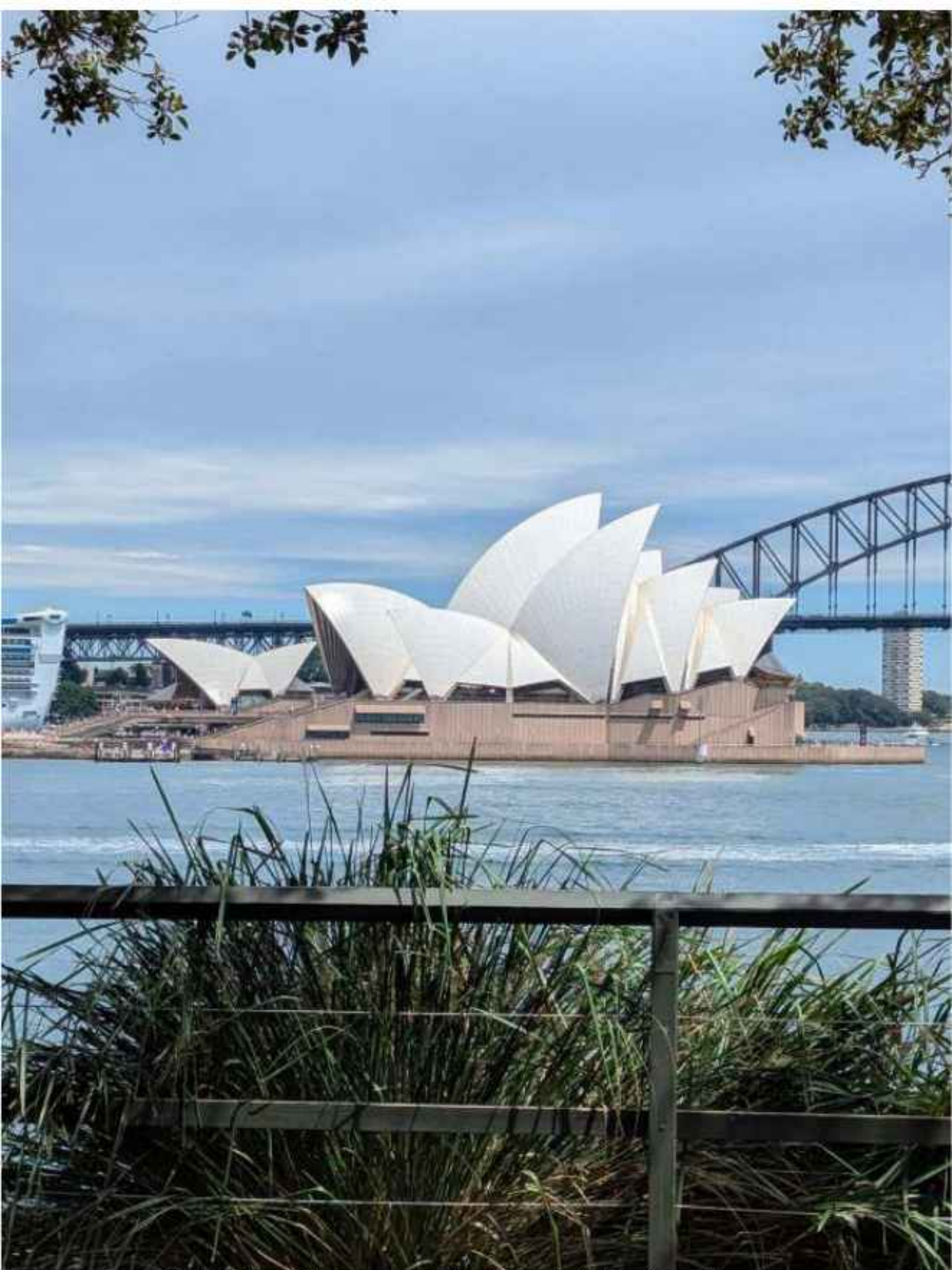
*Eucalyptus kambooka* was another species that stood out during the visit. It adds to the variety of Australian native trees in the collection.

A wide variety of ornamental and native plants add to the beauty of the collection throughout the gardens. Some of the species that were seen were *Tacca chantrieri* (Black Bat Flower), *Verticordia eriocephala*, *Rhodanthe anthemoides*, *Hibiscus rosa-sinensis*, *Thomasia discolor*, *Pimelea ferruginea*, *Begonia rex-cultorum*, and *Lophostemon confertus* (Brush Box). These plants have different textures, ways of growing, and ways of adapting to different climates, which adds to the variety of the garden's displays.

