



# My Healthy Soil Project

## Project proponents:

- Transition Town Vincent (TTV)

## Introduction

Soil and terrestrial vegetation are carbon sinks with around [two thirds of the terrestrial carbon pool sequestered in soil](#) (Australia State of the Environment (ASOE), 2021). Clearing, development and management of land for intensive land uses such as agriculture and urban have resulted in the loss of significant amounts of terrestrial carbon (resistant, humic, particulate) with Australia listed as number 3 (behind China and the United States) among countries with the highest loss of soil organic carbon (ASOE, 2021). Significant efforts are being made particularly in the agricultural sector to restore terrestrial carbon, however, in the urban environment this is largely ignored. This project aims to increase the capacity of urban residents to use locally available resources to transform their properties from being carbon sources towards being carbon sinks. This will provide a range of benefits including healthier soils and plants, better water management, increased canopy and healthier, more vibrant communities.

The project has drawn inspiration from three other projects. The first is the [Stockholm Biochar Project](#) which aims to make Stockholm the world's first urban carbon sink and to have 100,000 residents using biochar by 2020. Biochar, a form of charcoal (a resistant form of carbon), has been used extensively by the City of Stockholm and its residents in conjunction with compost to improve soil fertility and water holding capacity resulting in significant improvements to tree health and canopy cover and water management. Many other cities and towns globally are following Stockholm's lead.

The second project providing inspiration is the Transition Town Vincent (TTV) community food forest located at the north west corner of Floreat Athena playing fields. Drawing on lessons from the Stockholm project in particular, the food forest trees have survived and thrived during a record breaking long hot summer due to the addition of organics (FOGO compost, biochar, worm juice) at the time of planting. The third project is a recent study: [Soil health and carbon storage in community gardens in the Perth metropolitan area, Australia by Zhao et al. \(2024\)](#) which identified significant improvements in total carbon and associated soil health parameters (e.g. soil water holding capacity, microbial activity, water repellence) because of the use of compost in the sandy soils of these gardens.



## Project outline

(Refer to table 1 for a summary of the project outline).

### Vision

Residents value creating healthy soils and gardens using locally generated and processed carbon to enhance their environment, liveability and climate resilience.

### Problem and opportunity assessment

Western Australia's population is forecast to grow from about 2.7 million to up to 5.6 million by 2056 (State Planning Strategy, 2014). The majority of these people will be housed in urban areas with significant investment being made to transform both infill and greenfield areas to house this population on land devoid of carbon and nutrients but requiring healthy soils and vegetation to mitigate urban heat island effects and a warming, drying climate.

Low levels of soil organic carbon (SOC) and organic matter (SOM) in urban soils and gardens are contributing to high levels of water use, poor plant health and sub-optimal tree canopy cover. With a regenerative and circular approach to the management of organic resources, urban gardens can be transformed from a carbon source to a carbon sink, resulting in healthier soils providing a range of benefits including better water management and healthier plants and canopy cover. Achievement of this outcome will require those all those responsible for management of urban soils to be provided with the required resources, knowledge, skills and support.

Transition Town Vincent (TTV) is a community based organisation which has been established in the City of Vincent for 10 years where it has been at the forefront of civic leadership and empowerment related to sustainability. Recent projects have included the community composting station (replaced by FOGO), the tools n things library, movie nights and the food forest. In addition to providing a cluster of community leadership and extensive networks, the TTV is located in an area which provides a local resource hub /circularity precinct for servicing the project (figure 1). Similarly, it has an extensive network across the Perth region and WA regional communities.

