RMIT

Too Cool for School

Mitigating Climate Change in Schools in Melbourne's West

Report 2024

RMIT UNIVERSITY Landscape Architecture

ENVIRONMENT EDUCATION VICTORIA

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Brimbank City Council

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Acknowledgement
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Ross Kingston, (Project Manager Sustainable Infrastructure) Ashley Onori(Climate Emergency officer) from Brimbank Council, Jo Connor (Executive Officer) and Nerida Thompson from Environment Education Victoria, Cathy Steere (Principal), Anne Durham (Dep Principal) from St Augustine's Primary School, Rob Huntington (Deputy Principal), Sasha Koomen (Head of Synergy) from Overnewton Anglican Community College.

External Critics: Rutger Pasman, Dr Brent Greene, Dr Lee-Anne Khor, Dr Maud Cassaignau, Dr Katrina Simon.

Acknowledgement of country
We at RMIT University acknowledge the people of the Woi wurrung and Boon wurrung language groups of the eastern Kulin Nation on whose unceded lands we conduct our research, teaching and service. We respectfully acknowledge Ancestors and Elders past, present and emerging who have always been caring for Country. We pay our respects to Country, the lifeworld that sustains us all. Our research, education and service are already in a relationship with Country and the people of Country, here and in all the places we undertake our business. As mostly non-Indigenous people, we acknowledge our obligation in this relationship: to uphold the ngarn-ga [understanding] of Bundjil and practice respect for community and culture. Though there is much we still need to learn, especially about ourselves, we affirm our dhumbali [commitment] to that work. We hold as central to our business, dhumbali to a shared future with Indigenous peoples everywhere and especially Kulin Country and peoples.

Disclaimer
The views expressed in this report are those of the authors and do not reflect the views or policies of RMIT University, EEV or the City of Brimbank.

Frontcover image: Baoje Zhu and Tsz Ching Lee, Heritage Values in the Vicinity of Overnewton Anglican Community College and St Augustine's Primary, Keilor

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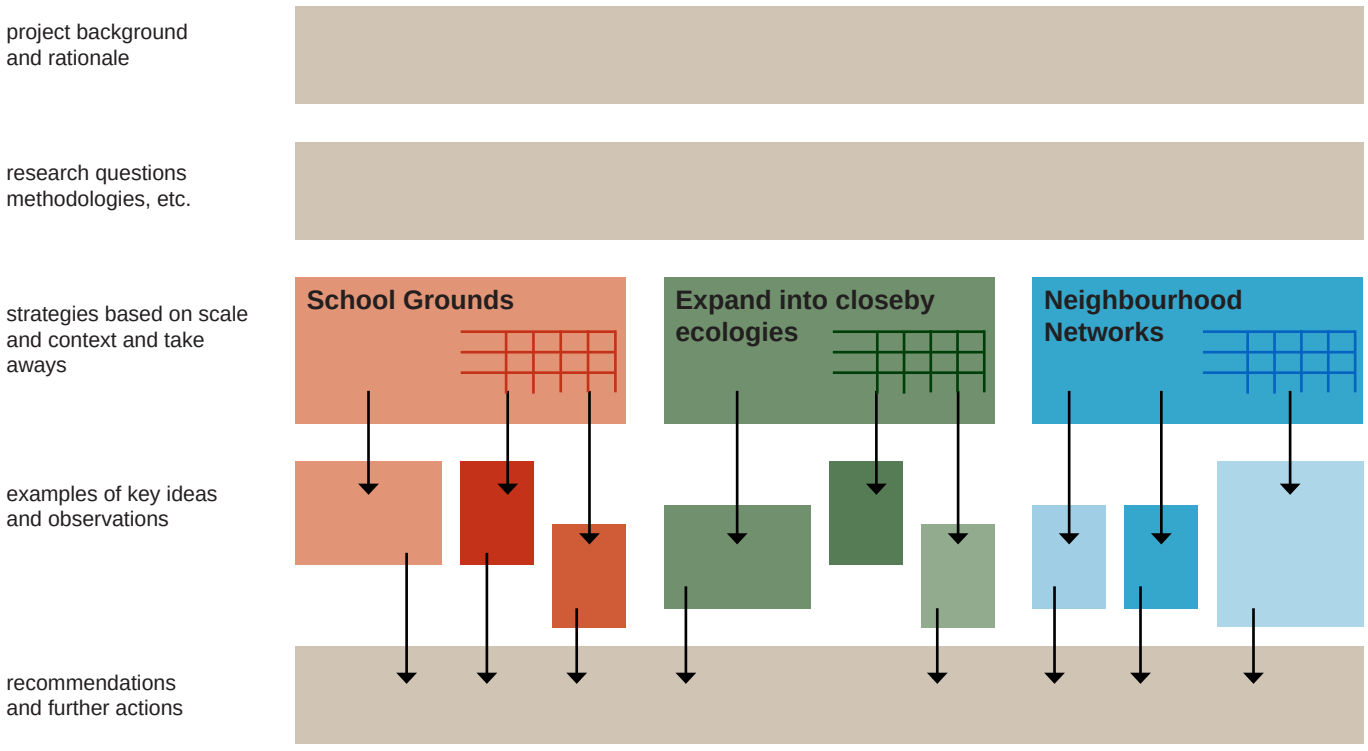
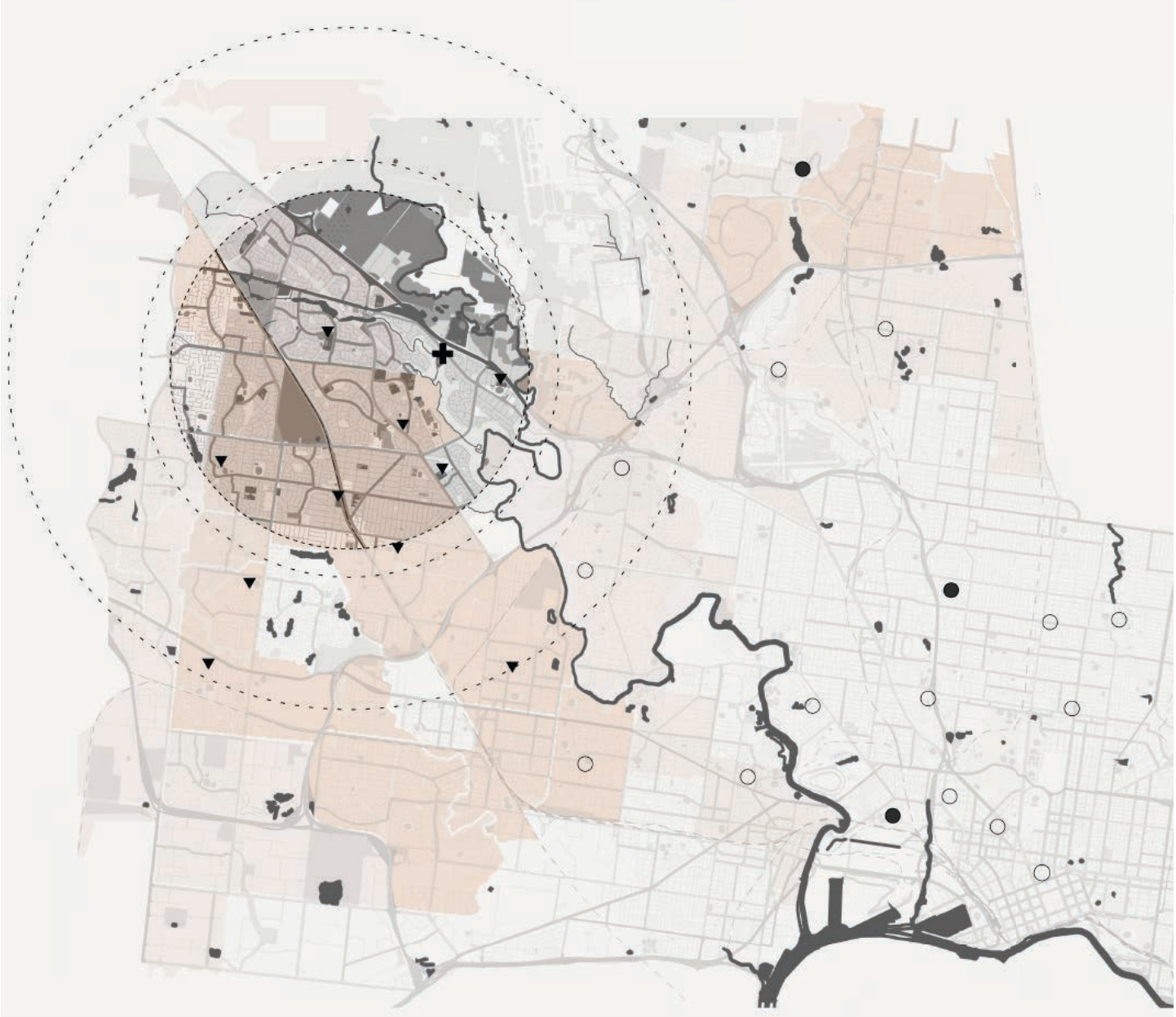
How to read this Report
This report contains different sections. A first-one explains the setup and objectives of the research, followed by themes and methods of investigation.

The middle section is structured into 3 different scales of propositions, ideas and findings by RMIT students, listed by theme in a coloured overview chart. For each of the proposed ideas and strategies we outlined the scale of an intervention, possible relevant stakeholders that would need to be involved, key criteria to be considered and reflected on the transferability of the strategy to other schools. This chart lists those takeaways and also links to examples with their descriptions. For each idea or strategy a small caption acompanies an image or drawing by our students to explain the rationale of the themes investigated. These ideas can be looked at and thought of selectively, or in combination with each other, transfered to other school locations or with different conditions as themes and strategies to implement. The examples in each section help visualise to different stakeholders how the implementation of propositions could look, and can provide inspiration for councils, schools and planners as well.

The report closes with a section with general recommendations. The aim is to provide a guide and ideas in between schools and councils to help them plan improvements to their spaces, provide opportunities for collaboration, and highlight the potential and importance of well-designed outdoor spaces for health, well being and expanded educational opportunities.





Melbourne's West with the Maribyrnong as a central corridor. Primary schools (triangle) are shown in Heat Vulnerable (orange) suburbs. Drawing: Danielle Gibbs

Introduction

Objective
The research study has investigated how primary and secondary schools in Melbourne can adapt their existing outdoor spaces to currently intensifying societal issues such as a climate change (Urban Heat Island effect, extreme weather events, drought etc), biodiversity reduction (extinction), health challenges (heat, lack of shade, pollution, air quality) changing mobility (challenges of access through public transport, car, walking and cycling) social disruptions (Covid-19 and need for outdoor learning) and educate future generations in uplifting ways within and beyond the school grounds.

How can local schools creatively adapt their outdoor spaces through landscape design approaches? The objective is to create improved environments that not only improve biodiversity, reduce water and energy consumption in schools while creating improved outdoor learning spaces. It is also to increase usability of spaces as well as the school communities' experience and engagement with landscapes, climate adaptation, and ecological awareness, and make those relatable through everyday experience.

This study and the resulting report outline identified strategies to demonstrate, test, discuss and advocate for a pathway for the future adaptation of schools in Melbourne. This study hopes to create a precedent to get more schools interested in the subject, which is also the objective of EEV/Resource Smart School Program and the grant associated with the creation of this document from Brimbank council.

Partner Involvement
The project was developed in partnership with Environment Education Victoria (EEV) -a non for profit organisation- as part of their Resource Smart Schools program, and supported by the Brimbank City Council. Overnewton Anglican Community College and St. Augustine's Primary School kindly participated in this study and opened their grounds to us for the purpose of this research. The interactions with the various partners was crucial in understanding their requirements, abilities and objectives to develop meaningful design-research responses. EEV, Brimbank Council and the schools provided valuable feedback throughout the project, through inception meetings, critiques, exhibition feedback, as did students from the two partner schools.

introduction of invasive species impacting adjacent creek and riverbed, Photo: Daniel Spiteri

School grounds surface at Overnewton Anglican Community College, Daniel Spiteri

Carpark (top left) without shade and erosion, Hazel Francis

Value of Partnered Design Research
Research-focused partnered projects provide opportunities to generate valuable research for partners of RMIT Landscape Architecture, via collaboration, stakeholder engagement on real sites and pressing contemporary questions. In a first instance, the partnered design-research studios were useful to industry partners as a generator for ideas and opportunity to explore potentials of the real-world project with academics and students. A curriculum is developed by academics around research questions and the site provided by the partner. The project was designed in such a way that students, staff and partners mutually benefited from the investigations, discussions and outcomes, that were then further explored through research.

After the studio activities had concluded, outcomes were reflected, contextualised and expanded into different formats of outputs that were of most value to the partner. In this case an exhibition supported public engagement processes, stakeholder discussions. A further iteration within a different studio eventually led to this research report that contextualises and outlines key findings of the process and recommendations. This report is funded through a Brimbank Council Grant, as part of an Environment Education Victoria project.

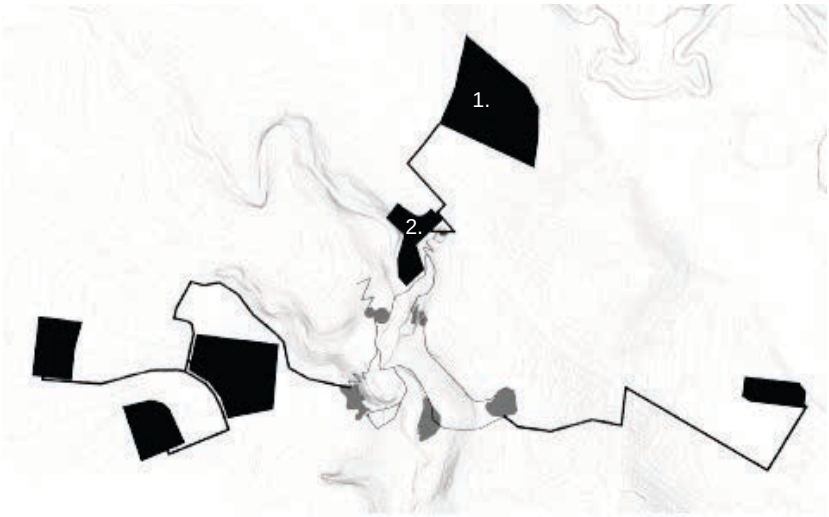
Timely Context
Following the 2015 Paris Agreement report by the United Nations Intergovernmental Panel on Climate Change (UNIPCC) , 2030 was set as a deadline for gas emissions to be halved. This was done with the intent to reach net zero by 2050. Subsequently the UNIPCC developed 17 UN Sustainable Development Goals to achieve this objective. In our research, we used these 17 SDG's as a way to test and challenge our propositions, and took on similar timeframes, to consider the present situation, its transformation on a short timeframe (within the decade) and its longer future-oriented goals by 2050. A localised context is exaggerated by El Niño/ La Niña oscillations and now experienced through recent events in Australia such as extended heat waves, droughts, heavy rain events and inundations of riverbanks.

RMIT students present projects and outcomes to Overnewton Anglican Community College staff and students, EEV, Brimbank council staff and principals of other interested schools, Hazel Francis

Geographic Context
Multiple potential case study schools are located in the Brimbank City Council area and follow similar programmatic, situational contextual patterns. As a collection the school catchments in Brimbank form a diverse context of historicly developed urban areas that include relevant natural systems bisected by metropolitan infrastructure. Each school however has its own unique connections to this urbanised context, often through its learning landscapes and local (community) infrastructures. We tested on two cases how to improve the outdoor spaces of schools. In this report we will reflect how the findings and propositions can be transferred to other school contexts.

Overnewton Anglican Community College
The first school site investigated was Overnewton Anglican Community College Yirramboi Campus located in Keilor in the Brimbank Council area. It is adjoining expansive residential neighbourhoods, with some new developments nearby, adjecent a noisy highway and underneath the Melbourne's Tullamarine airport flightpath. But it is also situated in very close vicinity to the protected areas of Maribyrnong River, Taylors Creek and Brimbank Park -making for a beautiful but also vulnerable context with relevant natural systems. For those protection areas Brimbank has a Habitat Connectivity Plan, a Green Wedge Management Plan and several resources on improving local flora.

St Augustine's Primary School
The second school site investigated is St Augustine's Primary School, which sits on the slopes of Taylors Creek in Keilor, another beautiful but vulnerable biodiversity corridor. The creek is part of a natural cutting in the urbanised eastern end of the Western Volcanic Plains, the third largest volcanic plain in the world. Within the catchment of Taylors Creek we can find diverse landscape types including a racetrack, a shopping centre, protected grasslands and suburban estates. The natural cutting of the creek in the basalt delivers at times spectacular topographical vistas and a vertical and horizontal layered landscape that seems hard to dissect from its now mostly urbanised landscape. Nearby the school are the remnants of Taylors Creek Cave, a silcrete complex cave system that is unique in Victoria.



Network diagram of school sites in Keilor with Overnewton (1) and St. Augustines (2) at the centre. plan: Xuerong Wang

Research objectives and questions
For our two representative test cases of schools, situated within a representative suburban context, mixing both urban development and adjacencies to remaining ecological corridors, we asked the following research questions:

- How can schools creatively adapt their outdoor spaces to societal and climatic challenges of the present and future?
- How can redesigned school landscapes help mitigate the effects of climate change such as more frequent and intense weather events?
- How can better microclimates, biodiversity and air quality through vegetation improve mental and physical health?
- How can landscape architecture strategically employ design thinking about vegetation, shading, topography and water flows, materials and activities at multiple scales and with different types of schools and student cohorts to strenthen spatial and social connections to the neighbourhood and adjacent ecosystems?
- How can we improve the usability of outdoor spaces to benefit different stakeholders: students, teachers, parents, visitors and the adjacent communities?
- How can strategic outdoor improvements increase opportunities for teaching and learning in schools? How does a new generation of students interact with, learn from and within improved landscapes? How can those landscapes be designed to invite new activities, discovery, exploration and interaction?

