



Lake Mac
Tiny Forest

Project Proposal

Forward

The Lake Mac Tiny Forest project is an initiative of [ReLeaf Lake Mac](#). ReLeaf Lake Mac is a subgroup of the [Sustainable Neighbourhood Alliance](#). A not for profit, incorporated association.

ReLeaf Lake Mac aims to empower grass roots efforts and build strategic partnerships that preserve, protect, and enhance Lake Macquarie's urban forests. Working across Lake Macquarie, we promote alliances among community-based groups, individuals, industry, and government agencies. We encourage everyone to contribute to the liveability of our city and the protection of our environment by planting and caring for trees and native vegetation.

Through these efforts, our community will value the urban forest as being integral to the quality of life, economic well-being, and a sustainable global environment. Our target is to increase tree canopy and native vegetation coverage to 50% in residential zones and 70% across the city (currently 21% and 51% respectively).



Background

Tiny Forests (also referred to as 'Mini' or 'Micro Forests') are a concept based on a methodology developed in the 1970's by Dr Akira Miyawaki, a Japanese botanist and specialist in the restoration of natural vegetation on degraded land. This methodology was expanded on by Shubhendu Sharma, founder of [Afforestt](#), India.

Tiny forests are a complete, yet small ecosystem (approx. 200 m²). They consist of a dense pocket of diverse, native vegetation. Diverse, intensive planting, in compact spaces, encourages plant competition and accelerates the establishment of [symbiotic mycorrhizae](#) which supports rapid plant growth. The result is a fast growing highly dense micro forest which captures carbon from the atmosphere, lowers urban temperatures, supports biodiversity and local wildlife, makes soil nutritious, and improves community well-being.

Over 3000 tiny forests currently exist worldwide aiming to reconnect people with nature, raise awareness and solutions for climate change.



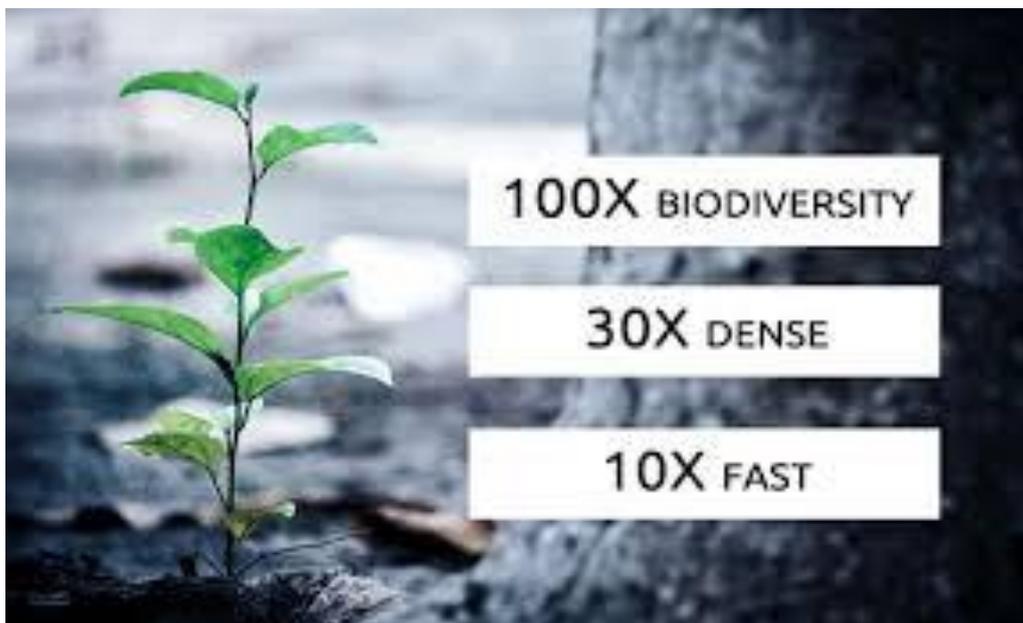
Benefits of a Local Tiny Forest

Supporting Biodiversity

The [United Nations Sustainability Development Goals Progress Report 2020](#) highlights that globally, we are continuing to fall short on halting biodiversity loss. Biodiversity loss due to human activity is leading to species extinction, upsetting the balance of nature, and making ecosystems fragile and less resistant to disruptions. Biodiversity plays a pivotal role in supporting local economies, food production and improved human health. [Lake Macquarie City Councils Environmental Strategy and Action Plan 2020-2027](#) outlines a commitment to protecting and enhancing local biodiversity.