Table 1 – Project outline – Transition Town Vincent - My Healthy Soils Project

Problem / opportunity statement	Long-term outcomes (3-5 yrs)	Medium -term outcomes (1.5-3 yrs)	Short-term outcomes (0-1.5 yr)	Inputs	Outputs: Activities	Outputs: Participation
<p>Low levels of soil organic carbon in urban soils and gardens are contributing to high levels of water use, poor plant health and sub-optimal tree canopy cover.</p> <p>Using a regenerative and community supported approach to the management of organic resources, residents can transform urban gardens from carbon sources to carbon sinks. This will result in healthier soils and plants, better water management and healthier, more vibrant communities.</p>	<p>Changes in attitudes and understanding related to incorporation of organics into gardens.</p> <p>Increases in soil organic carbon (SOC).</p> <p>Improved plant health and associated green cover and tree canopy cover.</p> <p>Improvements in water use efficiency.</p> <p>All organics produced within the Council area are retained or / and reused in local soils.</p> <p>Increased capacity to regenerate organics locally.</p>	<p>A scalable model developed for empowering residents to incorporate organics into their gardens.</p> <p>Soil improvement plans developed and implemented for a minimum of ?? gardens per year.</p> <p>Council incorporating organics into tree plantings, gardens beds and turf.</p> <p>Developers incorporating organics into new development sites.</p> <p>Community scale biochar maker commissioned.</p>	<p>Increased awareness and understanding of the use and role of organics among residents and decision makers.</p> <p>Development of local knowledge and skills for application to residential soil improvement.</p> <p>An understanding of attitudes and needs for residents to incorporate organics into tree zones gardens and verges.</p>	<p>Green waste resources.</p> <p>Organic and regenerative soil conditioners and fertilisers:</p> <ul style="list-style-type: none"> <li>- Mulch</li> <li>- Compost (FOGO)</li> <li>- Charcoal (biochar)</li> <li>- Liquid nutrients e.g. worm juice</li> </ul> <p>Research and evidence.</p> <p>Local knowledge, skills and labour (e.g. rover group).</p> <p>Partner organisations.</p> <p>Community resources hub(s).</p> <p>Land / space /water</p>	<p>Surveys.</p> <p>Information sheets.</p> <p>Guidelines.</p> <p>Workshops / demonstrations / displays.</p> <p>Trial / demonstration sites e.g. food forest /black cockatoo forest.</p> <p>Soil improvement plans for private:</p> <ul style="list-style-type: none"> <li>- Trees zones</li> <li>- Gardens</li> </ul> <p>Education, communication and extension plan</p> <p>Evaluation incl. Cost Benefit Analysis CBA</p> <p>Website / portal</p>	<p>Project steering / working group(s).</p> <p>TTV members in the initial pilot (max 10 – 20 gardens/verges)</p> <p>Researchers.</p> <p>Workshop attendees.</p> <p>Local governments.</p> <p>Council.</p> <p>Residents.</p> <p>Property developers.</p> <p>Mobile/ roving taskforce / work crew.</p> <p>Community gardens / Transition Towns / Friends of Groups.</p>



The project initially aims to engage with residents in the vicinity of the existing circularity hub / precinct to implement best practice soil health enhancement practices using organics including compost, biochar, mulch and liquid biofertiliser e.g. worm juice. In addition to increasing soil carbon, other outcomes expected include healthy carbon sequestering gardens with healthy green / canopy cover and reduced irrigation requirements. The project will support these residents in improving the carbon content and health of their soils and gardens and will develop a scalable model for empowering residents to incorporate organics into their gardens / verges.

## Inputs

Inputs will include:

- Green waste resources such as tree thinning, green / verge collected waste e.g. tree / vegetation thinning's, and food organics.
- Organic and regenerative soil conditioners and fertilisers e.g. mulch, compost (FOGO), charcoal (biochar) and liquid nutrients (e.g. worm juice). These are expected to be made stored and made available from near the Transition Town Vincent (TTV) tools and things library and food forest located at Floreat Athena.
- Education and extension / outreach resources and services.
- Local expertise and labour. This is expected to include a rover group of volunteers who will assist with the planning and implementation of soil improvement plans for the pilot sites.
- Partner organisations who will provide various inputs including information, knowledge, skill and funding.
- Local research and evidence. This includes the research from the community gardens as well as research data associated with the use of organics in the food forest i.e. soil analysis and other sites.
- The existing community resources hub currently comprising the tools n things library and fenced storage area, mulch pile, compost (FOGO) station, surrounding land and the Floreat Athena facilities (Litas Stadium meeting rooms).

The mulch and FOGO compost are already made freely available to residents by the Council. It is expected that the required quantities for the pilot project will be made available in the vicinity of the tools n things library. Initially the biochar will need to be purchased or alternatively provided free by one of the project participants. However, a grant will be sought for the purchase of a community scale biochar maker, the location of which will need to be determined. Worm farms will also need to be established.