Sketch of centralised food and waste system, physical model: Cheung Tsz Chun

Current Situation
The intention was to unpack through two case studies, how schools and their outdoor spaces can dramatically improve from better landscape designs to address current shortcomings:

- Difficulties of access and challenging drop off and pick up points
- Little shelter from the elements, such as sun, rain and wind
- Topographic treatment and surface materials that do not consider increased heat and water flows
- Lack of consideration of vegetation and nearby ecosystems as an opportunity for outdoor learning
- Narrow programmatic focus on sports and maintainance with little consideration for other informal outdoor play, creative, explorative and learning activities

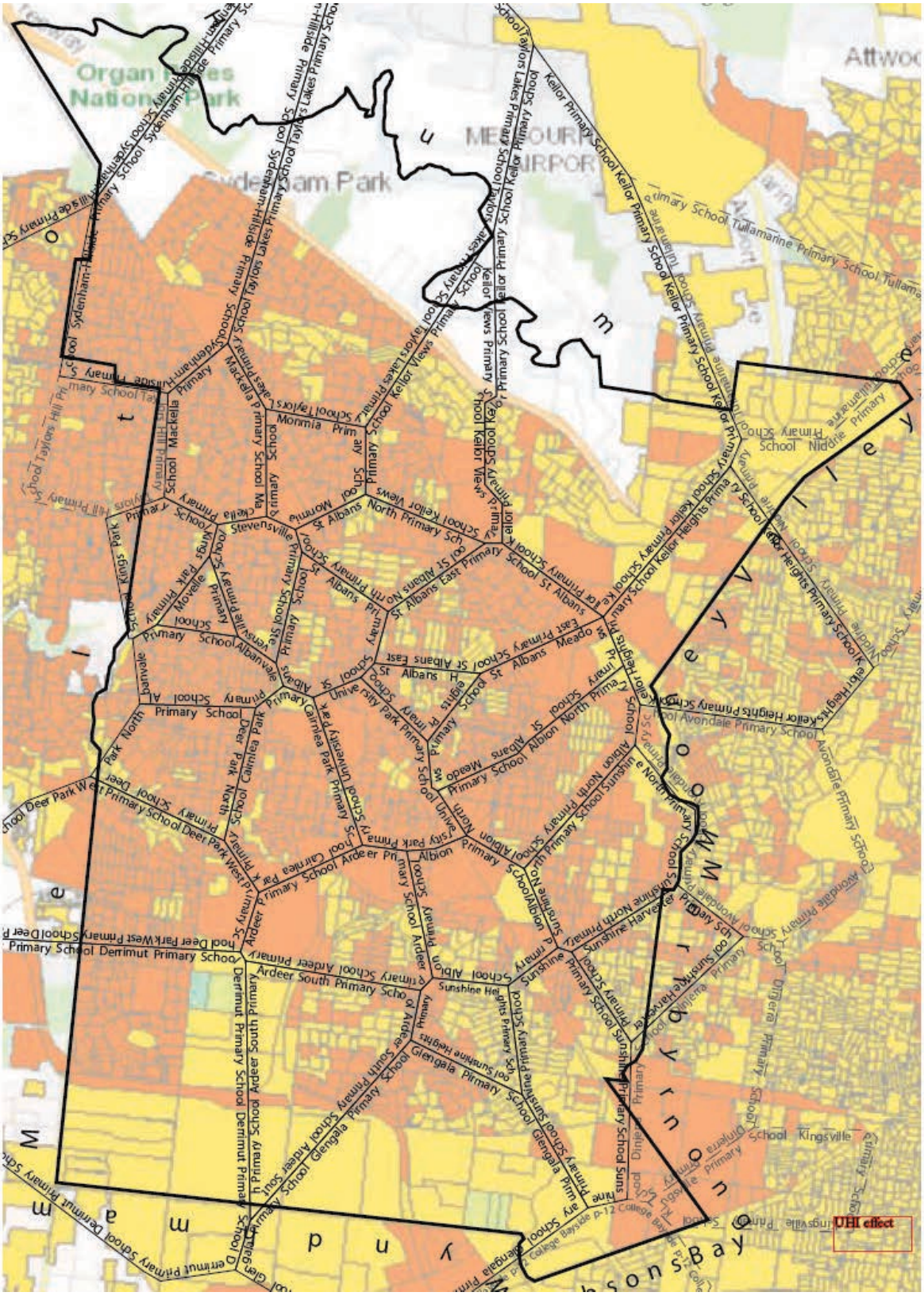
Methods and themes of investigation
The research used different methods to explore proposed strategies in order to gain in-depth knowledge of site, school community needs, challenges and opportunities:

- Field exploration of the overall site and its wider context through observation and drawing, photography, at scale mappings, diagramming, field notes…
- Creation of maps to articulate site findings combining at scale mapping with textual, graphical and photographic information.
- Site documentation using orthographic plans and sections as base for the study proposals
- Relevant precedent studies to inform best practice
- Community consultation and presentations for feedback by stakeholders.

The above informed propositions from which ideas are extracted which can be found in the middle sections of the document

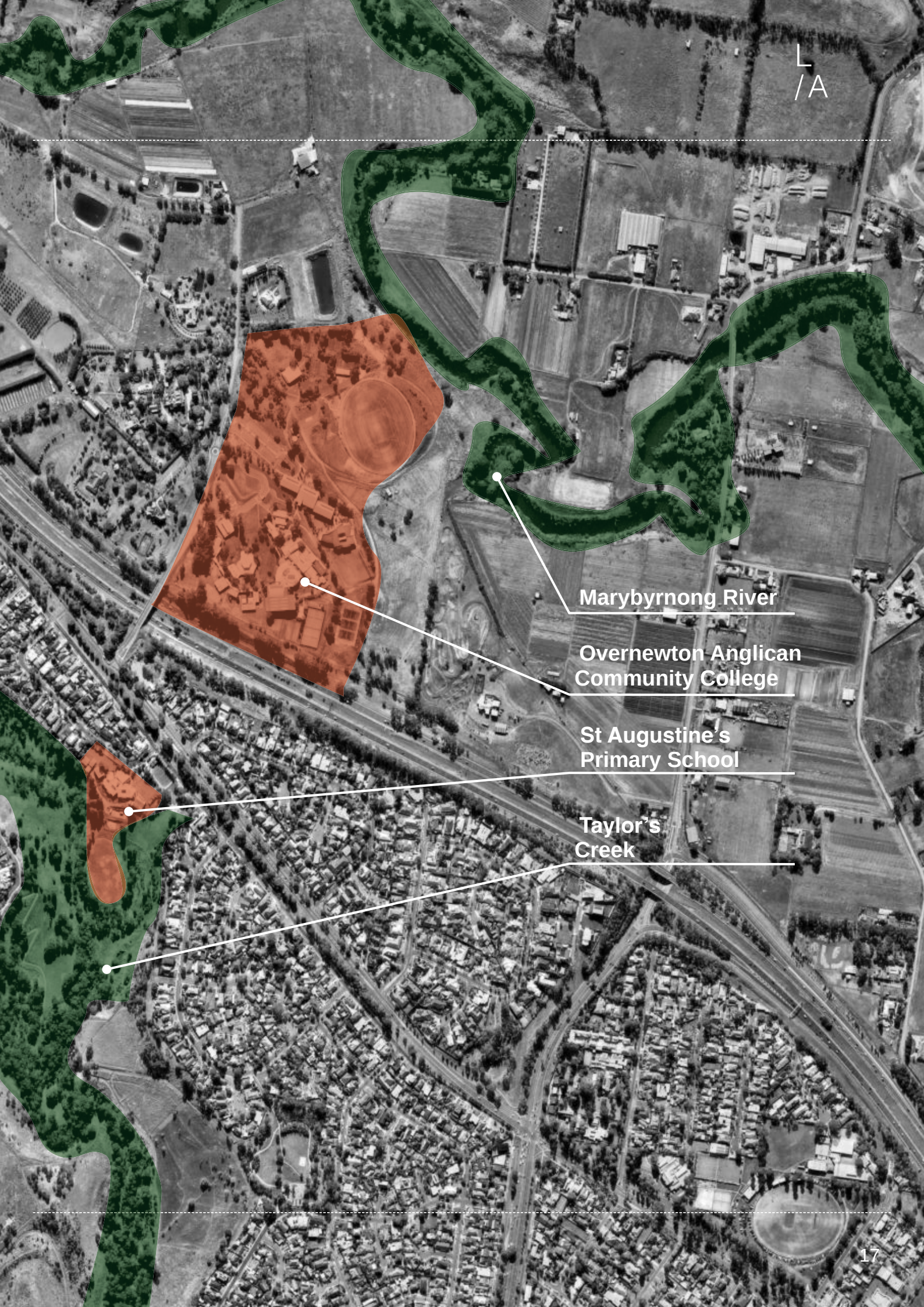
Themes addressed were:
- Diversify outdoor area opportunities and usages
- Considering daily activities and use of spaces over time
- Improving learning, teaching and play opportunities
- Improving biodiversity and vegetation
- Improving climatic conditions
- Improving water management in relation to topography
- Reducing environmental impact

Applicability to other schools
While the study investigated the context of a small part of the Brimbank Council area and two partner schools, key findings can be applied and translated to other schools within the council and elsewhere that face similar critical questions of climate and biodiversity adaptation, and improving outdoor space quality and comfort. The overview charts on pages 21, 33 and 47 describe in the row transferability, possibilities for carrying key ideas and concepts across to other sites. In this process, concepts may have to be adapted to new site conditions and contexts, and may require professional input by designers and/or specialists for best outcomes.

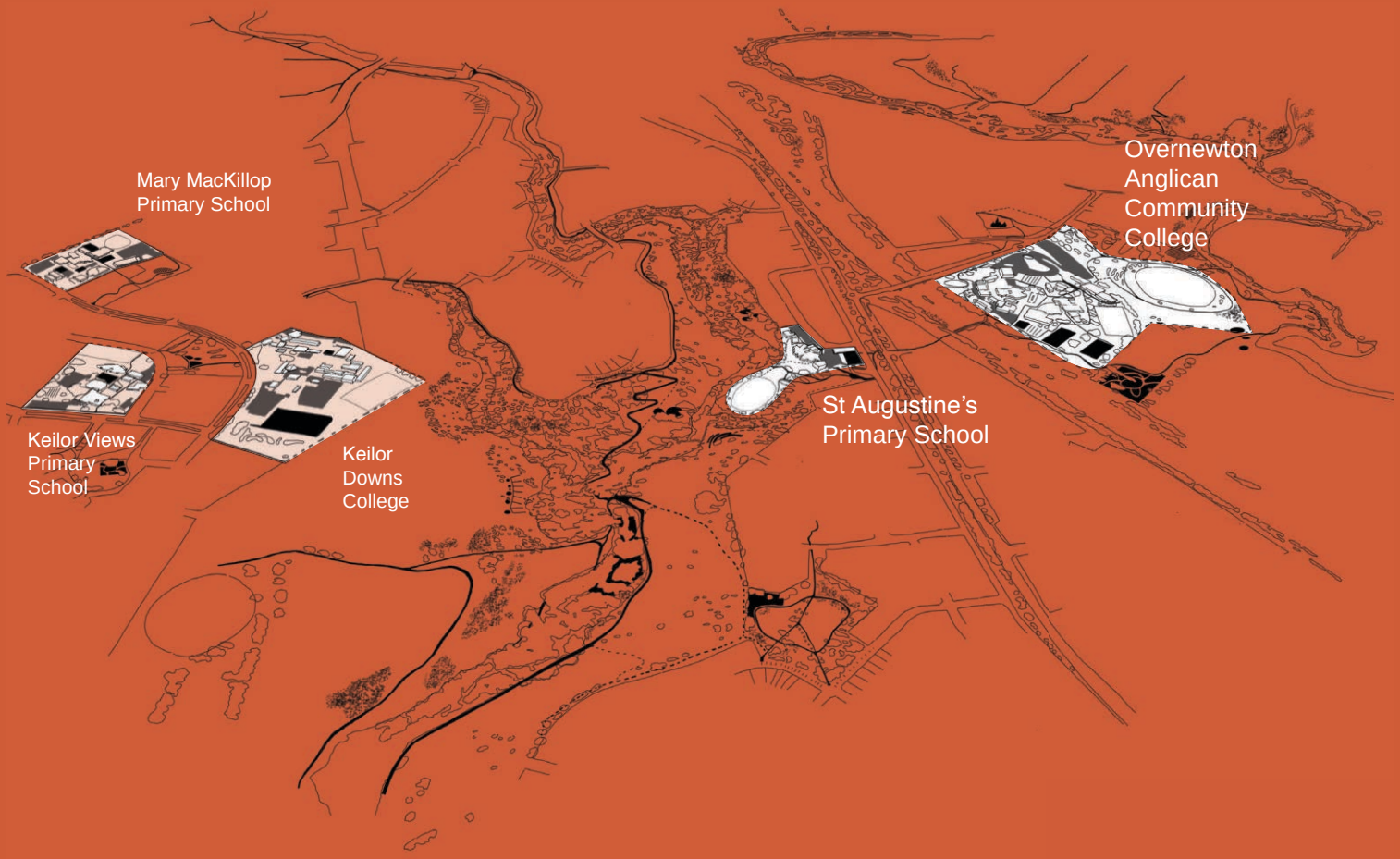


Primary school zone mapping (black lines) overlayed with the 2018 Urban Heat Island effect mapping (orange is above median) within the City of Brimbank, image: Bridie Storton

Aerial view of Keilor, Nearmap. (2023).


Marybyrnong River
Overnewton Anglican Community College
St Augustine's Primary School
Taylor's Creek

Strategies


Mary MacKillop
Primary School
Overnewton
Anglican
Community
College
Keilor Views
Primary
School
Keilor
Downs
College
St Augustine's
Primary School

Strategies

School Grounds

Finding Spaces
Some interventions focus on the campus grounds or on particular areas and programs of the campus. They are often framed around particular uses of the outdoor spaces: parking and drop off areas, lunch and eating opportunities, recreation and play areas, outdoor education areas just to name a few. These areas are constitutive elements of outdoor space uses found on many school campuses. This section focuses on how these areas can become more attractive, user friendly, experiential, more sheltered from the climate, less invasive to biodiversity, or more integrated to site and vegetation.

Multiply
Rethinking these constitutive spaces of campus life in light of the current climate, health and biodiversity crises has helped uncover new possibilities for multiple use, for relaxing, play, learning, and discovery. These multiple uses enrich campus life, learning, exploration and teaching for students, staff and visitors alike, often in unassuming and spontaneous ways. Water and topography can become objects of exploring physics through play, plants and wildlife can become tools to explain seasonal change, that gardens can be ways of exploring life-cycles and food and recycling become ways to develop a sense of sustainability and economic cycles. These are just some examples how landscaping can tangibly contribute to everyday education, and expand education into outdoor spaces.

School Grounds

Some ideas are best implemented on school grounds as they are distinctively part of the campus development and used by students, staff and parents. Often they can be transfered across different school locations, site conditions and within campus development plans.

	Multi-use parking + bus stops	Sensorial gardens
description	Temporary parking areas are redesigned with absorbent recycled asphalt into a colourful topography that can be used for chase, running and skateboarding outside of dropoff and pickup times. Water is drained into vegetated swales with shading trees where it is cleansed. The swale areas hold further play as well as waiting spaces and pathways to securely access parking and school.	Integrating small botanical and sensory garden on campuses to create interactive spaces, with opportunities for learning and calming properties. Integrates biological and ecology teaching, as well as providing a space for wellbeing activities. The space is placed at the interface with surrounding ecologies, to allow access to different generations and create encounter opportunities.
opportunities	• potential increase number of users outside of drop off times • improved conditions for waiting • capture heat radiation in vegetation • improve water quality through capture and filtration of runoffs into swales	• improve motor and observational skills • improve spatial awareness • improve seasonal awareness • new learning curricullum
constraints	• access and specific situations of parking areas • topographical conditions of parking areas	• cost of initial works • more frequent but less costly maintenance
stakeholders	School community Parents LGA	School community
transferability	many schools dedicate large areas of land to carparking and drop-off	with active gardening in more curriculla this could easily be adjusted to local needs
precedents	• R&Sie: *Asphalt Spot* • Zaha Hadid Architects: *Hoenheim-Nord Terminus and Car Park* • *Water as an Ecological factor for sustainable Campus Landscapes* • *Bus stops shelters Utrecht*	• Royal Botanical Garden
linkages to other ideas	• Cooling grounds • Water grounds	• Healing gardens • Water grounds • Intergenerational landscapes • Circular food

Circular food

Provision of shaded eating spots with playful disposal of garbage and compost. Opportunity to eat seasonal fruit. Compost to be reused in school gardening projects. The composting machine is conceived as playground device: a tube with viewing flaps and cranks that moves compost to the gardens

Cooling grounds

Removal of the prevalence of synthetic hardcourt coverings can reduce Urban Heat Island effect of asphalt, astroturf, concrete and rubberised surfaces This idea offers alternatives, (compacted sand, woodchips, timber decks, metal grates) creating breathable campuses with rain infiltration and regeneration of soils and microfauna for improved outdoor activity areas

Water grounds

Capturing and cleaning stormwater into a system of swales, retention ponds, wetlands and raingardens, cleaned water can be used for flushing toilets, watering vegetation. Improving waterflows can counteract the prevalent erosion problems found on sloped sites with strong levelling. Similar, waste water can be treated on campus grounds with an small amoromic digester before being filtered in a wetland system

- improve seasonal awareness through food and eat self grown fruit and vegetables
- new learning curriculum
- Turning chores into fun activities.
- Less littering

- improve medium and long term biodiversity quality
- reduce harmful particles into waterways and improve water runoff
- new play and activity opportunities

- increase use of stormwater captures a valuable resource for vegetation and cooling
- topography allows for interesting spatial choreographies for exploration

- more frequent but less costly maintenance

- public desire for high-tech sports facilities
- more frequent but less costly maintenance (which is imagened as a learning opportunity)

- cost of initial works
- size of land area needed for water system

School community

many schools start to focus on school growing and eating

- Thomas Chung: *Value Park*
- *Ceres farm* or *Childrens Farm Collingwood*

- Sensorial gardens
- Cooling grounds
- Water grounds
- Healing gardens
- Food networks

