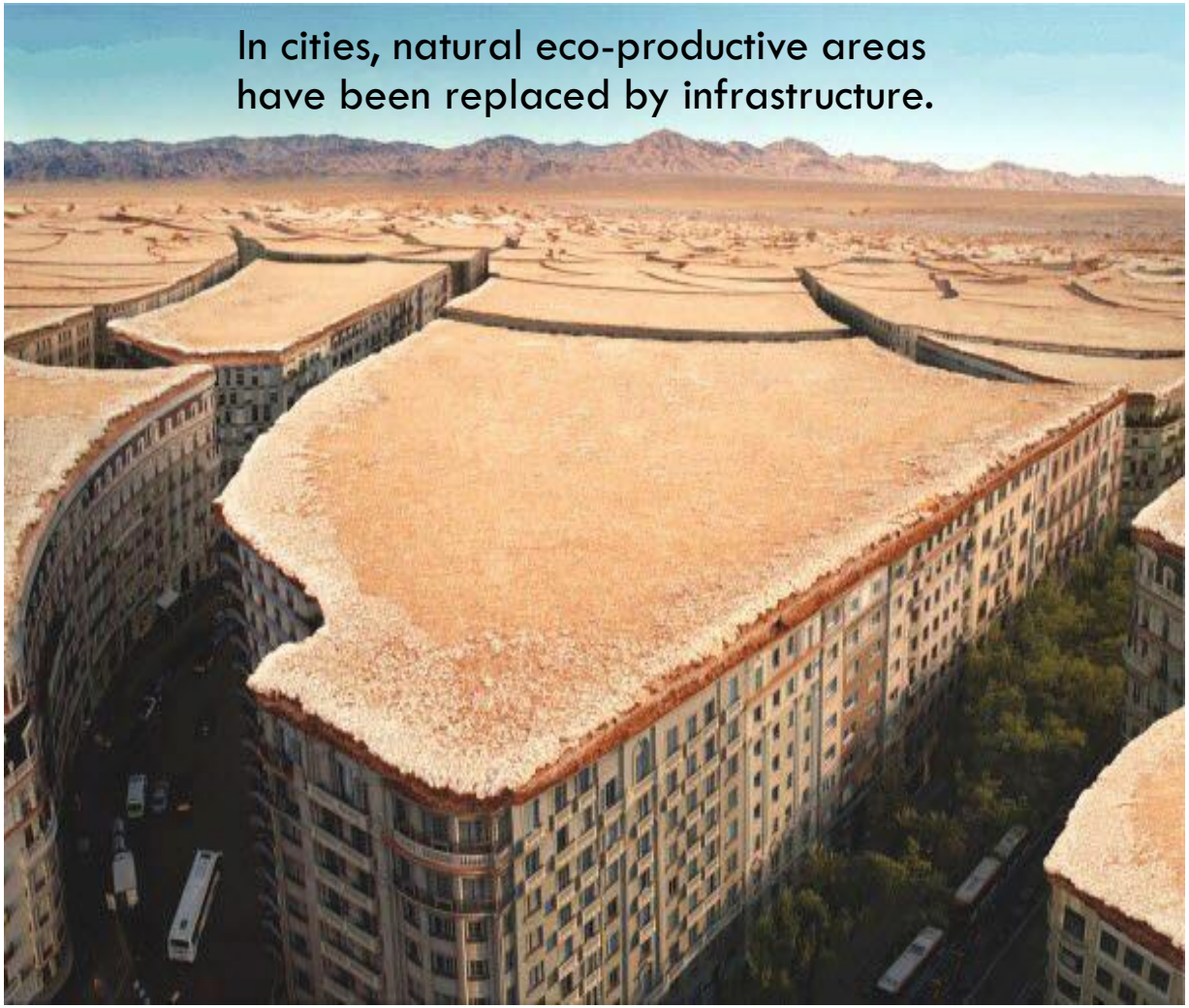
ARCHITECTURE EMBODIES EMBIRONMENTAL SERVICES

URBAN ENVIRONMENTAL SERVICES

Natural eco-productive areas are replaced by infrastructure. This has turned megacities into critical environmental scenarios lacking environmental services necessary for well-being.