Outputs will include surveys (e.g. attitudinal), information sheets, presentations and workshops, trial / demonstration sites, field days, garden plans, open gardens / verges,



case studies, multi-media communication video documenting the project and data on the change which has occurred, webpage and a recognition program.

Initial trial / demonstration sites will be located in the vicinity of the existing food forest, which already successfully uses mulch/biochar/compost/worm juice for the fruit tree plantings. In time they could be spread around the Council area.

## Outcomes

Short term Outcomes (0-1 yr) will include:

- Project steering group established.
- Demonstration / trial sites established.
- Baseline survey of participants providing an understanding of attitudes and needs for incorporating organics into gardens and verges.
- Soil improvement plans incorporating organics developed and implemented for the initial pilot gardens.
- Residents have an increased awareness and understanding of the use and role of organics in creating healthy soils.
- Development of local knowledge and skill for application to residential gardens and verges.
- Project evaluation report.

## Medium term outcomes

Medium term outcomes (1.5-3 yrs) are expected to include:

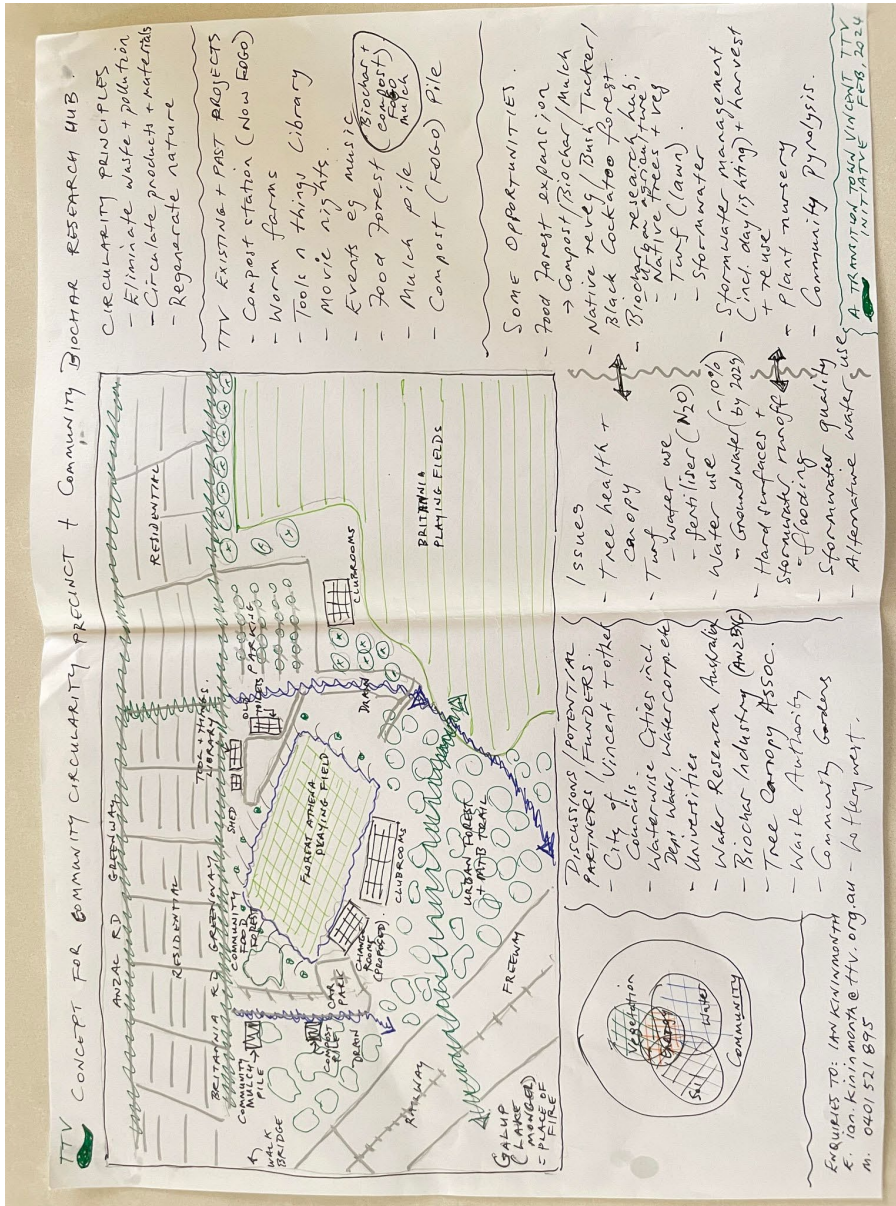
- A scalable model developed for empowering residents to incorporate organics into their gardens / verges.
- Residents empowered with information, knowledge and skills and resources to incorporate organics into their gardens / verges.
- Community scale biochar maker commissioned.
- Council trialling organics in tree plantings, gardens beds and turf.
- Developers incorporating organics into new development sites.

