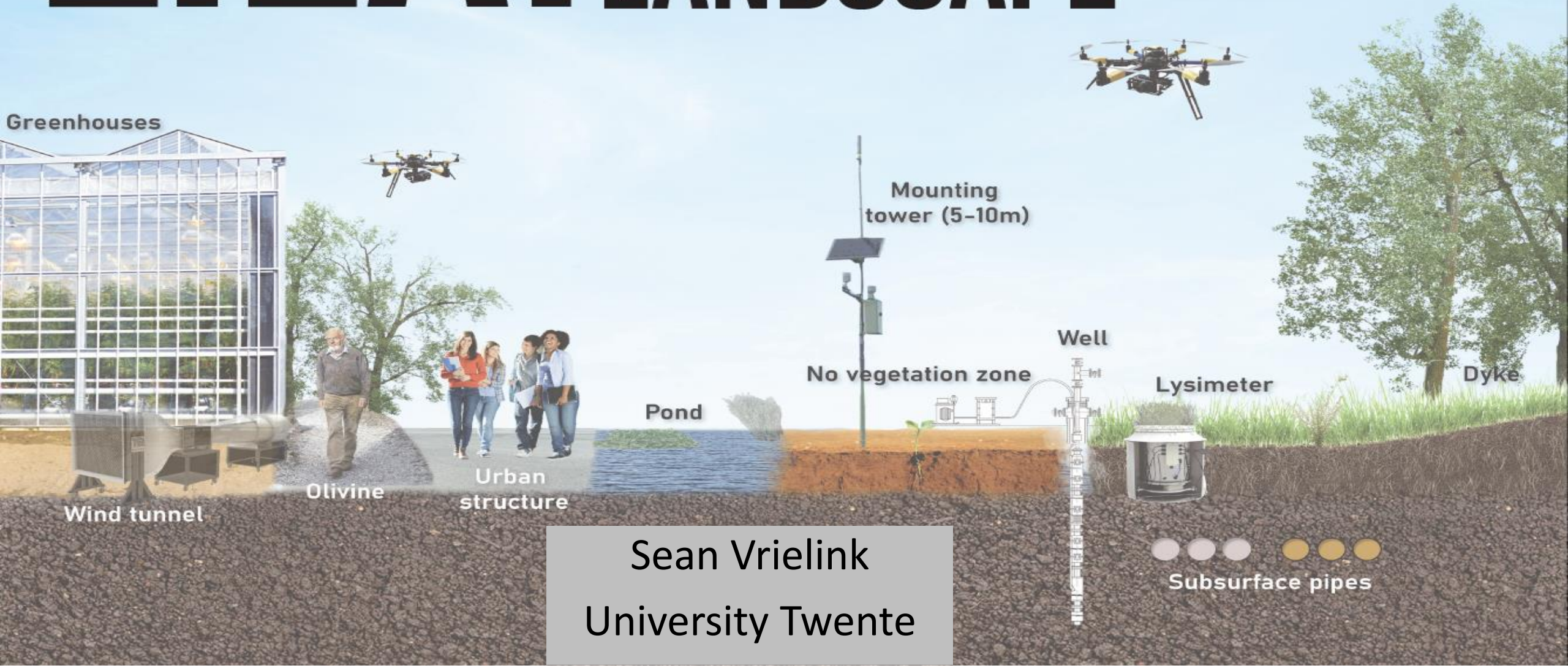


LILA. LANDSCAPE

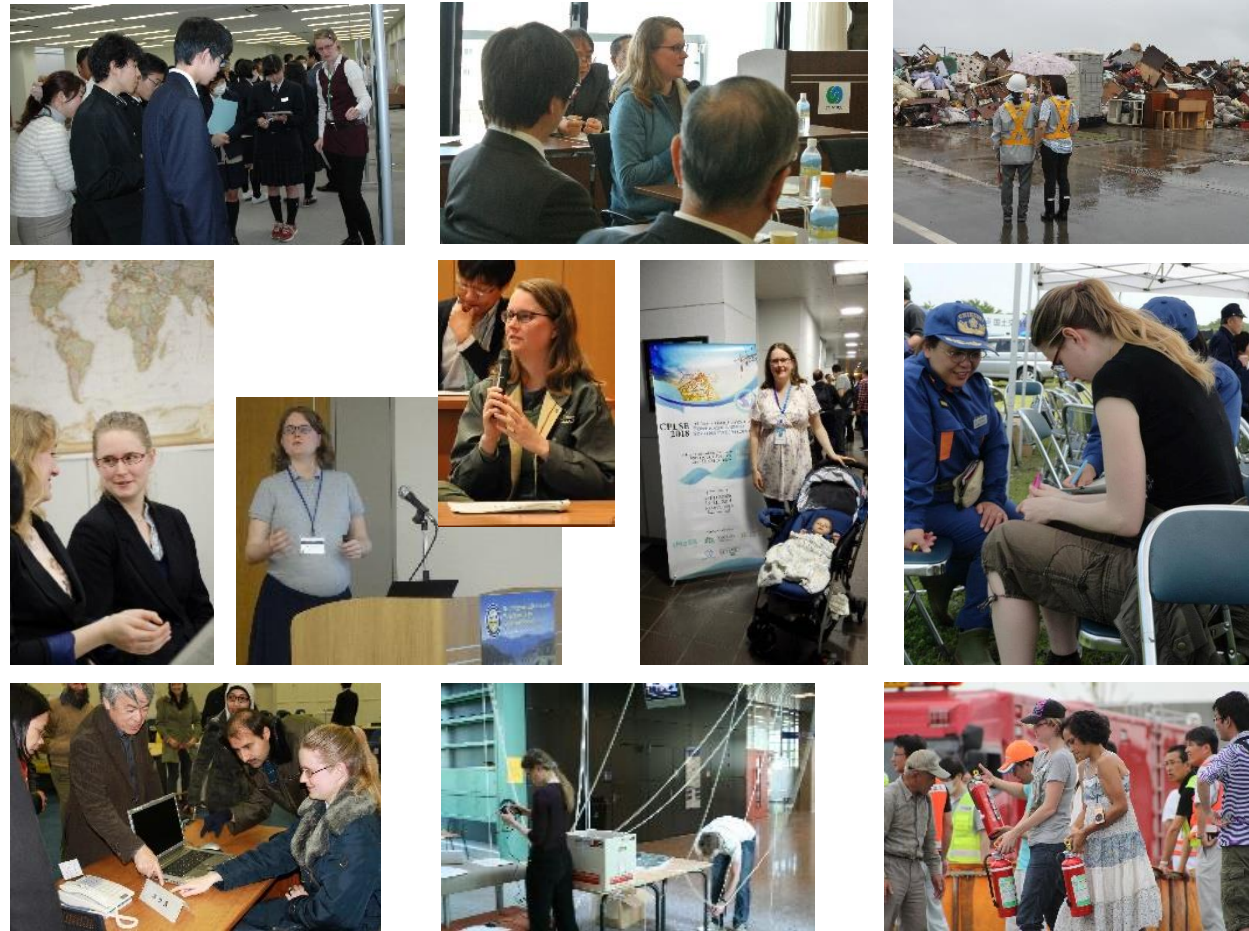
Living Innovation-Lab at the UT



Sean Vrielink
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ABOUT MYSELF

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- 2019 Lecturer on Green infrastructure and urban sustainability at the department Construction Management & Engineering, Engineering Technology, University Twente
- 2017 Postdoc National Institute Materials Science, Japan
- 2014 Researcher International Centre for Water Hazard and Risk Management (ICHARM), Japan
- 2011 PhD in Japan on Disaster management
- 2009 Data analyst Rosen Europe pipeline inspections
- 2008 Junior researcher for Freude am Fluss project
- 2006 Junior advisor, permit granter Rijkswaterstaat
- 2004 MSc at Nijmegen (NL) in Environmental Sciences
- 2001 BSc University College Utrecht (NL) in Science

I am genderqueer/nonbinary (they/them).