Critical Urban Settings

Lack of ecosystem and environmental services

Generation of environmental disservices

WORLD AWARDS IN SUSTAINABILITY

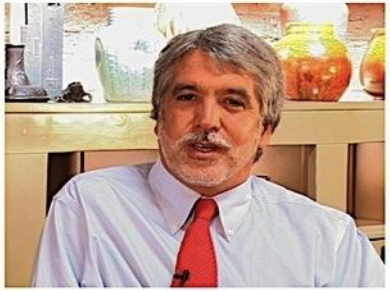
DOING MORE WITH LESS

PUBLICADO: 2010-11-17T19:00:00

Bogotá recibe premio en Planeación Urbana

El Enviromental Systems Research Institute otorgó al distrito, el premio Latinoamericano en Planeación Urbana y Plataformas de Información 2010. Se destacó la integración de la información geográfica que producen las Secretarías de Planeación y el Catastro de Bogotá.

Enrique Peñalosa, ex-alcalde de Bogotá recibe premio Gotemburgo



El ex alcalde de Bogotá, Enrique Peñalosa, fue distinguido hoy en Gotemburgo con el premio sobre desarrollo sostenible que lleva el nombre de esta ciudad sueca.

PLANETA CARACOL | NOVIEMBRE 24 DE 2009

Alcalde Petro recibe premio mundial ambiental

Enviado por jcortes | Fecha de publicación :Mié, 09/04/2013 - 19:24

Green Infrastructure Guidelines,
Secretary of Environment.
Bogota, bylaw 418, 2009

La ciudad de Bogotá recibió el premio mundial de "Liderazgo Climático y Ciudad", otorgado por el C40, Grupo de Ciudades sobre Liderazgo Climático, y Siemens, compañía alemana líder en tecnologías, este miércoles 4 de septiembre. El reconocimiento fue proclamado en Londres, capital británica.

Bogotá mereció el reconocimiento en la categoría de Transporte Urbano, por sus proyectos de Transmilenio y Biotaxis.

ARCHITECTURE EMBODIES EMBIRONMENTAL SERVICES

WORLD'S DEVELOPMENT GOALS

The use of ecosystem services concept has been growing significantly since it was adopted by the Millennium Ecosystem Assessment (MEA) in 2005.

The MEA defines ecosystem services as the "benefits people obtain from ecosystems" for their well-being. According to the MEA, human demands on ecosystems will grow greater in the coming decades, and the demand for ecosystem services is now so great that the valuation and trade-off of these services is becoming more common.

1970's-1980's

1990's-2000's

2005
Millennium Ecosystem Assessment (MEA),

Energy Crisis → **Climate Change** → **Ecosystem services**

ENVIRONMENTAL SERVICES

Supporting
Provisioning
Regulating
Cultural

Human well-being

ARCHITECTURE EMBODIES EMBIRONMENTAL SERVICES

BUILDING ECOPRODUTIVITY

Is the capability of the built environment to generate environmental services at a certain rate within given physical boundaries and interface them with their urban surroundings.

It is an inherent spatial attribute.

Most of green building evaluation methods account for reduction of negative environmental impacts, but fail to assess environmental contributions delivered by building clusters in the urban settings.

Ricardo Ibañez Gutierrez.
September, 2019

Creation of environmental services (E.S.) is not restricted to natural or landscape elements as it has been widely accepted, but they may alternatively be recreated or engineered in buildings as contributions for urban environmental resilience.

Ci = Construction impacts

Oi = Operational impacts

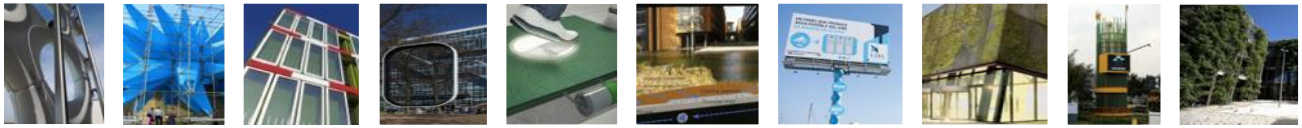
Eps = Ecosystem productivity of the site

ESc = Ecosystems services consumed (ha/yr)

Ci + Oi - **ESd** / EPs = ESc

↓

Esd: Evironmental Contributions (Ecoproductivity).



