



UNIVERSITY OF HELSINKI

FACULTY OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES

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EXPERIMENTAL GREEN ROOFS

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Landscape Architect

PhD student

THE FIFTH DIMENSION

- Green Roofs in Urban Areas

HENVI & WDC



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Meadow green roof



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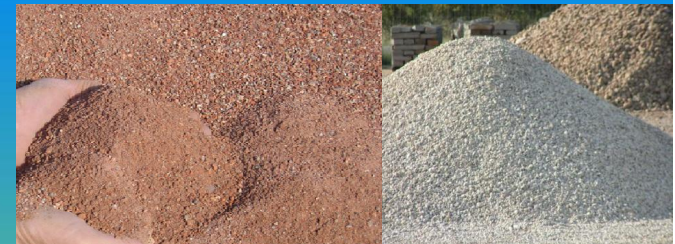
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Experimental design

- minimum treatment area is 2m²
- 2 types of green roof moisture layers
- 2 types of substrate: crushed brick and limestone (different thickness)
- substrate with biochar and without



Pictures: VegTech catalogue and www.archiexpo.com



Pictures: www.actrecycling.com.au/products2.html
www.nbstone.com/Ground%20Cover/Crushed%20Limestone%20Large.jpg

• 2 types of vegetation:

• Sedum-herb-grass mat Envire + Suomen Niittysiemen seed mixture

• Suomen Niittysiemen seed mixture + plug plants



Pictures: VegTech catalogue and Suomen Niittysiemen homepage

16 different treatments with 8 replicates

128 experiments (including replicates), 256m²



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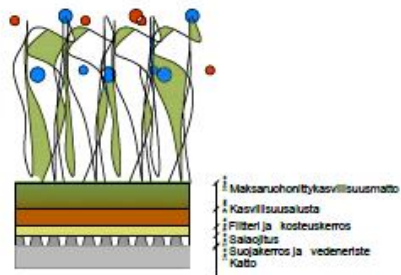


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Four types of experimental green roof constructions A,B,C,D

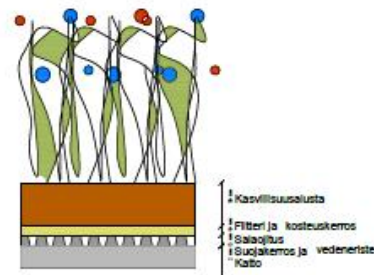
A

MAKSARUOHONITTYKASVILLISUUSMATTOA
+ SUOMEN NIITYSIEMENEN SIEMENSEOS



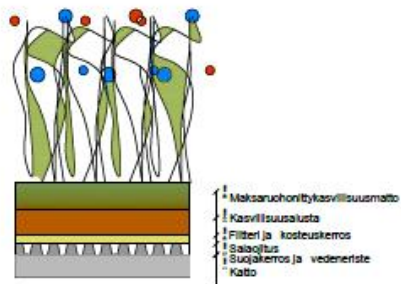
C

SUOMEN NIITYSIEMENEN SIEMENSEOS
SEKÄ-PISTOKASTAIMET



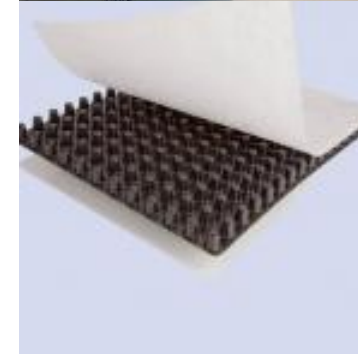
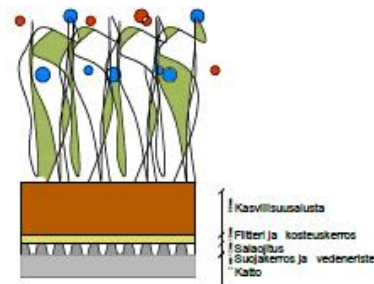
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MAKSARUOHONITTYKASVILLISUUSMATTOA
+ SUOMEN NIITYSIEMENEN SIEMENSEOS



D

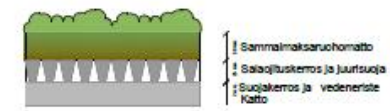
SUOMEN NIITYSIEMENEN SIEMENSEOS
SEKÄ-PISTOKASTAIMET



