HOE KAN WATER IN DE STAD BIJDRAGEN AAN VERKOELING?

REALCOOL | REALLY COOLING WATER BODIES IN CITIES

WAGENINGEN UNIVERSITY & RESEARCH

Amsterdam University of Applied Sciences

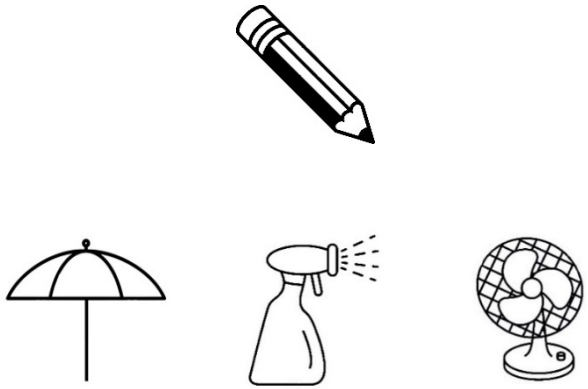
BACKGROUND

it has been assumed that urban water bodies necessarily have a cooling effect but, during warm summer periods, this cooling effect is limited over day and actually often originates night time warming

(Huang et al, 2006, Hathway and Sharples, 2012; Steeneveld et al., 2014; Heusinkveld et al., 2014, Theeuwes et al., 2013; van Hove et al., 2015)

OBJECTIVE

to create design prototypes of the most cooling combinations of shading, water vaporisation and ventilation around urban water bodies



PROTOTYPES

animated 3D scenes depicting layout and biometeorological effects / conceptual frameworks, not prescriptive tools

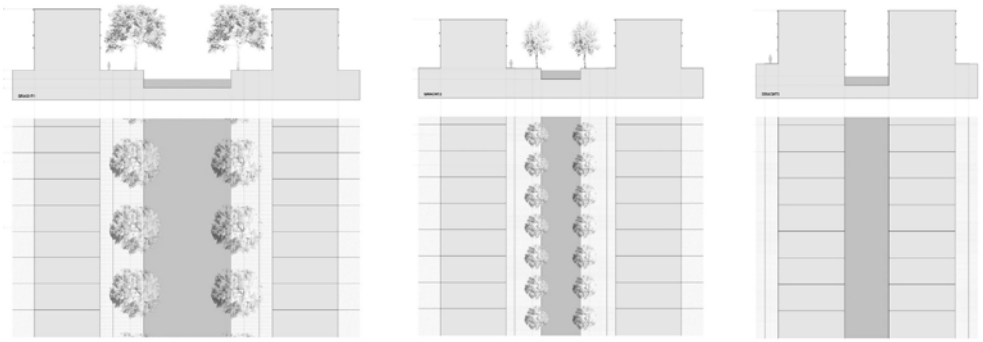
observe the animated scenes

select the design principles suitable to your project

combine the principles with the assignment and your design ‘signature’

DESIGN

experimenting with different combinations of shading, vaporisation and ventilation strategies around water



DESIGN

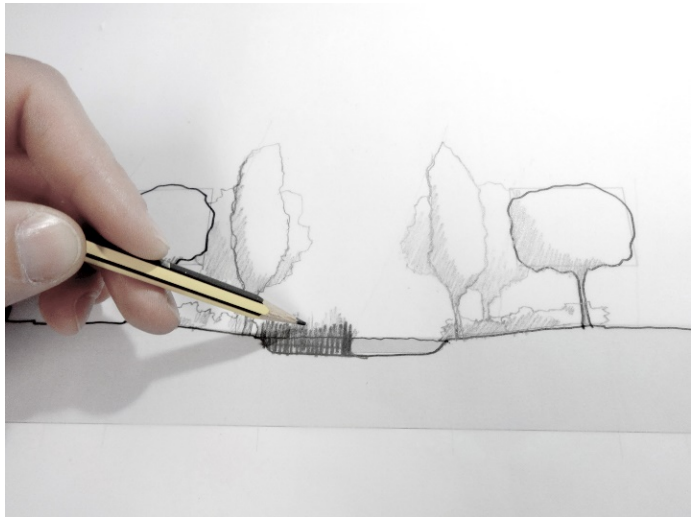
to reduce the thermal load placed upon people by increasing shading