Building Technologies that generate environmental services – Ecotectonic Services-.

ARCHITECTURE EMBODIES EMBIRONMENTAL SERVICES

METRICS

BUILDING FOOTPRINT AREA
(Baseline eco-production capacity of site)

SITE ECOSYSTEM FUNCTIONS

SITE ECOLOGICAL POTENTIAL

BUILDING BOUNDARY
(eco-production capacity of building)

ENVIRONMENTAL SERVICES DELIVERED
(Regulating and provisioning Urban ecosystem services)

SITE ECOSYSTEM FUNCTIONS

Solar radiation
Rain
Wind
Water streams
Water bodies
Atmospheric factors

EFFICIENT DELIVERY OF BUILDING SERVICES:
Program related functions
Shelter
Indoor Environmental Quality

REDUCE AND CONTROL BAD HABITS

Environmental Services

Regulating
Water run-off management
Water purification
Noise absorption
Carbon sequestration
Filtration of air pollutants
Release of oxygen
Temperature and climate regulation
Erosion control
Refugia for biodiversity

Multi-scale assessment

Andres Ibanez, Technical and Scientific Committee, Cofounder RECIVE, 2019

ARCHITECTURE EMBODIES ENVIRONMENTAL SERVICES

Andres Ibañez

Technical and Scientific Committee, RECIVE,

COLOMBIA

2006 -2009

RESEARCH, 2006

2009

PROMOTION

2010

WGIN
CHINA
LAGIN
MEXICO

2011-2014

Recive

RED COLOMBIANA DE INFRAESTRUCTURA VEGETADA

TECHNICAL GUIDELINES

HAINAN, CHINA
SINGAPORE
FRANCE
U.S.
HONG KONG

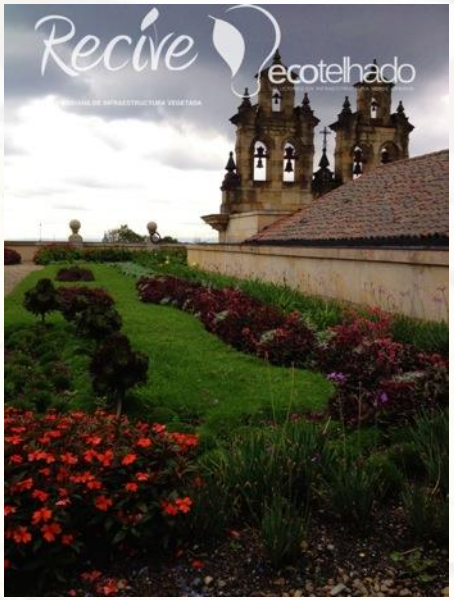
RESEARCH EXTENSIVE GREEN ROOF SYSTEMS AS SUSTAINABLE TECHNOLOGY IN BOGOTA

Experimentation

Publications

PROJECTS IN BOGOTA

PROJECTS IN BOGOTA



PROJECTS IN BOGOTA

Formulation of function-based and multi-scale biotic roofs guidelines:

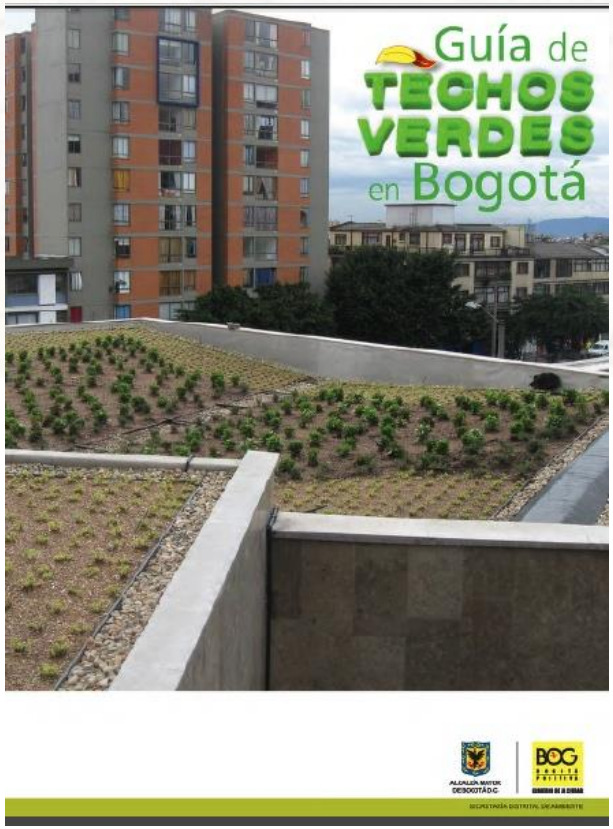
The case of Bogota.

Formulation of function-based and multi-scale biotic roofs guidelines:

The case of Bogota.

BOGOTA GUIDELINES DISTINCTIVE ASPECTS

GUIDELINES



1
FUNCTION BASED

2
PRESCRIPTION + GUIDANCE

3
MULTI-SCALE APPROACH

4
5 STAGES OF LIFECYCLE

5
ADVANCED PERFORMANCE

**CLASSIFICATION.
COMPONENTS.**

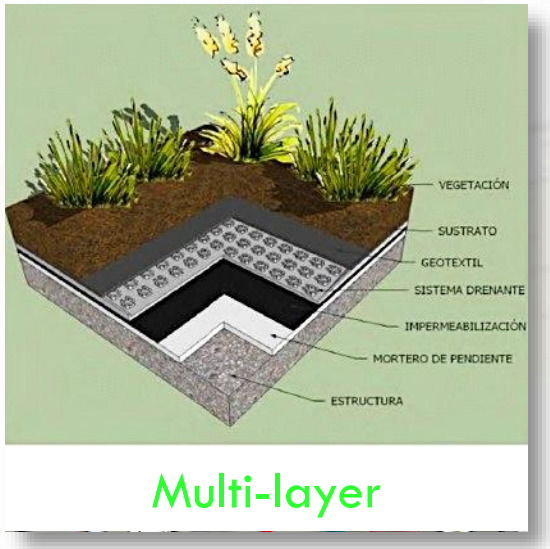
BIOTIC ROOF SYSTEM COMPONENTS

Active components

Stable components

Auxiliary elements

TECHNOLOGIES



Multi-layer

Elevated

ENGINEERED SYSTEM TECHNOLOGIES

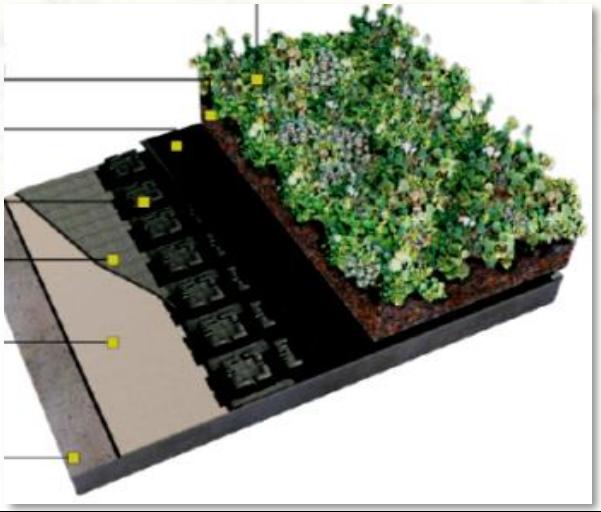
Receptacle

Mono-layer

airponics

Bogota.

Engineered system scale



Bogota.

Implemented roof scale

Engineered system scale

Bogota.