Pictures: VegTech catalogue

E

SAMMALMAKSARUOHOMATOT



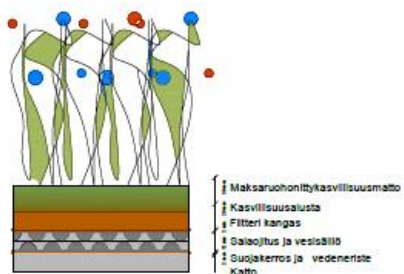
Profiles by M.Gabrych



Four types of experimental green roof constructions A,B,C,D

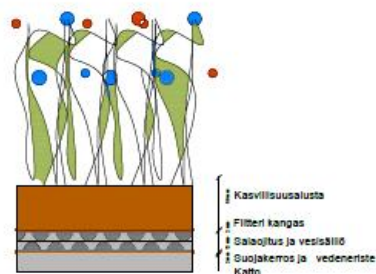
A

MAKSARUOHONITTYKASVILLISUUSMATTOA
+ SUOMEN NIITYSIEMENEN SIEMENSEOS



C

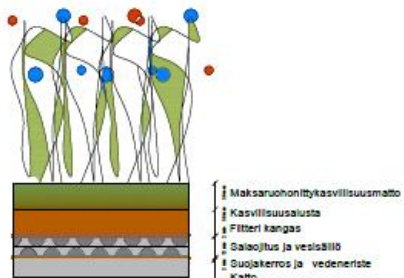
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SEKÄ-PISTOKASTAIMET



Picture: <http://www.archiexpo.com/prod/diadem/green-roofs-drainage-membranes-66377-397946.html>

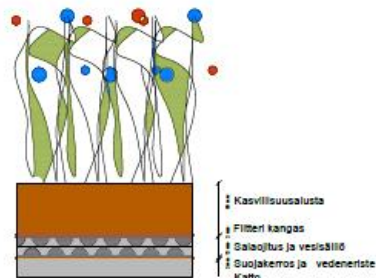
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+ SUOMEN NIITYSIEMENEN SIEMENSEOS



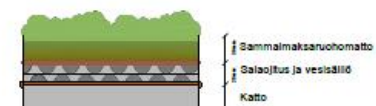
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SUOMEN NIITYSIEMENEN SIEMENSEOS
SEKÄ-PISTOKASTAIMET