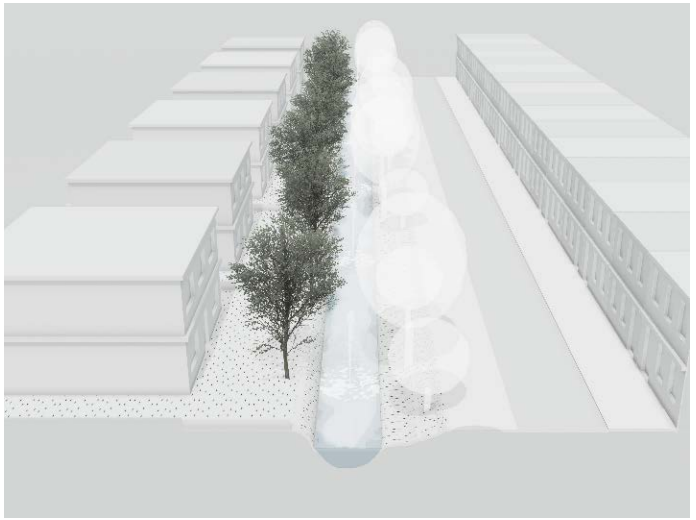
to cool the air through water vaporisation

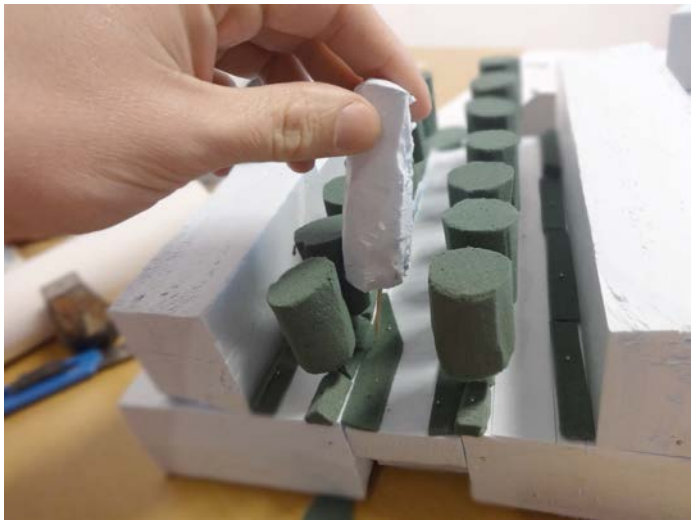
to stimulate cooling by wind

typical tropical day
(Tmax >= 30 °C) / 21st June / solar noon (1.40 p.m.)

DESIGN



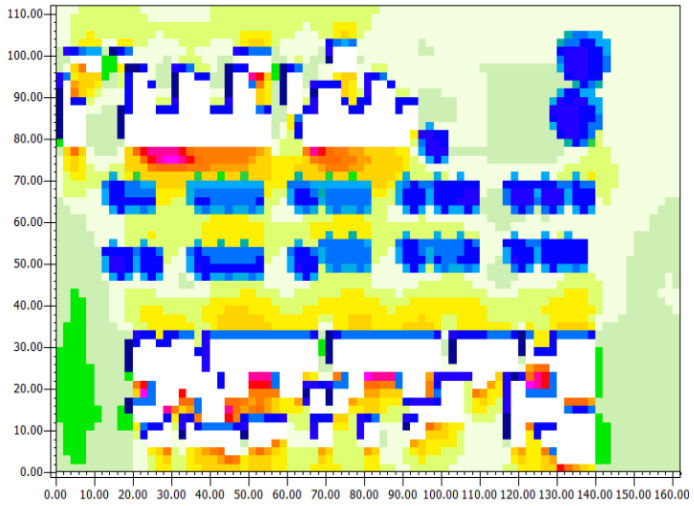




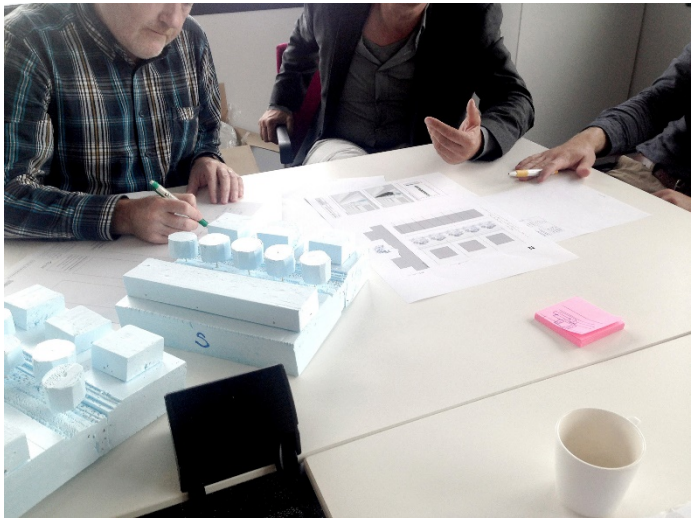

REALCOOL / DESIGN MATRIX
E-W
DESIGN STRATEGIES
SHADING
EVAPORATION
VENTILATION
AQUATIC PLANTS
VINES
MOSSES
GREEN WALLS
SHADING DEVICES
DESIGN ELEMENTS