Planting a tiny forest/s, proactively returns native vegetation to our urban centre, providing habitat and sanctuary for our local flora and fauna species and add to and enhance existing wildlife corridors.

[Research](#) from existing tiny forests demonstrate that they are reported to grow 10 times faster, 30 times denser and 100 times more biodiverse than traditional monoculture forests.



Mitigating Climate Change and Reducing Urban Heating

The [Intergovernmental Panel on Climate Change \(IPCC\) 6th report \(2021\)](#) concluded, with certainty, that climate change is real, it's happening now, and humans are responsible. The dramatic increase in carbon dioxide being emitted into our atmosphere, predominantly from fossil fuel use (85%) and land use change from deforestation and conversion of land for farming (15%), is causing the planet to warm at a concerning rate. Future climate scenarios highlight that Lake Macquarie can expect to experience a further temperature increase of just over 1°C by 2030 and be nearly 4°C warmer by 2090.

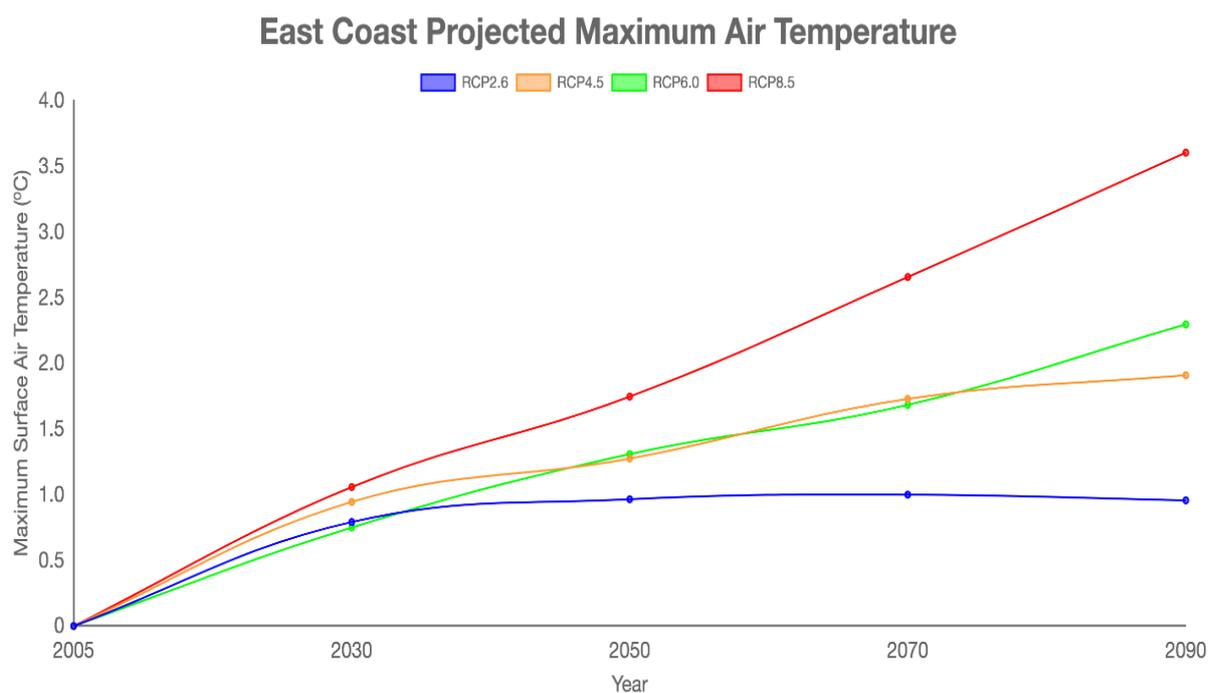
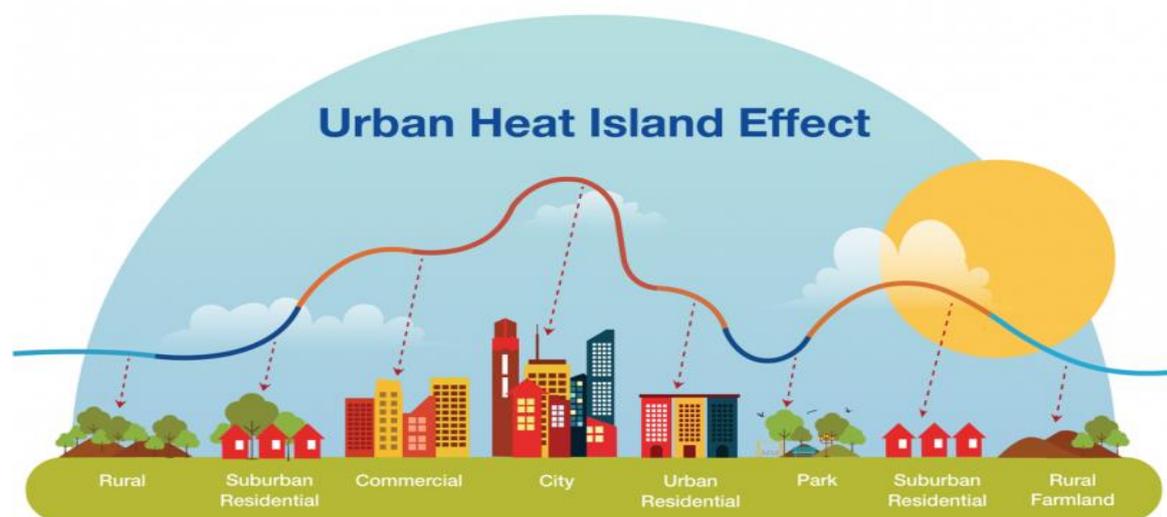