School community

many schools have underutelised hard surface courts

- Noble Park PS gardening program

- Cooling grounds
- Water grounds

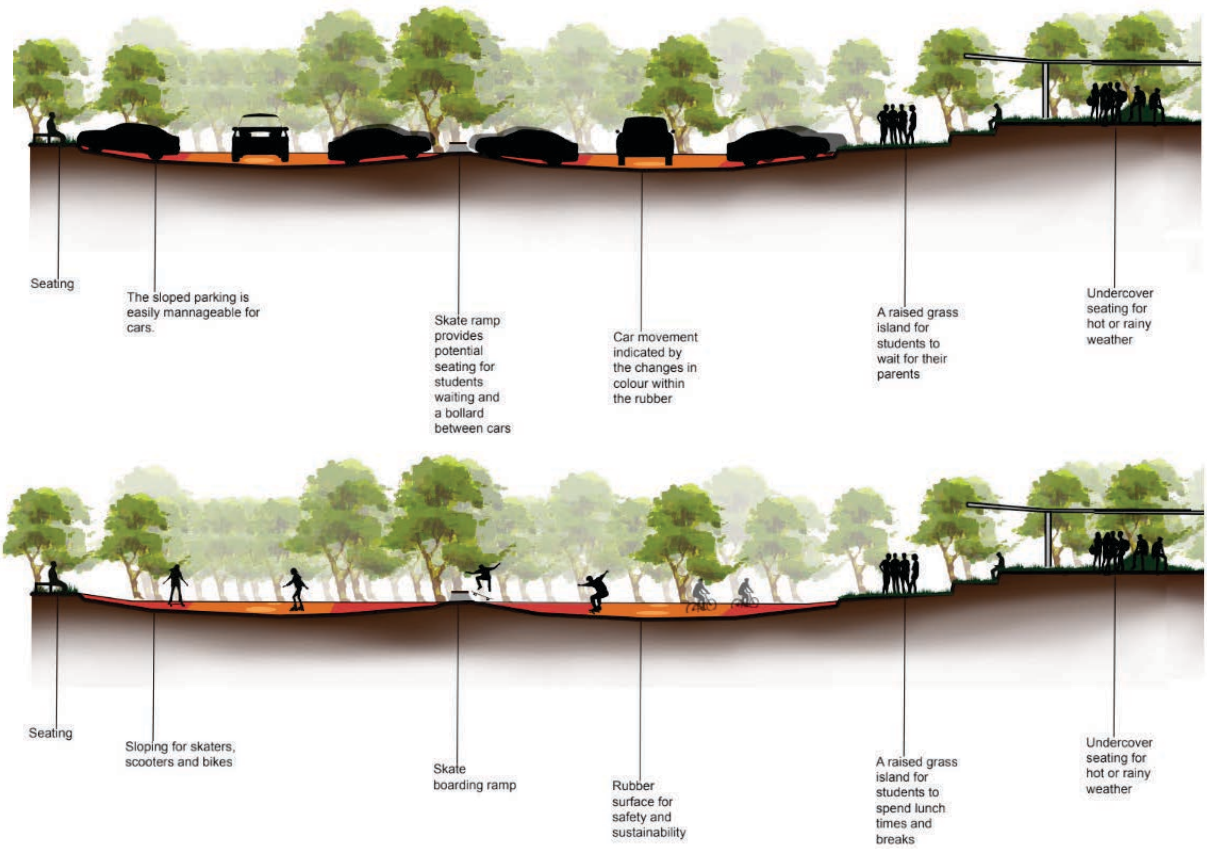
School community
LGA
Water Authorities

various systems are often already in place and could become part of the landscape

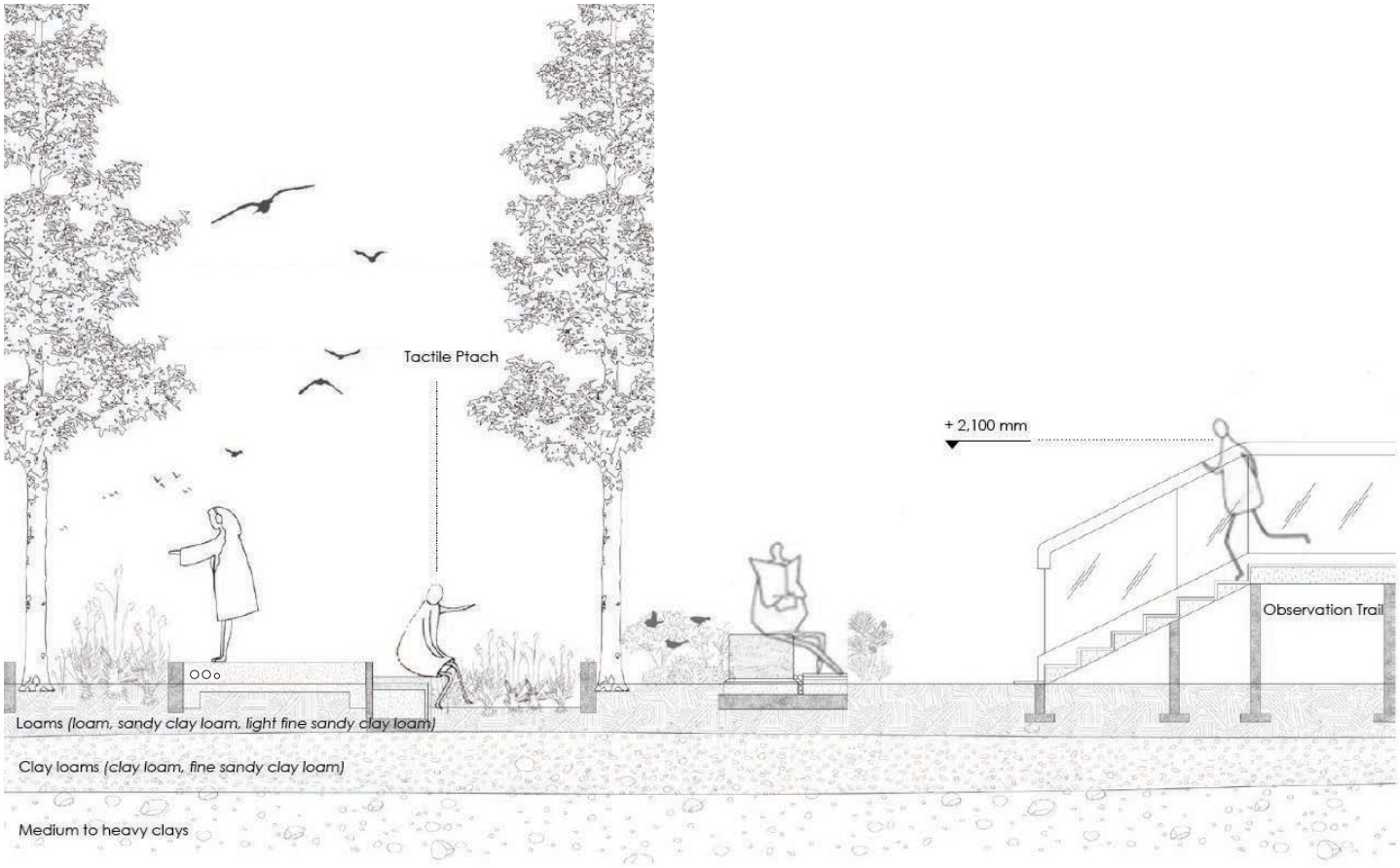
- De Urbanisten: *Water Square*
- Ooze: *Chennai, city of 1000 tanks*
- Andropogon Associates *Sidwell Friends Middle School*

- Cooling grounds
- Sensorial gardens
- Healing gardens

Multi-use parking + bus stop (ON)
The bus stop is moved from the street to a dedicated area where planting, wetlands and informal waiting areas reorientate the bus drop-off from a heat reflective hard surface to a green landscape experience with water play reusing captured rainwater. model and plan: Daniel Spiteri

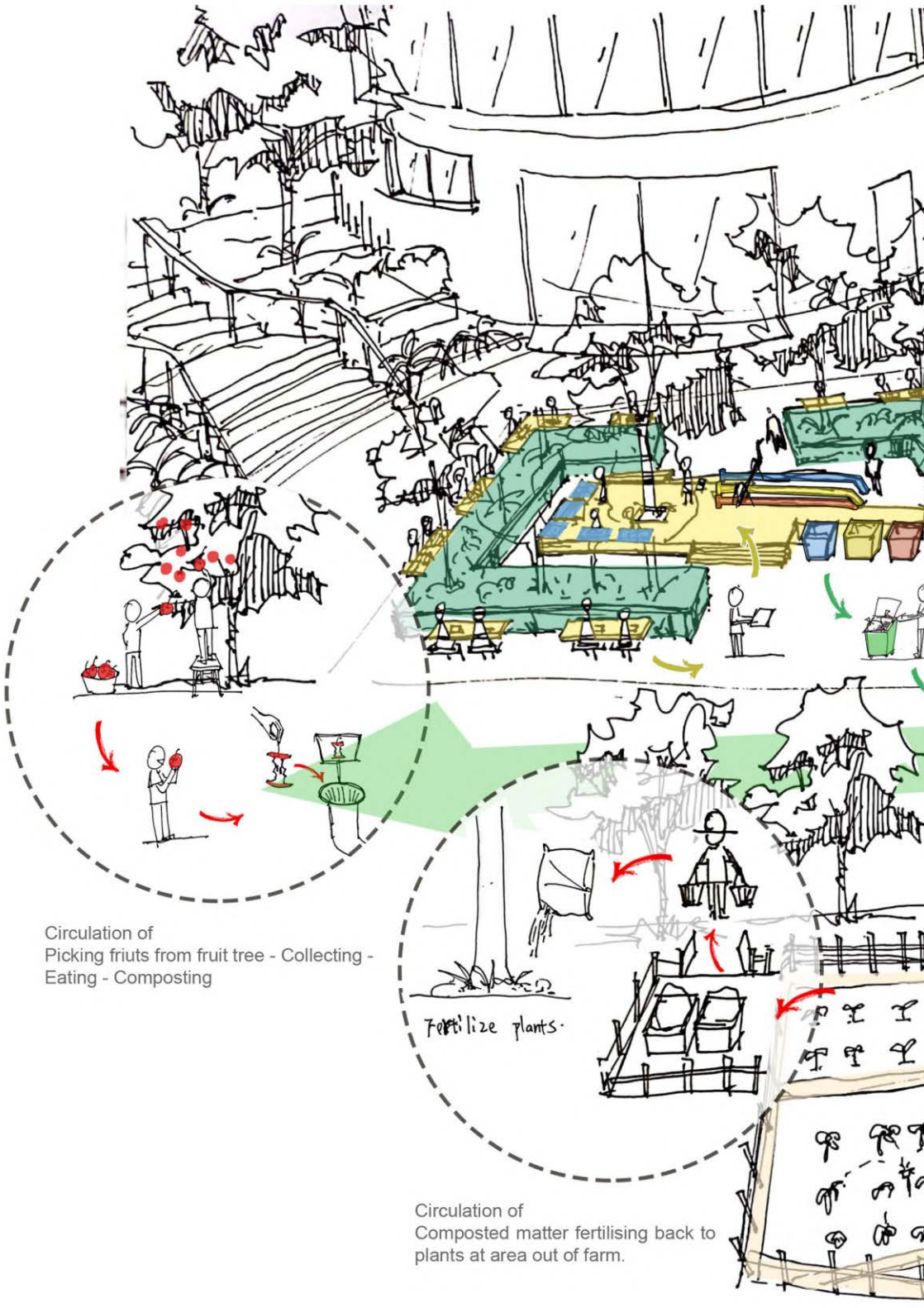


Multi-use parking (ON)
Drop-off zones and carparks are intermittenly occupied with intense car use at various times during the day and no car use at other times and can be transformed lightly with recycled porous asphalt to perform multiple functions at different times. For example to operate as running areas or skate park with undercover seating. sections: Hazel Francis

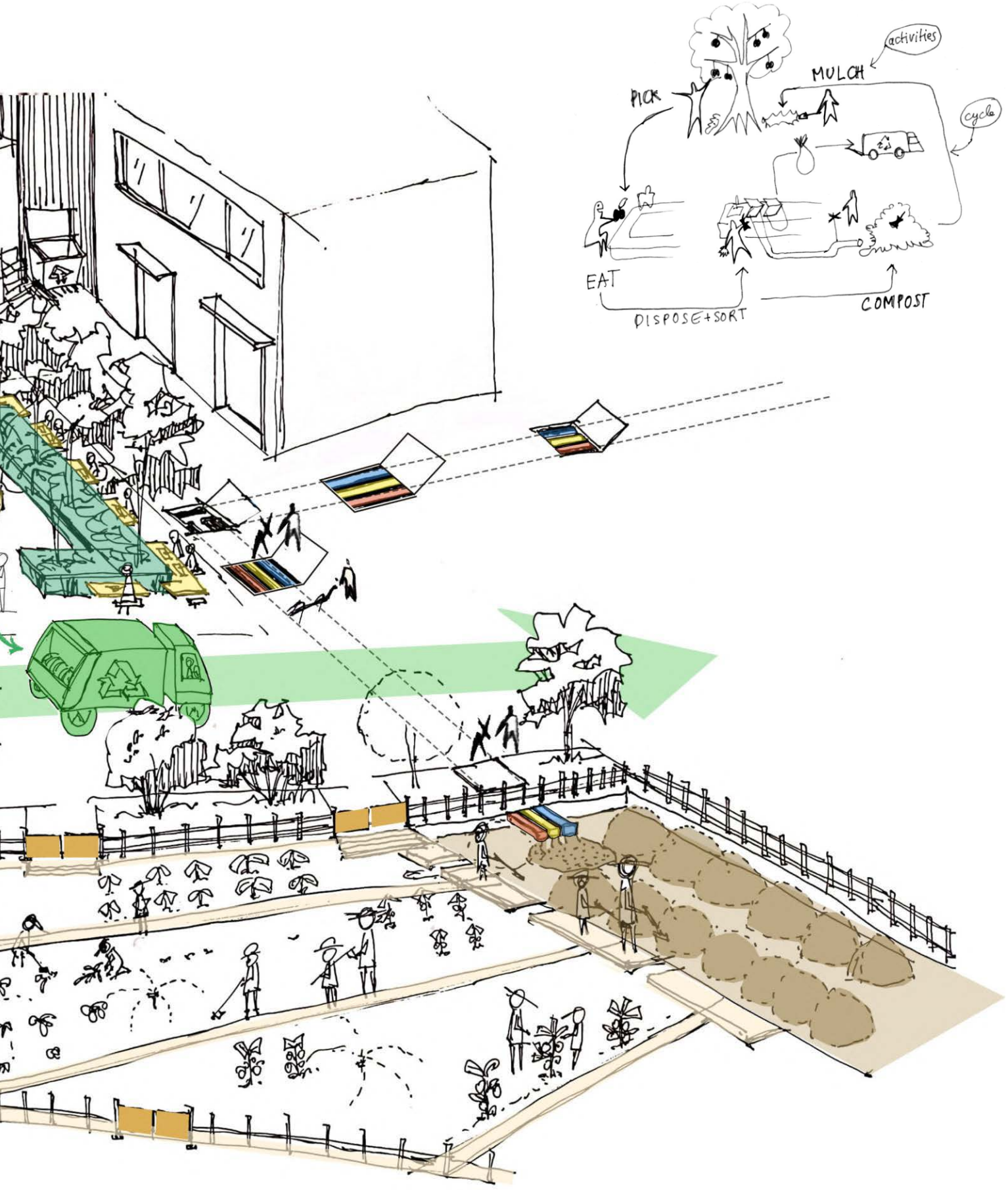


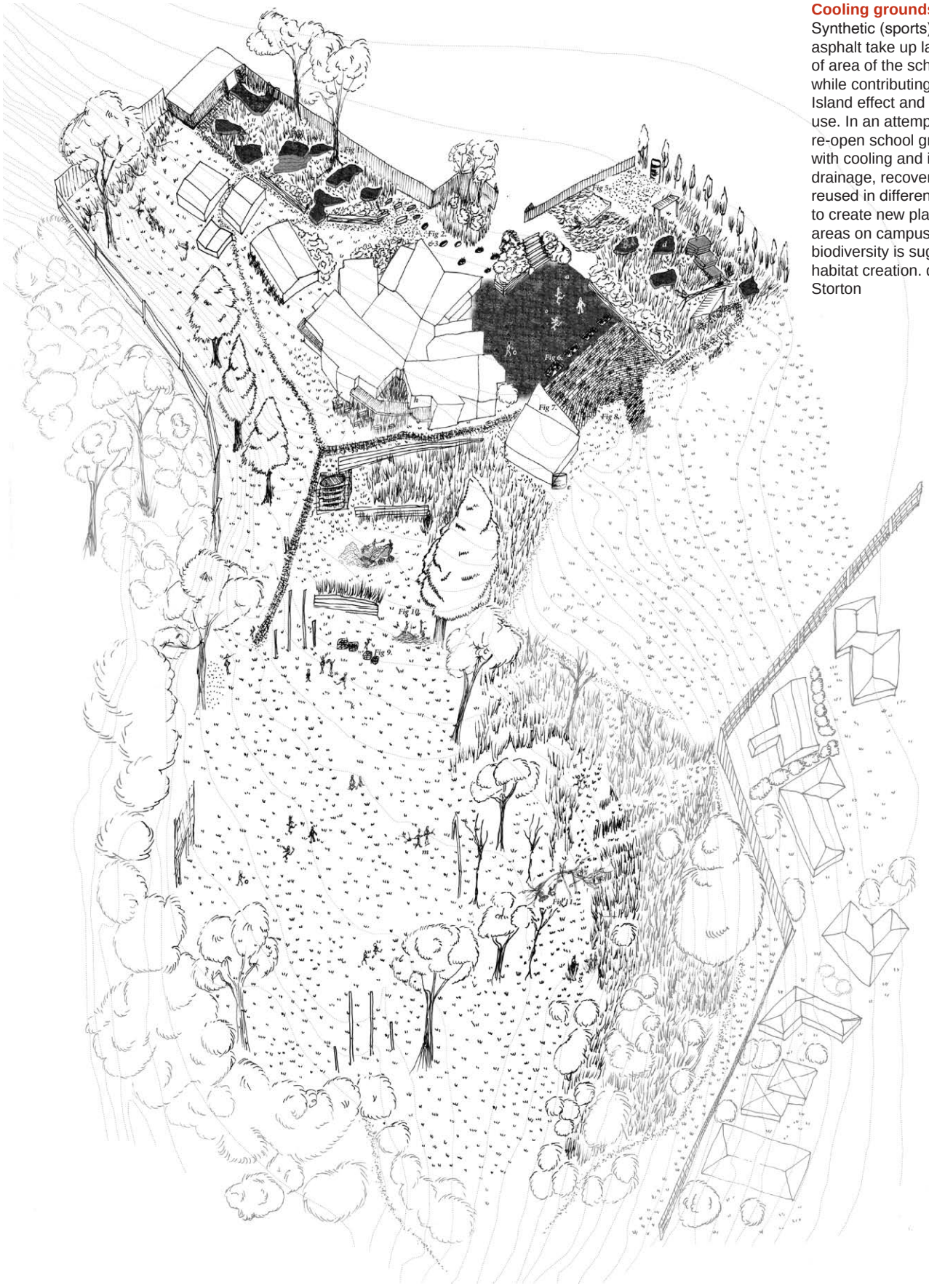
Sensorial gardens (SA)
Thematic active gardening within curriculum activities can be consolidated and framed by pathways that could provide integrated services and amenities such as seating, lighting and water transport. Image shows an example of tactile gardens for young explorers improving their well being and relaxation. The drawing above shows how a pathway encourages different activities and engagement at different heights. section drawing and image: Mingjuan Yang