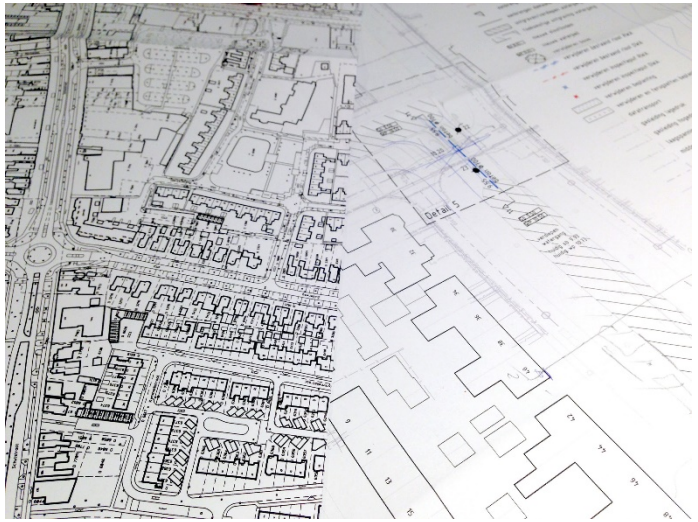
TEST

testing the design experiments on cooling effects and common practice criteria



TEST





CONCLUSIONS

1. little can be done through design to achieve cool small urban water bodies

2. urban design can create cooler urban water environments: lower PET (1-7 °C at 15h) or redistribute heat

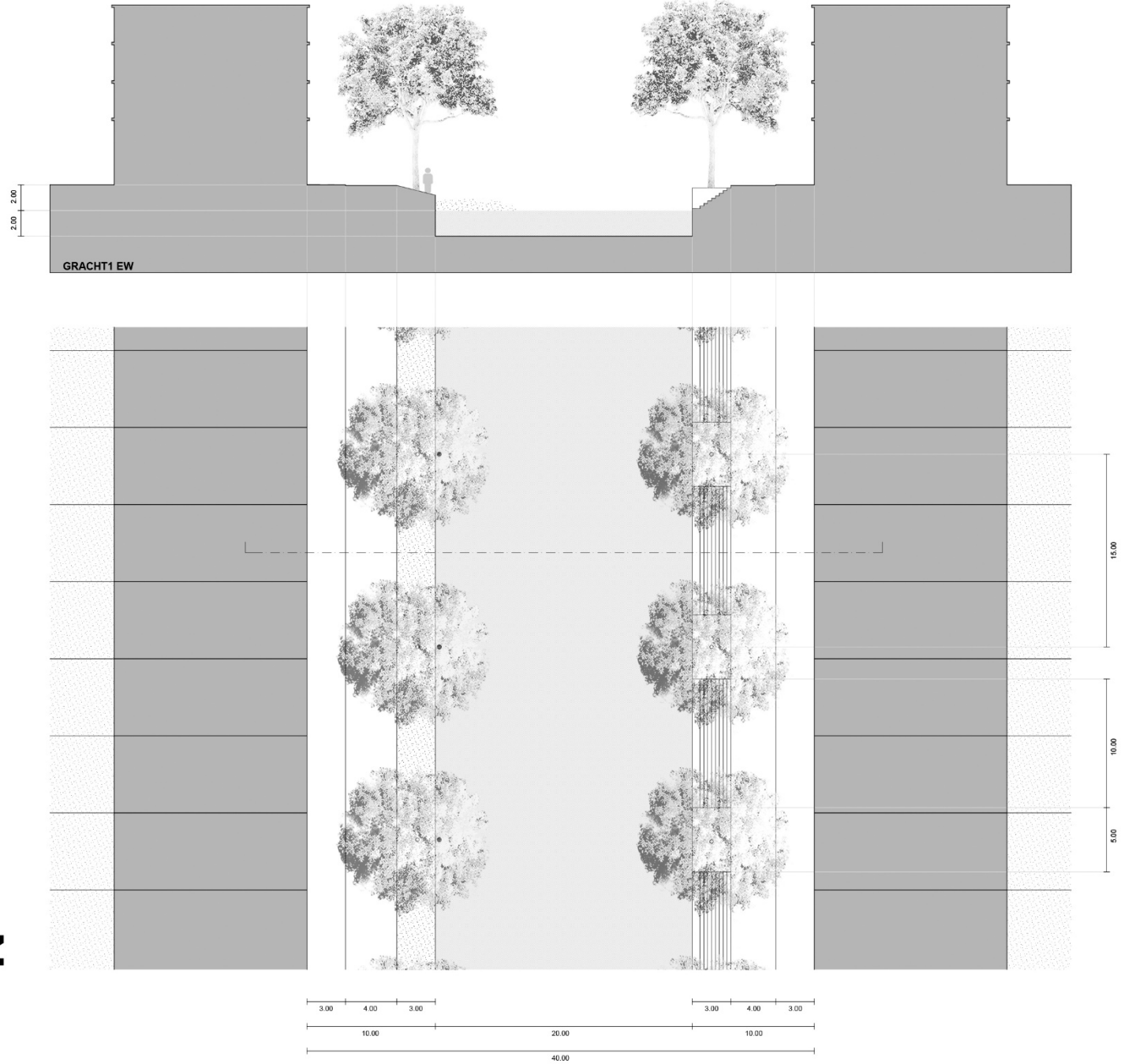
   2.1. shading is the most important factor (tree heights above 10 m)