Figure 1. Shows medium maximum air temperature for East Coast Australia from combined Global Climate Models under four different Representative Concentration Pathways scenarios. (Data source – CSIRO, 2021)

Furthermore, the Lake Macquarie region is projected to experience an additional 5 days per year of temperatures over 35°C by 2030 and up to 15 additional days by 2090 (total of 17 days and 27 days for 2030 and 2090 respectively). Given more Australians die from extreme heat events than any other natural disaster, this is of importance for future planning.

To mitigate climate change, it has been outlined that not only do we need to reduce our reliance urgently and drastically on fossil fuels but also sequester large amounts of existing CO² in the atmosphere. It has long been acknowledged that the simplest and most cost-effective methods of sequestering carbon is to plant trees.

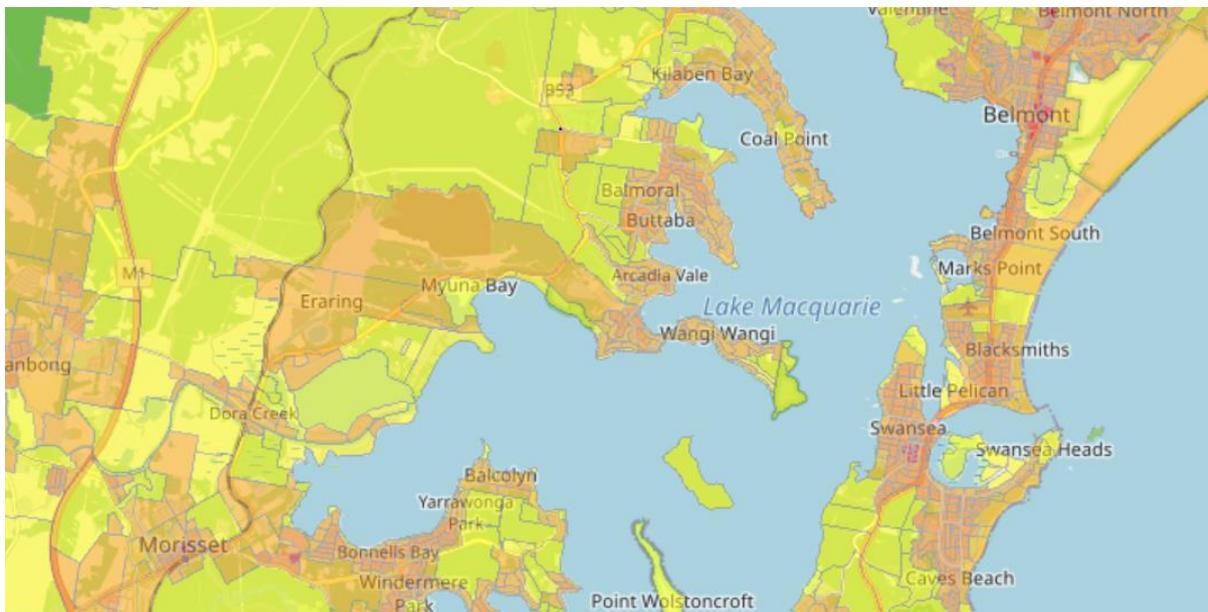
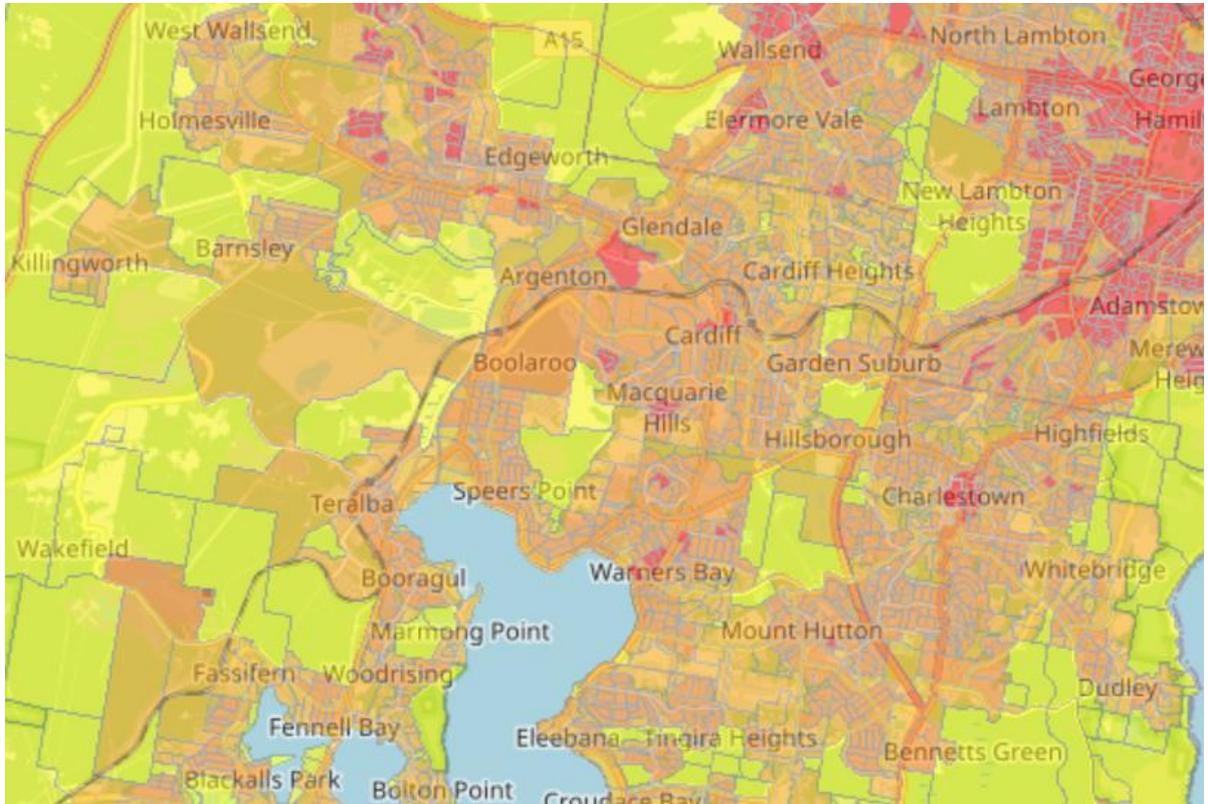
[Tree coverage in urban areas has been demonstrated to reduce the Urban Heat Island Effect](#) (UHI). According to CSIRO, urban areas can be more than 9°C hotter than the surrounding countryside. This is due to the removal of vegetation, disruption of natural water cycles and large areas of hard impermeable surfaces, that absorb heat in the day and slowly re-radiate it at night.



Using [data provided by the Department of Planning, Industry and Environment](#) (DPIE), Lake Macquarie Council has identified that the following (hot spot) suburbs requiring further, future consideration due to their thermal performance:

- Cameron Park
- Argenton
- Cardiff / Glendale
- Warners Bay
- Macquarie Hills
- Charlestown
- Swansea / Caves Beach

- Belmont / Belmont North
- Bonnells Bay
- Morisset
- Toronto



LMCC as outlined in their Baseline Thermal Assessment Report 2020, that they will be exploring options that will assist with adaptation to or mitigation of the effects of increased temperature in these areas. The proposed Tiny Forest offers the potential to support these plans (*site dependant).

The provision of the layering system of densely grouped plants, within an urban tiny forest acts like natural air conditioners. They also reduce air pollution, noise pollution and storm water runoff.

MICRO-FOREST acts like an evaporative cooler



Community Resilience and Improved Citizen Health and Wellbeing.

The planning and planting of a Tiny Forest has multiple social benefits. It connects community members with opportunities to learn about climate change mitigation strategies and undertake pro-social activities.