CONTENTS



What is the living innovation lab?



What green infrastructure will be built?



What are the research aims?



Collaboration



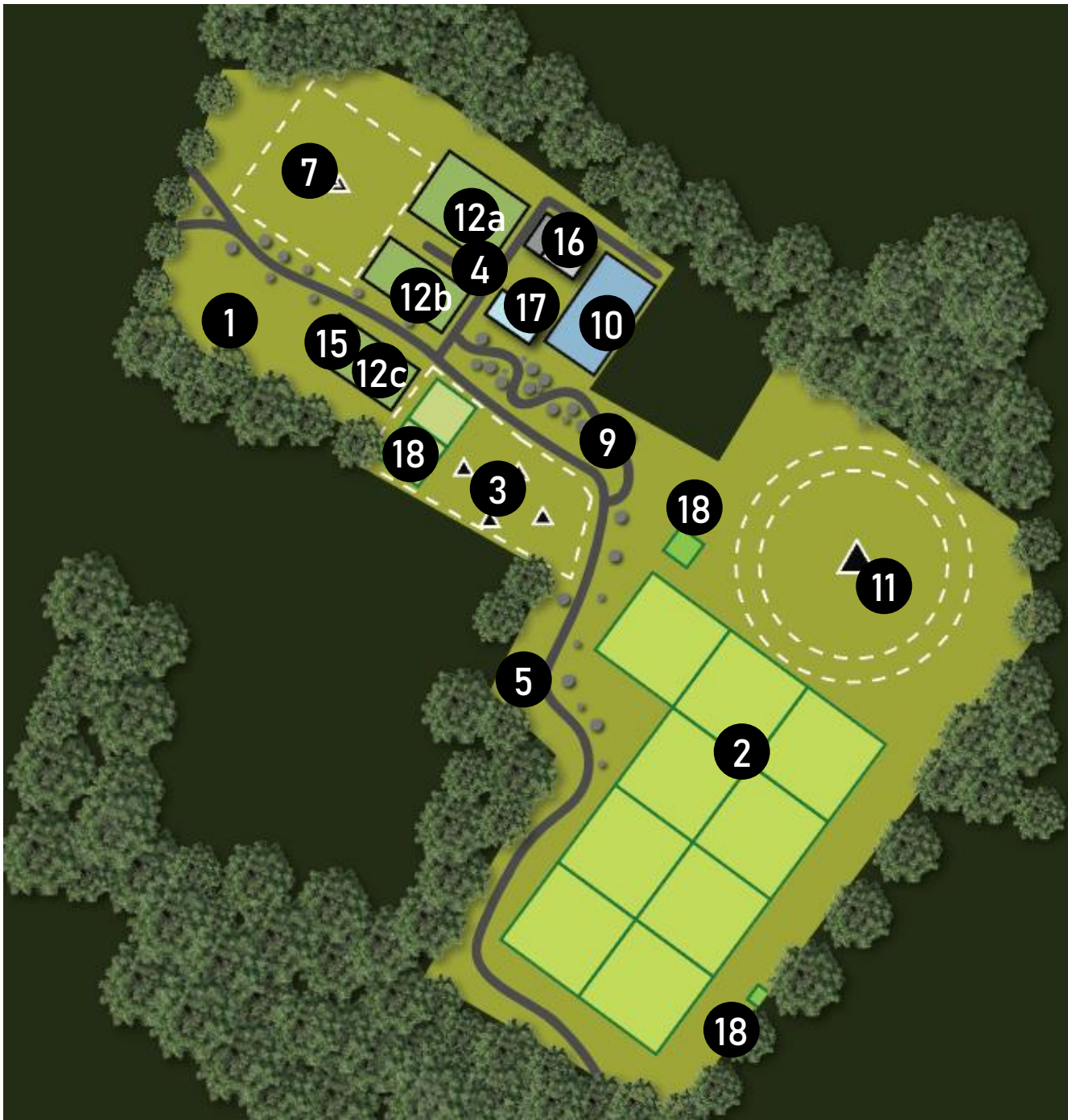
1) WHAT IS THE LIVING INNOVATION LAB?