   2.2. openness allows cooling by wind

   2.3. evaporating water through fountains (4 m high) and sprays has a maximum local cooling effect of 0.5 °C

the prototypes in practice

aesthetics
functionality
costs
maintenance
health effects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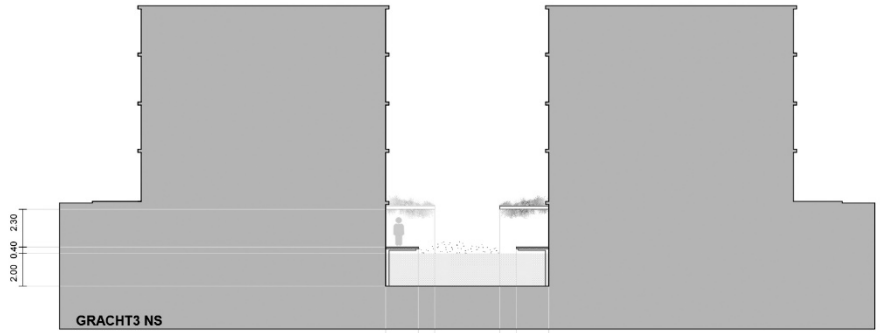
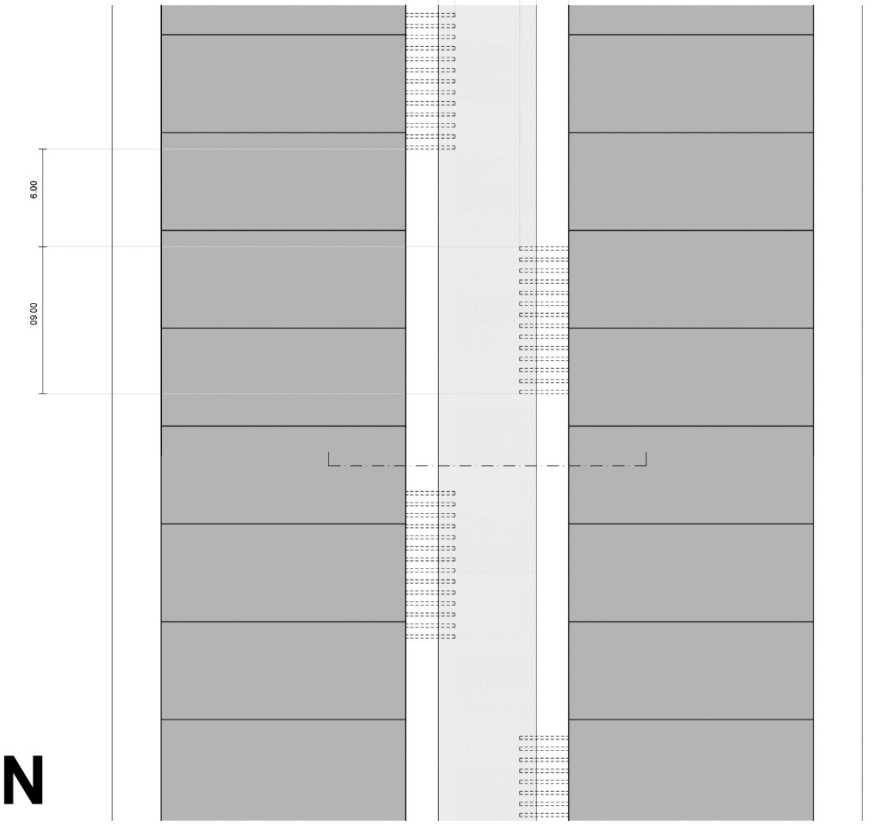
how well does this work
in practice?