E

SAMMALMAKSARUOHOMATOT



Profiles by M.Gabrych

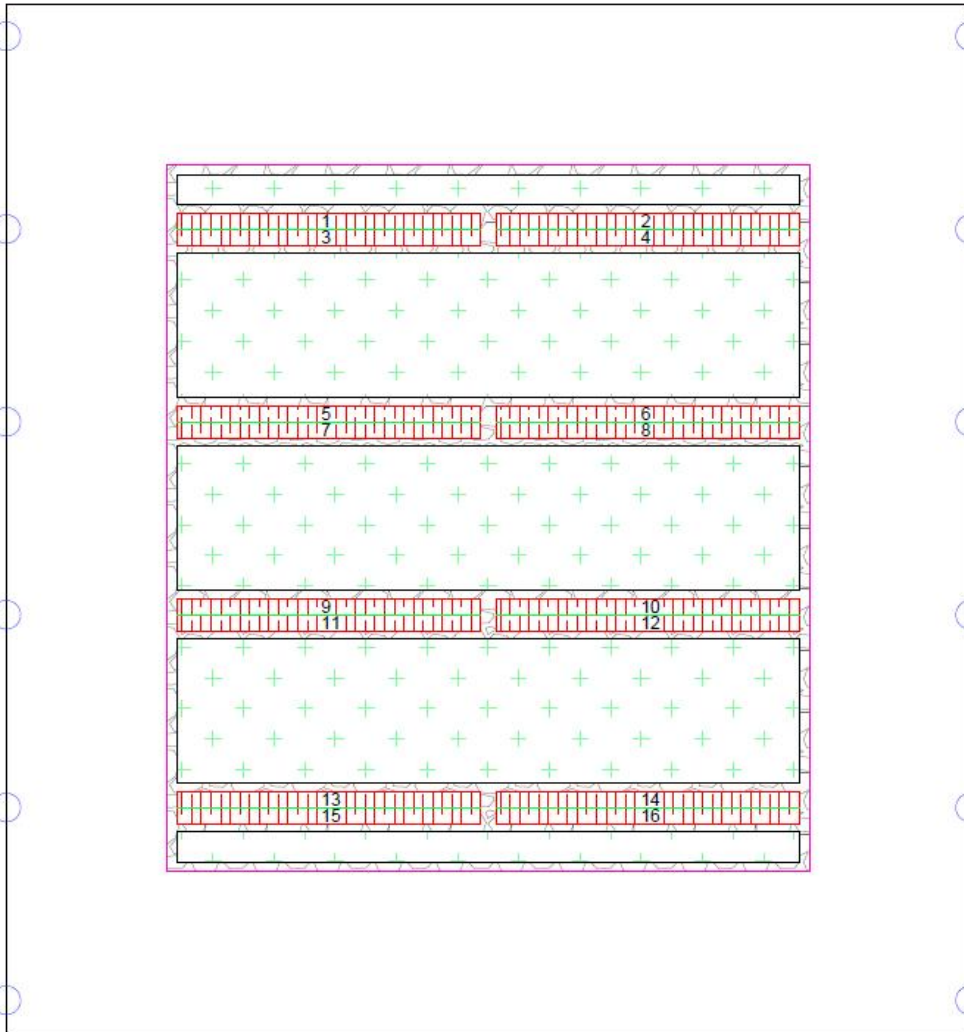


Planning experimental green roofs. Things to consider:

- **environmental:** placement and height of the building with the green roof
- **architectural limitations:** weight limit, green roof height limit, slope
- **research priority:**
 - similar design of all experiments
 - possibility to collect the storm water from the green roof, separately from each treatment
 - separation of treatments in order to avoid influence from the neighbourhood treatment (biochar, microbes, water flow, pollination)
- **economical:** cost limits



An example 1 of the experimental green roof



Legenda:

Korvaus, kasvillisuus- ja turvakuilut

A	1 2	MAKSAKUUKITTAHALLILUJUMATTOA + SUOMEN NETTYSEMÄEN SEMENSOJA, 2 cm KARJALLISTA KERROKSEKSI
B	3 4	MAKSAKUUKITTAHALLILUJUMATTOA + SUOMEN NETTYSEMÄEN SEMENSOJA, 2 cm KARJALLISTA KERROKSEKSI
C	5 6	SUOMEN NETTYSEMÄEN SEMENSOJA SEKÄ PISTOKASTAMAT (SIVERTÄ), 5 cm KARJALLISTA KERROKSEKSI
D	7 8	SUOMEN NETTYSEMÄEN SEMENSOJA SEKÄ PISTOKASTAMAT, 5 cm KARJALLISTA KERROKSEKSI

Korvaus, kasvillisuus- ja turvakuilut

A	9 10	MAKSAKUUKITTAHALLILUJUMATTOA + SUOMEN NETTYSEMÄEN SEMENSOJA, 2 cm KARJALLISTA KERROKSEKSI
B	11 12	MAKSAKUUKITTAHALLILUJUMATTOA + SUOMEN NETTYSEMÄEN SEMENSOJA, 2 cm KARJALLISTA KERROKSEKSI
C	13 14	SUOMEN NETTYSEMÄEN SEMENSOJA SEKÄ PISTOKASTAMAT, 5 cm KARJALLISTA KERROKSEKSI
D	15 16	SUOMEN NETTYSEMÄEN SEMENSOJA SEKÄ PISTOKASTAMAT, 5 cm KARJALLISTA KERROKSEKSI

E

	SAMMALMAKSAKUUKITTAHALLILUJUMATTO
	SEKA
	MILKVI SEURA
	LUKORISUNA

Plan by M.Gabrych



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Lauttasaaren välinevarasto 1