There is an expanding body of research identifying the positive connection that spending time in green spaces has on people's physical, mental, and emotional health. A study lead by [Mathew White \(2019\)](#), European Centre of Environment & Human Health found that people who spent two hours a week in green spaces including local parks – were substantially more likely to report good health and psychological well-being. These results were consistent across differing social economic backgrounds, ethnicity, presence of chronic illnesses and disabilities.

Further studies have shown that spending time in or merely admiring (looking at) nature is an antidote for stress, can lower blood pressure, increase self-esteem, and improve mood (Speldewinde, 2016).

The proposed Lake Macquarie Tiny Forest project aims to engage the local community in planning and decision making, through consultation, planting days, committees, and events—assisting to create a sense of community ownership. The community will be encouraged to become pro-active in developing their own local cooling solutions and provided with educational knowledge and resources to replicate the Tiny Forest concept in their own environments e.g., backyards, school yards, company grounds etc.

Supporting the United Nations Sustainable Development Goals

The [United Nations 17 Sustainable Development Goals \(SDG's – Sept 2015\)](#) provide a blueprint for a desired, global future. The Lake Macquarie Tiny Forest project supports the following SDG's -

- **Goal 11 – Creating Sustainable Communities** - Make cities and human settlements inclusive, safe, resilient, and sustainable.
- **Goal 13: Climate Action** - Take urgent action to combat climate change and its impacts.
- **Goal 15: Life on Land** - Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.



Project Details

Site Requirements

An ideal tiny forest site will:

- Be accessible to pedestrians and vehicles (earthwork machinery)
- Have minimal overhead powerlines, underground services, and existing mature trees
- Be closely located to housing, school/s and public transport
- Approx. 200m²
- Near an existing water outlet
- Highly visible
- Close to existing nature corridors
- Have adequate sunlight – 8hrs +
- Potentially be in area of urban heating concern (hot spot suburb)



Proposed Work Plan/Timeline

Site Identification and Council Approval	December - April 2022
Working Party – Member identification and initial planning meeting	March- April 2022
Business Sponsorship requests/in kind donation requests.	March-May 2022
Site inspection and landscape concept design	April - May 2022
Plant pre-orders	May 2022
Community Consultation	July 2022
Contractors and supplies arranged	June-July 2022
Earthworks	September 2022
Community Planting Day 1	November 2022
Community Planting Day 2	March 2023
Routine care and maintenance	Ongoing 2022-2024