The Living Innovation Lab is a joint initiative of the faculty of Engineering Technology (ET) and Geo-Information Science and Earth Observation (ITC).

Goals:

- provide a semi-controlled setting for observation, monitoring, and experimentation
- support training and education for vocational schools, university students, and practitioners
- connect with local communities and industrial partners

A Soil mechanics	J Vegetation monitoring
B Subsurface infra	K Vegetation growth
C Geophysical test site	L Vegetation root-soil interaction
D Urban environment	M Aeolian transport, windtunnel
E Soil moisture	N Coastal defense aquatic vegetation
F Insar corner reflector	O Greenhouse
G Rock garden	P Biodiversity monitoring
H Water quality	Q Greening infrastructure
I Climate tower	R Dynamic experimental field



1. Soil mechanics
2. Subsurface infra
3. Geophysical testsite
4. Urban infra
5. Soil moisture (throughout)
6. Discontinued
7. Insar corner/ geodesic pole
8. Combined with 4, to be confirmed
9. Rock garden
10. Water quality
11. Climate (meteo) tower
12. Vegetation
 - a. Vegetation monitoring with beam
 - b. Vegetation growth
 - c. Root-soil interaction
13. Combined with 12,17
14. Geo-information processing (no location)
15. Combined with 5
16. Coastal defence
 - a. windtunnel
 - b. Coastal dynamics/aquatic vegetation (possibly combined with 10,17)
17. Greenhouse
18. Biodiversity monitoring



DESIGN





ROCK GARDEN

2) Green infrastructure at the LLa

Phase 1

- Blue/green roofs
- Green walls

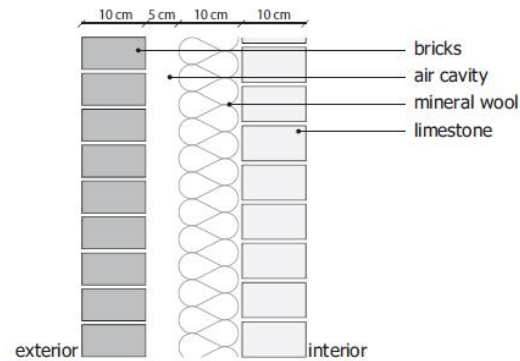


Fig. 1. Bare wall with materials layers.

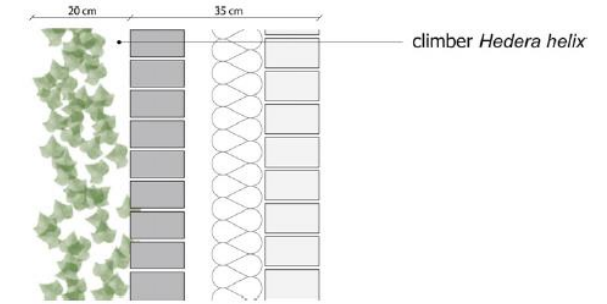
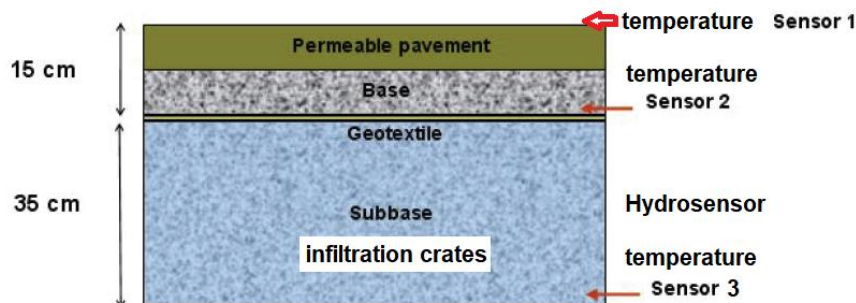


Fig. 2. Direct greening system with materials layers.