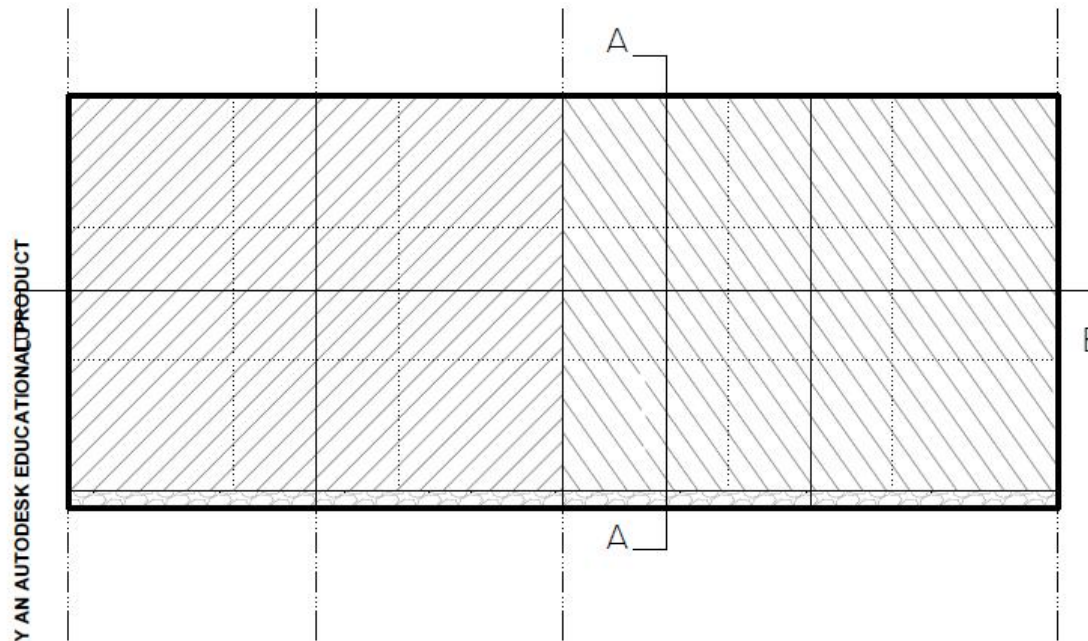


Picture : Taina Suonio



Experimental green roof plan

MINI I SIIRRETTÄVÄ KYLMÄ KONTTIVARASTO 1:25



LEGEND:

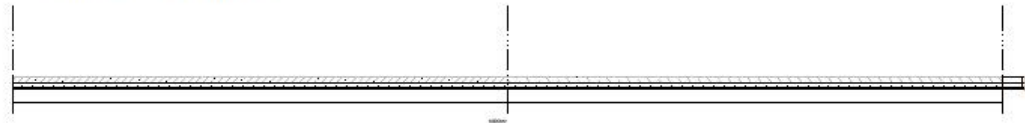
- BUILDING
- GREEN ROOF MATS BORDER
- RESEARCH SECTION BORDER
- FILT (MOISTURE LAYER)
- MIXTURE OF SUBSTRATE
- GRAVEL
- SUBSTRATE MIX 1, VEGETATION MATS PLUS SEED MIX
- SUBSTRATE MIX 2, VEGETATION MATS PLUS SEED MIX
- VEGETATIN SEDUM HERB GRASS MAT

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LEIKKAUS A-A 1:25



LEIKKAUS B-B 1:25



Lauttasaari viherkatto. Mini1
Viides ulottuvuus - koekatto
Project leader: Doc. FT Susanna Lehvävirta

Author: Malgorzata Gabrych

Plan by M.Gabrych



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Lauttasaaren välinevarasto 2