Building scale

Implemented roof scale

Engineered system scale

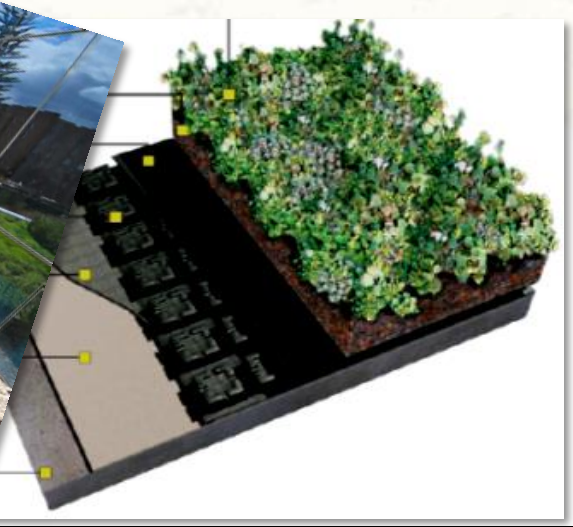
Bogota.

City scale

Building scale

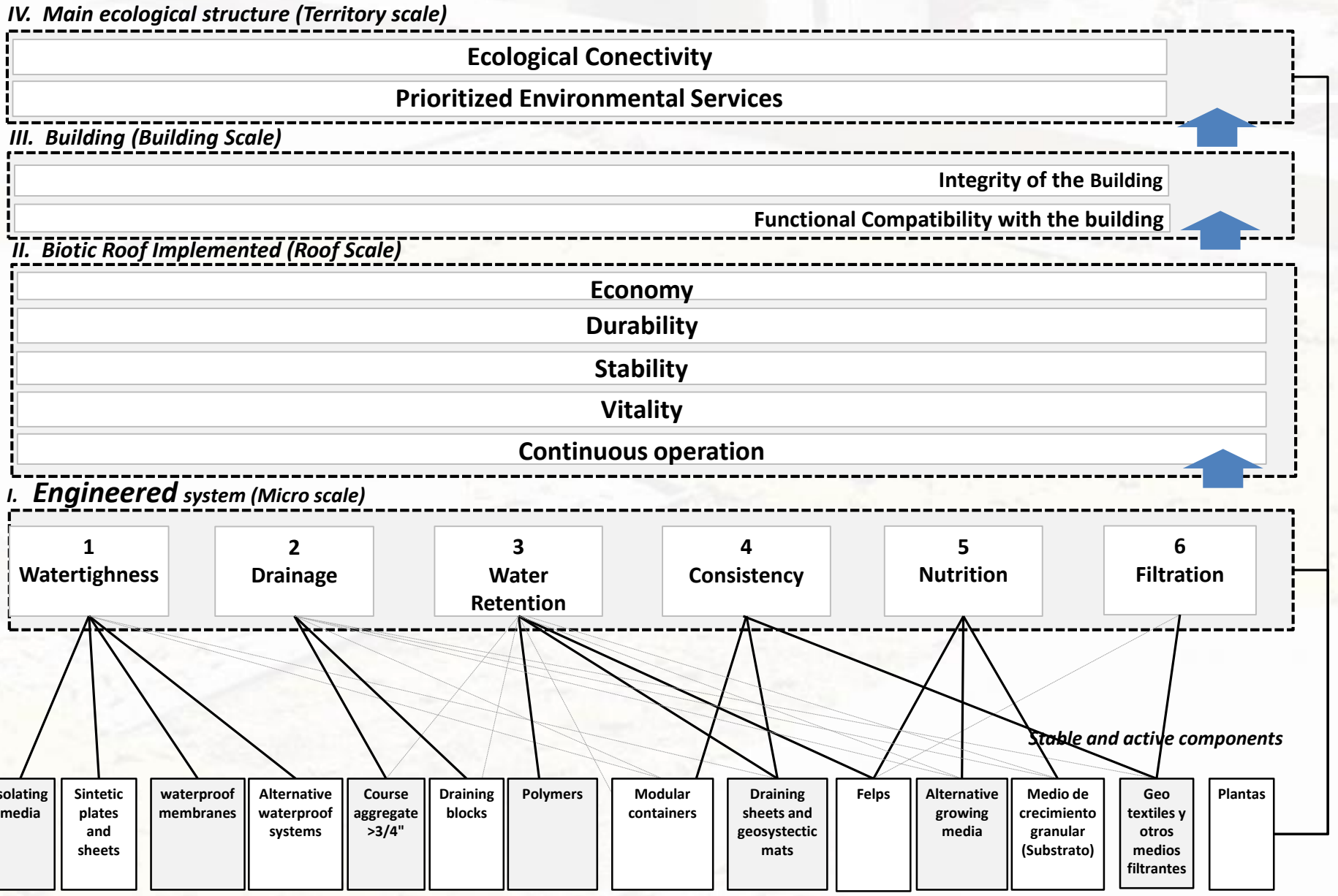
Implemented roof scale