Phase 2

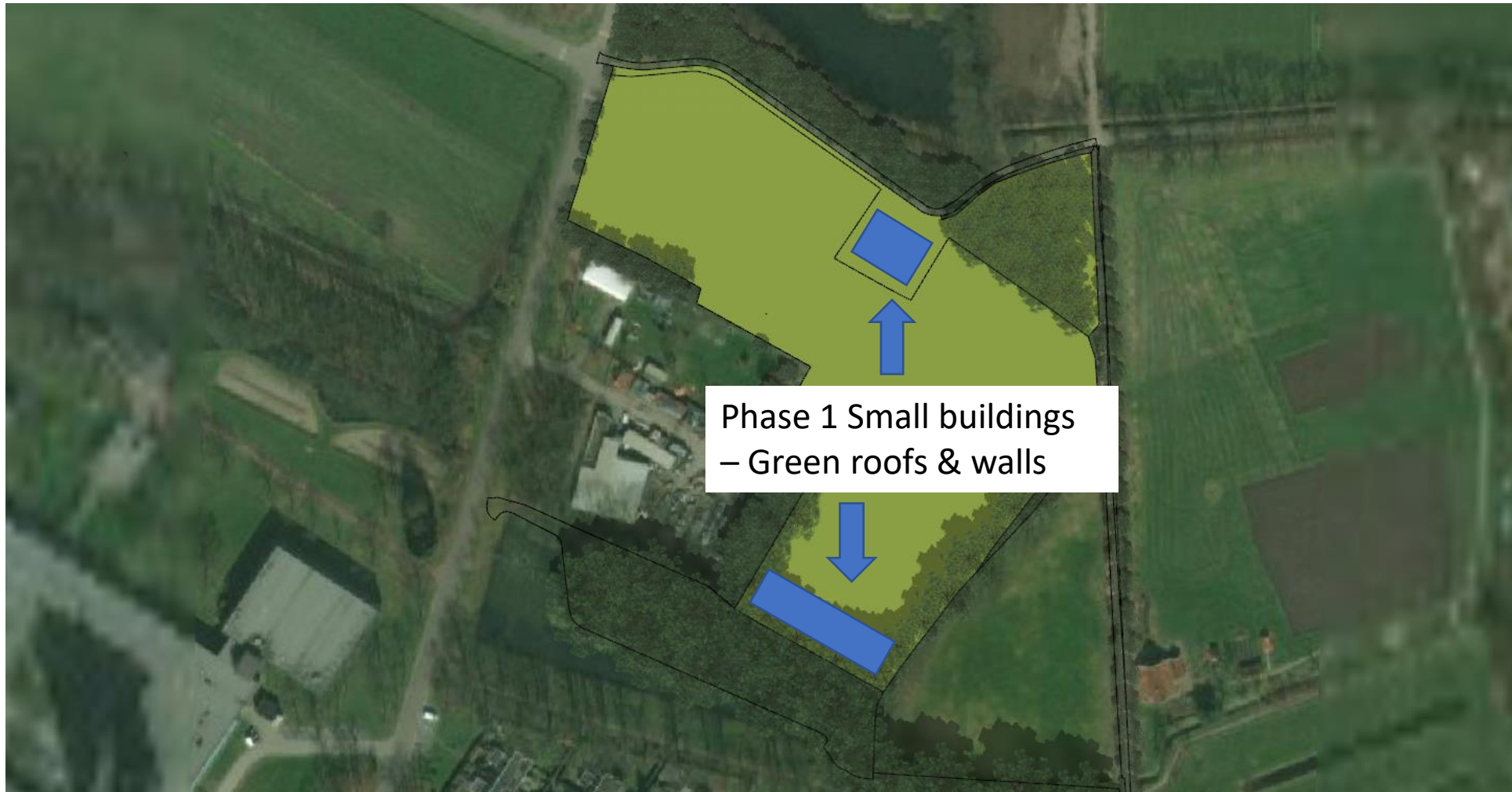
- Permeable pavement
- Retention area



2) Green infrastructure at the LLa



Phase 2
Parking spaces – pavement/retention





North: existing building



South: to be built



<https://www.utwente.nl/en/news/2021/6/1-089645/ut-campus-will-have-a-living-innovation-lab?code=7b96fe20#more-on-lila>