Sensorial gardens (SA)
Expanding on themes of outdoor curricullum many schools have started food gardens. Here an example shows how older students can contribute to school lunches with small food productive gardens. image: Mingjuan Yang

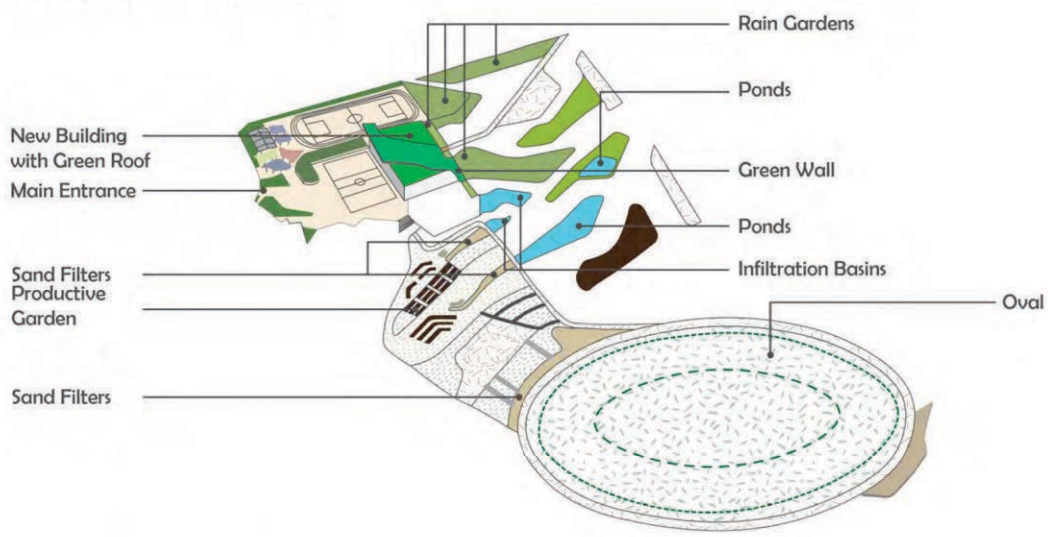


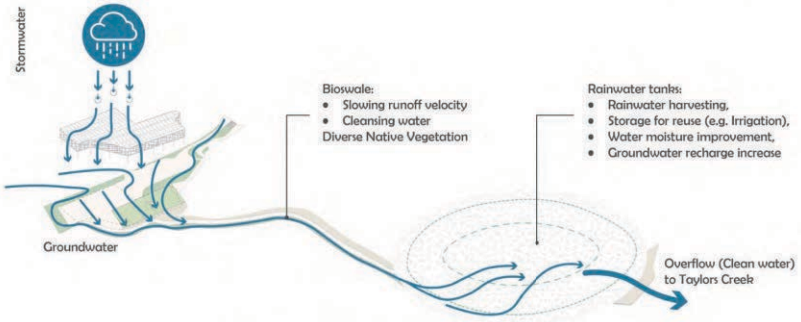
Circular food (ON)
On larger campuses a whole food production cycle can operate where students not only have the ability to grow and eat on campus but also activly learn how to transform food waste into fertiliser through composting to grow new food. Each eating section contains a washing and recycling station as well as a composting chute with cranks and flaps, designed like playground equipment. It encourages students to experience the composting and move the compost to the gardens. Fruit trees provide shade and fruit, fertilised by the compost and close the cycle. drawing: Cheung Tsz Chun

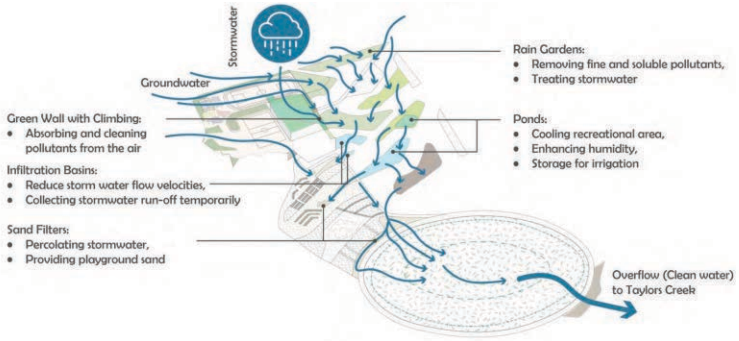

activities
MULCH
PICK
cycle
EAT
DISPOSE+SORT
COMPOST

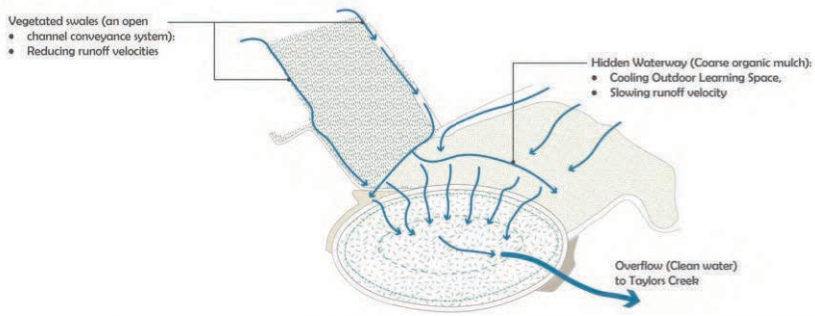


Cooling grounds (SA)
Synthetic (sports) surfaces and asphalt take up large amount of area of the school grounds while contributing to Urban Heat Island effect and being of singular use. In an attempt to literally re-open school grounds to help with cooling and improve natural drainage, recovered materials are reused in different configurations to create new play and discovery areas on campus. An improved biodiversity is suggested through habitat creation. drawing: Bridie Storton

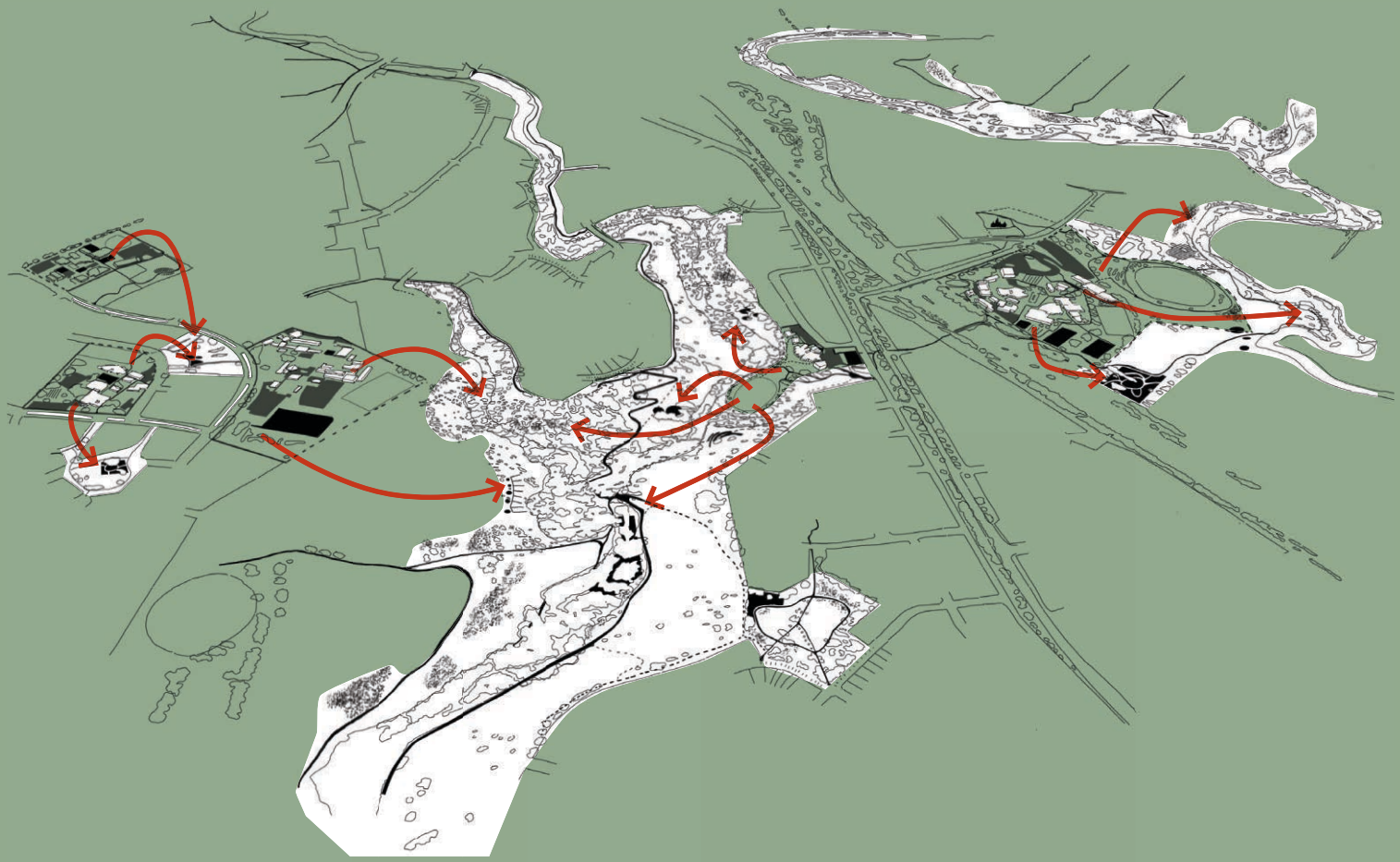








Water grounds (SA)
When we start to see captured rain water as a valuable source for drier times we can rethink the entire campus of a school as a new water capture and drainage system that cleans pollutants from roof and street run off before they enter interactive waterscapes. Here three specific scenarios, (parking, playscapes, vegetated landscape) are dissected individually while the drawing above calls out key new features of the system. By incorporating adjacent public lands, both school and council can benefit more from a playful, lower-investment on-surface water management system. Waste water can potentially be plugged in via an intermediate anaerobic filtration system. Drawings: King Lung Man



Strategies

Expand into Closeby Ecologies

connecting schools to local context
Some interventions make use of nearby landscae features such as vegetated areas, sports ovals, parks, playgrounds, creeks and rivers and wildlife corridors connecting wider geographic areas. The treatment of schoolgrounds in ways that restore biodiversity and soil quality can have beneficial impacts on adjacent ecosystems, and reduce current negative impacts like litter movement and stormwater runoff.

Biodiverse continuity
Some interventions make use of nearby landscae features such as vegetated areas, sports ovals, parks, playgrounds, creeks and rivers and wildlife corridors connecting wider geographic areas. The treatment of schoolgrounds in ways that restore biodiversity and soil quality can have beneficial impacts on adjacent ecosystems, and reduce current negative impacts like litter movement and stormwater runoff.

Expanding learning
Creating connections with nearby ecosystems provides increased learning opportunities for staff and students.
The vegetation connections increase habitat and biodiversity on campus and create opportunities for observation, reflection, and outdoor learning both on campus and in surrounding landscapes.
The create opportunities for local excursions within walking distance of the campus, connect schools to local neighbourhoods and the wider community.
The strengthened connections will support the co-management of school campus and surrounding areas and will require a degree of consultation, co-design and management with local communities, planning bodies and local government. Building these social and professional connections also creates opportunities for school staff and students to learn about local issues and land management practices.

Expand into closeby ecologies

Some ideas work best if considered across campuses and nearby ecologies. Partnerships and alliances can be established or strengthened to share endeavours, planning processes, funding and maintenance resources. Benefitting from synergetic processes, these ideas can allow multple nearby campusses and adjacent ecologies to grow stronger, healthier and full of opportunities.

description

Common goals

Putting agendas and wish lists together while thinking about individual requirments allows for unique opportunities within close proximity. Sports clubs, schools, local councils and ecology groups, such as the 'Friends of Taylors Creek' can all benefit from each others' strengths and values.

Healing gardens

Putting healthy children and education first, school gardens and neighbouring pocket parks can be transformed into healing gardens where (indigenous) medicenal plants can thrive. Gardens can also include mental health spaces for individual or group activities.

opportunities

- increase opportunities of collaboration to deliver unique projects
- improved capital and maintainance funding sources
- diversify learning opportunities
- increase physical and mental health of students
- connecting to country
- curricullum expansion to healthy living

constraints

- challenge of aligning funding and coordinated planning agendas
- need for leadership structures
- initial cost
- knowledge transfer gap

stakeholders

School community
Local / State Government
Friends Groups
EEV
Catchment Management Authority

School community
Local / State Government
Friends Groups

transferability

in different layouts and sizes depending to campus capacity.

precedents

- *Los Angelos River* Project
- Northcote Public Golf Course
- Indigenous Garden Abbotsford
  Childrens Farm

linkages to other ideas

- Cooling grounds
- Water grounds
- Bus drop-off areas
- Common goals
- Sensorial gradens
- Integenerational landscapes
- Food network

Invasive species

In response to the expansion of invasive flora and fauna into an adjacent ecological corridor. Approach mixing a physical containment (trail with embedded over- and underground mesh) and a management strategy involving school volunteers (staff, students, parents) and professionals. Topography management strategies of cut and fill have been found to geographically correspond to invasive species occurrences.

- improve medium and long term biodiversity quality
- shared responsibilities can reduce cost
- volunteer and learning opportunities

- some invasive species demand higher professional intervention and control. A sensible mix of volunteer work and professional work is required

School community
Local Government
Friends Groups

Not all schools face such challenges

- Fresh Kills Park, New York, Field Operations

- Common goals
- Water grounds
- Topographic shifts

Topographic shifts

Schools have a tendency of seeing topography and slopes as an obstacle. Insertion of sealed sports fields and steep retention walls or slopes are realised through cut and fill. An alternative proposes to embrace slopes as spatial conditions that invite play, exploration and activity for students in combination with retaining vegetation and allow varied spatial configurations.

- minimise initial cost
- better water retention lead to less erosion
- topography allows for playfull spatial choreographies for exploration

- reduction of tradition school grounds (sports ovals)
- in existing conditions, slow transformation of school grounds
- safety and restrictive access considerations

LGA
State Government Organisations
Friends Groups

Not all schools have strong topographic challenges

- Rosebud Foreshore topographic playground
- Ceres Farm playscape

- Invasive species
- Discovery trails

Discovery trails

Creating small spaces for nature play, around natural spatial pockets, with natural features and materials: a creekside situation, a clearing, a heap of timber sticks, a sandbank, The intention is to invite the creativity and playful exploration of children, often absent our society.

- minimise initial cost
- creative play, directed and instructed through problem solving activities
- nature play has proven beneficial for creative and critical thought development, complementing other forms of more directed learning.

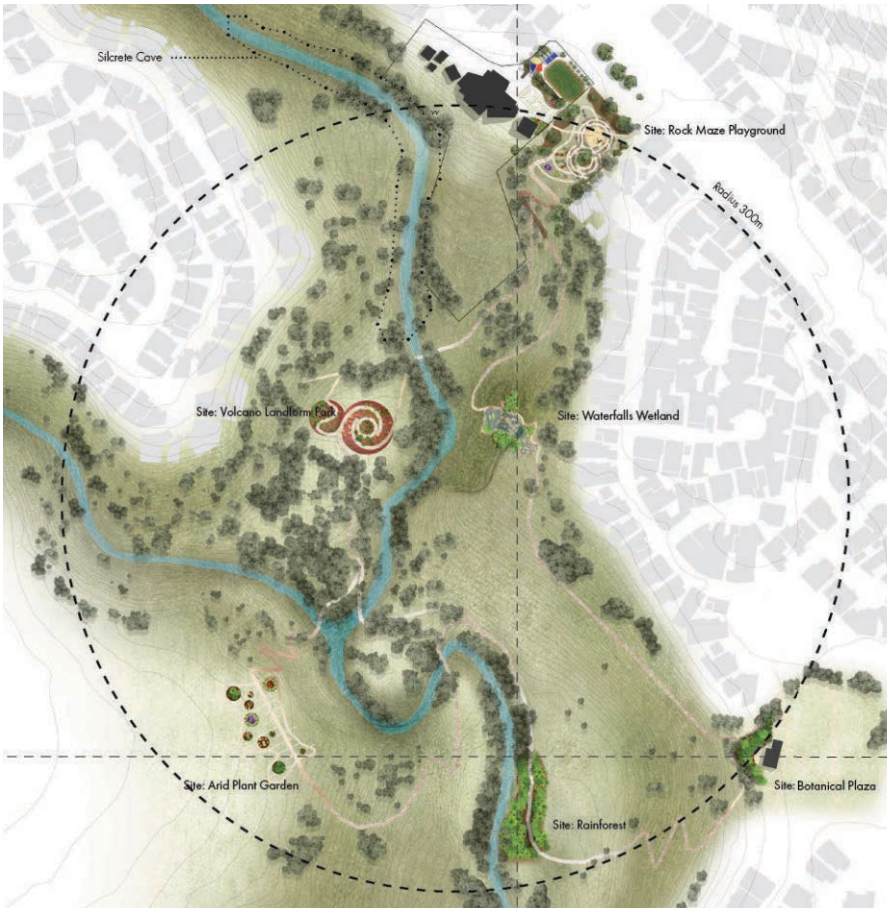
- various regulatory requirements in multiple landholdings
- risk averse safety and restrictive access considerations

