NATURE-BASED SOLUTIONS TO ESTABLISH A NET-POSITIVE URBAN WATER CYCLE IN AN OPEN BUILDING NEIGHBOURHOOD HYBRID

APPENDIX II

Appendix A: Open Building Zoning

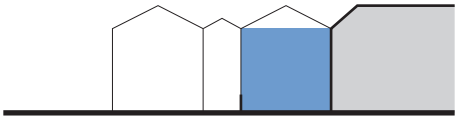
OPEN BUILDING ZONING

α-zone	area within the dwelling adjacent to the facade; its size is derived from specific living areas such as bedrooms
β-zone	area within the dwelling not adjacent to the facade; its dimensions are tailored to usage areas such as bathroom, shower, etc.
δ-zone	area outside the dwelling, adjacent to the facade; for private use such as balconies, loggias etc.
γ-zone	area inside or outside; for public circulation

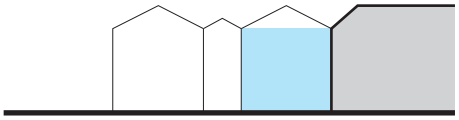
P	private area, not adjacent to the facade	**O**	public area, not adjacent to the facade
αP	private area, adjacent to built form; relationship with interior	**αO**	public area, adjacent to built form; relationship with interior
βP	private area, adjacent to built form; no relationship with interior	**βO**	public area, adjacent to built form; no relationship with interior
δP	private area, outside dwelling; used for balconies, loggias etc.	**δO**	public area, outside dwelling; used for balconies, loggias etc.
γP	area inside or outside; for private circulation	**γO**	area inside or outside; for public circulation

O αP PRIVATE

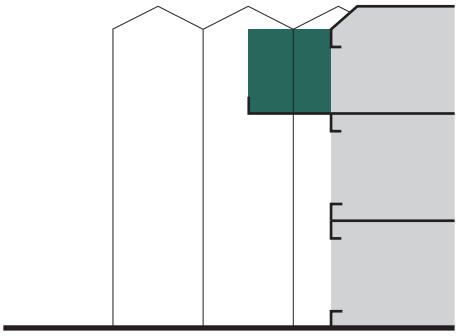
O αO PRIVATE



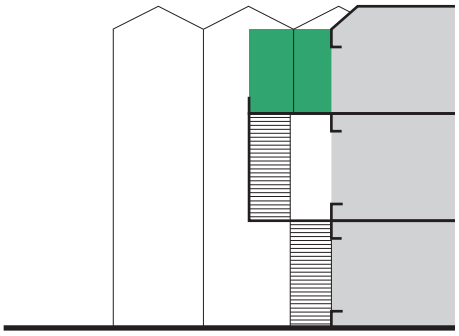
O βP PRIVATE



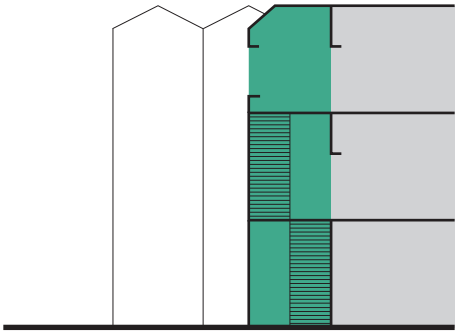
O βO PRIVATE



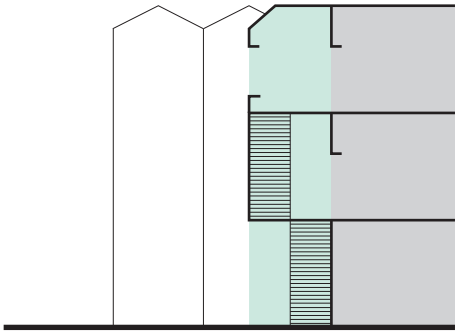
O δP PRIVATE



O δO PRIVATE



O γP PRIVATE



O γO PRIVATE

Appendix A: Excel bestand

OPEN BUILDING & NATURE-BASED SOLUTIONS

	MEASURES	INTERRELATION											SPATIAL IMPACT													
		WATERCHAIN				WATERSYSTEM									URBAN TISSUE						SUPPORT				INFILL	
															PUBLIC					PRIVATE	PUBLIC				PRIVATE	
		drinking water	Waste water	Greywater	Blackwater	Rainwater	Stormwater	Surfacewater	Groundwater	Soil	TECHNICAL	BIODIVERSITY	m2/IE	SUBSURFACE	O	βO	αO	βP	αP	P	γO	δO	γP	δP	α	β
✓	Above ground Drainage (gutters)					✓	✓	✓			✓															
✗	Adopting areas under trees and small plots of green											✓														
–	Bidet																									
✓	Bioswale/ bioretention cell					✓	✓	✓	✓	✓	✓	✓														
✓	Connection of biotopes to the outlying areas + green-blue grids					✓	✓	✓	✓	✓	✓	✓														
✓	Cooling extraction		✓	✓	✓	✓	✓	✓	✓		✓															
✓	Decentralised treatment	✓	✓	✓	✓			✓			✓															
✓	Ditches					✓	✓	✓	✓	✓		✓														
✓	Diver							✓		✓	✓															
✓	Downspout Disconnection					✓	✓		✓	✓	✓															
✗	Dry stone walls					✓					✓	✓														
–	Facilities for birds and other fauna on and around buildings										✓	✓														
–	Flexible water level management					✓	✓	✓	✓	✓																
✓	Floating or amphibious areas					✓	✓	✓			✓															
✓	(facade) Gardens					✓			✓	✓		✓														
✓	Grass fields + flower meadows					✓			✓	✓		✓														
–	Gravel layers and reserve drainage					✓	✓		✓	✓	✓															
✓	Green Riparian zones + wet biotopes							✓				✓														
✓	Green Roofs					✓			✓		✓	✓														
✗	Green Streets, Alleys + traffic lines					✓	✓		✓	✓		✓														
✓	Green Verges					✓	✓		✓	✓		✓														
✗	Green water squares					✓		✓	✓	✓	✓	✓														
✓	Heat extraction	✓	✓	✓	✓	✓		✓	✓		✓															
✓	Hedge biotopes/ natural hedges					✓			✓	✓		✓														
✓	Helophyte filter		✓	✓		✓		✓	✓	✓		✓														
✗	Helophyte filter (horizontal)		✓	✓		✓		✓	✓	✓		✓														
✗	Helophyte filter (vertical)		✓	✓		✓		✓	✓	✓		✓	2,5-5													
✗	Helophyte filter (vertical aerated)		✓	✓		✓		✓	✓	✓		✓	0,5-1													
✗	Infiltration boxes and infiltration drains/ wells					✓	✓		✓	✓	✓															
✗	Infiltration meadows and infiltration strips with above ground storage					✓		✓	✓	✓		✓														
–	Membrane filtration	✓	✓	✓	✓						✓															
✓	Parks + public greenery					✓			✓	✓		✓														
✓	Participation + Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
✓	Permeable Pavements (scoria semi)					✓	✓		✓	✓	✓															
✓	Pipes	✓	✓	✓	✓	✓	✓	✓			✓															
✓	Pump station (distribution household water)	✓				✓		✓	✓		✓															
✓	Rainwater harvesting	✓				✓		✓	✓		✓															
✓	Rainwater ponds (clean incl. rinsewater)					✓		✓	✓	✓		✓														
✗	Rainwater ponds (buffering and purification moderately polluted)					✓		✓	✓	✓		✓														
✓	Rainwater ponds (buffering and purification extremely polluted)					✓	✓	✓	✓	✓	✓	✓														
✓	Rainwater storage below buildings					✓				✓	✓															
✗	Rainwater tanks (regenton)					✓					✓															
✓	Sand filter		✓	✓		✓		✓	✓	✓		✓														
✓	Seasonal storage extra surface area					✓		✓	✓	✓																
✓	Seasonal storage extra storage height					✓		✓	✓	✓																
✓	Separate sewer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
–	Toilet compost/ dry	✓	✓		✓						✓															
✓	Toilet urine diverting	✓	✓		✓						✓															
✓	Toilet vacuum	✓	✓		✓						✓															
✓	Trees (Urban Tree Canopy)					✓			✓	✓		✓														
✗	Urban infiltration strips (planter boxes)					✓	✓		✓	✓	✓	✓														
✓	Urban water channels					✓	✓	✓			✓															
✓	Water roofs					✓		✓			✓															
✗	Water squares					✓		✓	✓	✓	✓															

Appendix B: Lunetten

LUNETTEN | UTRECHT | 1981 - 1982
NEIGHBOURHOOD |
CA. 262 DWELLINGS

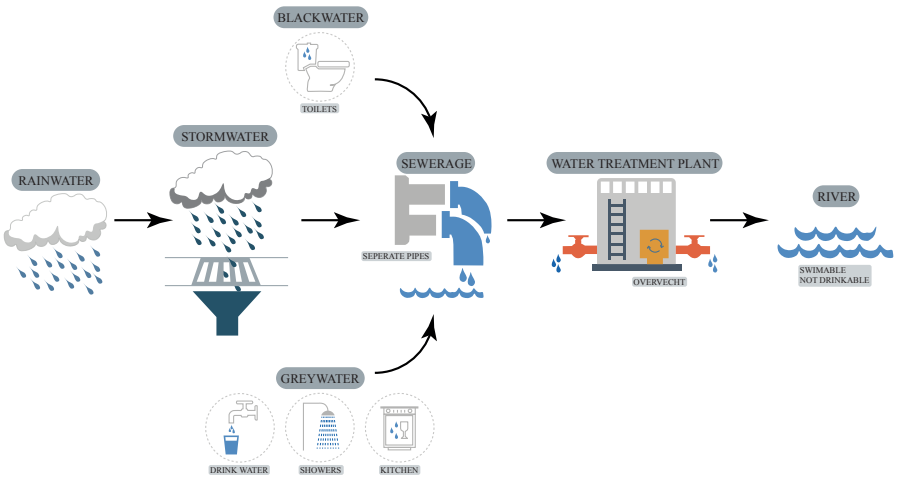
COMBINED SEWER SYSTEM

- Combined sewer system
- ‘fort‘ canals
- Urban water channels (canals)
  in connection to ‘Kromme Rijn’

OPEN BUILDING

- Open building project in the south-west of city Utrecht
- Low rise density base building of Lunetten project include flats, duplexes and row houses in 15 dwelling types
- ‘urban tissue’ is fitted out with neutral ‘supports’ for which each resident chooses their own ‘infill’
- Integration of a support structure in a larger urban tissue

source:
www.lunetten.nl
www.omgevingsvisie.utrecht.nl



source:
own image

PRINCIPLES LUNETTEN:

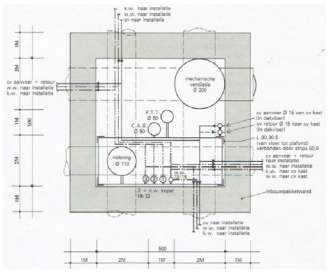
- Joint venture by nine housing associations
- Established along framework put forth by SAR (Stichting Architecten Research)
- Urban tissue is fitted out with neutral ‘supports’ for which each resident chooses infill
- Collective decision making throughout entire building process

x - unfortunately sustainability and more specific the usage of water and nature-based solutions was not thought of much at the time

source:
http://www.architectureguide.nl/project/item/prj_id/609
http://www.vdwerf.nl/lunetten.html

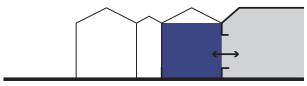
This Open Building project has been built in the center area of ‘Lunetten’, a new district in the south-west of the city of Utrecht, the Netherlands. It includes 262 dwellings, 173 rooms and 360m2 office space. The urban tissue of the project was a follow up of the ‘Molenvliet’ tissue model in Papendrecht: a high density low-rise fabric around front and back courtyards. But Here in Utrecht the model has been applied in new way: not on one area, but on different locations, mixed with other projects: a shopping center, a community center, a school and a housing center for elderly. Access galleries of the last link directly with our housing blocs B and C so that elevators of the elderly can be used by disabled occupants of our project. Different architects worked together to realize this urban fabric.