## Long-term outcomes (3-5 yrs)

Long term outcomes are expected to include:

- All organics produced within the Council area are retained or / and reused for incorporation into local soils in accordance with best practice.
- Increases in soil organic carbon (SOC).
- Improvements in water use efficiency with associated reductions in water use / reduced rates of water use increase.
- Increased capacity to regenerate organics locally.
- Improved plant health and associated green cover and tree canopy cover.

Figure 1 Concept for community circularity / resource hub



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**Appendices**

1. City of Vincent Sustainable Environment Strategy 2019 – 2024 targets
2. Soil organic carbon levels Leederville area



## Appendix 1 - City of Vincent Sustainable Environment Strategy targets:

This project will contribute to the following [City of Vincent Sustainable Environment Strategy 2019-2024](#) targets

### **Water**

- City operations. Groundwater use to be reduced by 5% by 2024 and 8% by 2029. Facility upgrades to achieve a 15% scheme water use reduction.
- Community: Groundwater use to be reduced by 5% by 2024 and 9% by 2029. Scheme water use to be reduced by 7% by 2024.

#### *Comment*

The use of organics such as compost and biochar has shown to increase maximum water holding capacity (MWHC) of soil considerably. In the Zhao et al. (2024) study the raised beds with composted soils had an average MWHC of 58.43% compared to the 4.74% of the control plots. In Stockholm biochar and compost are regularly used to improve the soil water holding capacity of tree and garden planting beds. In Dubbo, New South Wales, the Council has adopted the Stockholm approach and reported the [“tree watering rate was less than one-third of what it had been traditionally, when establishing advanced tree plantings”](#).

### **Waste**

- City operations and community: Zero waste sent to landfill by 2028 and waste associated greenhouse gas emissions to be reduced by 90%.

#### *Comment*

Green waste such as tree thinning's and grass clippings can be pyrolysed into biochar. Along with tree planting, biochar is recognised by the [IPCC as a carbon](#) dioxide removal (CDR) technology. In Stockholm, green waste is pyrolysed to produce biochar, with the associated carbon credits being available for purchase in an international market place (e.g. Puroearth). The biochar is used in private gardens and in municipal tree plantings and gardens to increase drought tolerance, improve plant growth and canopy cover and manage stormwater runoff (quantity and quality). Around 500 tonnes of green waste will generate about 125 tonnes of biochar (25%).

### **Urban Greening and Biodiversity**

- City operations: Tree plantings on public land to achieve 23% canopy cover by 2023 and 35% by 2050.
- Community: Halt and reverse net tree canopy loss on private land to achieve 7.5% canopy cover by 2023 and 12% by 2050.

#### *Comment*



Healthy soils result in healthier plants and trees and associated green cover and tree canopy cover. It also reduces costs associated with vegetation / tree deaths. In addition to Stockholm, Dubbo in New South Wales has also reported significant improvements in canopy cover due to addition of biochar and compost to soil.

For Discussion



Appendix 2 – Soil organic carbon levels in the Leederville area, City of Vincent (See <https://nationalmap.gov.au/#share=s-5nM1dm10UPnflm1QeX7TLCyuLIW> )