LGA
State Government Organisations
Friends Groups

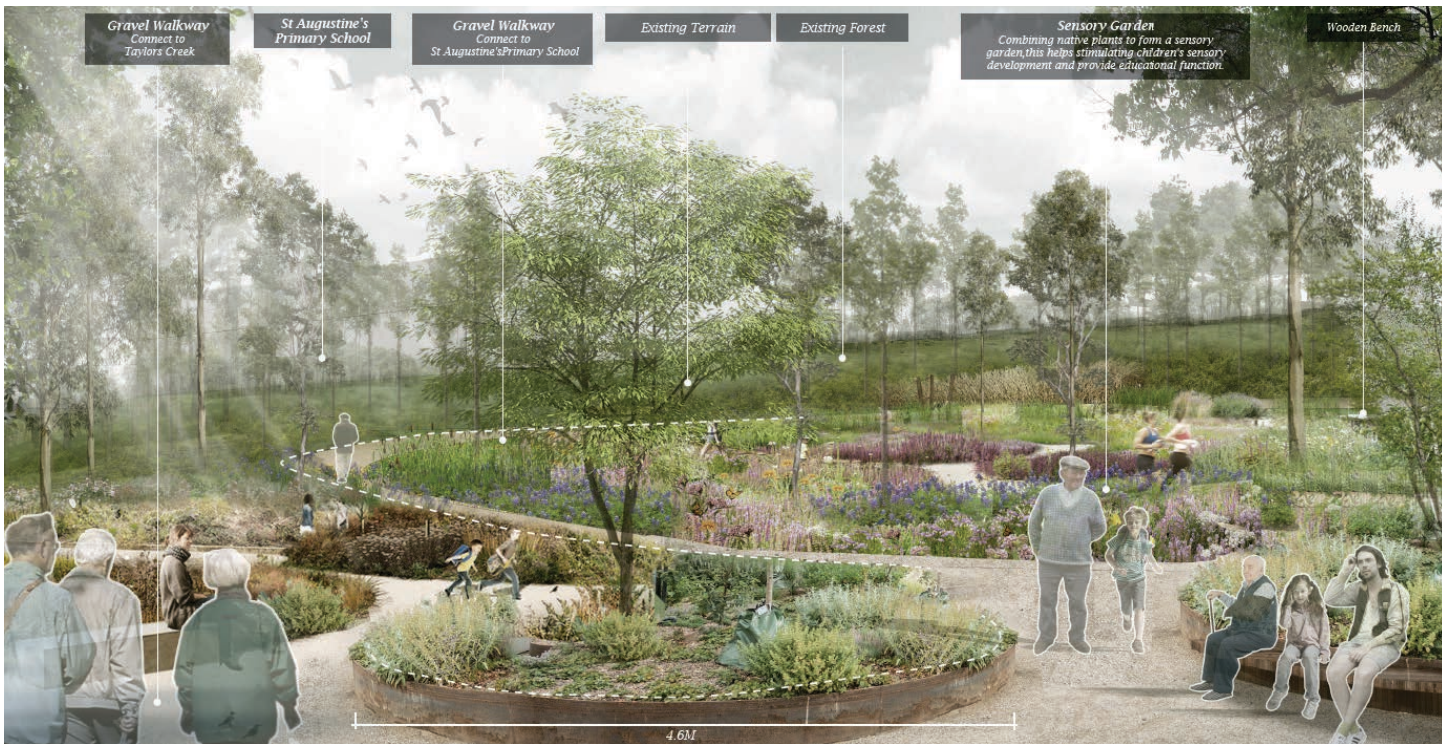
Linkages can be made to natural spatial pockets through improved street layout

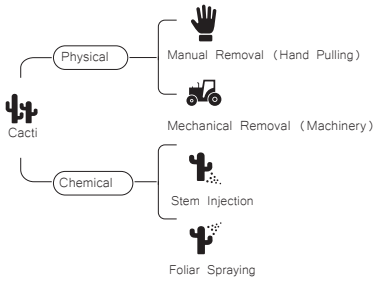
- Shipwreck walk Sydney, Neeson Murcutt Architects

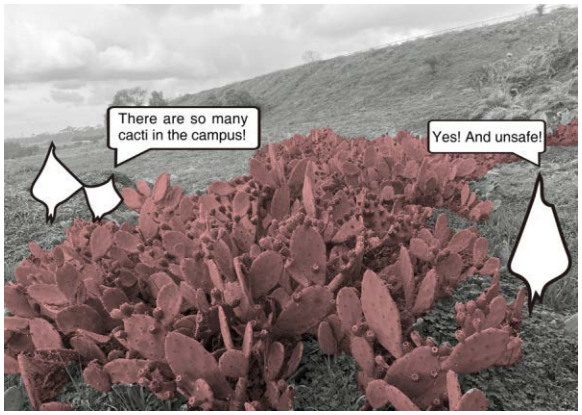
- Sensorial gardens
- Integenerational landscapes

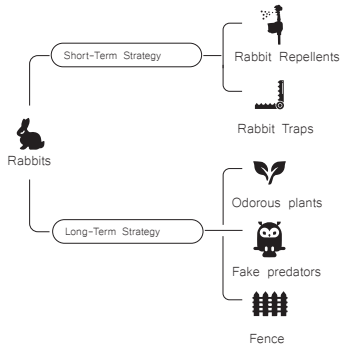


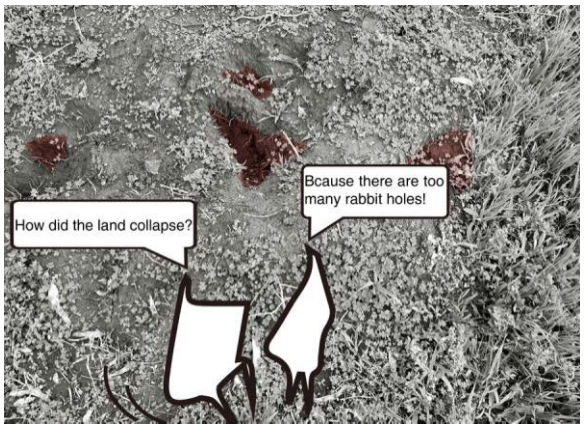
Common goals (ON, SA)
Working together with other stakeholders, such as Council, Friends' groups such as the Friends of Taylors Creek, new gardens can bring improved learning experiences with the creek's floodplain while increasing its biodiversity, variation of experiences and amenity. Here a series of botanical themed gardens enhance and showcase Australian landscape types which the various schools surrounding the creek can use in their curriculum. Drawing: Xuerong Wang



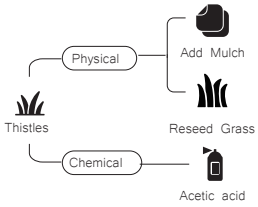


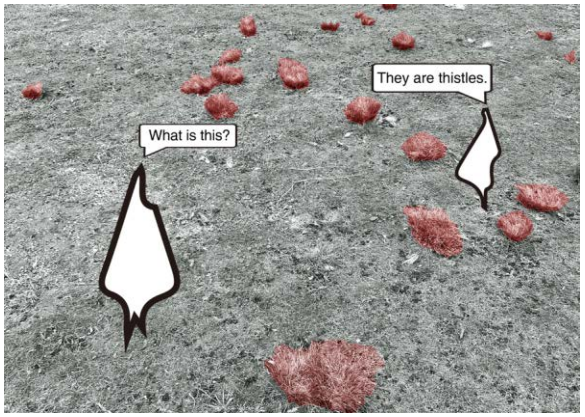




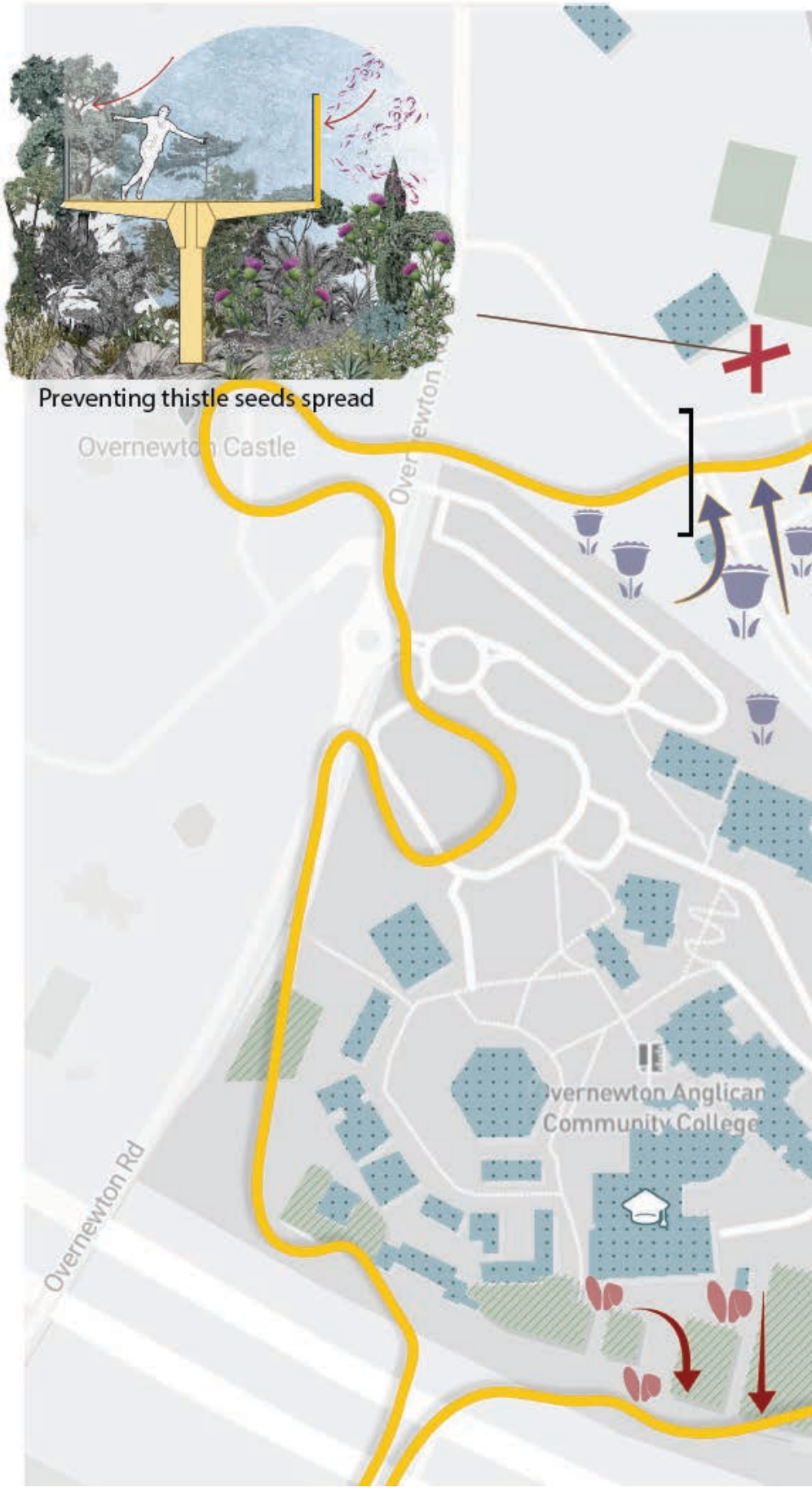


< Healing gardens (SA)
As we become more aware of the positive effects of outdoor learning activities LGA's are searching for wellbeing related landscapes while schools are more attuned to connect to country within their curricullum, Here both are combined within a botanic and sensory landscape to promote intergenerational encounters, physical and mental moments of calming, learning and experiences for sustainability. Image: Mowen Wu

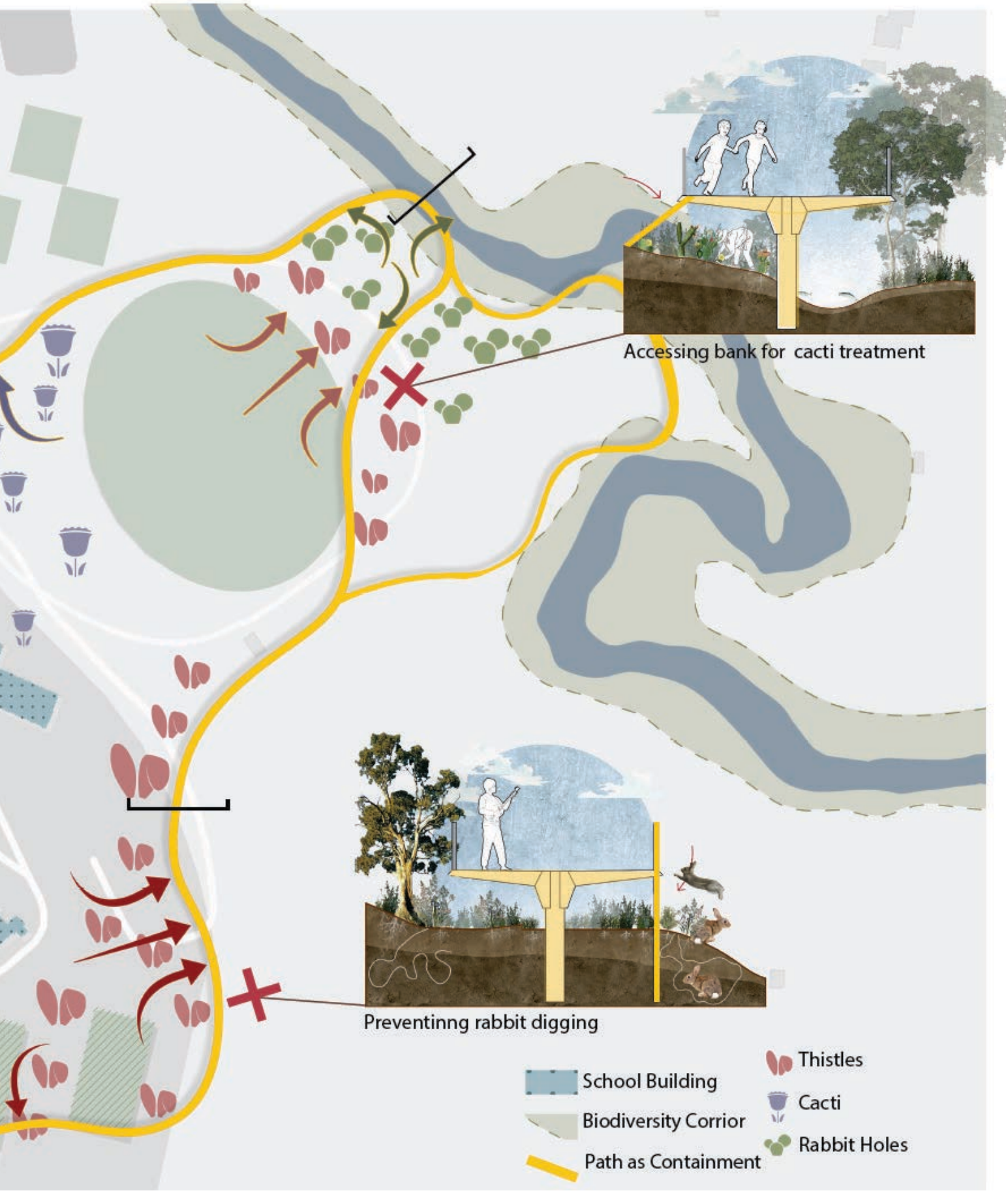




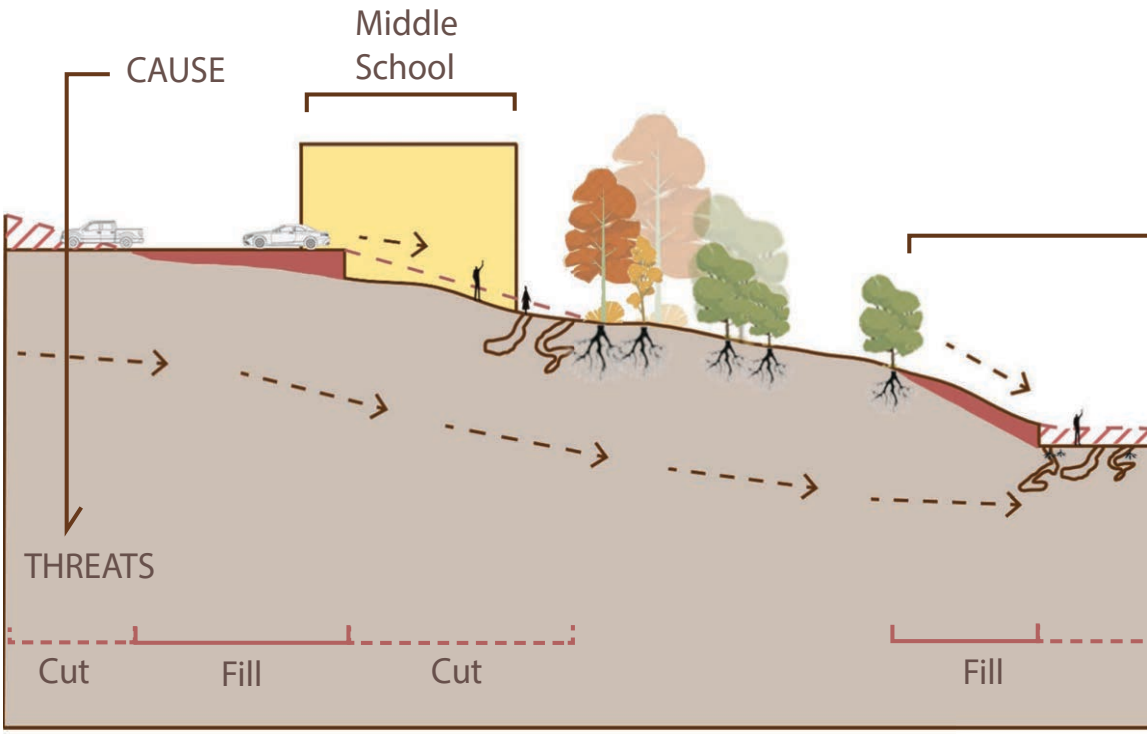
Invasive species (ON)
Invasive species, often introduced during terrain modifications and cut and fill operations on campus, are threathening adjacent unique native Australian landscapes in significant ways. Documenting where various flora and fauna species, from cacti to rabbits, are impacting the landscapes on and off campus can lead to strategies of removal on different scales and with different stakeholders (students, parent volunteers, professionals). Through identification of type and location, programs can be created, which include a student curriculum next to volunteer and professional interventions, to manage the removal. Images, stakeholder diagram: Yanqi Chen