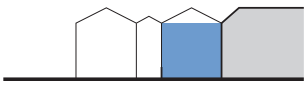
source:
http://thematicdesign.org/open-building-experience-2-lunetten-4d-utrecht-the-netherlands-1981-82/

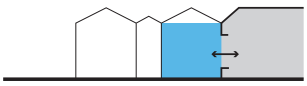


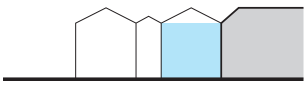
Appendix B: Lunetten

LUNETTEN | UTRECHT | 1981 - 1982





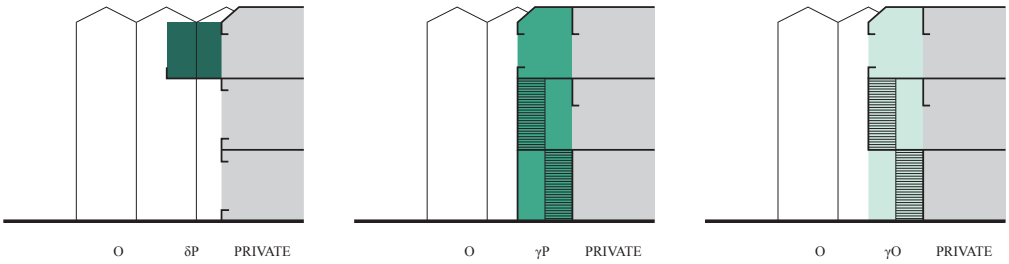


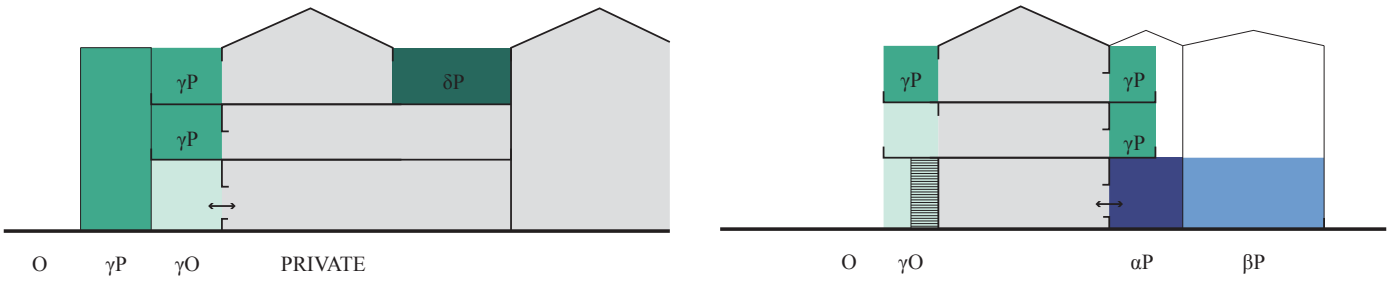


	MEASURES	INTERRELATION WATERCHAIN				WATERSYSTEM						SPATIAL IMPACT		urban tissue PUBLIC → PRIVATE						support PUBLIC				infill PRIVATE	
		drinking water	Waste water	Greywater	Blackwater	Rainwater	Stormwater	Surfacewater	Groundwater	Soil	TECHNICAL	BIODIVERSITY	m2/IE	Subsurface	O	βO	αO	βP	αP	P	γO	δO	γP	δP	α	β
✓	Downspout Disconnection					✓	✓		✓	✓	✓															
✓	(facade) Gardens					✓			✓	✓		✓														
✓	Grass fields + flower meadows					✓			✓	✓		✓														
✓	Green Verges					✓	✓		✓	✓		✓														
✓	Hedge biotopes/ natural hedges					✓			✓	✓		✓														
✓	Parks + public greenery					✓			✓	✓		✓														
✓	Participation + Education										✓															
✓	Pipes	✓	✓	✓	✓	✓					✓															
✓	Trees (Urban Tree Canopy)					✓			✓	✓	✓	✓														
✓	Urban water channels					✓	✓	✓			✓															

Appendix B: Lunetten

LUNETTEN | UTRECHT | 1981 - 1982





	MEASURES	INTERRELATION WATERCHAIN				WATERSYSTEM						SPATIAL IMPACT		urban tissue PUBLIC → PRIVATE						support PUBLIC				infill PRIVATE	
		drinking water	Waste water	Greywater	Blackwater	Rainwater	Stormwater	Surfacewater	Groundwater	Soil	TECHNICAL	BIODIVERSITY	m2/IE	Subsurface	O	βO	αO	βP	αP	P	γO	δO	γP	δP	α	β
✓	Downspout Disconnection					✓	✓		✓	✓	✓						■	■	■		■		■	■		
✓	(facade) Gardens					✓			✓	✓		✓					■	■	■							
✓	Grass fields + flower meadows					✓			✓	✓		✓			■											
✓	Green Verges					✓	✓		✓	✓		✓			■											
✓	Hedge biotopes/ natural hedges					✓			✓	✓		✓			■			■	■							
✓	Parks + public greenery					✓			✓	✓		✓			■			■								
✓	Participation + Education										✓															
✓	Pipes	✓	✓	✓	✓	✓					✓			■			■	■	■		■	■	■	■		
✓	Trees (Urban Tree Canopy)					✓			✓	✓	✓	✓			■				■							
✓	Urban water channels					✓	✓	✓			✓			■	■											

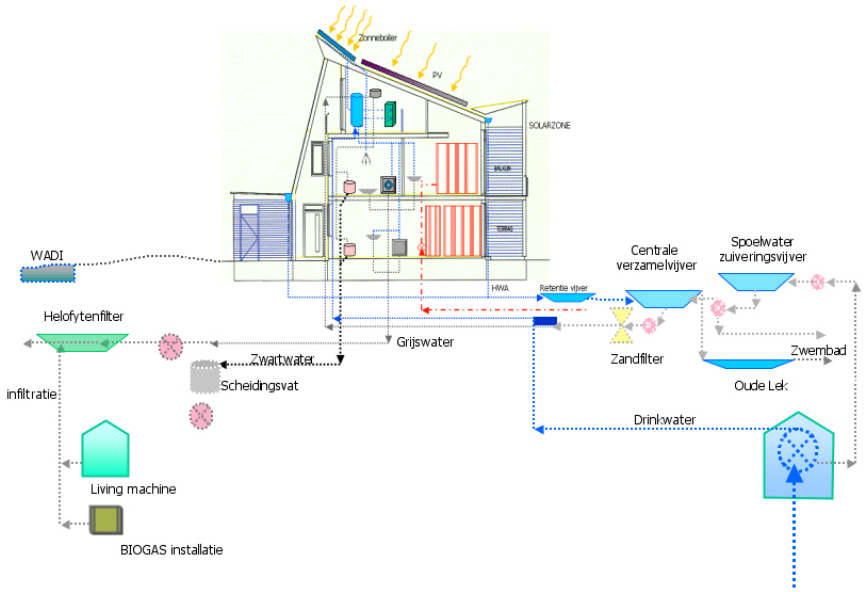
Appendix C: Eva lanxmeer

EVA LANXMEER | CULEMBORG | 1999 - 2010
NEIGHBOURHOOD | 24 HA
CA. 250 DWELLINGS

SEPARATE SEWER SYSTEM
WATER SYSTEM
WATER CHAIN
- local wastewater treatment

(PARTLY) OPEN BUILDING
- Common ownership
- Heatsource for collective heatgrid for heating dwellings (Thermo Bello)

DRINKING WATER
- Local extraction by Vitens through 4 groundwater sources
- double executed water supply
  - Primary for drinking water
  - Secondary for rinse water for toilet flushing



source:
http://www.eva-lanxmeer.nl/over/ontstaan/infrastructuur

PRINCIPLES EVA CONCEPT:
- Optimal connection of landscape elements and architecture
- Optimal embedding of sustainable water management and sustainable energy supply in the urban development plan
- Inventory of the 'Genius Loci': the existing qualities of the place that must be preserved and/or can be strengthened.
- Closing dust and energy cycles as much as possible and making natural cycles visible
- Bringing local and organic food production back to the experience of young and old

x - unfortunately not achieved to reuse rainwater from retention ponds for toilet flushing

In this district, living is combined with working, recreation, drinking water extraction and food production. It is a district with high ambitions in terms of cultural history, landscape, water, energy, use of building materials, mobility and resident participation in the development and management of the district. EVA-Lanxmeer has attracted a group of residents who appreciate using the offered space to develop and manage themselves. The district now has 300 households who work together, for example, in the communal garden of their courtyard, in the management of public green spaces, in car sharing, in the generation of sustainable energy and in the development of the Caetshage city farm.

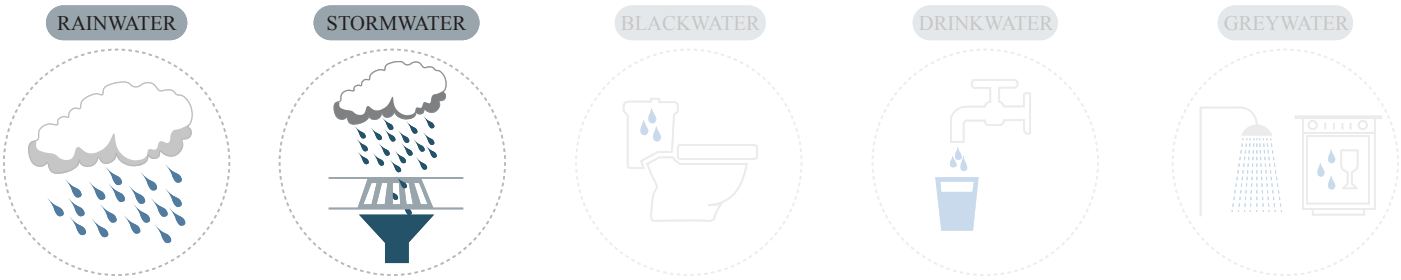
source:
http://www.eva-lanxmeer.nl/over/ontstaan/het-eva-concept & https://www.urbangreenbluegrids.com/projects/eva-lanxmeer-results/com/projects/eva-lanxmeer-results/




source:
http://www.eva-lanxmeer.nl/over/ontstaan/infrastructuur

Appendix C: Eva lanxmeer

EVA LANXMEER | CULEMBORG | 1999 - 2010
SEPERATE SYSTEM



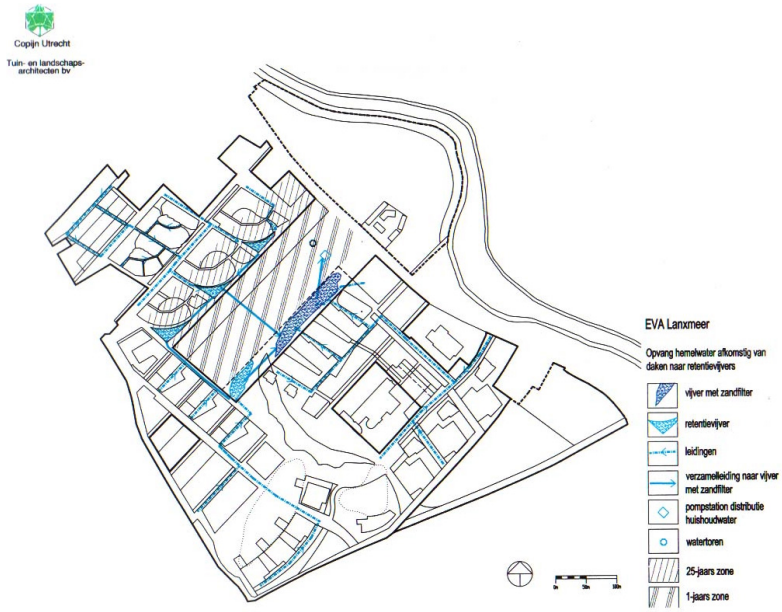
RAINWATER

- Harvested by roofs
- Closed Piping system leads water to **4 retention pools**

then to:

1 large infiltration pond with **sand filter**

- Rinse water from Vitens pumping installation is regularly released into pond to keep water moving (magnese + iron = additional benefit)
- Surplus water is discharged to **1 infiltration pond** (the 'Oude Lek')



source:
http://www.eva-lanxmeer.nl/over/ontstaan/infrastructuur

STORMWATER

- Streetwater is led away from water extraction site
- **Scoria semi-paving** for treatment and partial infiltration into soil
- **Gutters** lead streetwater to **Bioswales**
- Water infiltrates slowly into the ground

source:
http://www.eva-lanxmeer.nl/over/ontstaan/infrastructuur

Appendix C: Eva lanxmeer

EVA LANXMEER | CULEMBORG | 1999 - 2010

GREYWATER

- Greywater is led away from water extraction site
- Piping system leads water to **3 helophyte filters**

after filtering:
(nutrient rich) water infiltrates into **soil** + (nutrient rich) water is drained into adjacent water course

source:
http://www.eva-lanxmeer.nl/over/ontstaan/infrastructuur

BLACKWATER

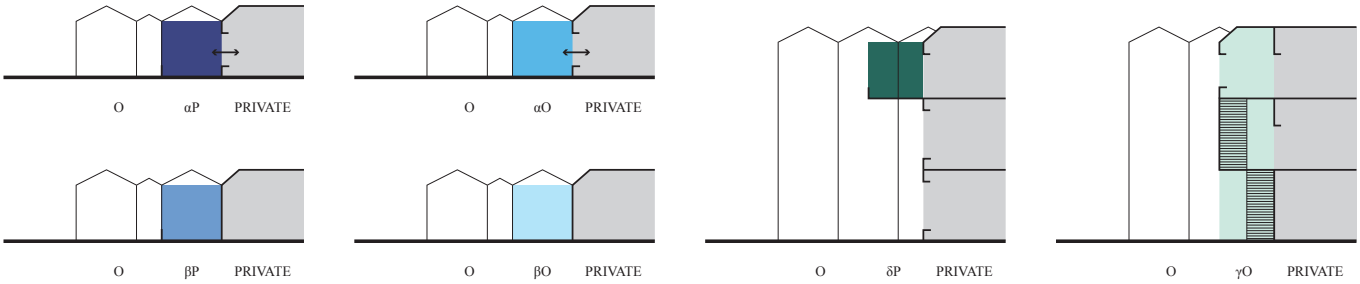
- Separate sewer system
- Blackwater is led away from water extraction site
- Piping system leads water to **sewer system**

