



Introducing heat resilience to a School Campus Zelzate

Summary

- A campus with multiple buildings and paved playgrounds
- The interventions on this site include replacing hard surfaces with water permeable paving, grass mats, a lime tree (*Tilia* spp.), installing an awning with a green roof and a green wall
- This design will reduce heat stress and contributes to the climate resilience strategy

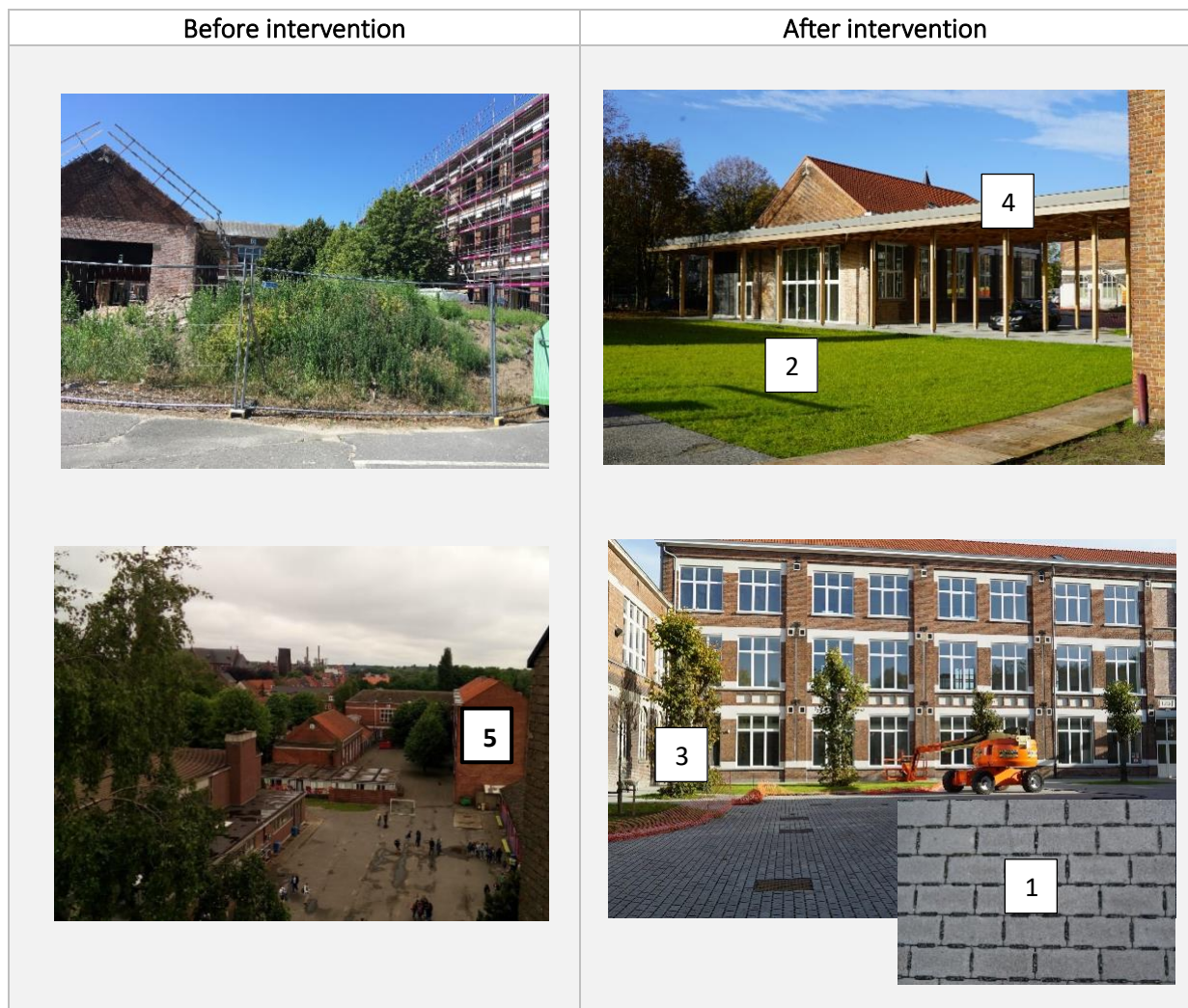


Figure 1. Overview of the interventions: removing hard surfaces and replacing them with permeable slabs (1), planting of grass turf mats (2), planting an additional lime tree (*Tilia* spp.) (3), installing an awning with a green roof (4), and installing a green wall (5).