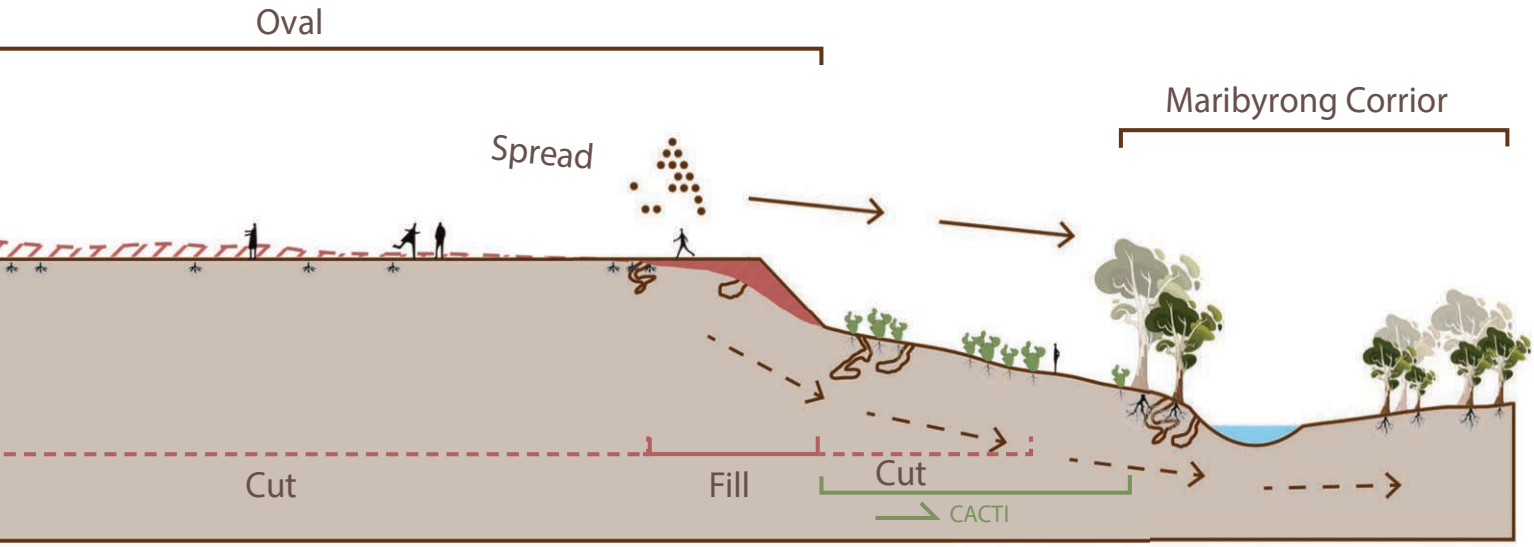
Invasive species (ON)
In this instance a containing path is created around the school campus, which also serves as a exercise and running track, that could contain invasive species and limit the impact on surrounding ecologies. It is combined with netting to capture seeds, and access to reach cacti for removal, and underground fencing to contain rabbit populations. The discovery trail strategy is combined with rabbit proofing, seed netting and a strategy to access invasive cacti for applying other containment and eradication measures. The aim of this combined strategy is to minimise the impact of invasive species on adjoining vulnerable ecosystems beyond campus areas. diagrams and plan: Yanqi Chen


Accessing bank for cacti treatment
Preventinng rabbit digging
School Building
Biodiversity Corrior
Path as Containment
Thistles
Cacti
Rabbit Holes

Topographic shifts (SA)
By softly managing the topography of school grounds new playful topographies can be created. Water can be captured, redirected and to clean storm water from streets, hard surface sports areas and parking spaces. Small changes in topography can be emphasised to enhance site specific activities and seating areas overlooking existing ovals. section: Maya Nettlefold

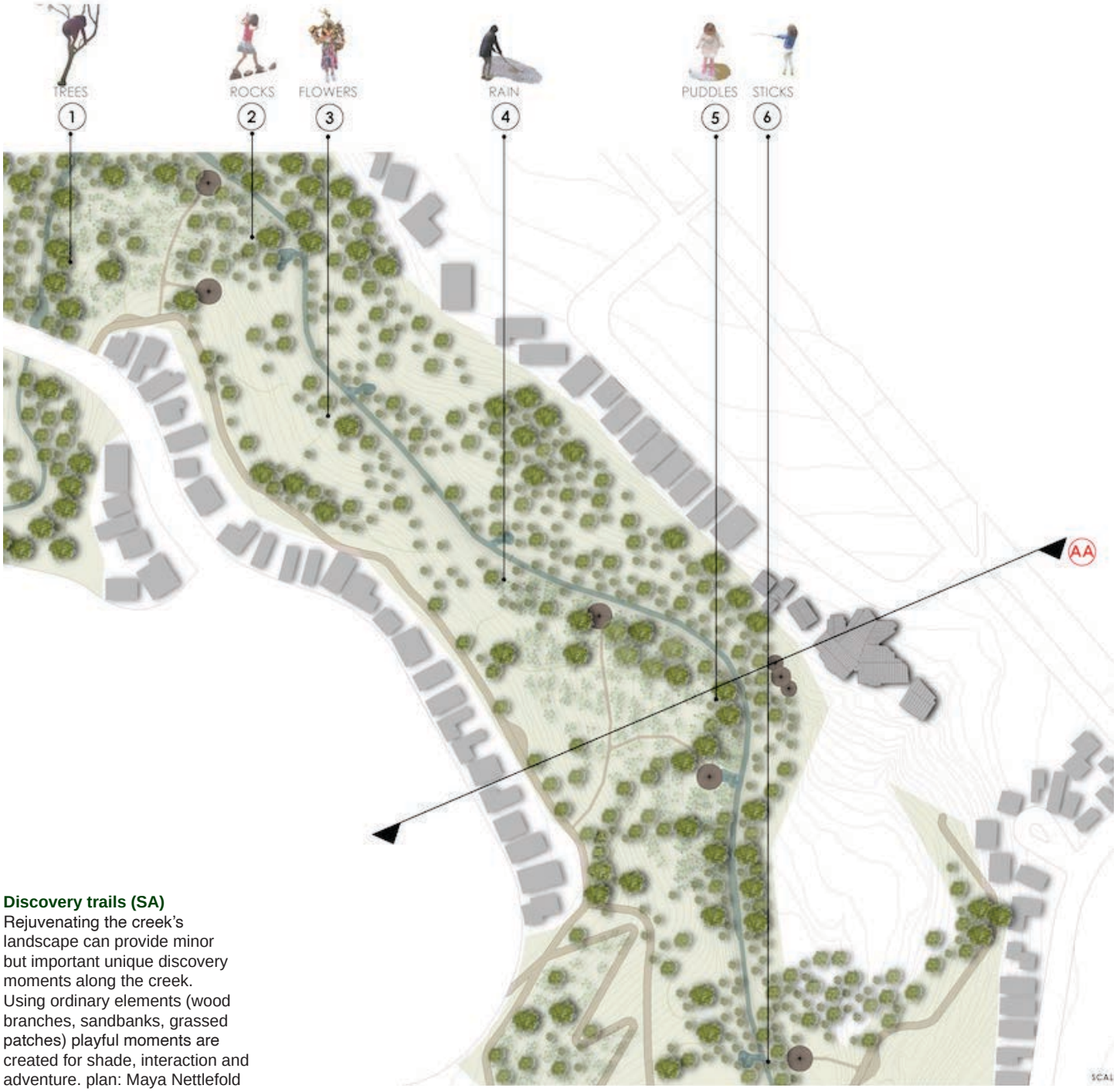


Topographic shifts/ Invasive species (ON)
Current techniques of flattening large areas in existing topographies with cut and fill, often for sports fields and car parking, create conditions for invasive species to settle with more ease in modified terrain. Erosion management, achieved through expensive retaining walls create barriers for informal activities but also cause long term erosion to increasing heavy rain events. section: Yanqi Chen


Oval
Maribyrong Corrior
Spread
Cut
Fill
Cut
CACTI

Discovery trails/ Healing gardens (SA, ON)
Rejunvenating the creek network and connecting it with accessible pathways creates new opportunities for learning, discovery and interaction between different users. It also improves the biodiversity of the creek. image: Mowen Wu

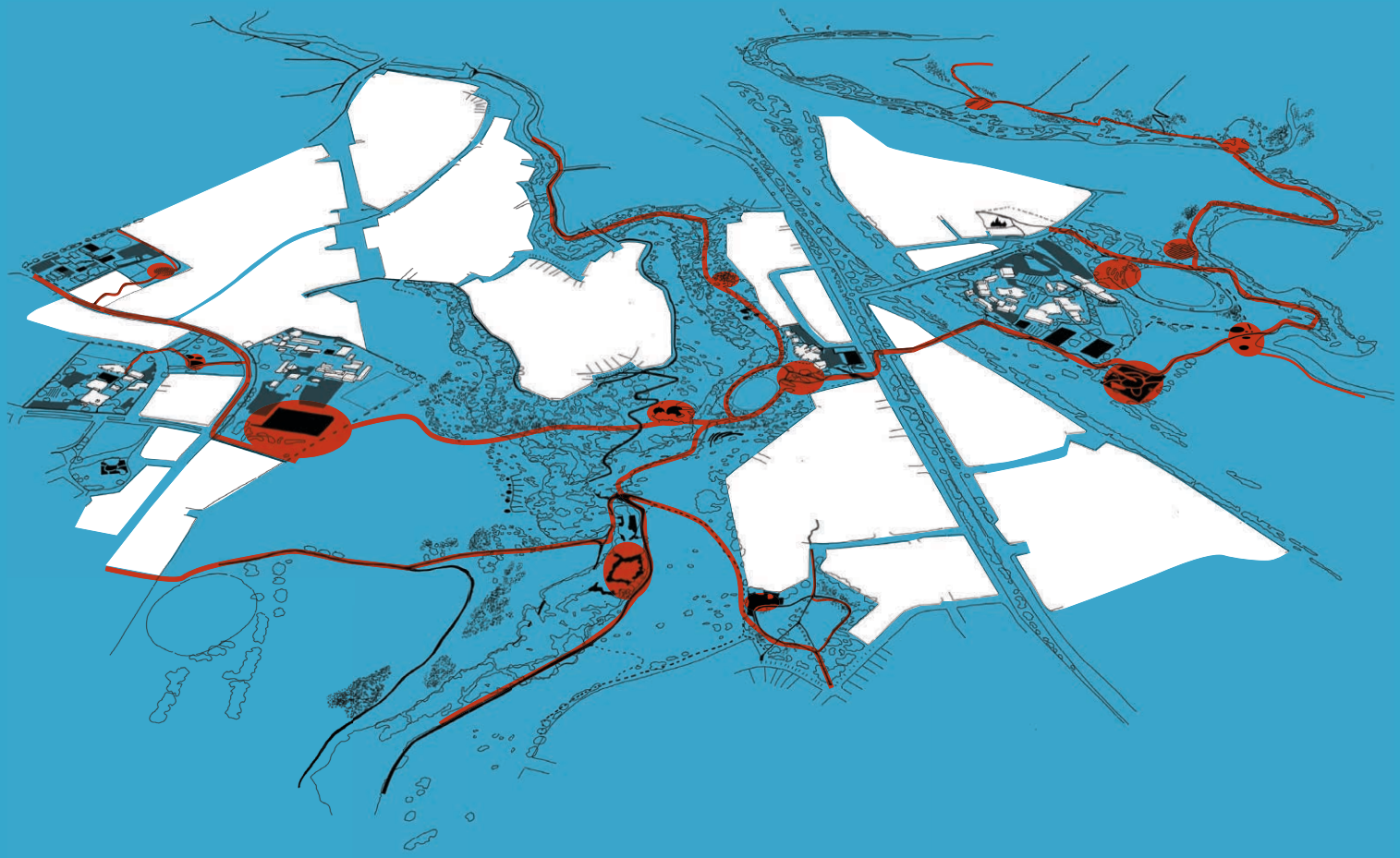

Gravel Walkway
Connect to
Taylors Creek Linear Park
Stepping Stone
Timber Bridge
over Creek
Wetland Habitat
Bird Watching
Platform
on the Slope
Taylors Creek



Discovery trails (SA)
Rejuvenating the creek's landscape can provide minor but important unique discovery moments along the creek. Using ordinary elements (wood branches, sandbanks, grassed patches) playful moments are created for shade, interaction and adventure. plan: Maya Nettlefold

Discovery trails (SA)
Using seasonal changes in weather and planting, elements such as flowers or rain can become part of playfull interactive learning moments within the creek's landscape. In the images above a swale can be expanded on from a piece of infrastructure to an adventure playground. image: Maya Nettlefold

Discovery trails/ Common goals (SA)
Small landscape elements, such as bridges, seating and platforms, can work individually as places for learning activity and together form a network of nodes in a pathway. Images: Nidhi Parmar



Strategies

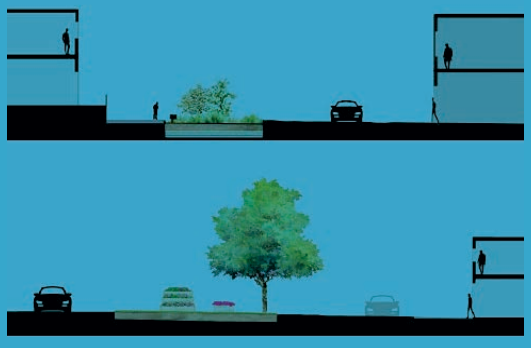
Neighbourhood Networks

Connections beyond the schoolgrounds
Some interventions go even further than immediate adjacencies and explore synergies with the whole neighbourhood or even across multiple schools. The rationale within these more long-term strategies is to identify elements or spaces that could be used both by the neighbourhood and the schools, or by multiple schools, for recreation and education. These would be beyond the scope of single schools budget or ability only.

Community meeting places
Schools play a strong role within communities outside of daytime activities. They are spaces where kids, parents, grandparents, teachers come together, where evening, weekend or holiday activities may occur, or where community groups and clubs may rent out spaces.This points to a strong connection to local communities that might be leveraged and expanded in beneficial ways for all.

Sharing resources
Schools operate with limited budgets and staffing resources, and have developed expertise in fundraising from their communities. This expertise could assist with developing common projects.
Examples exist of replacing carparking with vegetated play areas, using community support (for example Camberwell Primary School).

Neighbourhood thinking
The strategies found here explore how schools can operate in synergy with their neighbourhood to improve local landscapes with the aim to improve the connection to place and belonging as well as the biodiversity of the neighbourhood. Space improvements could then be activated by (multiple) schools and communities alike. Common funding and decision making models would need to be found, and may be facilitated by councils or other involved planning bodies.



Using and improving walkability in the neighbourhood can be achieved by rethinking the street section. Here two options are explored, one that increases biodiversity through the neighbourhood and below an active median strip for excersize and sports. Sections: Xuerong Wang

Neighbourhood Networks

Some ideas are beneficial and achievable only when we think about the neighbourhood. Schools are primary centres for neighbourhoods and can open collaborations and start conversations about sharing of funding, spaces and activity. Being long term anchors within a community schools can facilitate change over different time lines, from the immediate to long term planning.

Catchment wide thinking

Food and circular economy networks

description

Thinking by schools in an larger scale can increase the potential for curriculum and action undertaken by the students and staff. Schools can become anchors of neighbourhoods and facilitate change. For example in the *Los Angeles River* Project certain community led projects could only be funded and implemented under the umbrella project.

Combining school drop off areas with reuse and compost stations to create synergies between schools and neighbourhoods and increase engagement with sustainable behaviours. The school is conceived as the heart of the neighbourhood. Compost can be used to fertilise the school gardens. Synergies and efficiencies are created between daily school drop offs and travel for waste collection.

opportunities

- connecting and engagement with school communities
- increase funding streams and project champions by working together, increarse volunteering
- increase school profile and value within the neighbourhood

- could promote food swaps and material reuse
- reduction of traffic and waste
- reuse of compost, can be associated with used cloth collection, upcycling and other sustainable practices.
- school fundraising through use of Container Deposit Scheme and chairty bin collections..
- build relationships with recycling organisations such as SCR, Terra Cycle, Re-ground, etc.

constraints

- aligning agendas and funding streams
- training of volunteer groups

stakeholders

School community
Local/ State Government
Friends Groups

School community
Local Government

transferability

many small elements can make a network

precedents

- *Los Angeles River* Project
- *Water as an Ecological factor for sustainable Campus Landscapes*
- Northcote Public Golf Course

- Marilyn Reish, *Normalizing the Working Landscape*
- Bothwell Street BioLink, CoPP
- Supermarket and big chain (IKEA) recycling strategies

linkages to other ideas

- Multi-use parking + bus stops
- Timely matters
- Intergenrational landscapes
- Food Networks

- Sensorial gardens
- Circular food

Involving and engaging community

Upgrading of natural systems and areas while building on natural processes over longer time frames schools and volunteering activities can be designed around diversifying species though planting and removing invasive species to progressively improve biodiversity

- education in action opportunity, learning through doing and teambuilding
- connecting with local communities

- relies on volunteering

School community
Friends Groups

- *Parkstad* Limburg

- Invasive species
- Catchment wide

Intergenerational landscapes

Intergenerational activities are promoted to further cognitive and mental activity while allowing for knowledge sharing. These interactions can be incorporated in the landscape as both passive and active moments of connection.

- increase use of stormwater captures a valuable resource for vegetation and cooling
- topography allows for interesting spatial choreographies for exploration

- cost of initial works
- size of land area needed for water system

School community
Nearby aged care facilities

connections to aged care can be made through street upgrades with shaded rest areas

- Bothwell Street BioLink, CoPP

- Sensorial gardens
- Healing gardens
- Catchment wide

Heritage trails

A trail is framed around historical aspects of the neighbourhood and could connect as well as to other areas of significance. These historical connections consist of indigenous elements found on site, ecological areas of significance, and settler history elements to invite historical education, indigenous awareness, reconciliation activities, ecological classes but also other school activities like school runs, treasure hunts etc.

- create lived history experiences, and revive historical linkages
- create multipurpose trails that can be used for different forms of immersive teaching of history, reconciliation ecology, sports.