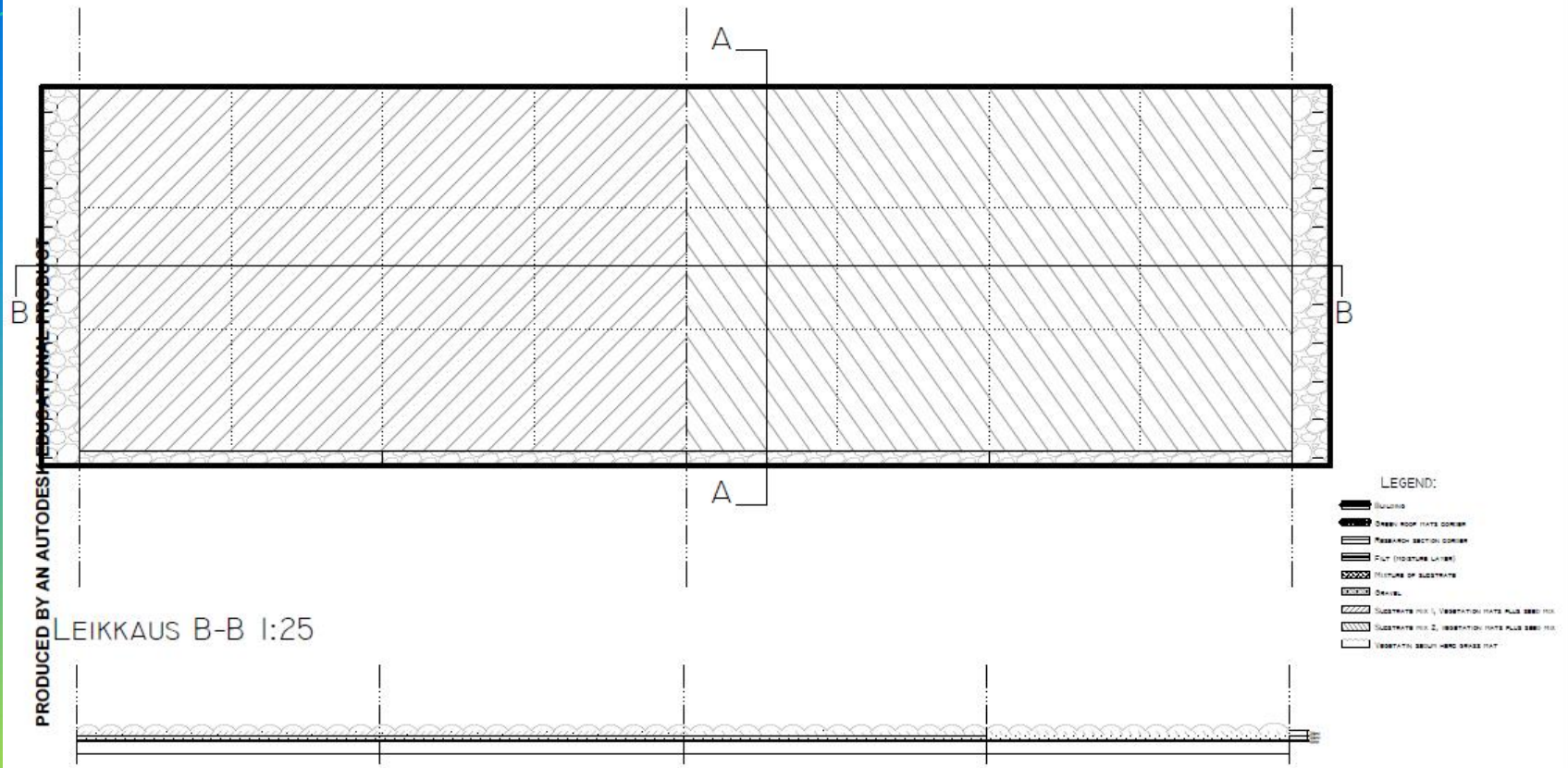


Picture: Taina Suonio



Experimental green roof plan

MINI 2 SIIRRETTÄVÄ KYLMÄ KONTTIVARASTO 1:25



Lauttasaari viherkatto. Mini2
Viides ulottuvuus - koekatto
Project leader: Doc. FT Susanna Lehvävirta

Author: Malgorzata Gabrych

Plan by M.Gabrych



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Picture: University of Helsinki

Exactum Green roof and greenhouse



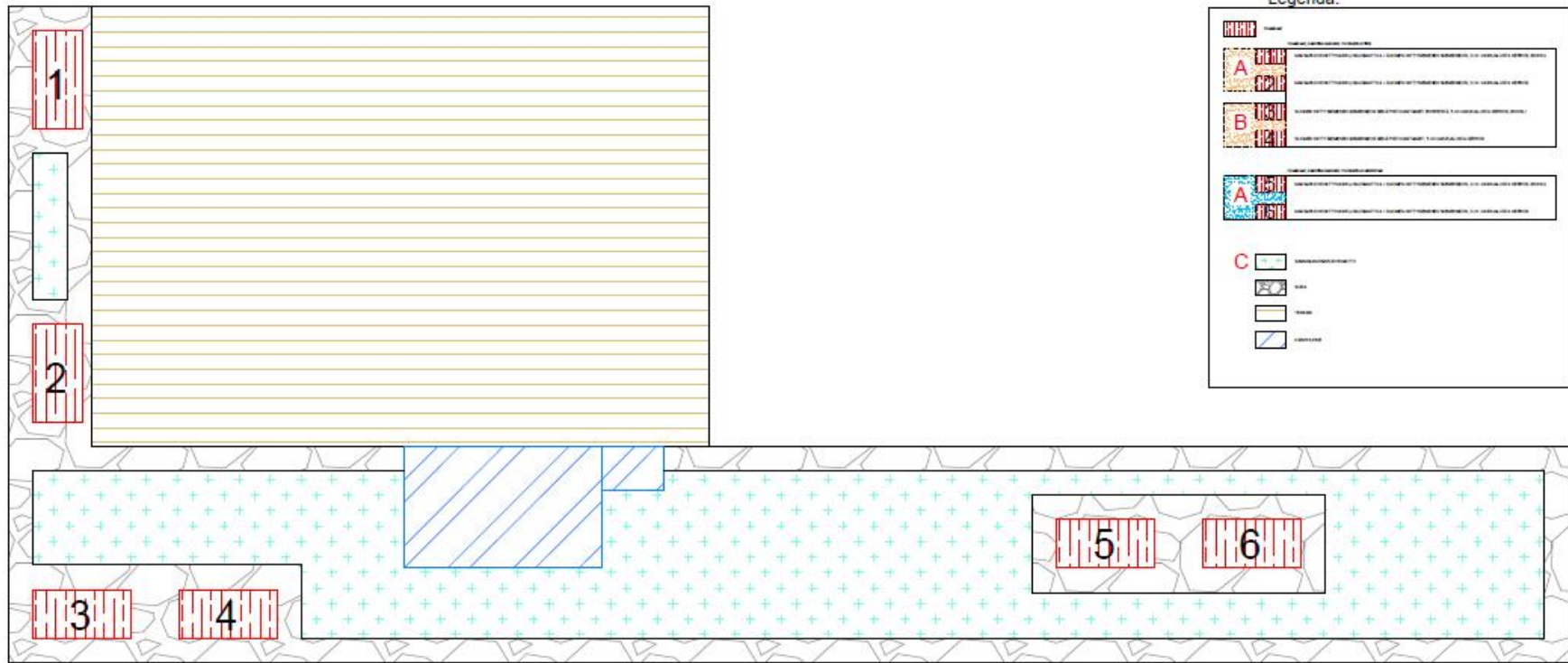
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EXACTUM GREEN ROOF PLAN