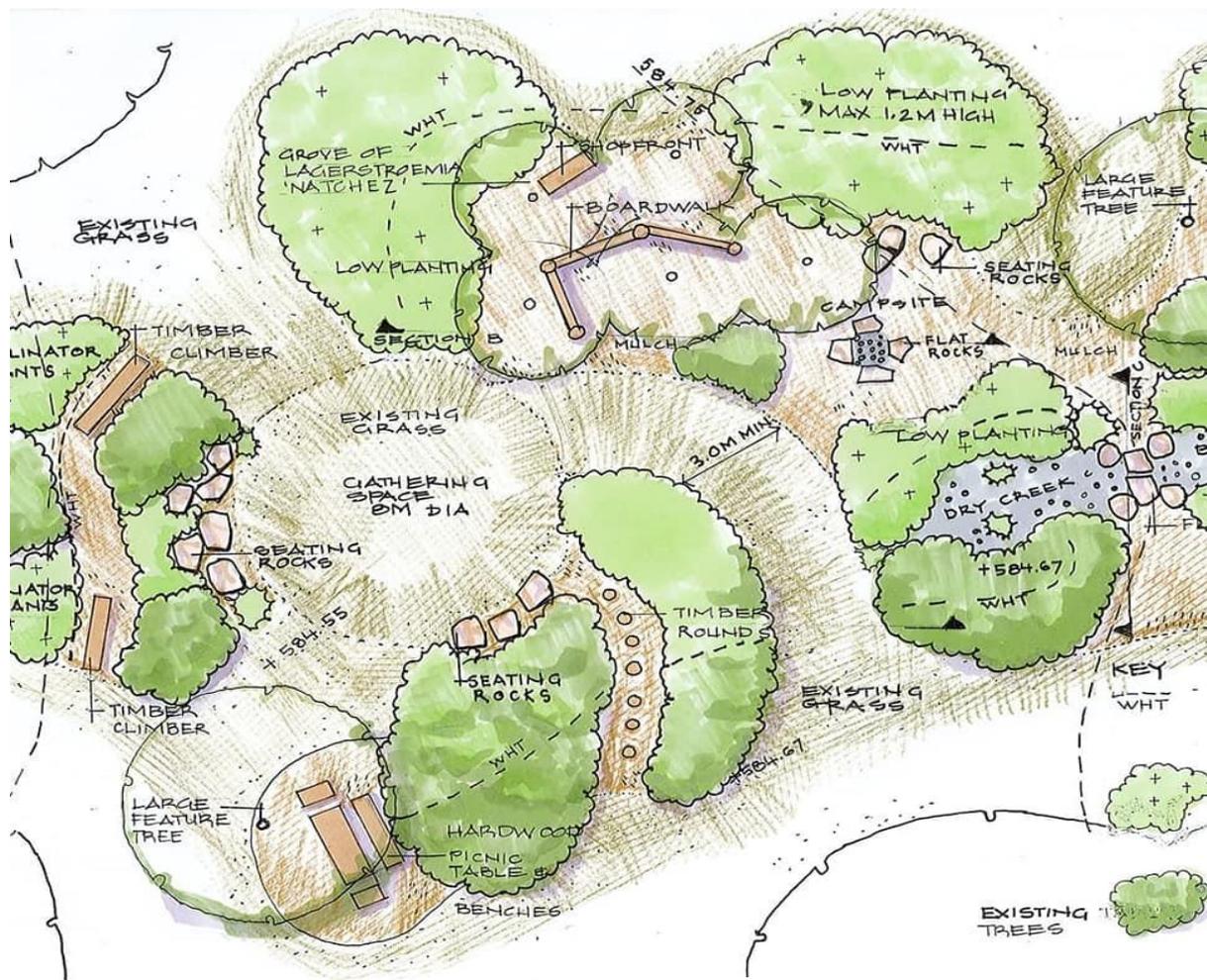


Proposed Budget

Tiny Forest Budget			In-kind
Landscape/concept design	site plan and planting guide	3,000	
Earthworks	remove grass layer excavate to 1m backfill with existing topsoil and compost/organic material.	5,000	
Compost (straw/manure)	200m2 @ 300mm	4,845	
Plants	1800 tube stock x \$3	5,400	
Corflute Tree Guards	1000 @ \$1235 x2	2,470	
Stakes	x2500	309	
Mulch	20 m3 - 200m2 x 100mm		1360
Organic Soil improvement	10 L Seasol	79	
	Mycogold 10kg	795	
Fencing	permanent timber fencing	3,000	
Temporary Fencing	20 days @ \$900 per 10 days	1,800	
Log barrier	barrier/edging	1,000	
Signage		300	
Instalments	rocks, seats, artwork	2,000	
Catering (consultation, working bees, events)		1,000	
Citizen Science – EarthWatch Australia			\$50,000
	total	\$32,358	\$51,360

*The Lake Mac Tiny Forest is expected to be funded through a combination of cooperate sponsorship, in kind donations and potential crowdfunding. See example - Watson (Canberra) crowdfunding project which raised over \$52,000 <https://startsomegood.com/watson-micro-forest>

<https://www.watsonmicroforest.com/>



JD EDGE LANDSCAPE PLAN, WATSON MICRO-FOREST, 1:100@A3, SHEET 1 OF 2.

Corporate Sponsorship Framework

Public and private companies are key to assisting tackle global biodiversity and climate challenges. The new report [Natural Climate Solutions for Corporates](#), outlines that Natural Climate Solutions (NCS) help conserve, restore, and improve ecosystems while increasing greenhouse gas emissions storage.

The use of Natural Climate Solutions (NCS) as part of a robust climate strategy can help corporates meet their corporate climate commitments and steer a pathway towards net zero.

Research conducted for the above report confirms estimates that NCS can provide one-third (close to 7 Gt CO²) of the climate mitigation to reach a 1.5- or 2-degree pathway by 2030—and at a lower cost than other forms of carbon dioxide removal. Deployed in the right way, NCS can also produce high co-benefits that accrue to nature and to communities. Lake Mac Tiny Forest is a NCS with multiple benefits for companies, biodiversity, climate mitigation and the local community. The Tiny Forest Project offers companies the below sponsorship opportunities:

Forest Family (Corporate sponsor) – donation \$10,000 +

In return sponsors will -

- be provided with the opportunities to attend and display promotional material at community planting days
- be provided with the option to participate media opportunities
- be appropriately acknowledged in all promotional material
- formally and regularly mentioned on official Facebook page
- have logos displayed on permanent signage and future educational resources (with QR code), as exemplified below



Forest Friends (Corporate sponsor) – donation \$5000- \$9,999

In return sponsors will -

- be provided with opportunities to attend and display promotional material at community planting days
- be appropriately acknowledged in all promotional material
- mentioned on official Facebook page

Forest Acquaintances – donation \$1000-\$4999

In return sponsors will -

- be appropriately acknowledged in all promotional material
- mentioned on official Facebook page

*Additional publicity and promotional opportunities will be considered by request.