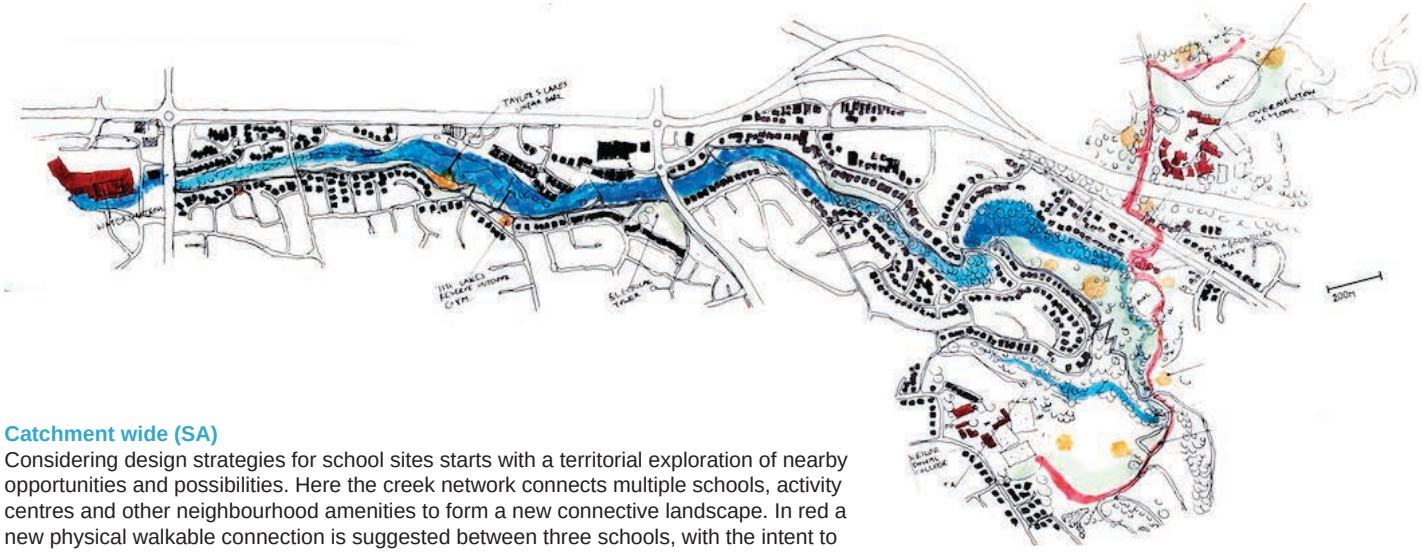
- presence of important historical and landscape elements and ecology areas of significance on site or in close proximity

School community
History and Friends Groups
Local indigenous organisations

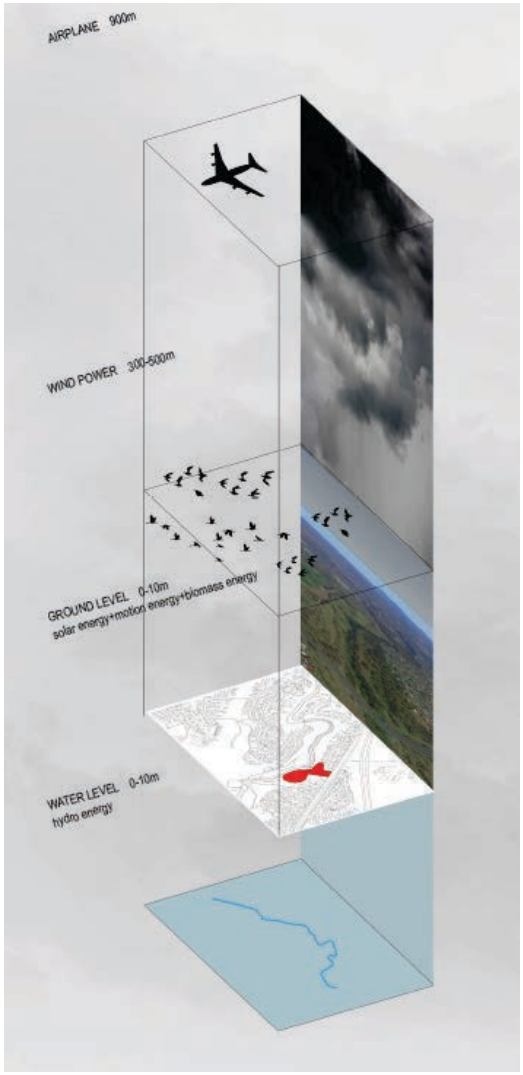
connections can be made through street upgrades and signage.

- Neeson Murcutt: Shipwreck walk Sydney
- Rocky Hall Preschool: Rural-remote community firepit

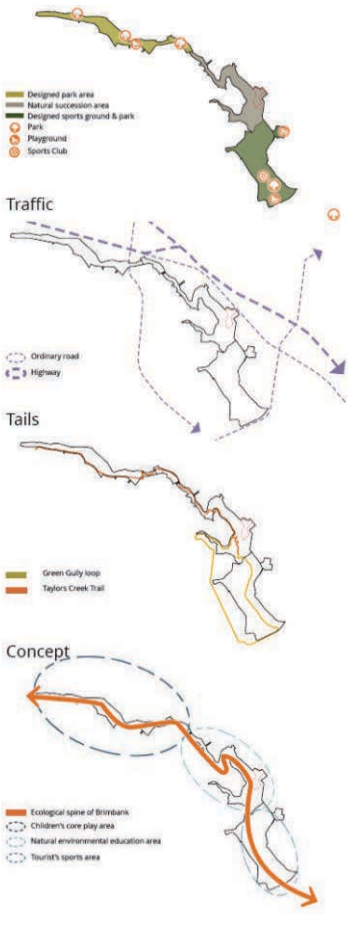
- Invasive species
- Dicovery trails
- Integenerational landscapes
- Catchment wide



Catchment wide (SA)
Considering design strategies for school sites starts with a territorial exploration of nearby opportunities and possibilities. Here the creek network connects multiple schools, activity centres and other neighbourhood amenities to form a new connective landscape. In red a new physical walkable connection is suggested between three schools, with the intent to encourage creating synergies between their infrastructures and safe off road access. This strategy could also offer traffic sheltered alternative pedestrian and bikeable school routes for children (in light orange). plan: Nidhi Parmar



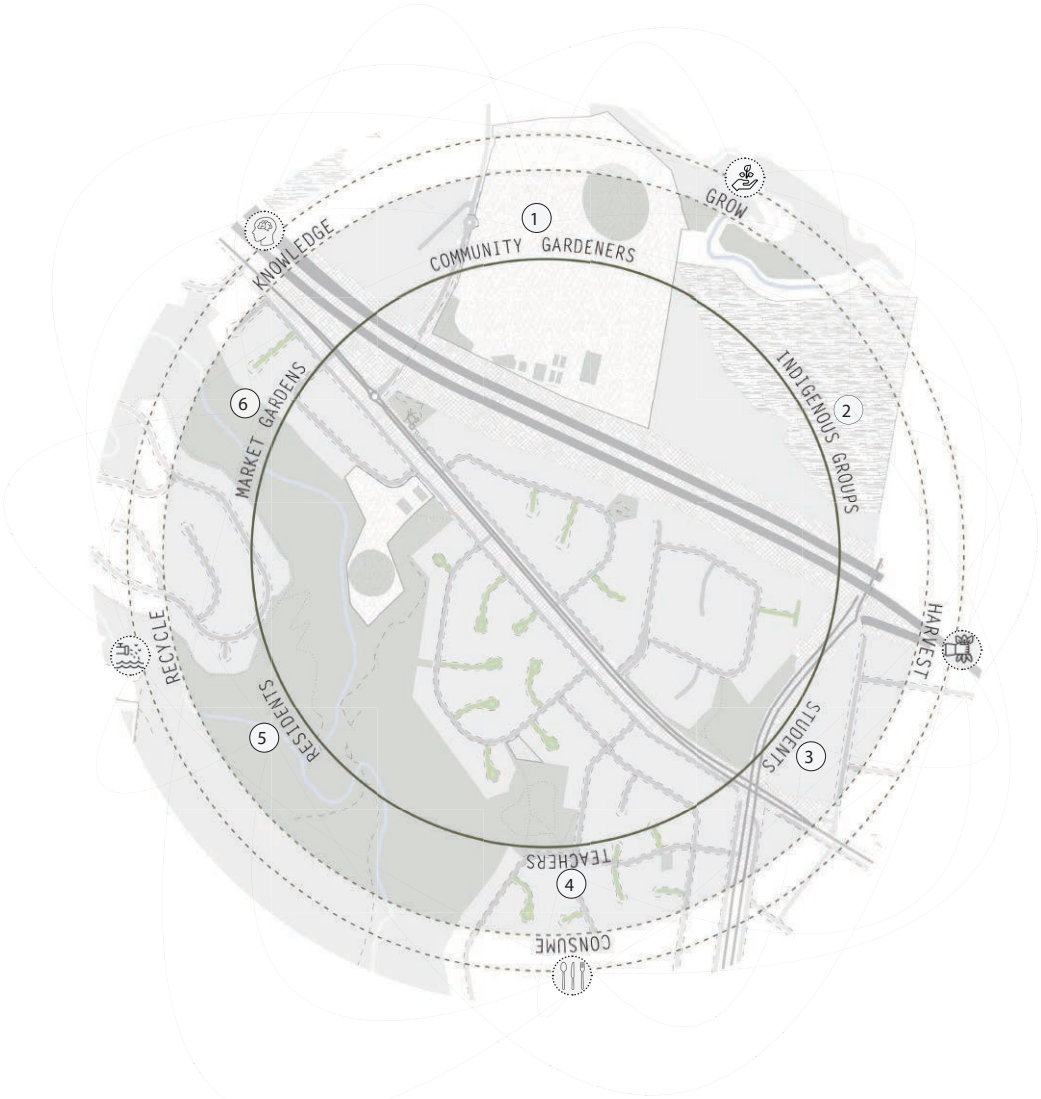
Catchment wide (SA)
Vertical scales are often forgotten when we think about landcapes, but sub-terrain and stratospheric environments have an enourmous impact on the surfaces of the ground. In our studied examples, thought was given on how to reduce impact of air traffic on bird-life though specific planting
Diagram: Ziyu Zhu



Catchment wide (SA)
Understanding complex contexts of school sites within creek or biodiversity corridor catchments can offer clear directions, in this case a clear pathing and connectivity along the creek corridor links three neighboring schools and school walking and bicycle routes for children. Diagram: Ziyu Zhu

Catchment wide (SA)
To better understand its relation to the neighbourhood and creek catchment the school site is part of a series of sections along the creek's biodiversity corridor. Opportunities along the creek can be identified in relation to creek and neighbourhood.
sections: Nidhi Parmar

Food networks (SA, ON)
Imagining the whole neighbourhood as an urban metabolism can help identify unique opportunities for planting, growing, cooking and reusing waste in different locations.
For example condensed plant groupings in the neighbourhood can be transformed into small food forests. Informed by a 'seven layers forest strategy', they can be interspersed with indigenous planting and localised in precise spatial arrangements. diagram: Danielle Gibbs



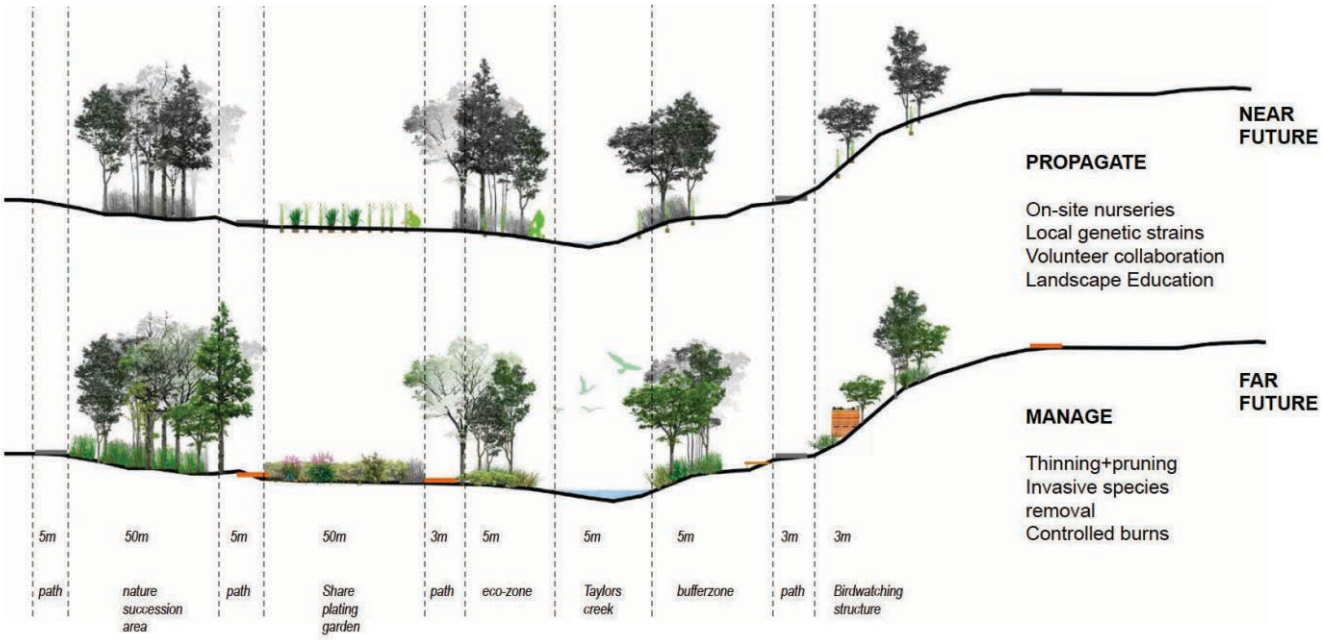

Images Source: Wimmera CMA


Image Source: Parks Australia


Image Source: Shutterstock


Images Source: Homes & Gardens

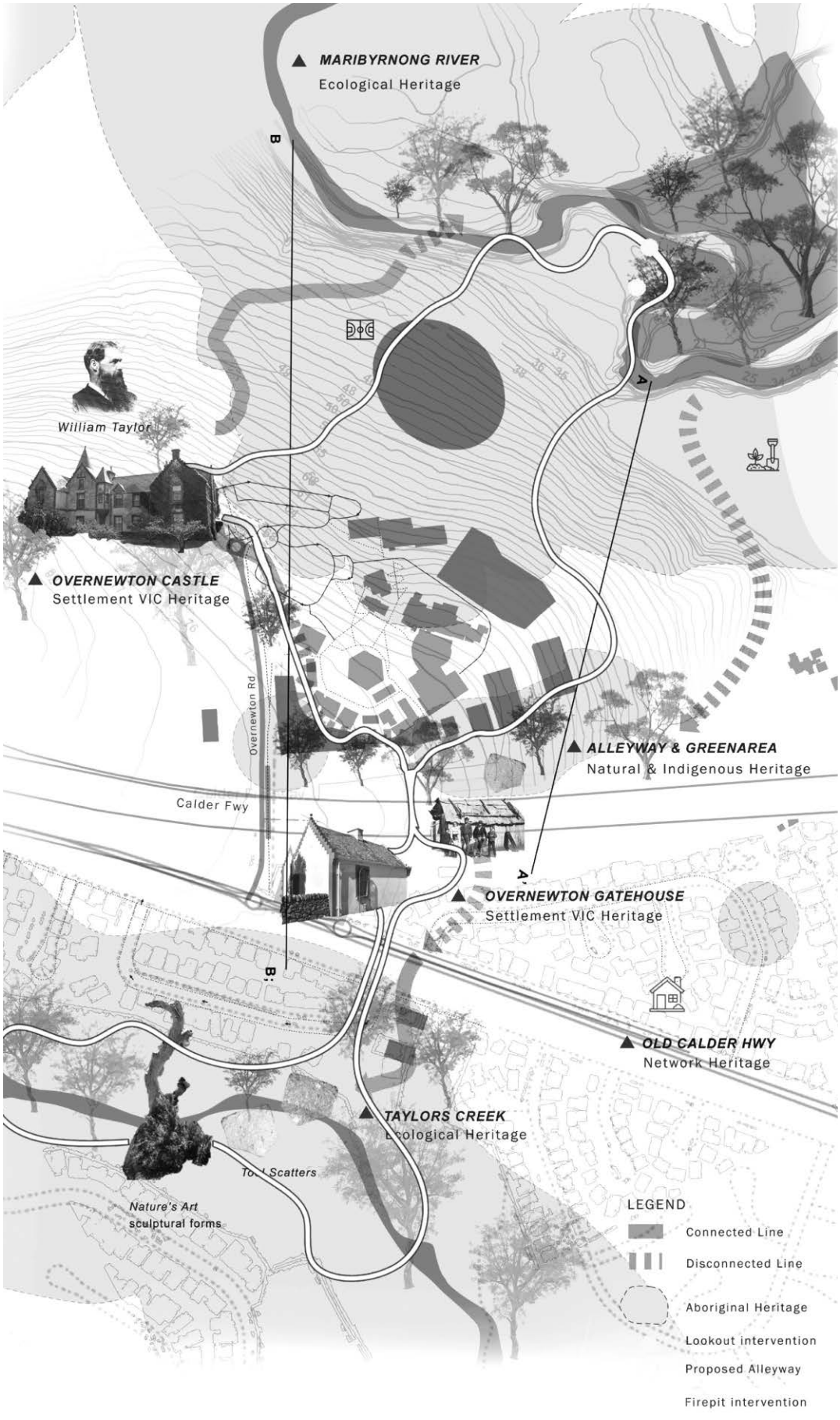

Image Source: Viator



Timely matters (SA)
Considering long term rejuvenation of adjacent landscapes can be part of a learning and engagement strategy of schools, with different stages in the process. Planting activities, such as making food forests, can involve the school and local communities and form moments and events of relationship building. They can than later serve as educational landscapes for all.
sections above: Ziyu Zhu, section food forest: Danielle Gibbs

Intergenerational landcapes (SA, ON)
Neighbourhoods can be are seen as a cohesive urban landscapes that contain schools, activity centres, biodiversity areas and creek catchments within urbanised landscapes. These landscapes can support integenerational contact, learning, health and well being across all ages. perspective: Nidhi Parmar and diagram: Ziyu Zhu

Heritage trail (ON)
Pathways can at times be lifted off the ground to show a new perspective on familiar places, move them out of flooding zone, avoid interrupting biodiversity corridors or traverse a road trench. A perforated materiality allows transparencies as well as the passing of vegetation, sun and rain to minimise impact. Key landscape elements can be identified with interpretive signage.
perspective: Nicole Baojie Zhu

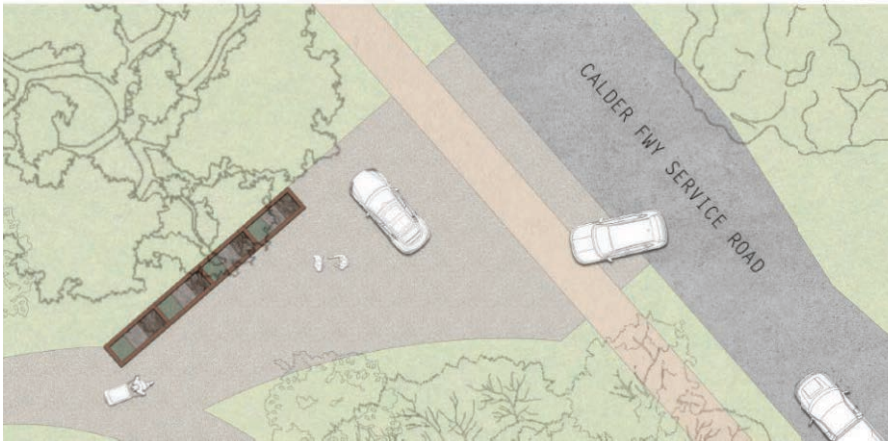


Heritage trail (ON)
With the rich history of Melbourne's West, both pre- and post colonial, schools can work together to improve on local knowledge networks and make them visible in the landscape by connecting landscape trails. The trails not only improve walkability but give a stronger identity to the neighbourhood. Further to creating a better pedestrian access to the public transport network, trails can be used for education about history, ecology, indigenous awareness, school and sports events., plan: Nicole Baojie Zhu