Location

Zelzate, in East Flanders, Belgium, is within in an industrialized area, north of the harbour of Ghent, near the Dutch border. The municipality has more than 12,000 inhabitants. The city centre is enclosed by two highways (R4 and E34) and is divided by the Ghent-Terneuzen Canal.

Site Description

The interventions have been made in the playgrounds of the BS De Reigers school campus and the adjacent BS De Reigers campus (figure 2), in a residential area near the city centre. These contain school buildings, which are undergoing phased refurbishment, paved areas, green areas and a small pond. As the playground is nearly completely paved, heat stress occurs during summer. This not only has a direct effect on children playing outside, but indirectly affects the attention span and health of everyone inside the classrooms nearby.

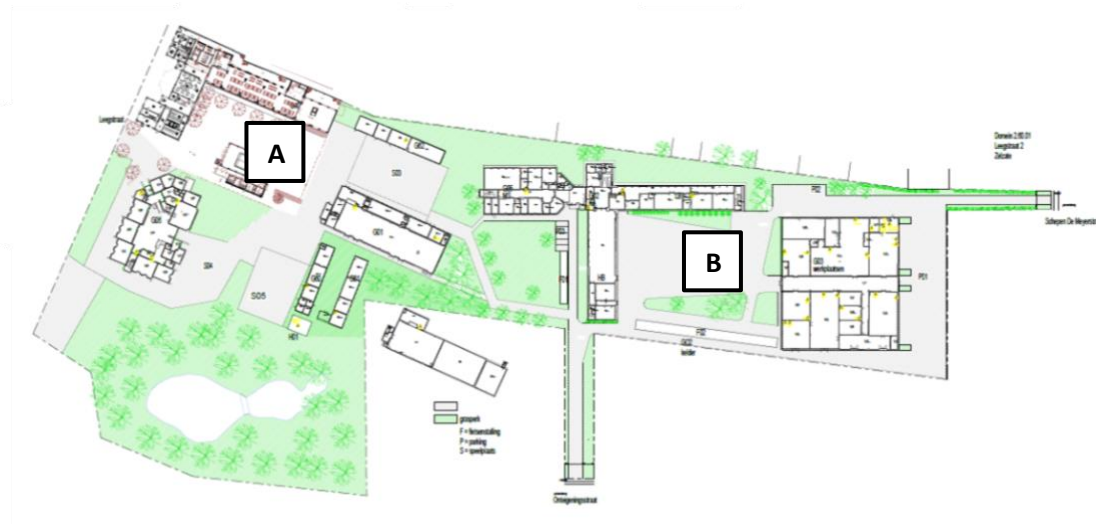


Figure 2. Ground plan of A) the playground of 'BS de Reigers' and B) playground of GO! Atheneum