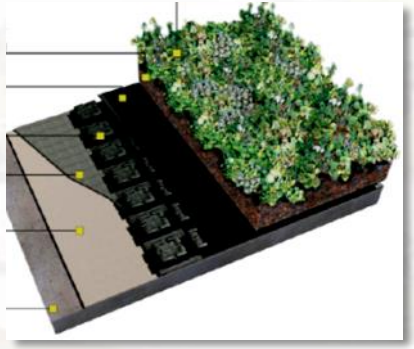
Engineered system scale



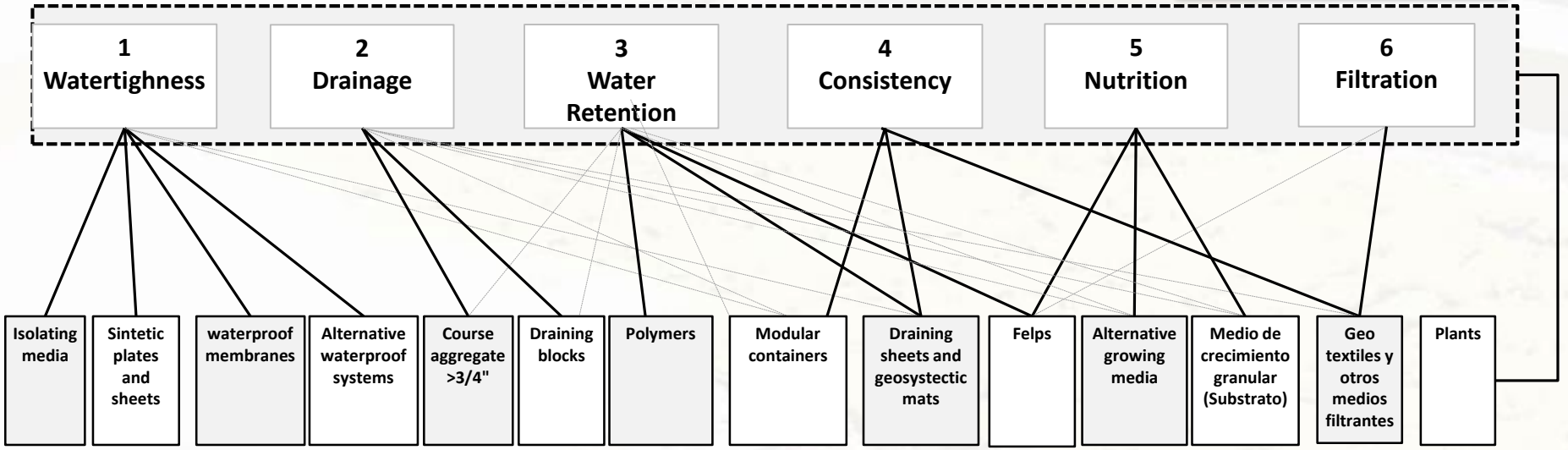
Formulation of function-based and multi-scale biotic roofs guidelines:

The case of Bogota.