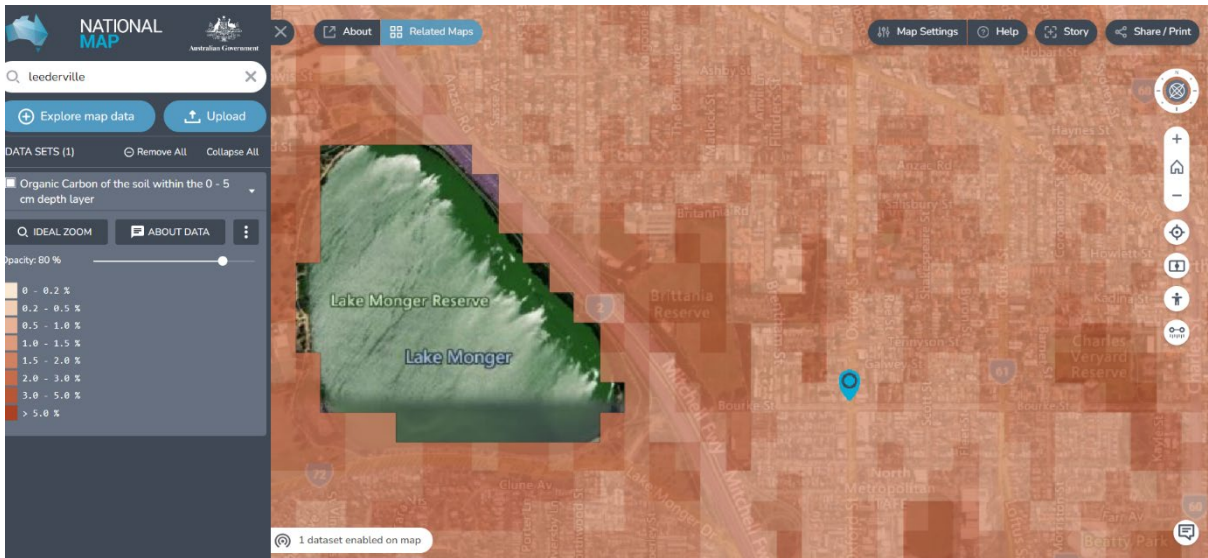


Figure 2 - Organic carbon of the soil within the 0 - 5 cm depth layer

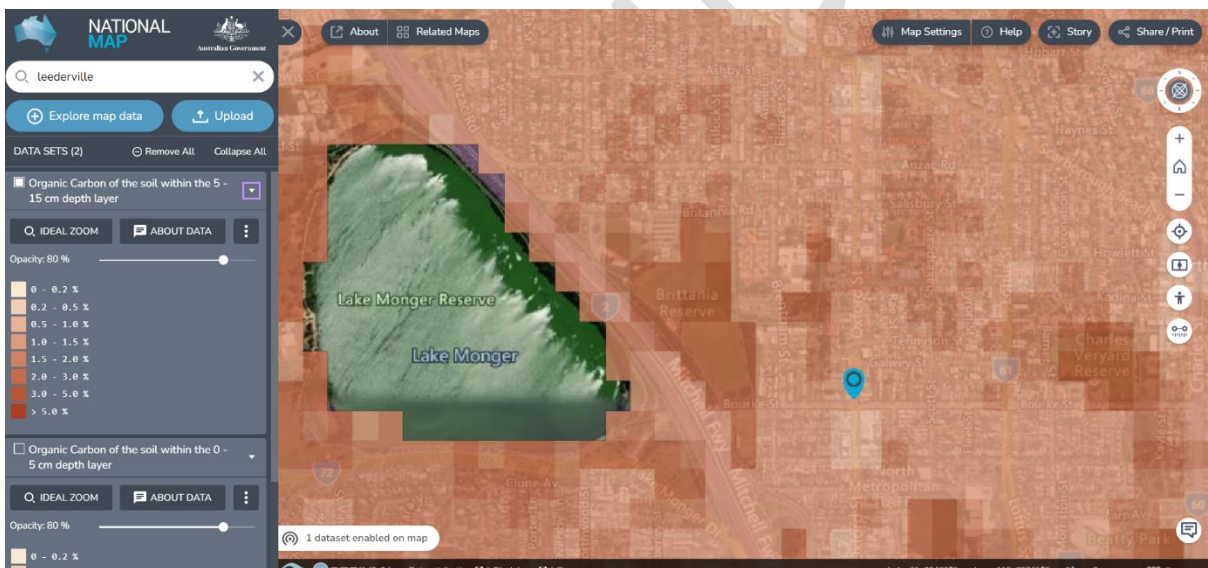


Figure 3 - Organic carbon of the soil within the 5 - 15 cm depth layer