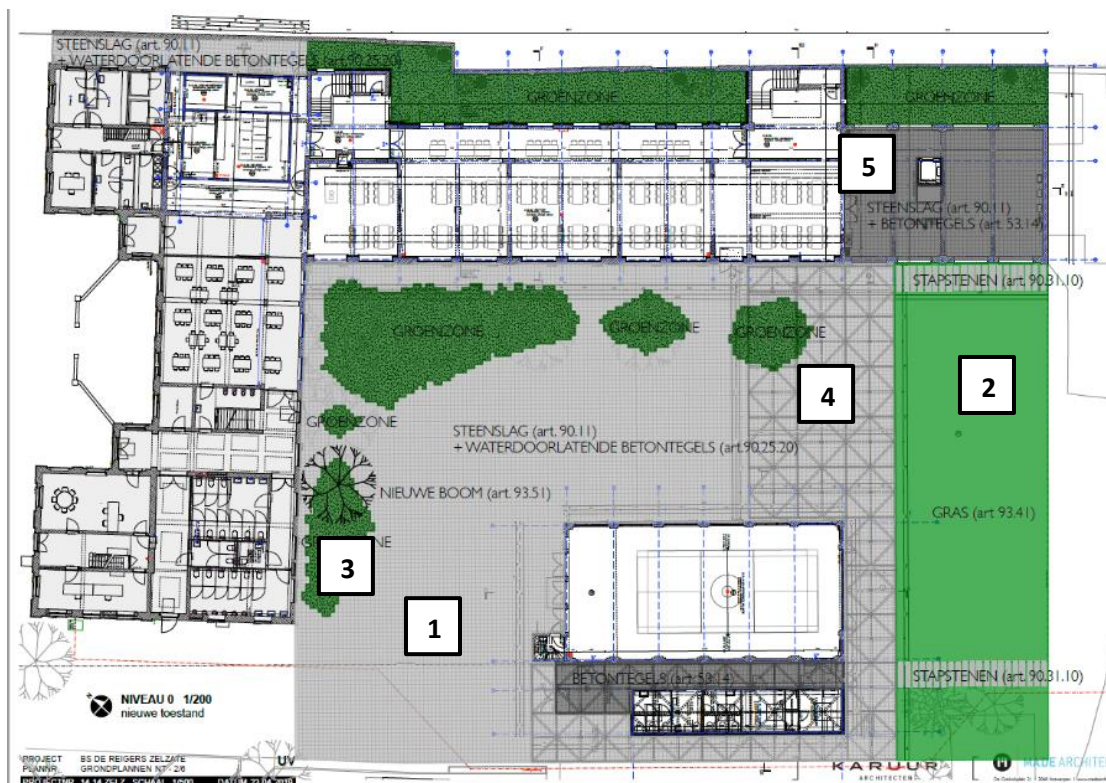


Figure 3. Ground plan of the playground of 'BS de Reigers' with the interventions: permeable slabs (1), grass turf planting mats (2) planting an additional lime tree (*Tilia* spp.) (3), installing an awning with a green roof (4) and installing a green wall (5).

The Decision-making Journey

Large areas of hard surface contribute to heat stress, which in turn negatively affects the health and wellbeing of the local environment, children and teachers. To address this renovation was carried out involving the removal of hard surfaces and redundant features. The East Flanders Cool Towns scientific team of visited the playground and conducted heat stress measurements during summer, so the precise locations suffering most from heat stress could be identified. This enabled plans to be made to remove 35% of the paving slabs from the playground and replacing these with a mix of water permeable paving (1132.89m²) grass turf (560 m²), adding an additional lime tree (*Tilia* spp.) (figure 1 & 3). Installing an awning with a green roof (456.55 m²) provides shade for a large part of the playground (figure 4). It had been intended to install a green wall (54.47 m²) with the school logo incorporated but this was not possible as the predicted maintenance costs were too high (figure 4).



Figure 4. Left: Illustration of the green wall on the school building. Top right: side view of the awning from the playground. Bottom right: top view of the awning with a green roof.

Implementation: problems encountered

- **Logistical:** the playgrounds were not all accessible at the same time due to refurbishment works and the organisation of the building site.
- **Delays:** a combination of technical renovation problems in the buildings, unforeseeable weather, and COVID-19 restrictions the timing of the installation of the green wall was delayed by around 6 months.
- **Financial:** due to financial restrictions the school was not able to afford the yearly maintenance costs of the green wall, so this project was abandoned. A damaged sewer system was found beneath the Go Atheneum playground creating additional costs that had not been budgeted for, so removal of hard surface in this area had to be abandoned (figure 2).

Indicative costs: please note that costs have been rounded and, while accurate at the time of implementation, can only be used as an indication of cost.

Capital Cost	€	£ 1 = € 1.19
Removing excess earth (10.4m ³)	260	218
Laying grass turf mats (5604m ²)	2,240	1,881
Planting a lime tree	600	504
Installing water permeable paving (1132.89 m ²)	52,962	44,488
Installing the awning construction and the green roof (456.55 m ²)	14,381	12,080
Total	70,443	59,172

Maintenance Costs	€	£ 1 = € 1.19
Grass areas	To be determined	
Lime tree	420	352
Permeable paving	To be determined	
Green roof	To be determined	

Green Wall Capital Cost	€	£ 1 = € 1.19
GreenTechStyle Alu montage frame	2,700	2,268
GreenTechStyle textile	8,500	7,140
GreenTechStyle plants	8,500	7,140
Watering unit	8,000	6,720
Total	27,500	23,100

Green wall Maintenance Costs (recommended)	€	£ 1 = € 1.19
€80 per m ² per year using a mobile raised platform to access the wall 6 x per year, for replacement and trimming of the plants + clear drip + fertiliser	3,808	3,199
Green wall Maintenance Costs (minimum)	€	£ 1 = € 1.19
€61.5 per year (= clear drip + fertiliser) minimal maintenance without replacing any plants excl. aerial platform	479	402
€61.5 per year (= clear drip + fertiliser) minimal maintenance without replacing any plants incl. aerial platform (needed for this green wall)	784	659

Reflection: what went well/what could have gone better?

- The less concrete pavement there is, the more the rain can infiltrate the ground which helps avoid overheating and contributes to maintaining groundwater level.
- The shade from the awning helps to avoid overheating during the summer period.
- The process was time consuming due to COVID-19, financial restrictions, and changes in management priorities.
- As the site had a single owner no time was lost negotiating between owners.
- Due to higher maintenance costs than expected the green wall was cancelled in the last phase. Early communication and physical meetings with the partners involved could prevent this in future projects.
- Due to the building renovation works, other projects, such as the climate friendly playgrounds, have been postponed.