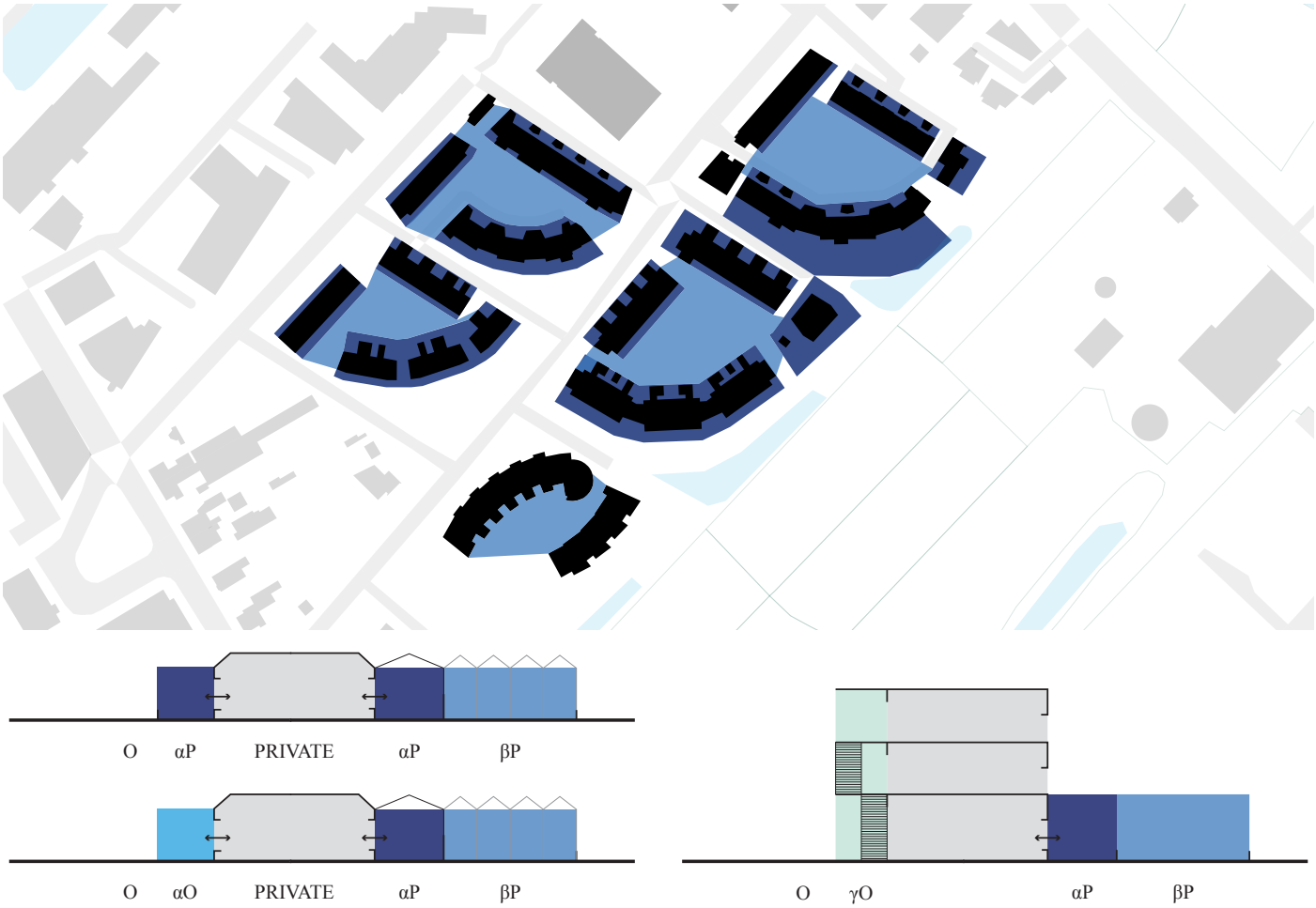
The original plan was to collect and reuse the blackwater and convert it together with green and garden waste in a biogas plant into usable energy. Due to Dutch legislation this has however not been realised.

source:
http://www.eva-lanxmeer.nl/over/ontstaan/infrastructuur

Appendix C: Eva lanxmeer

EVA LANXMEER | CULEMBORG | 1999 - 2010





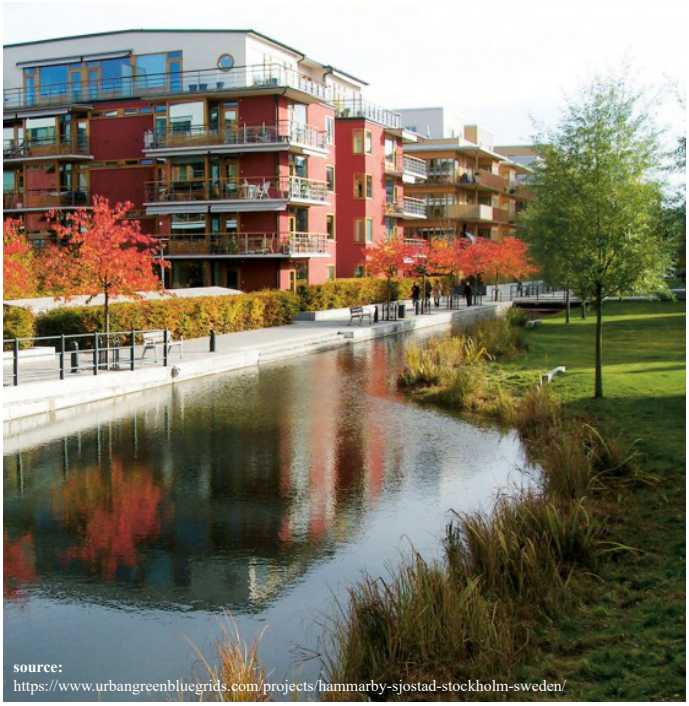
	MEASURES	INTERRELATION WATERCHAIN: drinking water	Waste water	Greywater	Blackwater	WATERSYSTEM: Rainwater	Storm water	Surfacewater	Groundwater	Soil	TECHNICAL	BIODIVERSITY	SPATIAL IMPACT: m2/IE	Subsurface	urban tissue PUBLIC: O	βO	αO	βP	αP	PRIVATE: P	support PUBLIC: γO	δO	γP	δP	infill: α	PRIVATE: β
✓	Above ground Drainage (gutters)						✓				✓															
✓	Bioswale/ bioretention cell					✓	✓	✓	✓	✓	✓	✓														
✓	Connection of biotopes to the outlying areas + green-blue grids					✓	✓	✓	✓	✓	✓	✓														
✓	Decentralised treatment	✓	✓	✓							✓															
✓	Ditches					✓	✓	✓	✓	✓		✓														
✓	Diver							✓		✓	✓															
✓	Downspout Disconnection					✓	✓			✓	✓															
✓	(facade) Gardens					✓				✓		✓														
✓	Grass fields + flower meadows					✓				✓		✓														
✓	Green Riparian zones + wet biotopes							✓				✓														
✓	Green Roofs					✓				✓	✓	✓														
✓	Green Verges					✓	✓			✓		✓														
✓	Heat extraction (stadsverwarmingssysteem)	✓								✓																
✓	Hedge biotopes/ natural hedges					✓				✓		✓														
✓	Helophyte filter		✓	✓		✓		✓		✓		✓														
✓	Parks + public greenery					✓				✓		✓														
✓	Participation + Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
✓	Permeable Pavements (scoria semi)					✓	✓			✓	✓															
✓	Pipes	✓	✓	✓	✓	✓	✓	✓			✓															
✓	Pump station (distribution household water)	✓				✓		✓	✓		✓															
✓	Rainwater harvesting (pipe system)	✓				✓		✓	✓		✓															
✓	Rainwater ponds (clean incl. rinsewater)					✓		✓	✓	✓		✓														
✓	Sand filter		✓	✓		✓		✓	✓	✓		✓														
✓	Seasonal storage extra surface area					✓		✓	✓	✓																
✓	Seasonal storage extra storage height					✓		✓	✓	✓																
✓	Separate sewer	✓	✓		✓	✓	✓	✓	✓	✓	✓															
✓	Trees (Urban Tree Canopy)					✓			✓	✓		✓														

Appendix D: Hammarby

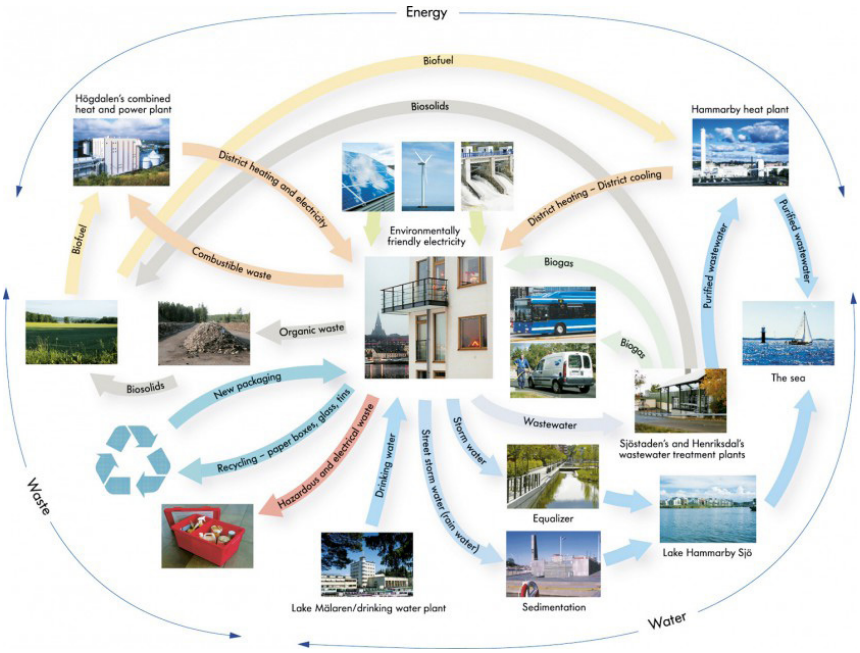
HAMMARBY | STOCKHOLM | 1990 - 2016
DISTRICT | 160 HA (200 INCL. WATER)

SEPARATE SEWER SYSTEM
WATER SYSTEM
WATER CHAIN
- Urban water channels (canals)
- Local wastewater treatment

(PARTLY) OPEN BUILDING
- Not intended as open building
- Open building spaces occur



source:
https://www.urbangreenbluegrids.com/projects/hammarby-sjostad-stockholm-sweden/



source:
https://www.urbangreenbluegrids.com/projects/hammarby-sjostad-stockholm-sweden/

PRINCIPLES HAMMARBY:
- Water related district
- Sustainability is primary focus: high ambitions are integrated into the planning process from the first phases.
- Wastewater is treated locally: the sludge produced by the treatment process is recycled and used for fertilising the farmland and forestry land.
- Biogas as by-product of waste processing: Biogas is used as fuel for vehicles such as buses, taxis and waste collection trucks. Also provides for heating 1000 homes in the area.

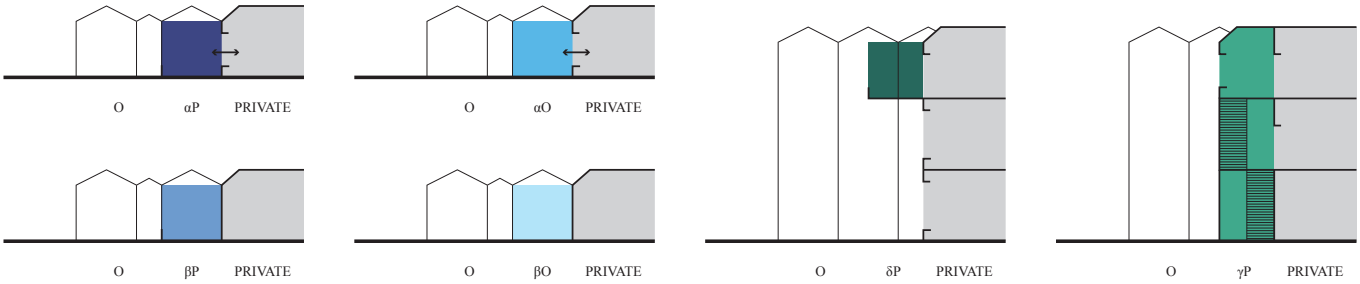
Sustainable alternatives for managing water, energy and waste are carefully studied at the level of architecture and infrastructure. For example, the electricity used comes from renewable sources. New types of fuel cells, solar cells and solar panels are being tested in the area. Heat is extracted from the treated water in the treatment plant, which is then used for district heating. With a spread in temperatures ranging between 10°C and 20°C over the whole year, the wastewater is highly suitable for both heat and cold extraction. In summer the cold water can be used for cooling.

source:
https://www.urbangreenbluegrids.com/projects/hammarby-sjostad-stockholm-sweden/

source:
https://www.urbangreenbluegrids.com

Appendix D: Hammarby

HAMMARBY | STOCKHOLM | 1990 - 2016



	MEASURES	INTERRELATION WATERCHAIN				WATERSYSTEM						SPATIAL IMPACT		urban tissue PUBLIC					PRIVATE	support PUBLIC				infill PRIVATE	
		drinking water	Waste water	Greywater	Blackwater	Rainwater	Stormwater	Surfacewater	Groundwater	Soil	TECHNICAL	BIODIVERSITY	m2/IE	Subsurface	O	βO	αO	βP	αP	P	γO	δO	γP	δP	α	β
✓	Above ground Drainage (gutters)					✓		✓			✓															
✓	Cooling extraction		✓	✓	✓						✓															
✓	Decentralised treatment		✓	✓	✓						✓															
✓	Downspout Disconnection					✓	✓		✓	✓	✓															
✓	Floating or amphibious areas					✓	✓	✓			✓															
✓	(facade) Gardens					✓			✓	✓		✓														
✓	Grass fields + flower meadows					✓			✓	✓		✓														
✓	Green Riparian zones + wet biotopes							✓				✓														
✓	Green Roofs					✓			✓		✓	✓														
✓	Green Streets, Alleys + traffic lines					✓	✓		✓	✓		✓														
✓	Green Verges					✓	✓		✓	✓		✓														
✓	Heat extraction (district heating system)		✓	✓	✓						✓															
✓	Hedge biotopes/ natural hedges					✓			✓	✓		✓														
✓	Parks + public greenery					✓			✓	✓		✓														
✓	Participation + Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
✓	Permeable Pavements (scoria semi)					✓	✓		✓	✓	✓															
✓	Pipes	✓	✓	✓	✓	✓					✓															
✓	Pump station (distribution household water)	✓				✓		✓			✓															
✓	Rainwater ponds (buffering and purification extremely polluted)					✓	✓	✓	✓	✓	✓	✓														
✓	Separate sewer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
✓	Trees (Urban Tree Canopy)					✓			✓	✓		✓														
✓	Urban water channels					✓	✓	✓			✓															