BROWN WASTE
- dry leaves
- straw/dry grass
- paper
- wood chips

GREEN WASTE
- food scraps
- grass clippings
- coffee grounds
- egg shells

COMPOST
- stored in bins
- turned regularly
- watered occasionally
- provides nutrients to food forest plants



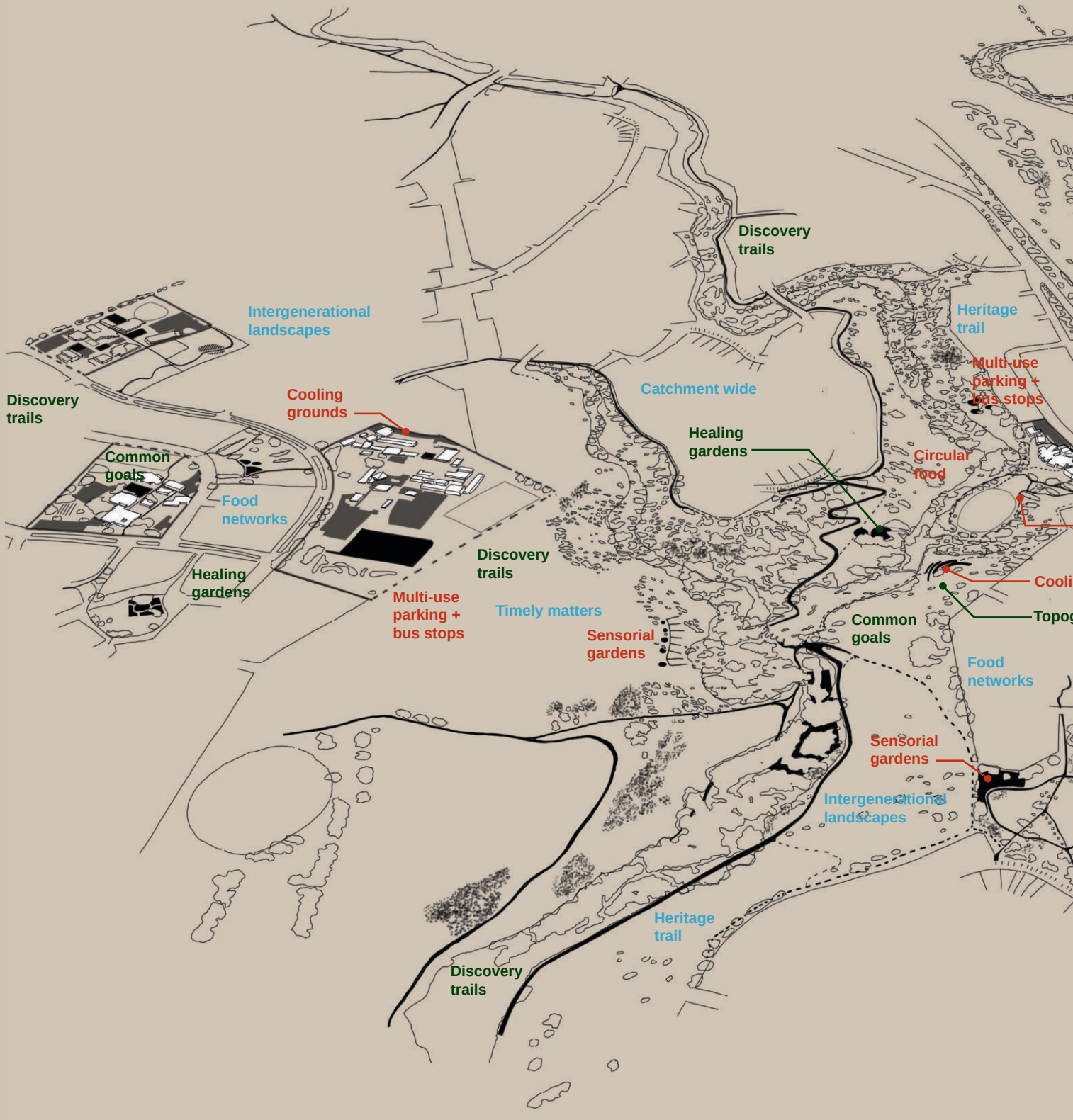
Food networks (SA, ON)
Schools sit often at the heart of communities, with many children, parent, grandparents, former students and occasional local club users directly or indirectly linked. As they often already have strong ties to the neighbourhood, as well as experience in organising improvement initiatives, they form a good starting point to organise a network for local improvement.

Here a small insertion of a composting station is made on the campus entrance. Neighbours and students are able to monitor, collect and take compost as needed in their gardens, while parents can do this while dropping or picking up their kids, reducing travels. plan and perspective: Danielle Gibbs

Food networks (SA)
Creating an network of individual elements to support a whole food cycle brings in the community and expands the schools curriculum into the neighbourhood. Here the community food forrest and compost station are on common land whie the cooking workshop and learning landscape are on school grounds. Opening up and sharing the network can improve inclusive and common goals. plan: Danielle Gibbs


L
/A
COMPOST
STATION
SHED
RW
RW
PUBLIC RESERVE
PLAYGROUND
COMMUNITY FOOD
FOREST

Outcomes


Discovery trails
Intergenerational landscapes
Heritage trail
Multi-use parking + bus stops
Catchment wide
Discovery trails
Cooling grounds
Common goals
Food networks
Healing gardens
Circular food
Healing gardens
Discovery trails
Multi-use parking + bus stops
Timely matters
Sensorial gardens
Common goals
Food networks
Sensorial gardens
Intergenerational landscapes
Heritage trail
Discovery trails

School Grounds

Expand into closeby ecologies

Neighbourhood Networks

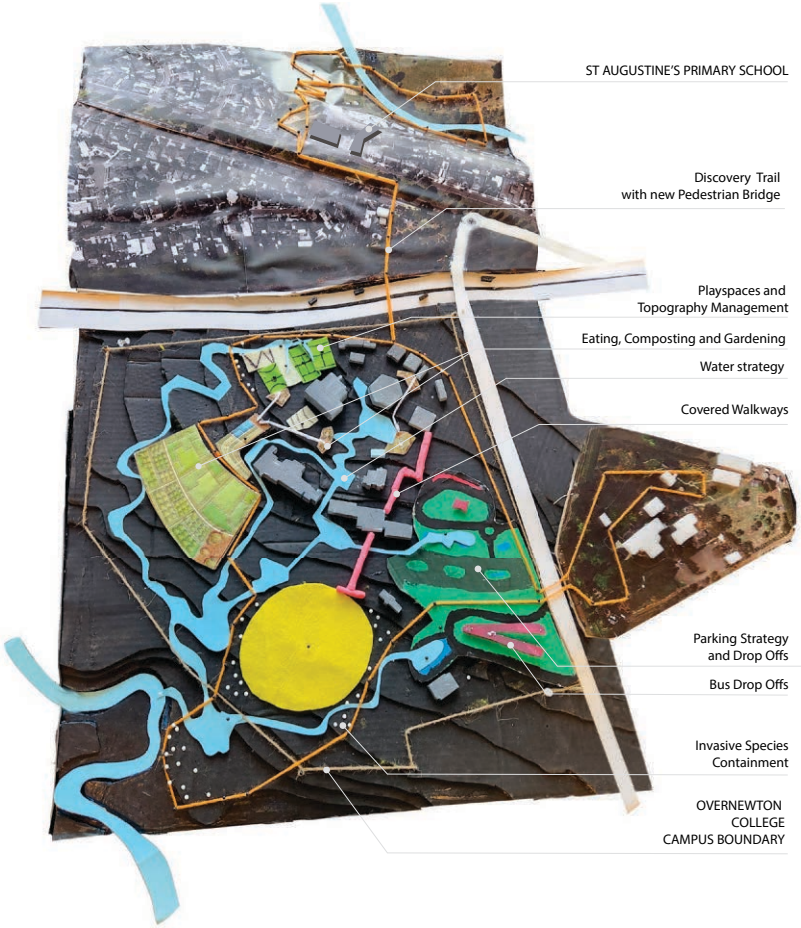
Learning Landscapes

Multi-purpose landscapes with extensive benefits
The project considered at various scales landscape, biodiversity and climatic conditions to address the main objective of the study. It looked at shading, wind and aeration corridors, water and elements of evaporative cooling, seasonal vegetation and changes in weather, water management in relation to the catchment and topography, water events, droughts and plant maintenance, controlling erosion, runoffs and invasive species into the creek, The study also intensively studied the usage of spaces over time such as pickups/ drop-offs/ traffic, breaks/ recess/ lunches/ packing up and garbage collection, play/ sport/ other learning outdoor activities. It looked at these also in relation to the wider geographic and social fabric of the neighbourhood, the quality of spatial experiences and mobility aspects. Through that it became increasingly clear that the use of the school grounds for students, parents, visitors and are closely intertwined with surrounding communities. Further schools can have a wider impact on their neighbourhood, as providers of large open spaces, and in this have a wider responsibility in their community. They can provide cool oases that refresh the wider neighbourhood, and together create networks of cooling open spaces. They further have the capacity to open up these spaces to other members of the community, for weekend or school holiday activities, or on heat wave days.

Schools can thus play a major role in increasing the experience and engagement with topics of climate adaptation, biodiversity, and ecological awareness, and landscape architecture can make those relatable through everyday engagement.

Learning landscapes for all
The project revealed that beyond being functional landscapes for drop offs, pickups, sport, recreation, lunchtimes, socialising, the landscapes can provide many further inbuilt wellbeing and learning opportunities. Improved landscapes can provide a calming, nurturing and stimulating environment for students, staff and visitors to replenish before, during and after school, improving physical, mental health and wellbeing. Offering invitations for play, physical activity, social interaction, discovery, and performance also offers manifest health benefits, from which students' learning will be positively affected.

Further the creation of beautiful, engaging, and cooling landscapes for all offers passive and active learning opportunities: They allow for discovery about ecology, flora and fauna, seasonal change, climatic phenomena, while also inviting outdoor teaching, educational activity, playful learning, and reflective opportunities for courses. Thus, they can help expand the curriculum of schools in tangible and fascinating ways helping teachers to visualise ecological learning.



Single or combined strategies and urban plans

As the report outlines, there are many options for improving outdoor spaces, from very small localised interventions to larger scale strategies that profit from collaboration with the neighbourhood, the council, or other schools. This gives schools opportunities to start small, combine different approaches dependent on budget and capacity, and scale up their endeavours over time. It also allows finding shared funding and implementation models.

Further in the first iteration on the Overnewton Anglican Community College Keilor Campus, we tested how different strategies can be worked out to function together, like a jigsaw puzzle. Different elements of the strategy could be implemented at different times, to progressively achieve a coherent climate strategy. A useful tool for us as students and designers has been a physical model (above) to test how different strategies can be worked out to complement each other. It showed how 'pieces' can be added, removed, or changed. It can also be used to test changes in the building stock. This approach allowed us to demonstrate how different strategies can work with each other, like the invasive species containment strategy leveraging off the discovery trail and a new pedestrian access strategy. The correlations and synergies between different ideas and strategies are highlighted in the colour coded overview charts as 'links to other ideas'. In such a way, individual ideas can be linked, combined and reshuffled to fit scale and uniqueness of each school campus, be it large or small.

Collaboration and Possible Partnerships

A wider role for schools
The study strengthened the idea that schools play a strong role within communities, and that this role can be strengthened to both the benefit of schools, communities and councils. They are spaces where kids, parents, grandparents, teachers come together, where some evening, weekend or holiday activities may occur, or where community groups and clubs may rent out spaces, where elections are held and their role expands beyond mere teaching.

School grounds can become exemplary spaces for the community, spaces where the neighbourhood first gets exposed to new concepts and ways of treating outdoor and urban spaces. Schools have a role model function, and concepts tested on their grounds might be picked up by the community to wider effect. Schools can offer events that showcase and test their experiences.

Schools can also play a safe haven and green oasis function in climate events, where they offer sheltered spaces to vulnerable populations, or also just an alternative social space when staying at home over a few days may become a bit claustrophobic. If conceived in such a way, school spaces that are traditionally only used over 40 weeks a year and 5 days a week, 5,5 hours a day can also expand to host other activities for the community creating synergies between local and education communities that may be leveraged on in multiple strategic ways.

Benefits for thinking at multiple scales
The project revealed that improvement strategies can happen at multiple scales, from small to medium localised interventions, interventions encompassing the whole school ground, interventions involving the direct vicinity to spread out interventions connecting with the wider neighbourhood or between schools. This offers different opportunities for operation and collaboration.

This project has revealed that school could benefit extensively from creating projects in collaboration to be more effective and in using their capacity for change:

With communities:
In some cases projects would benefit from community involvement: Schools have experience and good track records from crowdfunding projects. For projects that would offer benefit to both school and community, that are positively impacting on adjacent public areas, or where spaces become available to community after school hours, such funding models could be used to develop projects that are of mutual benefit. Further some projects could be conceived as connecting ecosystems between school and public areas, and such projects could also be sourced in partnership.

With council:
Some projects can be of relevance for the whole neighbourhood, or to large publicly owned areas, as for example projects that would benefit adjacent biodiversity areas for instance. Such projects could profit from collaboration with councils or other public bodies. Often schools lack the resources of staff or volunteers to achieve such endeavours and for instance to manage and coordinate invasive species on school and adjacent lands was seen in one example. Public funding could secure works that are of relevant public benefit in exchange for instance of maintenance or public access to relevant areas outside of school hours.

With other schools:
Many endeavours would also benefit from being realised in collaboration between schools, such as developing general strategies and approaches, or developing connections between schools. Information and experience sharing could benefit the tight budget of schools to implement better landscape strategies in a timely manner for such pressing issues that impact the health of students and staff alike. Schools could also share information of their experiences and post occupancy surveys to ensure maximum impact and success.

Future directions
This report has outlined some relevant strategies to address contemporary challenges currently faced by schools, from climate change, biodiversity loss, mobility issues, but also the attendant issues of useability, comfort, well-being, health of and in outdoor spaces. This short study of two cases allowed us to make first recommendations. Developing a more extensive research project with RMIT University to investigate a selection of strategies in more detail would be a further avenue to develop some of those strategies in more detail.

Developing such a research as transdisciplinary collaboration with education specialists, climatologists, ecologists, health experts would offer opportunities to develop propositions further. A test project for the implementation with post occupancy and climate monitoring would allow us to measure the impact and effect of such a project. Test projects could be broken down in different sections to gauge the impact of each intervention on usability, climate, health, wellbeing of students, staff and visitors.

With climate change ever more visible, and extreme weather ever more evidently producing health impacts, it is urgent now to address the impact of poor performing spaces on the most vulnerable including children. Impactful research into outdoor spaces not only reduces the risk of overheating, lack of shade, but also creates more agreeable, versatile, educationally valuable and stimulating environments for learning is urgently needed. We hope that this research is only the starting point for increased awareness, knowledge and expertise across generations, organisations and learning landscapes.

Further Readings

Brimbank Council, Habitat Connectivity Plan,

Brimbank Council, Green Wedge Management Plan

Billy Fleming: 'Design and the Green New Deal', places journal https://placesjournal.org/article/design-and-the-green-new-deal/

Burns, Site Matters: Design Concepts, Histories and Strategies. United Kingdom: Psychology Press. 2005

City of 1000 Tanks, Chennai, https://www.cityof1000tanks.org/

De Urbanisten, Water Square, Rotterdam, https://www.urbanisten.nl/work/benthemplein

EEV, Resources smart schools, https://www.eev.vic.edu.au/rss-online-resources

HDI Gerling (2011 Bruun & Möllers Landscape Architects., https://www.bmla.com/en/projects/hdi-gerling/

Hershberger Design: Laurance Rockefeller Preserve, https://hdlajh.com/projects/laurance-s-rockefeller-preserve-interpretive-center

Jan Gehl, Life between buildings: using public space, Island Press 1971

Jan Gehl, Cities for People, 2001

Landscape Institute, 'Landscape for 2030: How landscape practice can respond to the climate crisis', https://www.landscapeinstitute.org/publication/landscape-2030/

Los Angeles River Masterplan, https://larivermasterplan.org/

Los Angelos River Revitalization, https://lariver.org/

Neeson Murcutt: Shipwreck walk Sydney, https://neesonmurcuttneille.com/shipwreck-lookout/

OOZE, Chennai Water tanks, http://www.ooze.eu.com/en/urban_strategy/city_of_1000_tanks_chennai/

Ourt Catchments, Our Communities, https://www.water.vic.gov.au/__data/assets/pdf_file/0040/668785/our-catchments-our-communties-strategic-directions-statement.pdf

Marilyn Reish, Normalizing the working landscape, https://www.marilynreish.com/work/theworkinglandscape

R&Sie: Asphalt Spot

Rocky Hall Preschool: Rural-remote community firepit, https://yuin-monaro.storylines.com.au/2017/07/03/test-opportunity-13/

Rose, S. (2020 'How to get cacti out of the yard, https://www.weekand.com/home-garden/article/cacti-out-yard-18041180.php

Steph Donse (Ed. Landscape as Protagonist, Mongolo

Scenario Journal, Interview with Ch. Waldheim: Landscape Urbanism Now https://scenariojournal.com/article/an-interview-with-charles-waldheim/

Singh N., Singh S., Mall R, “Urban ecology and human health: implications of urban heat island, air pollution and climate change nexus” Urban Ecology, Elsevier. https://www.sciencedirect.com/science/article/abs/pii/B9780128207307000173

Thomas Chung: Value Park, https://www.archdaily.com/477405/value-farm-thomas-chung?ad_medium=gallery

Utrecht Bus stops, https://www.activesustainability.com/construction-and-urban-development/bus-stops-latest-bee-conservation/?_adin=02021864894

VSGA Awards 2019- Noble Park Primary School. https://www.vsgp.org.au/wp-content/uploads/2020/08/Noble-Park-Primary-School-VSGA-AWARDS-2019-learning.pdf

Waldheim, Charles, ed, Landscape Urbanism Reader, https://www.amazon.com/Landscape-Urbanism-Reader-Charles-Waldheim/dp/1568984391

Water as an Ecological factor for sustainable Campus Landscapes, https://www.researchgate.net/publication/291356702_Water_as_an_Ecological_Factor_for_a_Sustainable_Campus_Landscape

‘What is biological control?’, https://biocontrol.entomology.cornell.edu/what.php

Woodstream, W. (2020) The best rabbit bait and trapping tips, https://www.havahart.com/articles/the-best-rabbit-bait-and-trapping-tips

Zaha Hadid: Hoenheim-Nord Terminus and Car Park, https://www.zaha-hadid.com/architecture/hoenheim-nord-terminus-and-car-park/