I. Engineered system (Micro scale)

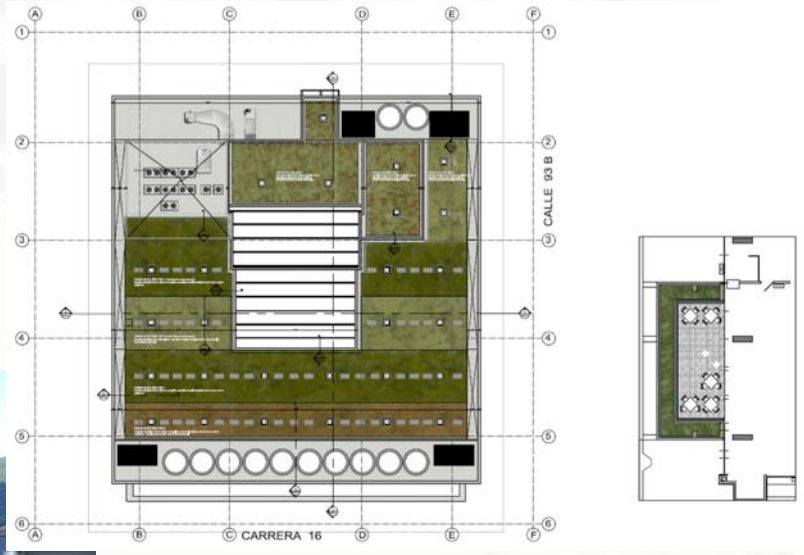


Stable and active components

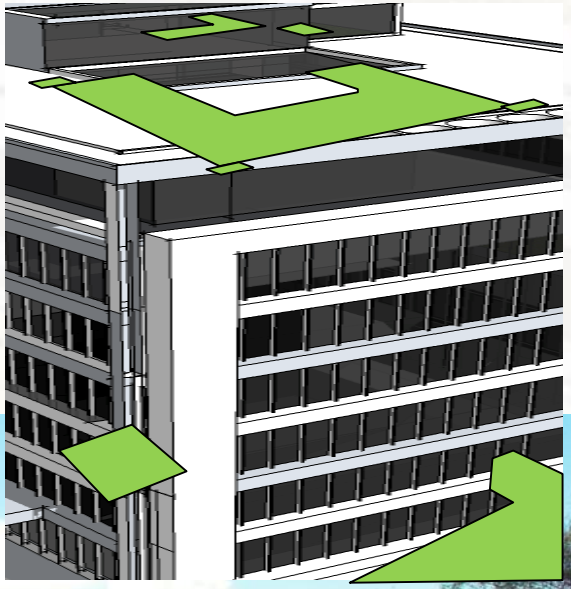
Bogota.

II. Biotic Roof Implemented (Roof Scale)

- **Economy**
- **Longevity**
- **Stability**
- **Vitality**
- **Continuous operation**



Bogota.



III. Building (Building Scale)

Integrity of the Building

Functional Compatibility with the building

Bogota.