June, 07:30h (UTC+2, summer time)



June, 13:30h (UTC+2, summer time)



June, 19:30h (UTC+2, summer time)



3) Research aims

LiLA aims:

- give the public insight into current UT research
- create an environment for observation, monitoring and experiments
- support training and education by means of challenge-based learning on large societal challenges of urban resilience, climate change, and the energy transition

3) Research aims Green Infrastructure

Circularity & sustainability

100% is not feasible, but how can we make construction projects **more** circular and **more** sustainable?

LILa Green Infrastructure can act as a guide for future UTwente construction projects.

When are we done?

When are we climate proof, how many green roofs are needed to combat the Urban Heat Island effect, how much water can green walls help absorb and evaporate precipitation from local storms, how much green infrastructure is needed to reach our climate goals?

3) Research aims Green Infrastructure

We aim to quantify the potential climate resilience benefits:

- reduced urban floods and runoff peaks
- reduced heating/cooling
- carbon sequestration

and quantify the potential tradeoffs:

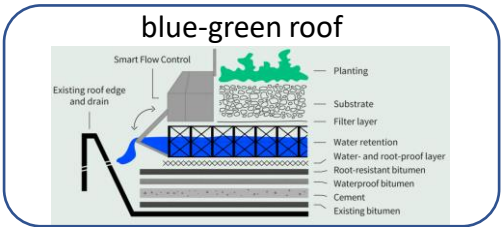
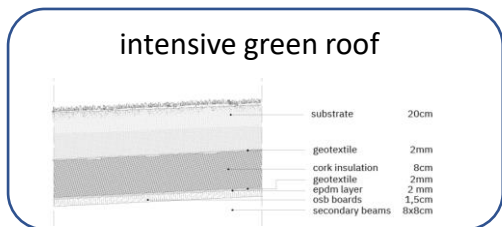
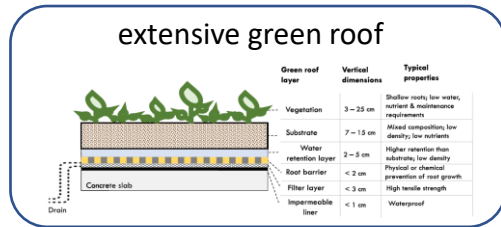
- CO2 emissions during production, maintenance (for irrigation and pumping), and end of life (life cycle analysis)
- required irrigation and stored precipitation

all through continuous monitoring and modeling.

This provides insight into the **water-energy resource tradeoffs** when implementing urban green infrastructure.

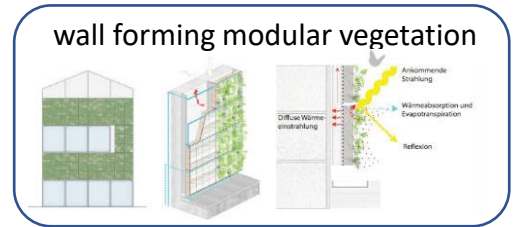
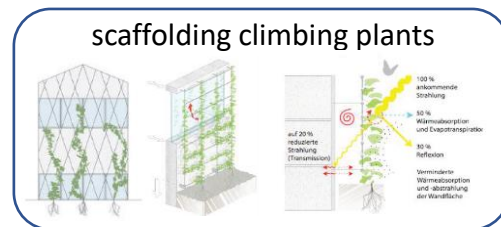
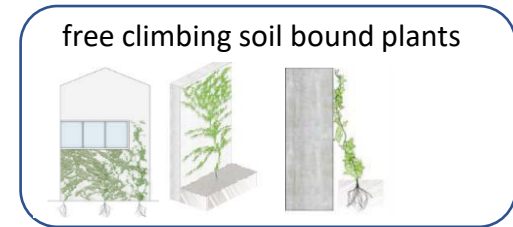
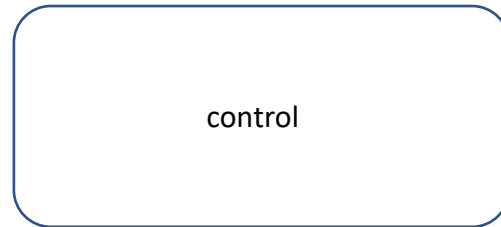
Green roof types