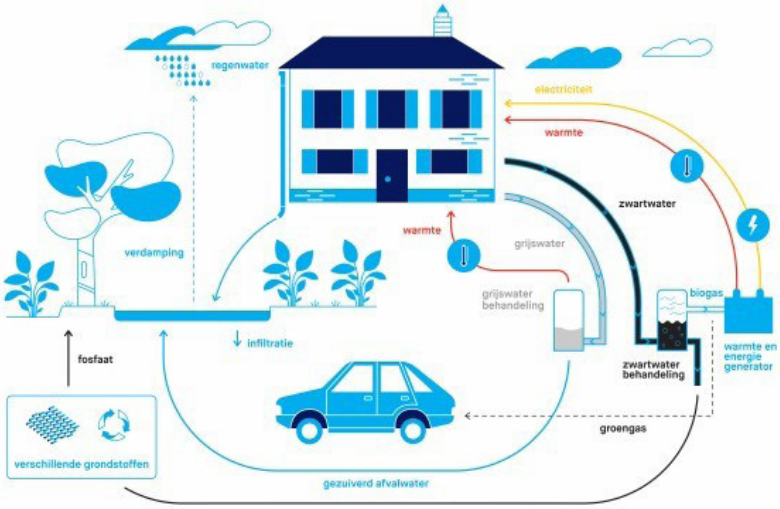
Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

BUIKSLOTERHAM | AMSTERDAM | 1990 - 2016
NEIGHBOURHOOD | CA. 35 HA


source:
https://www.openbuilding.co

SEPARATE SEWER SYSTEM
WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water
- Local wastewater treatment

OPEN BUILDING
- Collective decision making
- Open building structures & spaces
- Flexibility/ adaptability for future proofing
- Support & Infill
- (partly) wooden constructions



PRINCIPLES BUIKSLOTERHAM:
- Open Building structures
- Focus on flexible 'future proof' buildings
- Wastewater is collected separately: Separate sewer system combined with vacuum toilets.
- Reuse of wastewater: The sludge produced by the treatment process is (in some projects) recycled and used for fertilising allotments.
- 'Nieuwe sanitatie'

x - unfortunately not much attention to nature-based solutions at the urban tissue level.

source:
https://www.waternet.nl/werkzaamheden/nieuwe-sanitatie/

The area of Buiksloterham is located on the northern IJ bank. It is currently being redeveloped from an industrial area to a circular residential area. A maximum of 8,575 homes can be built in the area. In the 2020 investment memorandum, a vision was set out for Buiksloterham for the next 13 years. It concerns new-build homes - how many homes and for whom -, the space available for business, greenery and social facilities, and sustainability and reuse. In the investment memorandum it is shown how Buiksloterham can further develop into a pleasant living-working area.

source:
https://www.amsterdam.nl/projecten/buiksloterham/


source:
https://architectenweb.nl/

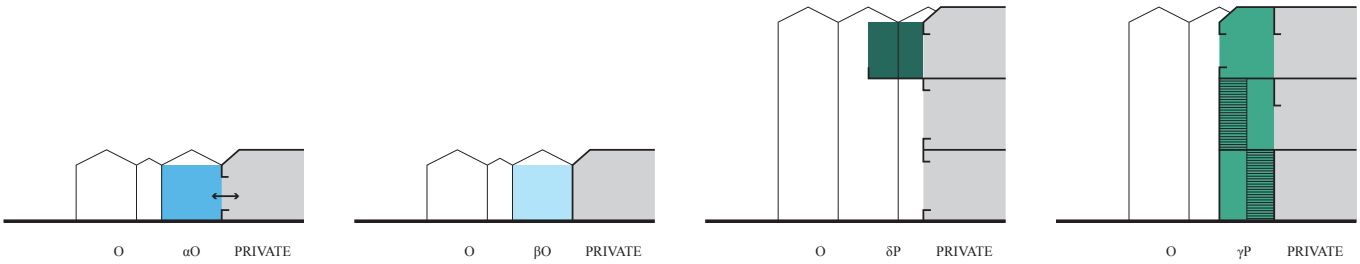

source:
https://patch22.nl/

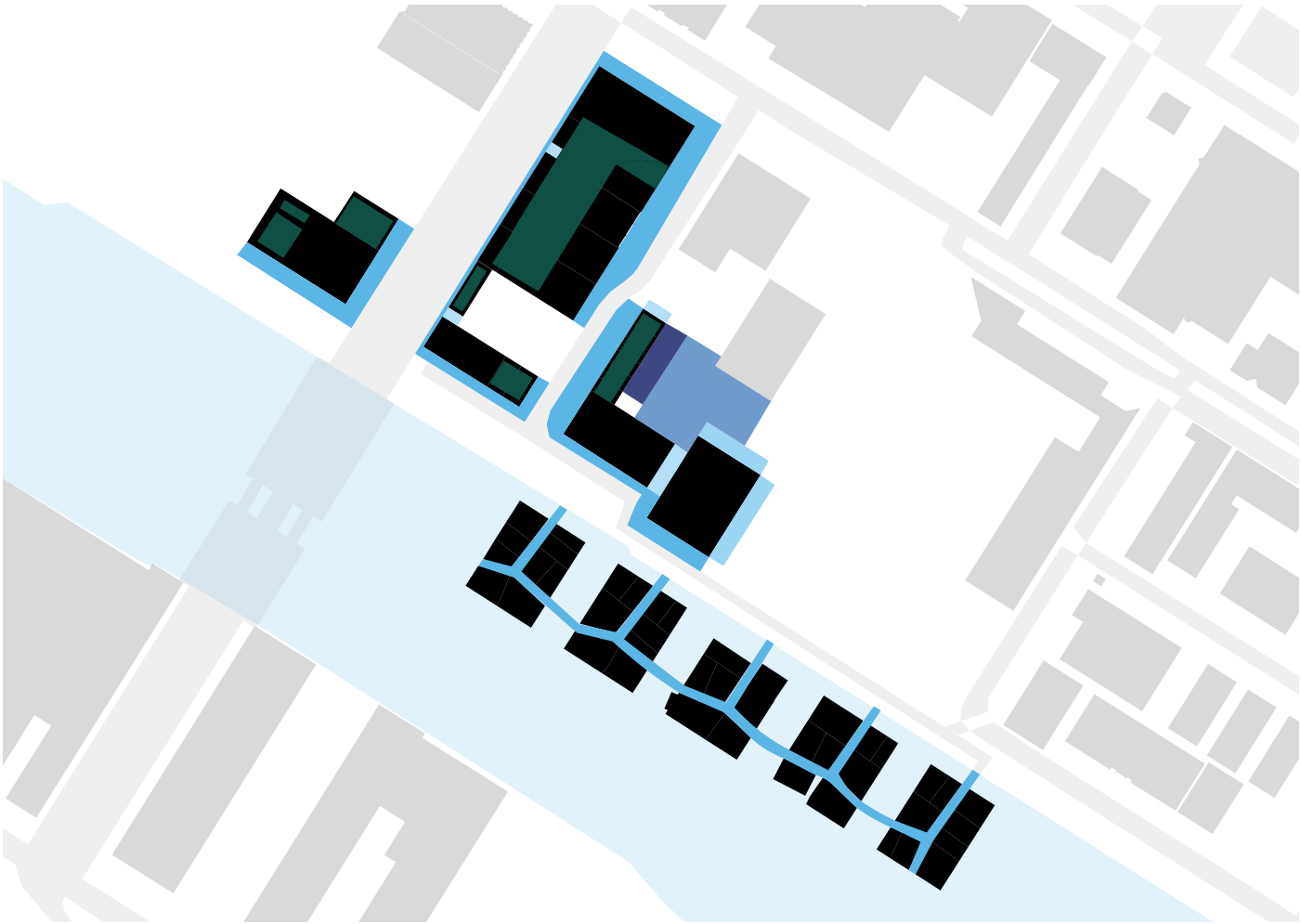

source:
https://schoonschipamsterdam.org/


source:
https://olafcipser.com/

Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

BUIKSLOTERHAM | AMSTERDAM | 1990 - 2016





	MEASURES	INTERRELATION WATERCHAIN				WATERSYSTEM						SPATIAL IMPACT		urban tissue PUBLIC					PRIVATE	support PUBLIC				infill PRIVATE	
		drinking water	Waste water	Greywater	Blackwater	Rainwater	Stormwater	Surfacewater	Groundwater	Soil	TECHNICAL	BIODIVERSITY	m2/IE	Subsurface	O	βO	αO	βP	αP	P	γO	δO	γP	δP	α	β
✓	Cooling extraction (Wko incl. surface water IJ)							✓			✓															
✓	Decentralised treatment (floating treatment plant)		✓		✓			✓			✓															
✓	Downspout Disconnection					✓	✓		✓	✓	✓															
✓	Floating or amphibious areas							✓			✓															
✓	Grass fields + flower meadows					✓			✓	✓		✓														
✓	Green Roofs					✓			✓		✓	✓														
✓	Heat extraction (Wko incl. district heating & waterroof + solar collectors)	✓				✓		✓	✓		✓															
✓	Hedge biotopes/ natural hedges					✓			✓	✓		✓														
✓	Participation + Education										✓															
✓	Pipes	✓	✓	✓	✓	✓					✓															
✓	Rainwater harvesting	✓				✓		✓	✓		✓															
✓	Rainwater storage below buildings					✓				✓	✓															
✓	Separate sewer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
✓	Toilet urine diverting	✓	✓		✓						✓															
✓	Toilet vacuum	✓	✓		✓						✓															
✓	Trees (Urban Tree Canopy)					✓			✓	✓		✓														
✓	Water roofs					✓		✓			✓															

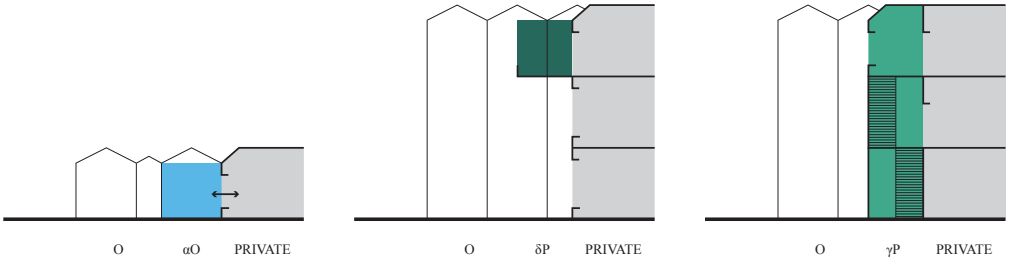
Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

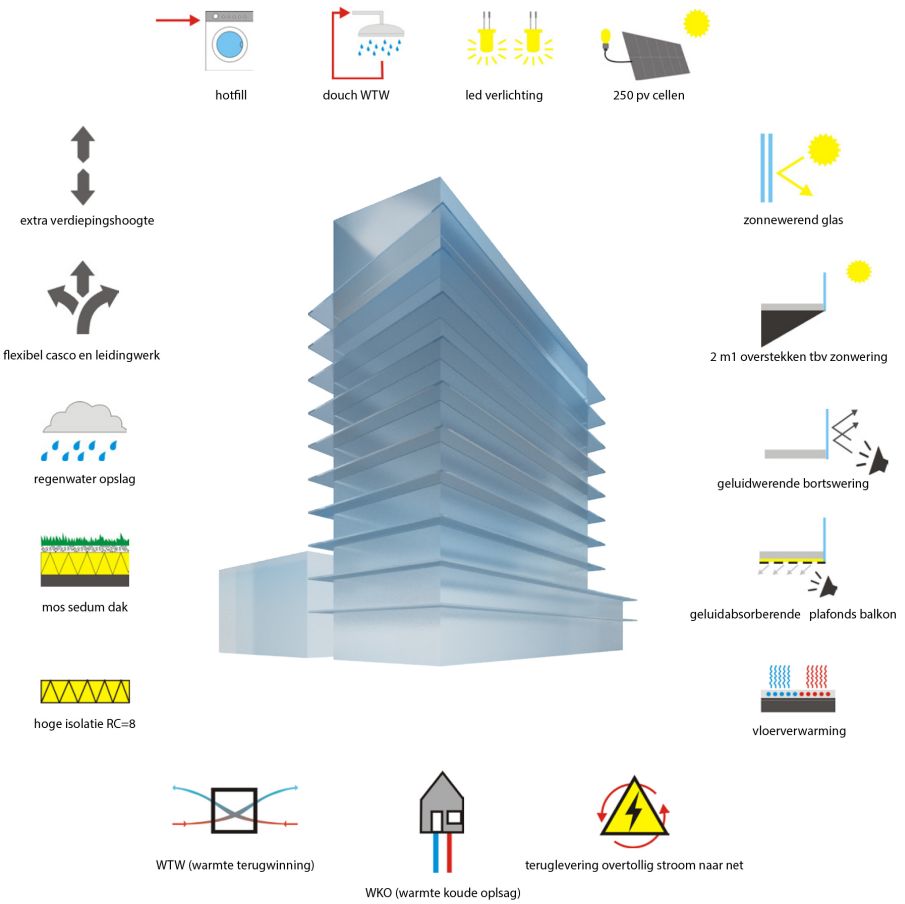
BLACKJACK | AMSTERDAM | 2016
BUILDING | 5000 M²
33 APARTMENTS | 14 COMMERCIAL UNITS

SEPARATE SEWER SYSTEM
WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water