MEASURES OF (POTENTIAL) SUCCESS	EVIDENCE
Reduction in PET value (baseline vs result values, comparison with reference point)	Green roof/canopy: 21.5°C Hornbeam tree in hard surface: 17.6 °C Row of catalpa trees in grass: 12.5 °C
Size of the area (m ²) with improved heat resilience (the total area that benefits from the measures approximate this by using the same approach used for the initial estimation in the application form)	2149,44m ²
Number of daily users benefitting from the intervention (if relevant/available: are there specific times of day or the year when there is heavy use?)	800 people All pupils and teachers of the school
Co-benefits achieved (for example biodiversity, pollution reduction, economic benefits, influence on property value, long-term savings, aesthetic improvement, psychological impact, increased health and wellbeing)	Increases the well-being of pupils during breaks, especially after lunch, they make use of the shade provided by the green awning. The teachers on duty during the breaks also enjoy the greenery around the playground. “We notice an increase of outdoor activities, more pupils and teachers chose to eat outside, some teachers also include more outdoor activities because the awning provides the possibility to be in the shade even during the warmest period of the day”
Any other results observed	Educational purposes

Technical and financial specifications:

The permeable paving and the awning with the green roof

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The green wall

[Flexible eco systems: Green textile | Sioen CSR](#)

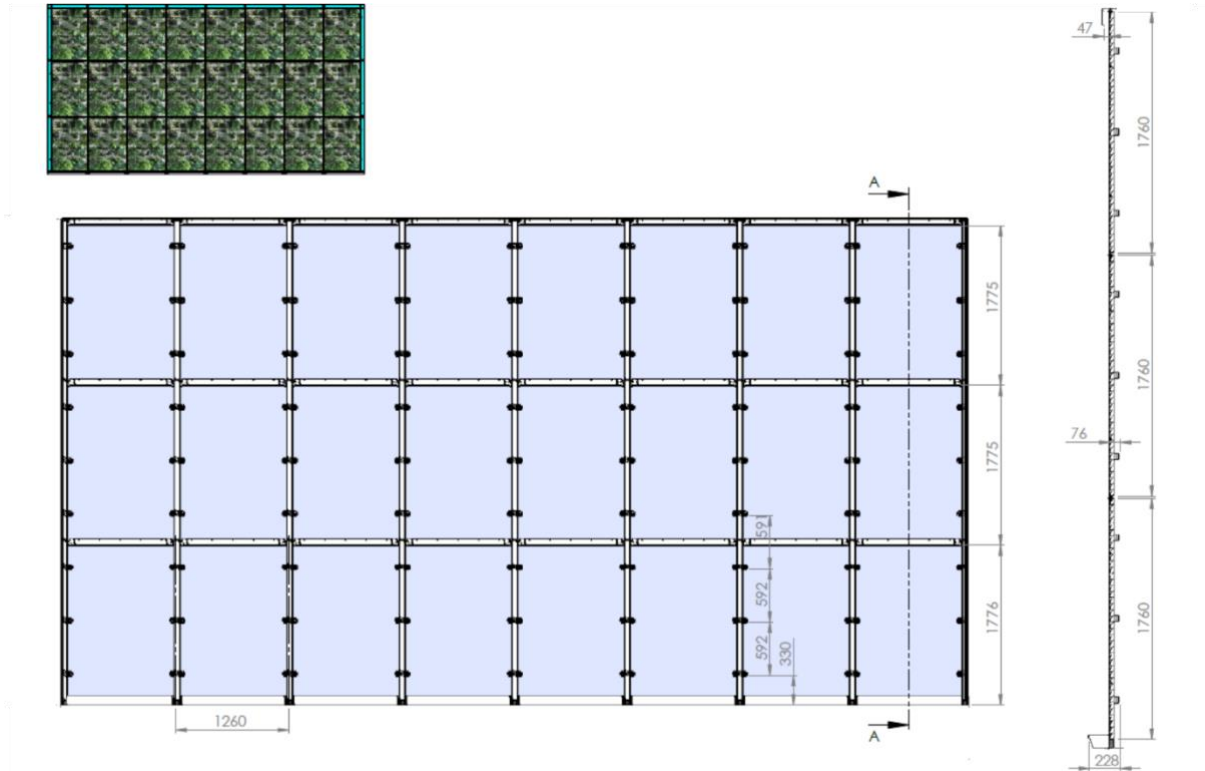


Fig 6. The green wall, detail of the construction.