4 sections of 5x5m flat green roof



Green wall types

4 sections of 3m wide and at least 2m tall



3) Research aims

Proposed set-up:

- Green roofs: 4 green roof sections, each 5x5m: 1) control (no green roof), 2) sedum species, 3) annuals species, 4) sedum + annuals species. Preferably in an area with sunlight - half shade. Electricity/dataloggers required for sensors, water for irrigation system.
- Green walls: 3 green wall sections, each 3m wide and about 2m tall minimum, with each different species mixtures. Preferably in an area with sunlight - half shade. Electricity/dataloggers required for sensors, water for irrigation system.
- Permeable pavement/retention area: tbd in a later phase.

4) Collaboration

Existing

- University Twente - Shaping Expert Group Sustainability
- Vrije Universiteit Amsterdam
- Municipality Enschede/ Groenblauw Enschede
- Green Panels
- Dakbloemenweide

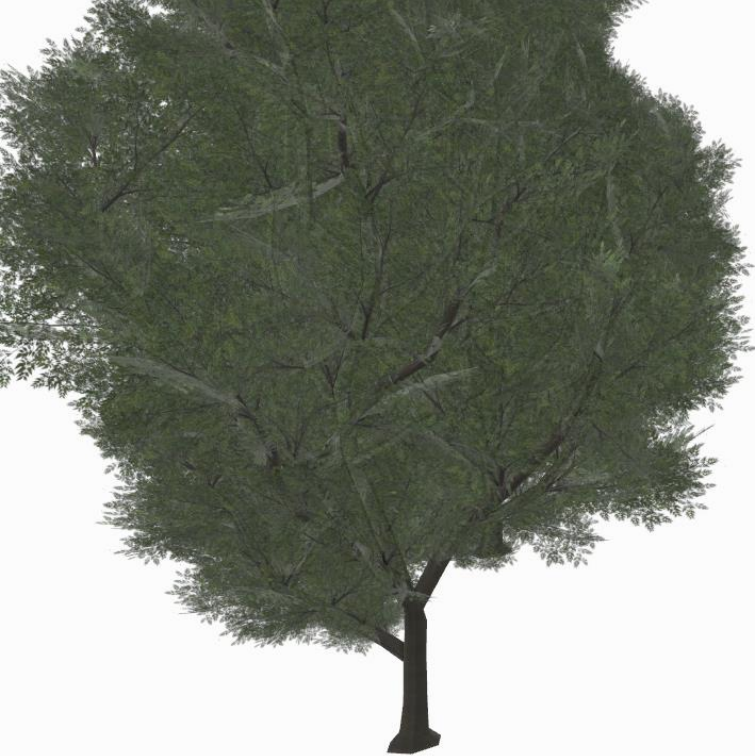
Next steps:

- Wavin
- Natuur en Milieu Overijssel
- Saxion University for Applied Sciences
- Waterboard Vechtstromen
- Tauw
- You?



4) Collaboration

1. Design of the green infrastructure (new building, green roofs, green walls)
2. Construction and maintenance of green infrastructure, specifically water management
3. Additional research from environmental life cycle analysis/ biodiversity/social cohesion perspective (Life Cycle Costing expert)
4. Attracting visitors to see the green infrastructure in practice
5. Design of the green infrastructure (permeable parking places and underground drainage basin)



Draft impression



Draft impression