OPEN BUILDING
- Collective decision making
- Open building structures & spaces
- Flexibility/ adaptability for future proofing
- Support & Infill


source:
https://ab101.nl/portfolio_page/black-jack-buiksloterham/

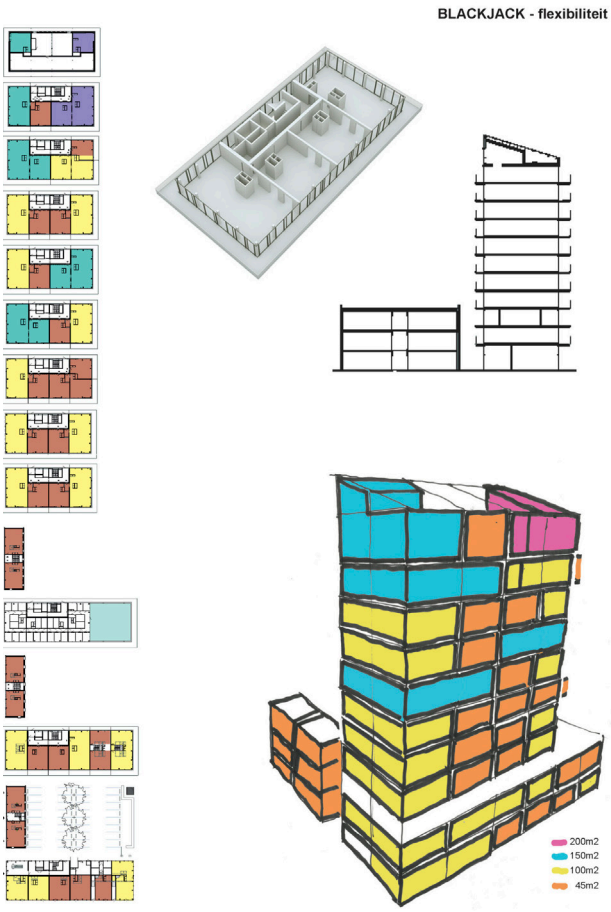




source:
https://www.b-n-b.nl/projects/blackjack/

PRINCIPLES BLACKJACK:
- Building is flexible and energy-neutral
- Maximum infill with solar panels
- Installation space with a collective air treatment unit linked to a heat pump with heat and cold storage in the ground
- Heat recovery shower channels and hotfill connections for dishwashers and washing machines
- Variation in appartments 50 - 150 m²
- Design, initiative and development:
  Dirk Jan van Wieringhen Borski (BNB Architects)
  Rene de Prie (BO6 Architects)

source:
http://thematicdesign.org/
https://www.b-n-b.nl/projects/blackjack/
https://architectenweb.nl/nieuws/artikel.aspx?ID=40892
https://ab101.nl/portfolio_page/black-jack-buiksloterham/



source:
http://thematicdesign.org/open-building-blackjack-an-energy-neutral-cooperative-development/

source:
https://ab101.nl/portfolio_page/black-jack-buiksloterham/

source:
https://ab101.nl/portfolio_page/black-jack-buiksloterham/

BLACKJACK:

BlackJack is an energy efficient eleven story high building with maximum glass, maximum light, maximum view, maximum size of balconies, extra inside height, maximum freedom in choosing the size, facade and layout of your own dwelling. A bright, sober and sturdy building designed with attention and care in the details. BlackJack is an exercise making an cost- and energy- efficient apartment building with maximum freedom, public participation and flexibility for house-owners, now and in the future.

To achieve this the carcass is made of prefab concrete columns and fontanel walls which makes it possible to combine or separate units very easy. The façade has a predetermined building system but the layout is determined by each buyer. Each floor has an over dimensioned amount of facilities like a fuse box, doorbell, underfloor heating unit, front door etc. In the upper layer of every floor there is an intelligent pipeline system installed making all imaginable layouts possible. These measures gives people the opportunity to choose their own size and layout of their dwelling. This makes it also possible to have an office at home with own entrance, merge, divide and change the use in the future.

The building consists of 80% residentials and 20% commercial units. All buyers, both private or business became member of the cooperative association. The cooperative is also the client.

With each owner individually we developed a tailor made design and floorplan. Hereby all houses are unique. The often free floorplans deviate from what is known as a standard in housing floorplan. This is not invented in advance but arose from the wishes of the clients and the unique opportunities that were possible.

Sustainability consists of more than technology and energy, but also of environment, flexibility, quality, health (light and air), excess, future value and social sustainability. A lot of attention has been paid to all these themes in BlackJack.

BlackJack is for everyone. There is a mixture of young and old, high income, low income, starters, elderly, singles, couples, from 24 to 68 and dwellings from 45m2 to 200m2. A group who became as a result of the progress, a close and social committed group.

source:
http://thematicdesign.org/open-building-blackjack-an-energy-neutral-cooperative-development/

Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

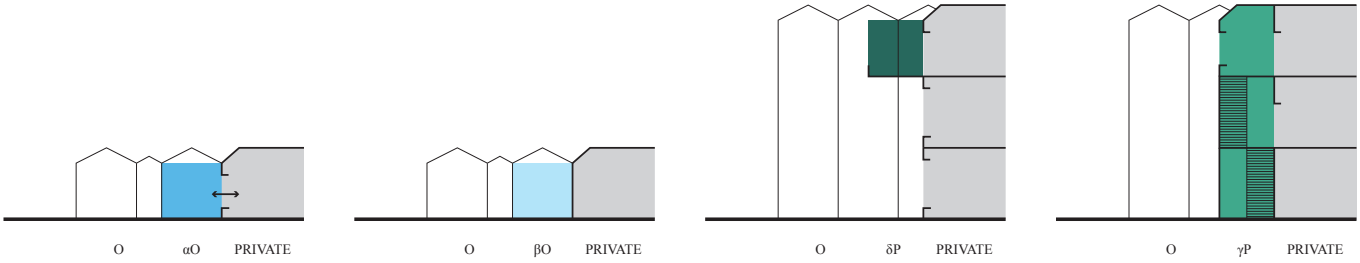
PATCH22 | AMSTERDAM | 2016
BUILDING | 5400 M²

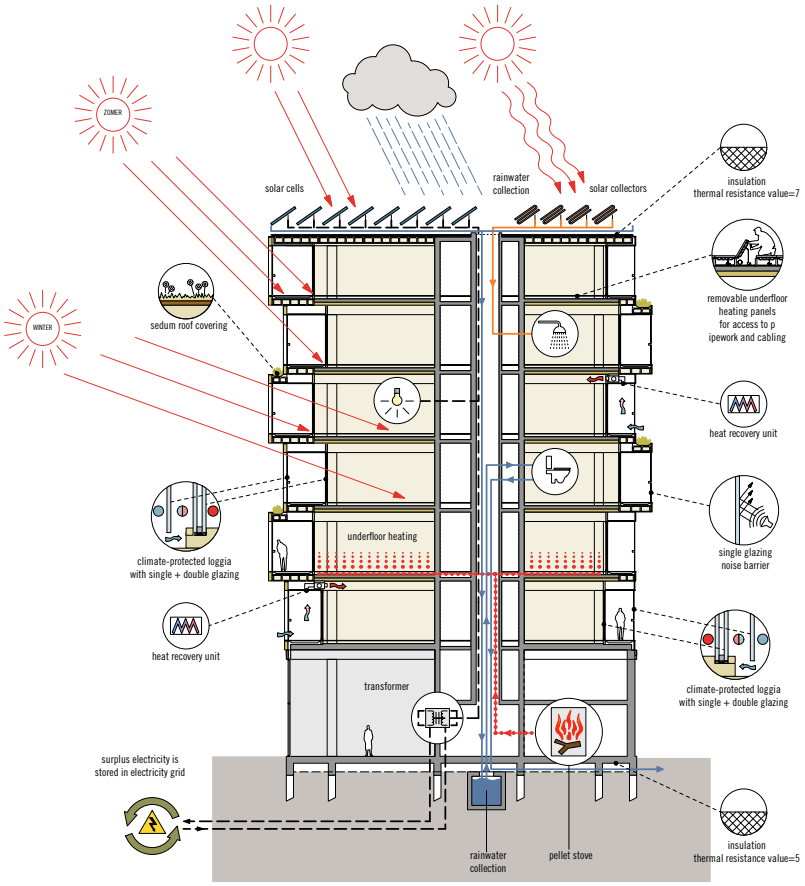
SEPARATE SEWER SYSTEM

WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water

OPEN BUILDING

- Collective decision making
- Open building structures & spaces
- High level of Flexibility/ adaptability for future proofing
- Support & Infill
- Mainly consists of wood



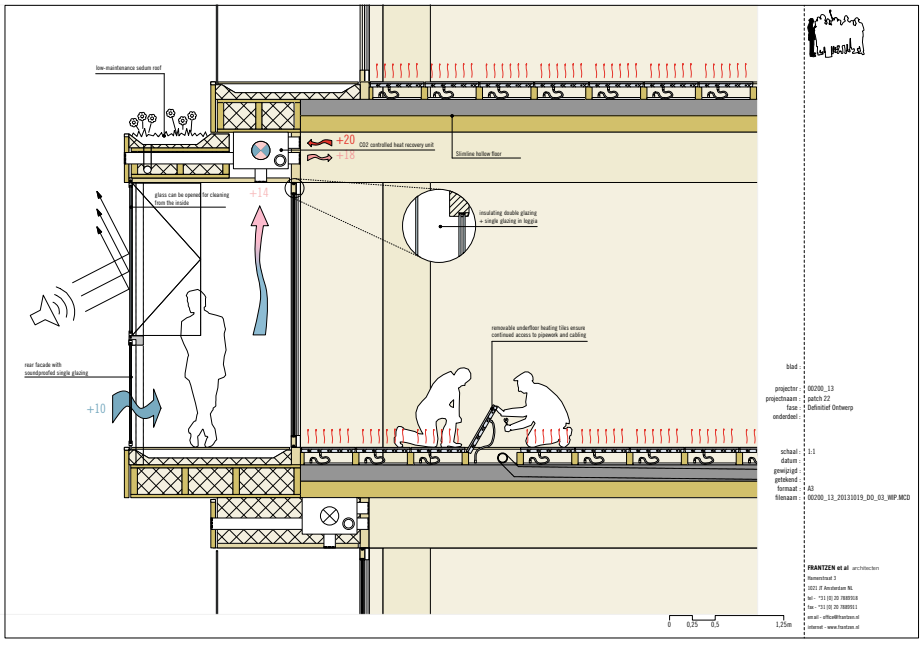


source:
http://patch22.nl/sustainability/#lifecycle

PRINCIPLES PATCH22:

- Building is flexible and energy-neutral
- Oversized wooden building
- Stacked villas
- High level of sustainability
- Piping and cabling horizontally to central shafts in the core
- Solar panels
- Rainwater is collected and reused in a greywater circuit: toilets are flushed with rainwater
- Heat accumulating loggias on the south and north facades
- Electronically controlled extraction of ventilation air based on CO^2 content and humidity; supply directly from the grills in the external facade.

source:
http://thematicdesign.org/open-building-patch22-a-highrise-in--wood/
http://patch22.nl/
https://lemniskade.nl/portfolio/



source:
http://patch22.nl/sustainability/#lifecycle

source:
http://patch22.nl/

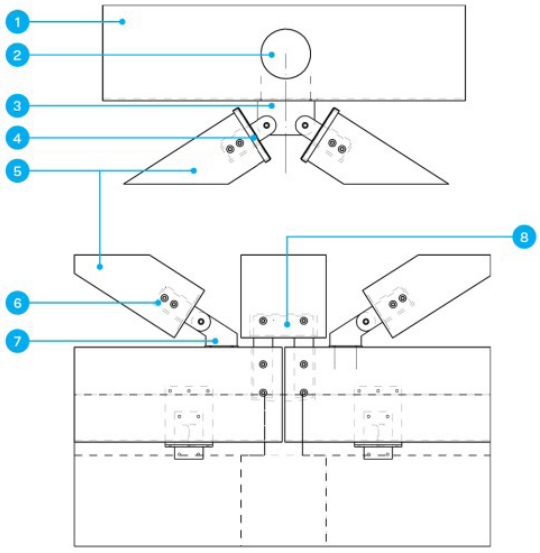
PATCH22:

PATCH22, a 30m tall high-rise in wood, was one of the successful plans in the Buiksloterham Sustainability Tender in 2009. The initiators, the architect Tom Frantzen and building-manager Claus Oussoren,founded Lemniskade Projects to achieve independently what they had never been able to manage when working on commissions for their previous clients: an outsized wooden building with a great degree of flexibility, striking architecture and a high level of sustainability, not because that was what was required but because that is what ought to be done.

The project was developed for their own account and risk in the middle of the crisis years of 2009-2014, and innovative financing solutions were conceived and implemented to meet this challenge. The project also incorporates numerous innovations in the technology used and application of technical rules, all aimed at achieving the desired flexibility without having to make compromises. Examples include the hollow floors and removable top floor, the lack of shafts in the apartments — achieved by having the piping and cabling taken horizontally to central shafts in the core — and agreements for a fixed ground lease with flexible positioning of the functions within the building. But the most unusual feature is the use of a wood as the main structure for the 30m-tall building. Moreover, the wood has largely been left visible, making this a key factor in the ambience of the apartments and the exterior.

source:
http://thematicdesign.org/open-building-patch22-a-highrise-in-wood/

source:
http://patch22.nl/



1. 20" × 8" glulam chord
2. Ø10" hole
3. Steel knife plate with two M16 bolts
4. Steel end cap
5. 12" × 8" glulam web member
6. Steel knife plate with two M12 bolts
7. Steel shoe with M16 bolt and eight M10 × 120mm screws
8. Steel knife plate with six M12 bolts

source:
https://www.architectmagazine.com/technology/detail/patch22s-timber-structure-faces-the-weather_o

Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

SCHOONSCHIP | AMSTERDAM | 2011
NEIGHBOURHOOD | 8500 M²
46 DWELLINGS (30 WATER PLOTS)