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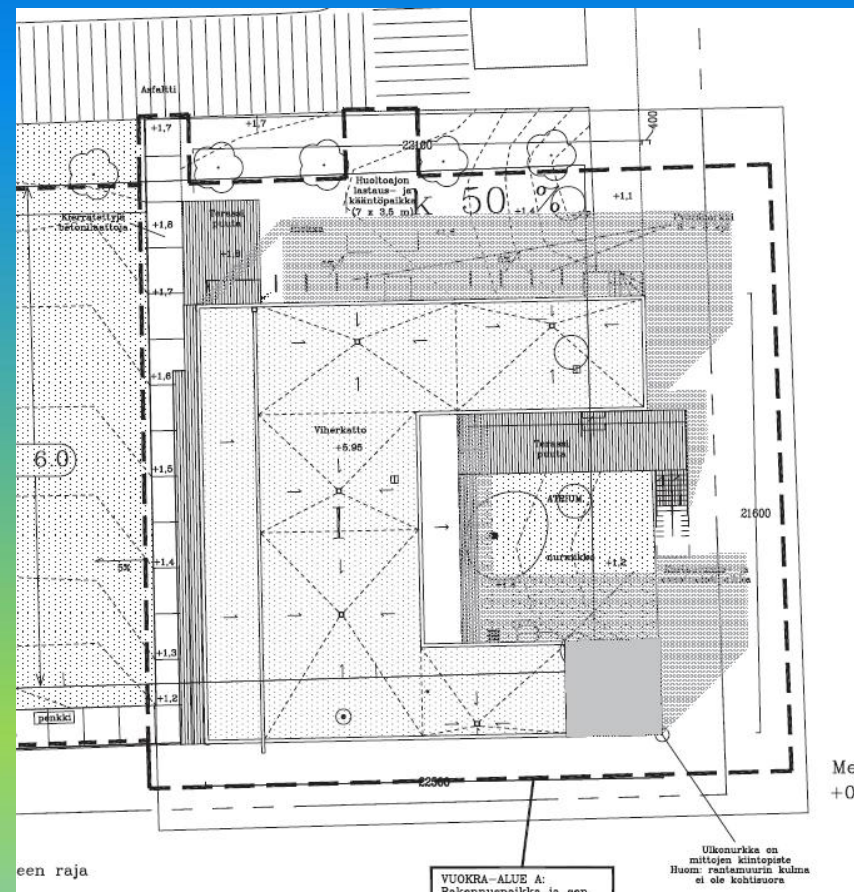


HAKANIEMI

Kulttuurisauna



Picture: website



Plan : NOW Tuomas Toivonen and Nene Tsuboi



Green roofs during planning process

Aleksandria/Fabianinkatu



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Project leader
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<http://www.luomus.fi/english/botany/research/greenroofs/>

Many Thanks to:

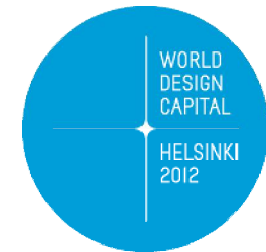
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Modernia Oy



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