The Miyawaki Tiny Forest Methodology Outlined

Following identification and approval of the proposed forest site, the following steps will be undertaken.

Step 1. Soil Survey

Detailed soil analysis to be undertaken to assess the soil on the follow parameters

- Physical texture
- Organic Carbon (if possible)
- Soil Ph
- Evidence of micro and macro biology

This assists to determine the extent of remediation and soil nourishment needed e.g., manure, mulch, seaweed solution, blood and bone, straw etc. Once complete, identify biomass suppliers.

Step 2. Native Species Selection

- Visit local forest and conduct potential native vegetation surveys
- Collate primary and secondary data to validate
- Allocate each species to different layer of forest – scrub, sub tree, tree, canopy
- Contact suppliers
- Ensure genetic diversity of trees of same species
- Create order list with balance to layers

Step 3. Sapling procurement

- Identify supplies
- Assess quality of stock including inspecting root development to ensure fully developed with healthy shots
- Check propagation methods and ensure standards.

Step 4. Soil Preparations

- Uniform and consistent biomass preparations
- Enrich biomass mixture itself using microbiological enhancers

- Soil nourishment at 2 different layers.
- Enrich to 1 metre
- Secure and finish site preparation

Step 5. Plantation

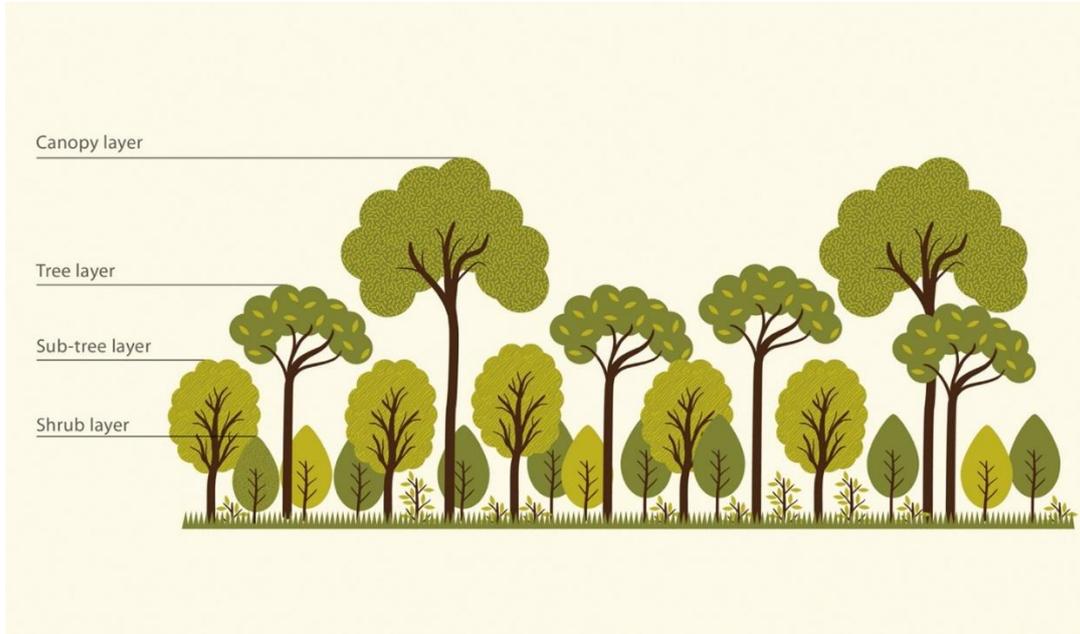
- Species are arranged as per layers specified in Miyawaki method
- Planting demonstrations given
- Root zone enhanced with microbiology enhancers
- Tree guards applied
- Mulched to 75mm

Step 6. Maintenance

- Site dependant - but inclusive of watering (first 12 months) and manual weeding (first 2 years). No pruning, or chemical usage.

Important Features and Underlying principle

- Local Forest survey and replication, is the essential first step.
- Identifying the most genuine supplier/s of 'native' species
- Native species only – species that have grown in the area without human intervention for thousands of years.
- Importance of layering not just dense planting, to create true forest.
- Soil preparation and plant selection are equally important
- Forest should be hose watered not sprinkler or dripline with appropriate amounts of water (during dry spells)
- No pruning or removal of natural litter to occur. This only weakens the forest system. It should not require any maintenance post 2-3 years, if a genuine forest is created.
- Weeds should be removed for first 2 years.
- Chemical free – no pesticides, herbicides etc.