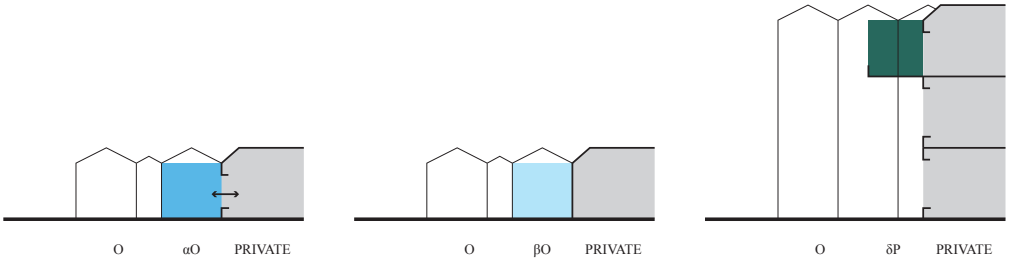
SEPARATE SEWER SYSTEM

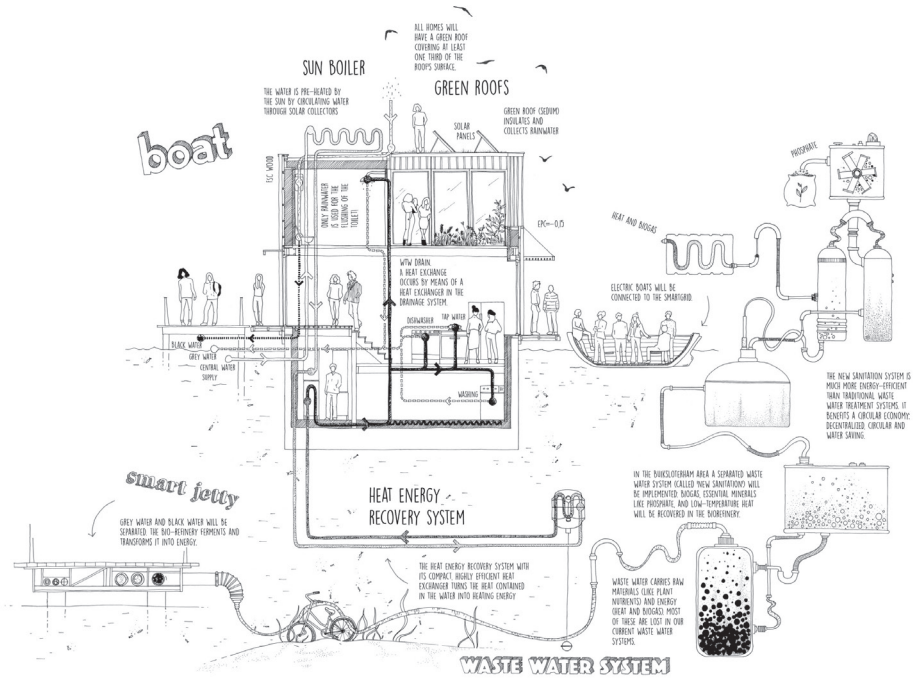
WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water
- Local wastewater treatment
- Move with the tide

OPEN BUILDING

- Collective decision making
- Open building structures & spaces
- (partly) wooden constructions

source:
https://www.newgenerationsweb.com/projects/schoonschip/



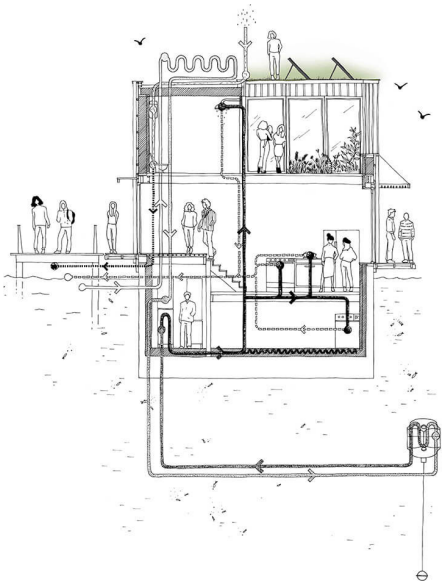


PRINCIPLES SCHOONSCHIP:

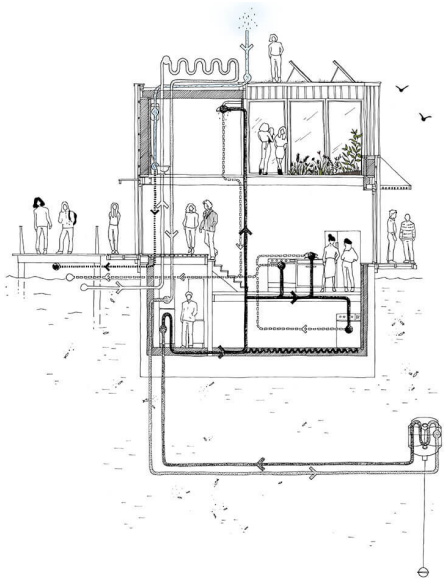
- Concrete floating structure as basis of every building
- Sustainable construction and other building materials and techniques have been used: Timber frame construction on top of concrete base. Most dwellings are finished with wooden cladding in combination with clear wooden window frames. (one dwelling is fitted with straw panels and finished with sprayed cork.
- Rainwater is collected and reused in a greywater circuit: showering is ideally been done by collected rainwater
- Green roofs make up one-third of the total roof surface
- 500 solar panels have been installed
- Own energy and heat generation (no connection to natural gas)
- Greenhouses and floating gardens provide for crops to be eaten by its residents

source:
http://www.spaceandmatter.nl/schoonschip

source:
https://greenprint.schoonschipamsterdam.org

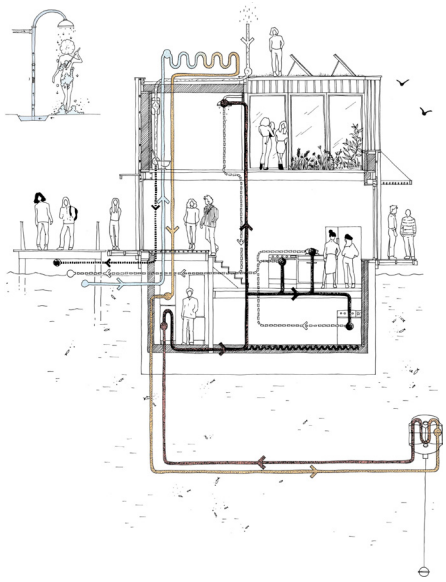


SEDUM ROOF
Each of our properties have a green roof covering at least a third of its surface. A sedum roof has a relatively thin substrate layer on which succulents (sedum), grasses and mosses can grow, which cause a delayed drainage of the rainwater. A second advantage of a sedum roof is that it has a positive effect on noise reduction and dust absorption. Schoonschip combines its sedum roofs with solar panels, which increases the solar panels' efficiency as this combination provides natural cooling.

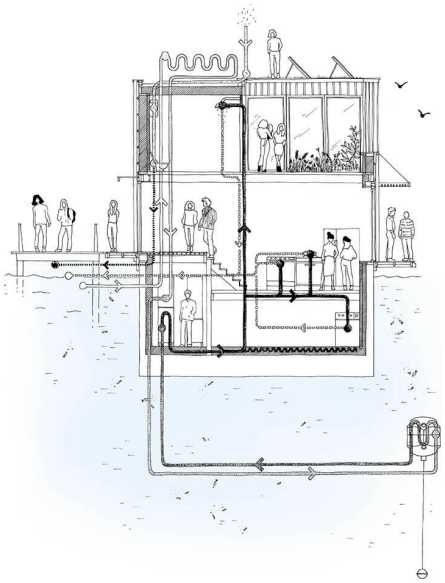


RAINWATER COLLECTION
A few of our houseboats (not all of them, see Lessons Learned: Rainwater Collection) have a water tank or barrel to collect the rainwater in, which is used to flush toilets and water plants.)

VACUUM TOILETS
All of our properties are equipped with vacuum toilets. You will probably have seen them on planes, in which case you will recognise the distinctive sucking sound they make when flushed. One of the major advantages to the vacuum toilet is that it only uses 1.5 litres of water per flush.

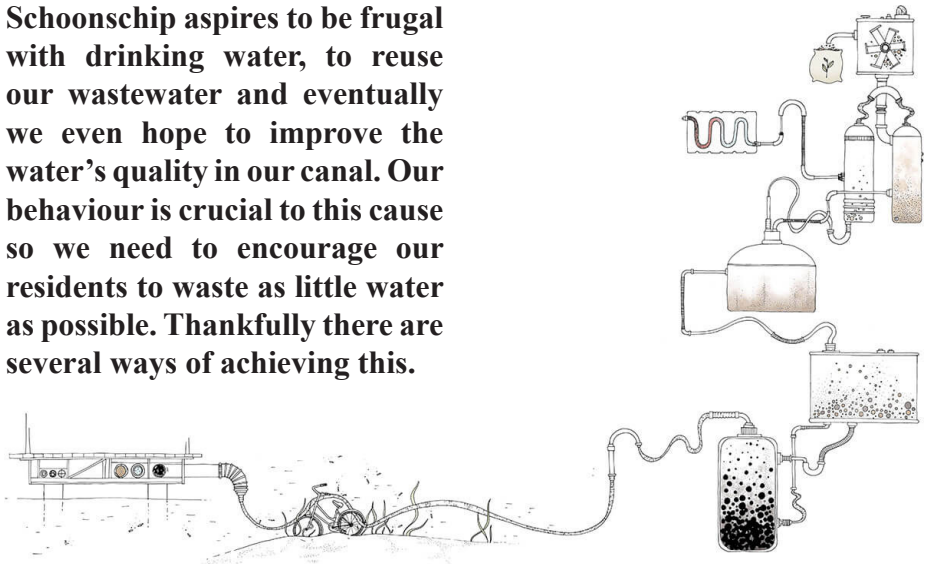


WATER EFFICIENT SHOWERS
Many of us have chosen to install a shower containing a recirculation system, so large families and those of us who simply enjoy a long shower can still manage to save water. It starts the same way a regular shower would work, with the wastewater simply drained away. After a while however, thanks to its ingenious and hygienic system, the recirculation shower will start pumping the water through a closed circuit, drastically reducing the water usage. Not only does this save up to 90% in water, but it also reduces the energy consumption by approximately 80%. Incidentally, all of our households' showers contain a heat recovery system.



CANAL WATER
Naturally, we did consider how we could put our canal water to use, but as it's brackish water we had to discard that option unfortunately. Our canal (the Johan van Hasselt Canal) branches off the IJ River, which in turn is directly connected to the sea, making the water in our canal saltier than fresh water which if used domestically would cause a number of issues, one of which being the corrosion of our water pipes.

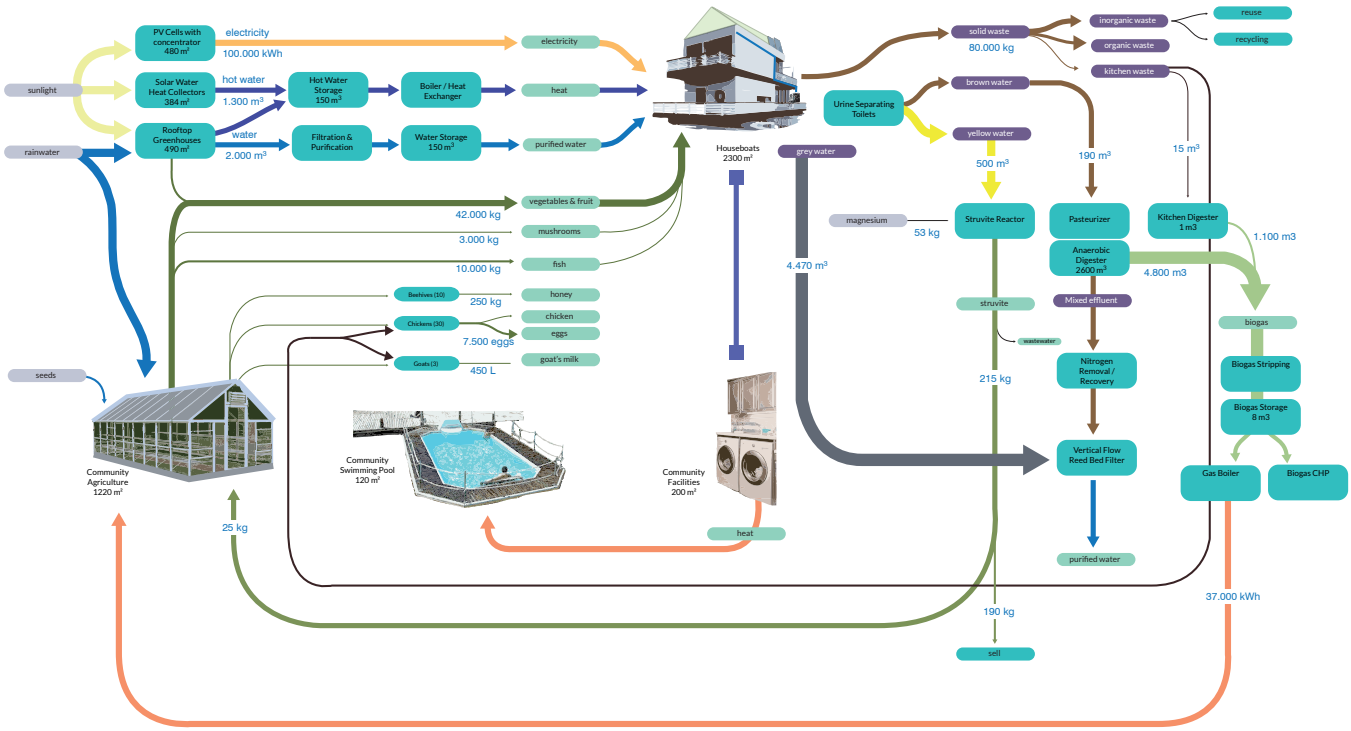
Schoonschip aspires to be frugal with drinking water, to reuse our wastewater and eventually we even hope to improve the water's quality in our canal. Our behaviour is crucial to this cause so we need to encourage our residents to waste as little water as possible. Thankfully there are several ways of achieving this.