I also saw verge planting strategies used along roads and pathways in the Sydney area, in addition to the formal displays. These plants are meant to survive saltwater,

drought, and a lot of foot traffic, making them great examples of urban planting that can last.

Overall, my time at the Royal Botanic Garden Sydney taught me about the difficulties of keeping historic botanical landscapes in good shape as the climate changes. The combination of gardening, monitoring the environment, and careful planting design showed how gardens must always change to fit new environmental conditions while still keeping their cultural and botanical importance.



Sydney Botanic Gardens overlooking the iconic Sydney Opera House.



A guided tour examining areas affected by climate change, particularly rising sea levels and increasing salinity. A key highlight was discussion around the historic pond — with no formal records of its origin — and how its design could be adapted to mitigate tidal inundation.



Increased salt content has impacted tree health, with limb dieback occurring from the centre of canopies due to root system stress. This demonstrated the long-term effects of saline intrusion on coastal plantings.



Buffalo Grass & Tidal Impact  
Areas of dried *Stenotaphrum secundatum* (Buffalo Grass) showing damage where tidal surges reach the lawn, reinforcing the visible effects of sea-level rise.



Nursery Tour

Behind-the-scenes insight into plant production, stock management, and preparation for seasonal displays.



Views across the Sydney skyline framed by the Palm Grove and fern glasshouse illustrate the contrast between urban density and lush botanical collections.



*Tacca chantrieri*



*Verticordia eriocephala*



*Rhodanthe anthemoides*



*Pimelea ferruginea*



*Thomasia discolor*



*Hibiscus rosa-sinensis*



*Begonia rex-cultorum*



*Lophostemon confertus*



*Annual Design Process  
Step-by-step layout of annual beds,  
focusing on repetition, pattern, colour  
cycles, and visual rhythm.*



Mulching display beds



Agapanthus in the background and Brugmansia providing structural height.



Learning about irrigation systems and misting

Carrying out selective removal of banana stems (*Musa* spp.) to reduce overcrowding and maintain structural balance within the tropical display.





Potting and propagation of orchid species, including division and controlled environment management.



Orchid propagation within the nursery collection.



*Nepenthes spp*



*Grammatophyllum spp.*



*Cattleya spp.*



*Dendrobium chrysotoxum*



*Cattleya spp.*



Guided tour of the 1924 Green Glasshouse, exploring its historical significance and early glasshouse design. Discussion focused on traditional temperature regulation methods, including passive ventilation, shading, and manual climate control systems. This highlighted how historic horticultural infrastructure balanced plant requirements with limited mechanical technology, and how these principles continue to inform modern controlled-environment growing systems.



### Staghorn installation and ferns

Learning how to position *Platycerium* (staghorn fern) within the fernery display while working on a ladder, ensuring suitable light and humidity conditions for epiphytic growth.

## **Mount anna gardens**

The visit started with a guided tour of the garden that focused on how large-scale botanical landscapes can also give ideas for designing a home garden. I was especially drawn to the smaller, more private garden areas because they showed how planting ideas from botanic collections can work in homes.

An example is a planting area with shade next to the Science Building. This cool microclimate corner showed how the direction of the sun, the amount of shade, and the nearby buildings can affect the types of plants that can grow there and how they grow. I also did some hands-on gardening work during the visit, like weeding the dry garden beds and helping with general garden upkeep. These activities taught me how ongoing care helps large public plantings last longer and look better.

A layered native planting scheme stood out as a favourite because it had strong colour harmony and different textures that worked well together. The design showed how Australian native plants can be used in planting plans for both aesthetic and environmental reasons. Another display showed how symmetry and repetition can be used in planting design. The formal structure of this arrangement went against the common belief that Australian native gardens should always look casual or natural.

The tour went on to the botanic science facilities, which included the plant library and the digital coding systems used to keep track of plant samples. Seeing staff take notes and pictures of plants showed how important it is to keep accurate records in conservation horticulture.

Going to the propagation nursery taught me about the scientific methods used in plant production and conservation work. The endangered species team talked about how to grow and reintroduce rare plants into the landscape. They also talked about how to use different soil mixes based on the needs of each species.

Staff showed how to collect seeds in protective bags to keep the genetic material of this critically endangered species safe in the *Wollemia nobilis* conservation area. This showed how botanic gardens help protect rare plants.