Maintenance Schedule

Following initial tree planting, the below maintenance is anticipated.

During the project approximately 6-10 'Forest Guardians' will be identified. A Forest Guardian is an individual or group who has committed to assisting with the long-term success of the project by providing regular maintenance, with the support and supervision of Releaf Lake Mac.

0-1 Month

- twice weekly hose watering (if no rain)

1-6 months

- Weekly watering (if no substantial rain)
- Bi-monthly weeding and litter clean up– with community volunteer assistance.

6-12 months

- Quarterly weeding and litter collection mornings

12-2 years

- Quarterly weeding/litter collection and check fence and signage, for any required maintenance. Re-mulch.

2-3 years

- Weeding if required. Forest should be self-suppressing by this stage.

Examples of Similar Projects -

India -

After 1 year, a 750 m² Miyawaki tiny forest with 2278 trees and 44 native species, India



July 2018



July 2019



Netherlands -



Downer, Canberra





Further recommended reading

<https://www.theguardian.com/environment/2019/jul/04/planting-billions-trees-best-tackle-climate-crisis-scientists-canopy-emissions>

<https://www.nationalgeographic.com/environment/article/why-tiny-forests-are-popping-up-in-big-cities>

https://www.1millionwomen.com.au/blog/go-native-why-we-need-wildlife-allotments-bring-species-backburbs/?fbclid=IwAR2iro_L1EcEFM69Vuw2_dD9mbvmYVvpX9_K_qUVBpB6iAq3Z95HwWvdtM0

https://www.theguardian.com/technology/2021/sep/25/good-ideas-good-work-and-good-luck-australian-grassroots-campaigners-on-how-they-got-it-done?fbclid=IwAR0mqosYQrUsDJn2H8ZcnoONFow4rcsxGbr-nvlp7Q8KbNsArkTBCyZh1_Q

<https://www.theguardian.com/environment/2020/jun/13/fast-growing-mini-forests-spring-up-in-europe-to-aid-climate>

<http://urban-forests.com/miyawaki-method/?amp>

<https://earthwatch.org.uk/get-involved/tiny-forest>

https://earthwatch.org.uk/images/downloads/Naturebased_solutions_for_urban_resilience.pdf

<https://www.crowdforexing.org/miyawaki-mode>

Supporting Documentation – Video and Image Board

World Economic Forum (3 mins) Please Watch

<https://www.weforum.org/videos/these-tiny-urban-forests-could-be-a-secret-weapon-against-climate-change> (3 mins)

Ted Talk (5 mins)

https://www.ted.com/talks/shubendu_sharma_how_to_plant_a_tiny_forest_near_you?language=en

Image Board



Example layout



Example fencing – featuring local, native species.



Example signage



Signage and seating

22NM004	Support for Tiny Forest projects
File	F2022/00036 - D10568960
Author	Councillor - Jason Pauling

The City of Lake Macquarie has always prided itself on its environmental and ecological credentials. Increased population and urbanisation have had impacts in relation to ecological matters. Tiny forests may provide increased biodiversity in urban areas.

Tiny forests are a complete, yet small ecosystem. They consist of a dense pocket (approx. 200m²) of diverse, native vegetation that captures carbon, aims to reduce urban heating, creates habitat for wildlife, and supports community connectedness. They are often grown in Urban areas such as underutilised parks or besides major road ways.

Tiny forests use a particular planting method developed in the 1970's by Dr Akira Miyawaki, therefore called the 'Miyawaki method'. The method involves intense soil remediation to incorporate nutrients and soil enhancers, and a dense planting structure that is 30 times denser than traditional forests. This results in accelerated growth of about 10 times faster than traditional forests; and as it establishes and attracts more species, becomes up to 100 times more biodiverse than monoculture forests.

There are over 3000 existing tiny forests worldwide - each helping to combat climate change by sequestering carbon and supporting biodiversity.

There is currently a proposed pilot project for a tiny forest within Lake Macquarie which would leverage collaborations between:

- Local community groups - ReLeaf Lake Mac, The Sustainable Neighbourhood Alliance, Trees In Newcastle, Lake Macquarie Landcare
- Local businesses
- Lake Macquarie City Council
- Earthwatch Australia - <https://www.earthwatch.org.au/tiny-forests>

Recommendation

Council endorses the concept of tiny forests and commit to investigating a suitable location and ongoing management regime to support the development of a tiny forest pilot project.

Attachments

Nil.

Motion unanimously endorsed at LMCC meeting 21 February 2022.