IV. Main ecological structure (Territory scale)

Ecological Conectivity

Prioritized Environmental Services

Purpose

Requirements

Key aspects

Properties and units

Recommendations

Purpose

Requirements

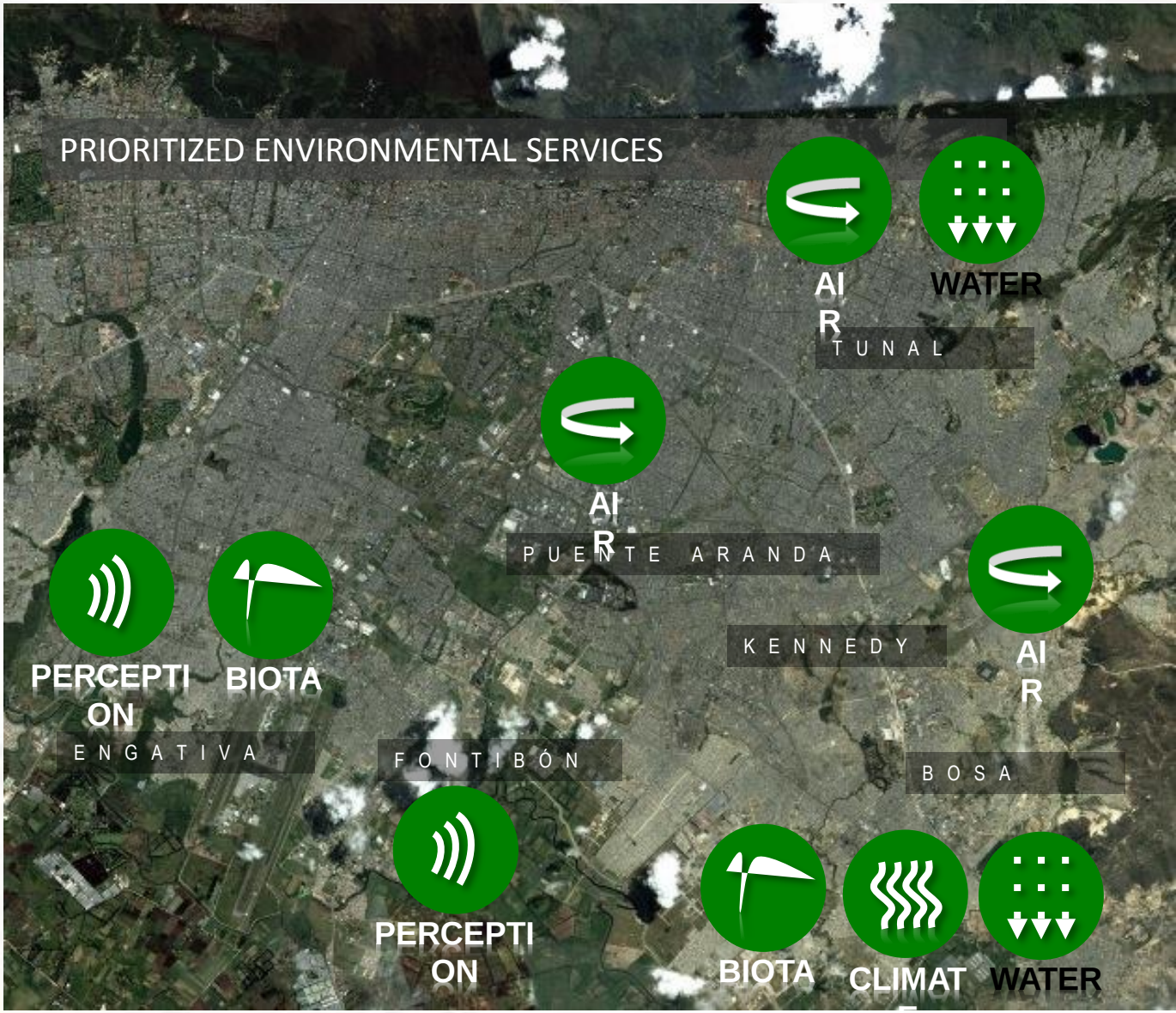
Key aspects

Properties and units

Recommendations

Formulation of function-based and multi-scale biotic roofs guidelines:

The case of Bogota.



BIOTIC ROOF GUIDELINES. BOGOTA D.C.			
	TECHNICAL REQUIREMENTS AND RECOMMENDATIONS		
MINIMUM REQUIREMENTS (MANDATORY)	Operativity of the engineered system	1	**Watertighness**
		2	**Drainage**
		3	**Water retention**
		4	**Consistency**
		5	**Nutrition**
		6	**Filtration**
	Biotic Roof Implemented	7	**Economy**
		8	**Longevity**
		9	**Stability**
		10	**Vitality**
		11	**Continuous operation**
	Building	12	**Integrity**
		13	**Funtional compatibility**
	Main Ecological Structure	14	**Ecological connectivity**
		15	**Prioritized environmental services**
ADVANCE PERFORMANCE (RECOMMENDED)	Advanced Performance	1	**Lightness**
		2	**Self-regulation**
		3	**Thermal isolation**
		4	**Acoustic isolation**
SPECIAL PERFORMANCE (FOR FUTURE INCENTIVES)	Special Performance	1	**Evapotranspiration**
		2	**Water run-off reduction**
		3	**Reduction of water flow rate**
		4	**Carbon sequestration**
		5	**Oxygen release**
		6	**Ecological revitalization**

WGIC 2016, Green Rises 2600 meters

2016 WGIN CONGRESS

Well-being and Environmental Services: The Next Green City

2010/2030

Water, Air, Energy, Climate, Biota, Perception

Andres Ibanez, Technical and Scientific Committee, Cofounder RECIVE, 2016