USAGE OF WASTEWATER
We have divided our wastewater into two separate categories, based on where it came from: grey water for kitchen drainage, shower, washing machine and dishwasher and black water for human waste. Our grey water is drained down the council's sewer system, but for our black water we have set up a trial scheme with "Waternet", the regional water supplier. Our vacuum toilets are linked to vacuum tubes, which lead directly to a nearby floating processor (a digester). This processor then distils biogases from the black wastewater, which can be turned into electricity for our homes, and which can even fuel our cars. Moreover, Waternet will also extract phosphate from the wastewater, which is an important and rare fertiliser.
You can learn more about these new sanitation methods on Waternet's website: "Nieuwe Sanitatie" (only

source:
https://greenprint.schoonschipamsterdam.org/impactgebieden/water#oplossingen

SCHOONSCHIP // FINAL MATERIAL FLOWS



source:
https://www.metabolic.nl/projects/schoonschip/

source:
https://greenprint.schoonschipamsterdam.org/impactgebieden/water#oplossingen

NEW SANITATION:

The aforementioned "New Sanitation" trial scheme proved to be so cutting edge that accomplishing it called for many discussions and fine-tuning with Waternet, the Amsterdam council, engineers and installation companies. We had to invent new systems in technical-, organisational-, financiel- and legal terms, which ended up being an extremely time consuming and costly process.

RAINWATER COLLECTION:

Initially we were quite adamant about expecting all the properties to be equipped with some form of rainwater storage, however when we started to think it through in earnest, we discovered that this was an unrealistic expectation. In order to keep the floating houses balanced, many of the designs had the water tank based at the property's centre, from where the water would be pumped to the toilet. But what if the tank would overflow due to some particularly (and typically) heavy rainfall? And what if the pump would break down while the residents were on holiday? Where would the excess water go then? In some cases there was simply no conclusive technical solution available.

And then there was doubt. For instance, what was the advantage of building in a rainwater collector if we weren't really going to be using a lot of water to flush our toilets anyway? After all, our vacuum toilets would save us a lot of water, and to collect all that rainwater just to water our plants seemed a bit excessive. So in the end we decided that having a tank for rainwater collection was no longer a mandatory requirement. Even so, a number of Schoonschippers chose to build this facility into their dwelling anyway.

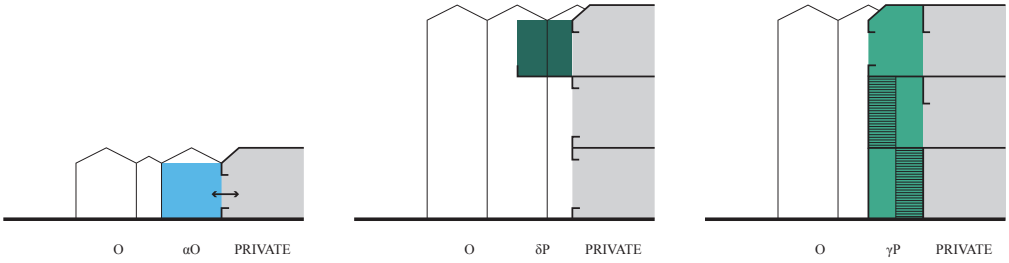
source:
https://greenprint.schoonschipamsterdam.org/impactgebieden/water#oplossingen

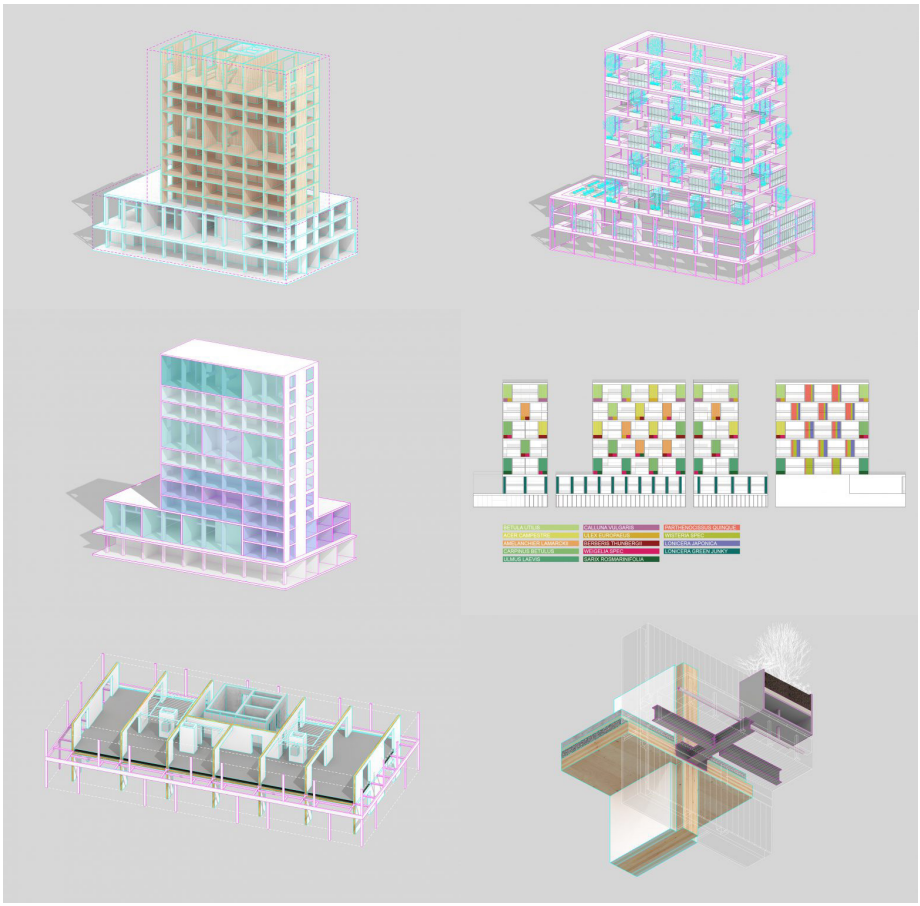
Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

STORIES | AMSTERDAM | 2021
BUILDING | 5500 M^2
29 APARTMENTS, 6 COMMERCIAL UNITS

SEPARATE SEWER SYSTEM
WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water

OPEN BUILDING
- Collective urban living
- Residents' decision making related to floorplan layout
- Open building structures & spaces
- (partly) wooden construction





PRINCIPLES STORIES:
- Wooden main supporting structure
- Floors made up of CLT, exposed as timber ceilings. Combined with screed of foam concrete for acoustic insulation
- Steel framework as supporting structure for facade
- Lots of greenery in facade
- Green roof (sedum roof) for rainwater harvesting
- Solar panels on all flat parts of the roof
- High-quality insulation
- Heat recovery system
- Underfloor heating (by means of district heating)
- Future residents have a large choice concerning floorplan layout

source:
https://olafgipser.com/projects/residential-building-bsh/#1

STORIES:

BSH20A ‘Stories’ addresses the challenge of high-density, communal, sustainable, and healthy urban living. As a building co-operative project it combines human and non-human habitat, is built largely from renewable, bio-based resources, and deploys ‘open building’ principles to ensure accommodation of future needs.

The building is a mixed-use residential tower in post-industrial Amsterdam Buiksloterham with 35 housing and commercial units and an on-ground parking garage. Located in a former industrial harbor area, it occupies an exposed lot marking the intersection of a main street and a former industrial harbor basin. Stories is the result of close collaboration between its future residents, architect, contractor, and advisors.

The plinth of 11 m height consists of a conventional prefab concrete structure and forms the basis for a 45 m high tower made from CLT (cross-laminated timber) plate construction. The mass timber construction determines the bay width of 4,50 m, leading to a floorplan spanning over 6 bays. Large openings allow for spatial connection across the bays, facilitating flexible partition from one to six individual units per floor. The walls are clad with fire-resistant and soundproofing plasterboard. The floors are equally made of CLT-plate, exposed as timber ceilings on the floors below, and combined with a foam concrete mass layer for acoustic insulation.

In its current configuration, Stories contains 29 apartments ranging from 43–185 m2 size, many combined with working spaces facilitating living/ working combinations, forming ten different apartment types and consisting of single and double-height units. Ceiling height is 2,87 m respectively 6,12 m.

Yet Stories does not only provide private space but addresses collective urban living. An enveloping steel structure contains extensive outdoor spaces in the form of private balconies and winter gardens which are simultaneously architectural shading elements, a communal roof for urban farming that is connected to a shared, multifunctional indoor space, and 57 double-height vegetation units. The larger ones of these are niches for trees, bushes, grasses, and related animal life. They act as privacy screens between individual units, operate as infrastructure providing a healthy environment and microclimate, enrich the local urban biodiversity, and add seasonal, soft and sensual expression to the building. Stories provides habitat for an expanded collective of humans and non-humans.

source:
https://olafgipser.com/projects/residential-building-bsh/#1

source:
https://olafgipser.com/projects/residential-building-bsh/#1

SUPERLOFTS | AMSTERDAM | 2016

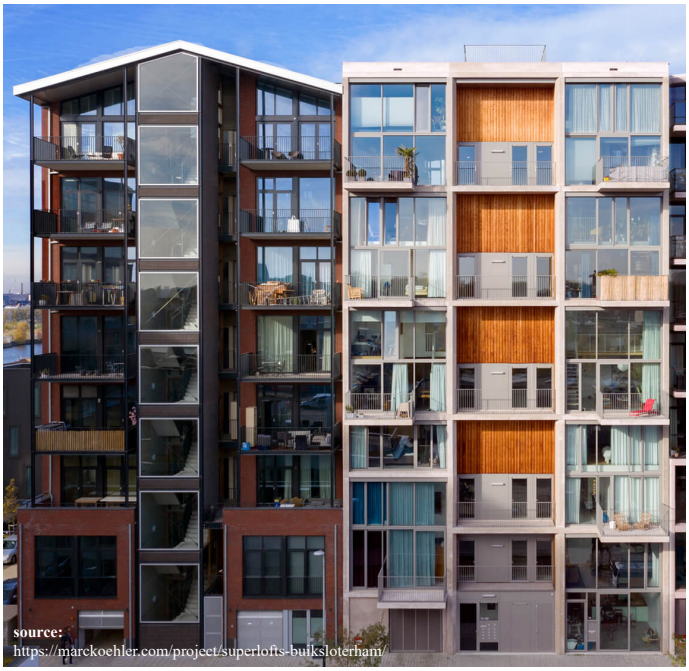
BUILDING |
19 LOFTS

SEPARATE SEWER SYSTEM

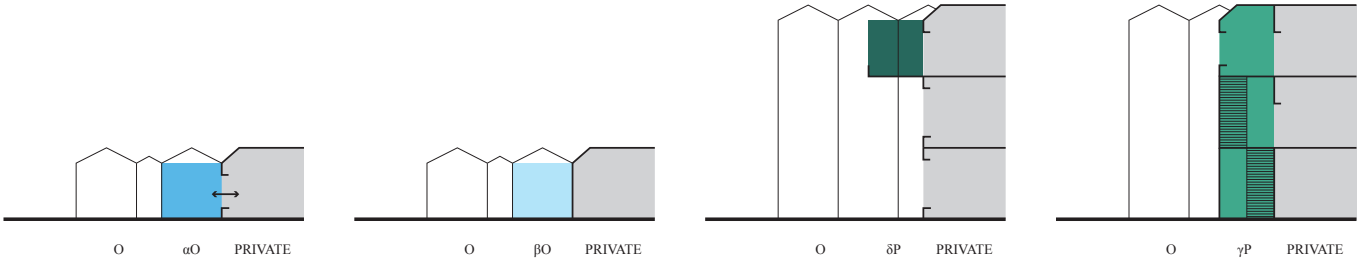
WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water
- Local wastewater treatment
- Move with the tide

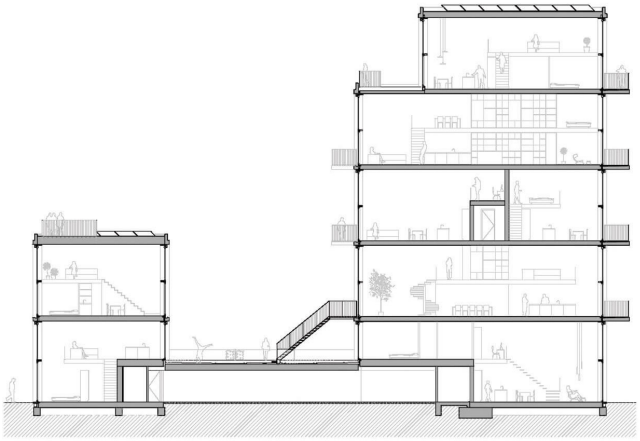
OPEN BUILDING

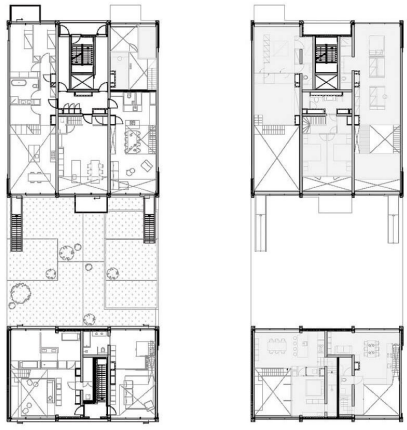
- Co-housing
- Open building structures & spaces



source:
https://marckoehler.com/project/superlofts-buiksloterham/





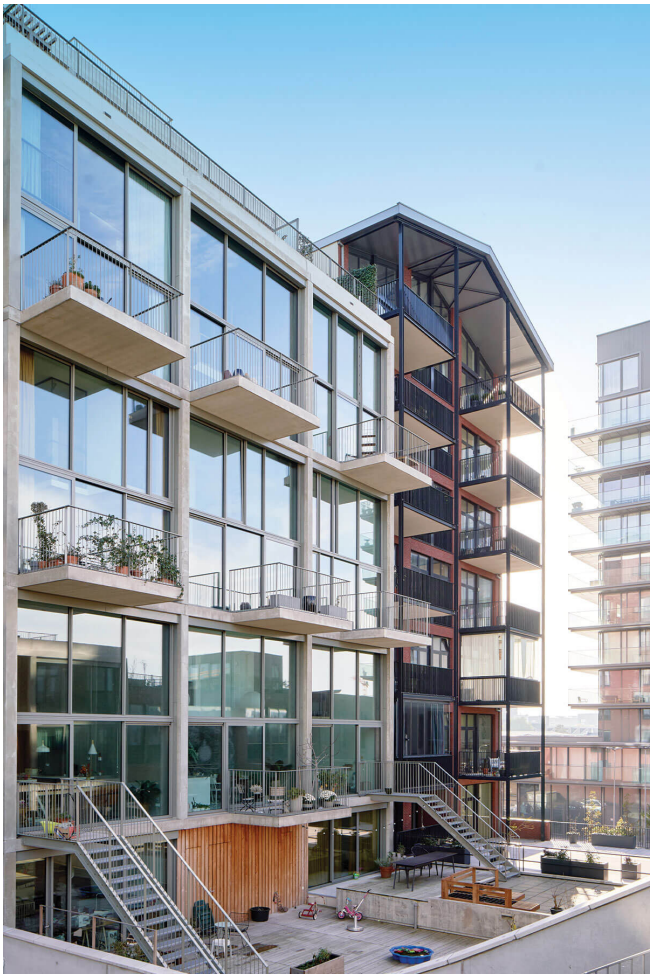


source:
https://architectenweb.nl/nieuws/artikel.aspx?ID=45711

PRINCIPLES SUPERLOFTS:

- State-of-the-art 'green' building technologies
- Reduced energy demand by applying high performance insulators, smart power grids, geo thermal pumps
- Wastewater recycling
- Large diversity of housing types adapted to market demand
- Underfloor heating and cooling
- CO^2-controlled ventilation
- Solar panels on roof generate total of 15200 Wp of solar energy
- Climate positive
- Designed with (partly) circular (renewable or recycled) building materials and technical facilities to prevent the waste of natural resources

source:
https://www.vinkbouw.nl/in-verkoop/superlofts-houthavens
https://superlofts.co/
https://architectenweb.nl/nieuws/artikel.aspx?ID=45711



source:
https://architectenweb.nl/nieuws/artikel.aspx?ID=45711

SUPERLOFTS:

Superlofts is a revolutionary development & design model for hybrid co-housing communities that can radically improve the quality of cities and the way people live together.