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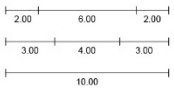


how well does this work
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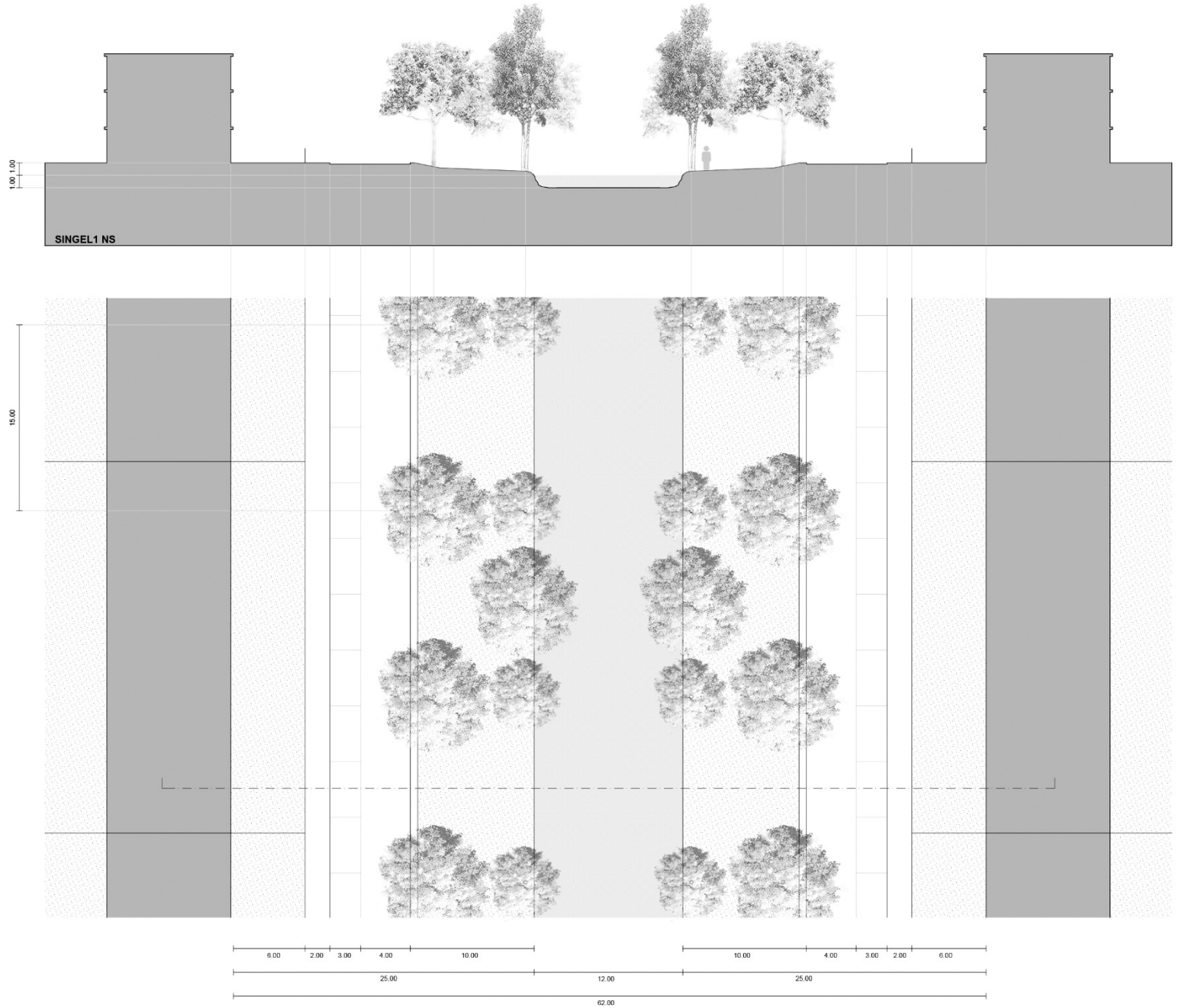
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how well does this work
in practice?