People were also doing maintenance work in the Banksia garden, where they were rebuilding the fence to protect the plants. Comparing older and newer plant compositions showed how planting palettes change as our understanding of ecology grows.

When you stand on top of Mount Annan, you can see the whole garden and how it fits into the natural landscape around it. Seeing birds all over the site made the garden's ecological value as a biodiversity refuge even stronger.

A big part of the experience was doing hands-on work with propagation. I helped graft *Grevillea* species and learned techniques like interstock grafting, which involves putting a second graft on top of the main graft to make the plants more compatible and improve their performance. The nursery works in stages. First, cuttings are put in a

high-humidity propagation zone (P2). Once roots grow, they are moved to the growing-on area (P1). Finally, they are hardened off in the tube house before being planted outside.

They also showed how to propagate *Acacia* species. Many species in the Fabaceae family have tough seed coats, so they need to be broken before they can germinate. Some ways to do this are hot-water scarification, mechanically rubbing the seed coat, and growing new plants from cuttings. Some species from Western Australia are grafted onto *Acacia maidenii* rootstock to make them last longer and better able to handle eastern clay soils.

We also talked about treatments that break dormancy using gibberellic acid, especially for species that are hard to germinate. When propagating sensitive Australian natives like *Actinotus* (Flannel Flower) and *Brachyscome*, it's important to keep an eye on the humidity and fungus.

In nurseries, strict hygiene is very important. To keep bacteria from spreading, diluted bleach solutions are used. When propagating plants from the Proteaceae family, special care must be taken with hormone concentrations to avoid damaging the callus tissue that is forming.

In general, my trip to Mount Annan helped me learn more about conservation horticulture and the scientific methods used to grow Australian native plants. The combination of plant science, ecological restoration, and landscape design showed how important botanic gardens are for creating horticultural practices that can handle climate change.



**THE AUSTRALIAN BOTANIC GARDEN MOUNT ANNAN**



### Small Space Design Observations

- 1) Cool Climate Corner – A shaded planting area positioned beside the Science Building. The microclimate created cooler growing conditions, demonstrating how aspect and built form influence plant selection.
- 2) Favourite Planting Scheme – A layered native composition showing strong colour harmony and textural contrast, reinforcing how Australian species can be used decoratively as well as ecologically.
- 3) Formal & Symmetrical Display – A structured planting design using repetition and symmetry. I appreciated the balance between formal layout and native plant material, challenging the perception that Australian gardens must be informal.



### science & Plant Records

Tour of the science facilities, including the plant library and coding system used for cataloguing specimens. Observing staff documenting and photographing plants highlighted the importance of accurate botanical records in conservation horticulture.



Comprehensive tour of the propagation nursery, examining different soil mixes tailored to species requirements. The endangered species team explained how rare plants are propagated, grown on, and reintroduced, reinforcing the scientific responsibility of botanic institutions.



Tour of the *Wollemia nobilis* conservation area. Seed was collected in protective bags to preserve genetic material.



Little Corella (*Cacatua sanguinea*)



### Propagation Techniques

Hands-on propagation of *Grevillea* species. Demonstrated grafting methods included:  
Interstock grafting (secondary graft onto primary rootstock)  
Selection of compatible rootstocks for improved longevity

The nursery operates in stages:

P2 (High Humidity Zone): Cuttings are processed and placed under high humidity until roots establish.

P1 (Growing-On Area): Once rooted, plants are potted on and grown for approximately one month.

Hardening-Off / Tube House: Plants are gradually acclimatised to external conditions before distribution.

	0 Company	Price (£)
Accommodation - Australia	Airbnb	£540.97
Accommodation - Australia	Airbnb	£437.72
Accommodation - Australia	Airbnb	£199.80
Public Transport - Plane	Emirates	£448.17
Public Transport - Plane	JetStar	£445.02
Public Transport - Plane	JetStar	£172.90
Public Transport - Bus/Tram	Myki	£90.85
Public Transport - Bus/Tram	Cranbourne Transport	£25
Public Transport - Skybus	Skybus	£12.30
Public Transport - Bus/Tram	Sydney Public Transport	£34.85
Groceries	Supermarkets	£505.44
Food / Lunch	Various	£64.99
	Total	2978.01
Accommodation - Singapore	Hostel	£149.10
Public Transport - Singapore	MRT / Bus	£30
Admission	Gardens by the Bay & Flower Dome	£64.20
Medical Insurance	Insurance Provider	£400
Visa	Visa Application	£300
	Total	943.3
	RHS Busaries	2435
	Merlin Trust	1500
	Giving back	957