Superlofts projects address people with unique lifestyles looking for personalised spaces and a new way of living in the contemporary city, where Creative Freedom, Social Inclusiveness, and Healthy living are the fundamental values. The Superlofts concept provides an open framework of action, avoiding the conformity of traditional housing. It creates a sense of communal urban living while providing the individuality that makes loft spaces so desirable.

Superlofts offers a 6m tall (19,7ft) raw-space in which you can customize or self-build your dream home. This provides the opportunity to match lifestyle and budget for a variety of unique users and attitudes from compact studios to XL penthouses and from affordable 'do it yourself' to turn-key luxury. Superlofts become a kind of 'urban villages' with very diverse types of dwellings and vibrant user communities. They attract a niche-market of urban pioneers to the urban fringe where they become catalysts of urban development.
Superlofts are radically flexible and thus resilient mixed-use buildings that can adapt over time to shifting trends and behavior. They are functionally hybrid buildings in which residential-, work- and 'maker spaces' blend into each other. They allow users to 'grow into their home' and make investments over time. They are based on a modular and prefab base-structure and flexible fit out system. This allows the interiors to be updated independently, tapping into the trend of healthy, circular and cradle to cradle building products. It supports a transition from ownership to leasing. Superlofts use the latest technologies in renewable energy, air purification, rainwater- and waste recycling and E-mobility. In Delft we go all electric, in Utrecht geothermal and solar; with each new site, we push the limits further.

Superlofts is initiated by Marc Koehler Architects [MKA] and is applied by local professional partners, developers and user-groups, who form a worldwide network. Superlofts works with focus-groups who participate in the decision-making process in an early stage, resulting in uniquely crafted spaces and resilient co-living communities. In some cities Superlofts projects have been crowdfunded by the future homeowners, in others, developers and investors have stepped in. The model has proven to be highly adaptable to different sites.

The Superlofts website connects Superlofts members in different projects worldwide providing a platform for exchanging ideas and inspiration in loft design, and green co-living. Superlofts is currently active in 7 countries. The flexibility of the open framework creates an opportunity to add common spaces or shared facilities at minimal costs. This creates social well-being while providing each homeowner with a unique chance to co-create and experience their own personalized home.

With several projects currently completed and much more in development in the Netherlands and abroad, Superlofts is the evolutionary and customizable co-housing concept of the future that will soon meet the targets of the Paris Agreement.
Please contact us for more info or to partner with us at www.superlofts.co/en
Best regards,
Marc Koehler, architect & founder of Superlofts

source:
https://thematicdesign.org/superlofts/

Appendix E: Buiksloterham (BlackJack, Patch22, Schoonschip, Stories, Superlofts, TopUp)

TOPUP | AMSTERDAM | 2020
BUILDING | 4844 M²
28 LIVEWORK & 3 COMMERCIAL UNITS

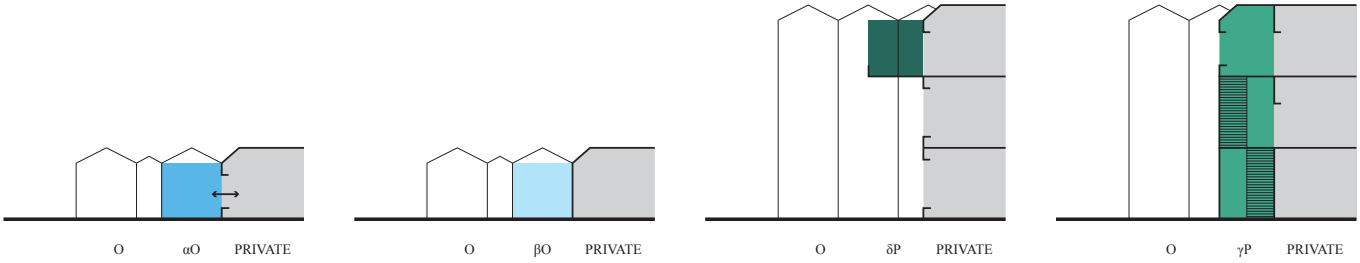
SEPARATE SEWER SYSTEM

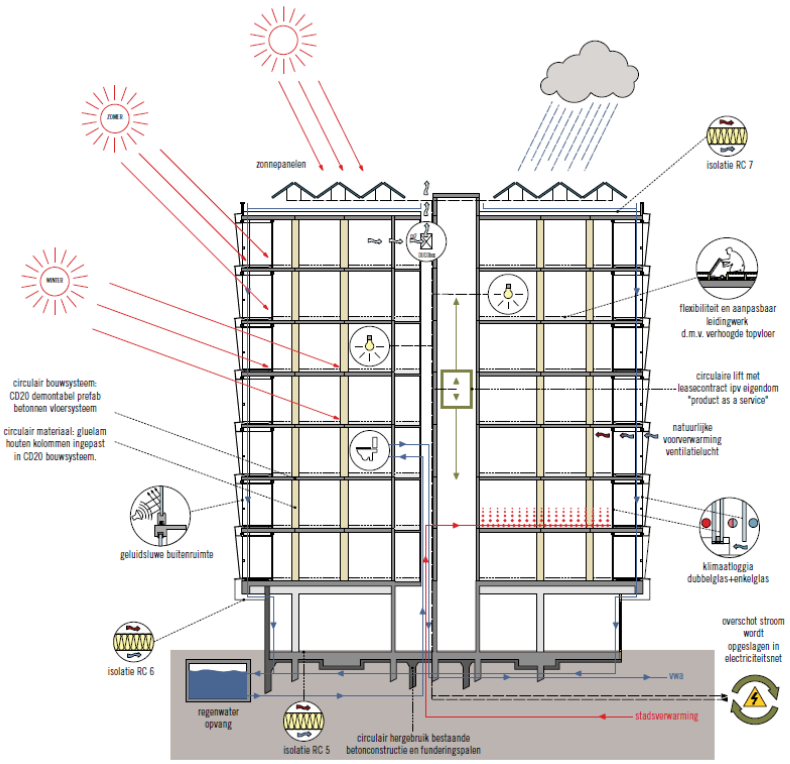
WATER SYSTEM
WATER CHAIN
- Reuse of rainwater
- Separate collection of grey and black water
- Local wastewater treatment
- Move with the tide

OPEN BUILDING

- Collective decision making
- Open building structures & spaces
- (partly) wooden constructions

source:
https://lemniskade.nl

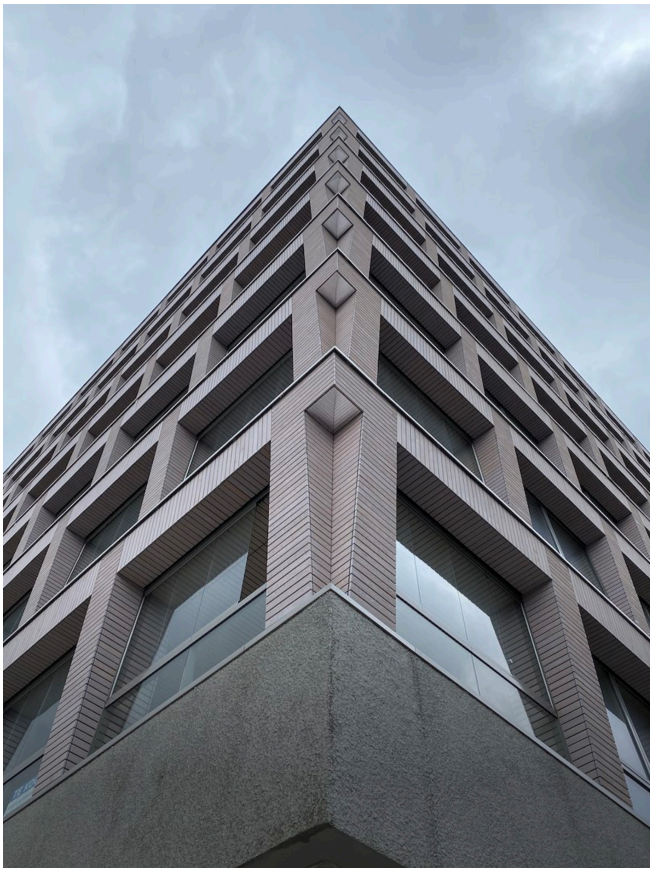




PRINCIPLES TOPUP:

- Building is flexible:
  Completely free design of the space
- Oversized wooden building
- High level of sustainability
- Piping and cabling horizontally to central shafts in the core
- Solar panels
- Rainwater is collected and reused in a greywater circuit: toilets are flushed with rainwater
- Concrete existing base
- Sustainable construction: timber frame construction on top of concrete base dwellings are finished with wooden cladding in combination with clear wooden window frames.
- Materials can be reused: wood, concrete and aluminum
- Heat accumulating loggias on the south and north facades
- Electronically controlled extraction of ventilation air based on CO^2 content and humidity; supply directly from the grills in the external facade.

source:
https://www.dearchitect.nl/projecten/arc20-top-up-in-amsterdam-frantzen-et-al



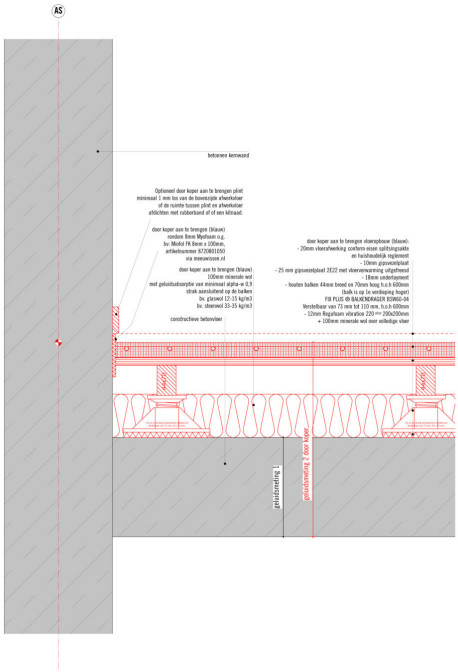
source:
https://www.dearchitect.nl/projecten/arc20-top-up-in-amsterdam-frantzen-et-al

TOPUP:

Top-Up is realised next to PATCH22. On top of an old concrete cable reel building located at the Johan van Hasseltkanaal in Buiksloterham, Amsterdam Noord. It will consist of a maximum of 28 living-working lofts from 99 m² to 496 m² with very spacious outdoor spaces of at least 29 m². The building will have a visible wooden support structure and floor-to-ceiling windows. The lofts are delivered without interior partition walls and has a free floor height of 3 meters. No restrictions, just light, air and space. Thanks to the free height of no less than 3 meters and the storey-high windows, these houses are bathed in sunlight and daylight. A view of the water opens up from the living room and kitchen. The robust appearance of the apartments, partly thanks to the visible wooden support structure account for a special characteristic of the building.

Thanks to the maximum width of over 3 meters, plenty of room for a nice sitting area or a large table is provided on the large loggia's of 29 square meters. The loggia is accessible from the living room via sliding doors. Glass folding panels will be placed above the glass balustrade, which you can fold open. Even with a little sun on a beautiful winter day, it is possible to sit outside. Moreover, one sits covered and protected from winds.

Top-Up is a sustainable residential building, both in terms of material use and energy use. This is partly due to the use of double glazing, solar panels and heat-accumulating loggias, and the reuse of rainwater for flushing the toilets. The building therefore fits perfectly in Buiksloterham, a district that is fast becoming Amsterdam's first circular district. In Buiksloterham, the reusability of products and raw materials is maximized and value destruction minimized. In the case of Top-Up: the building can be dismantled in 100 or 200 years, whereby all raw materials such as wood, concrete and aluminum can be reused.



source:
https://lemniskade.nl/portfolio/top-up-amsterdam-noord/
https://www.top-up.amsterdam
https://www.amsterdamwoont.nl/actueel/top-up-riant-en-comfortabel--wonen-en-werken-aan-het-water-in-amsterdam-noord/