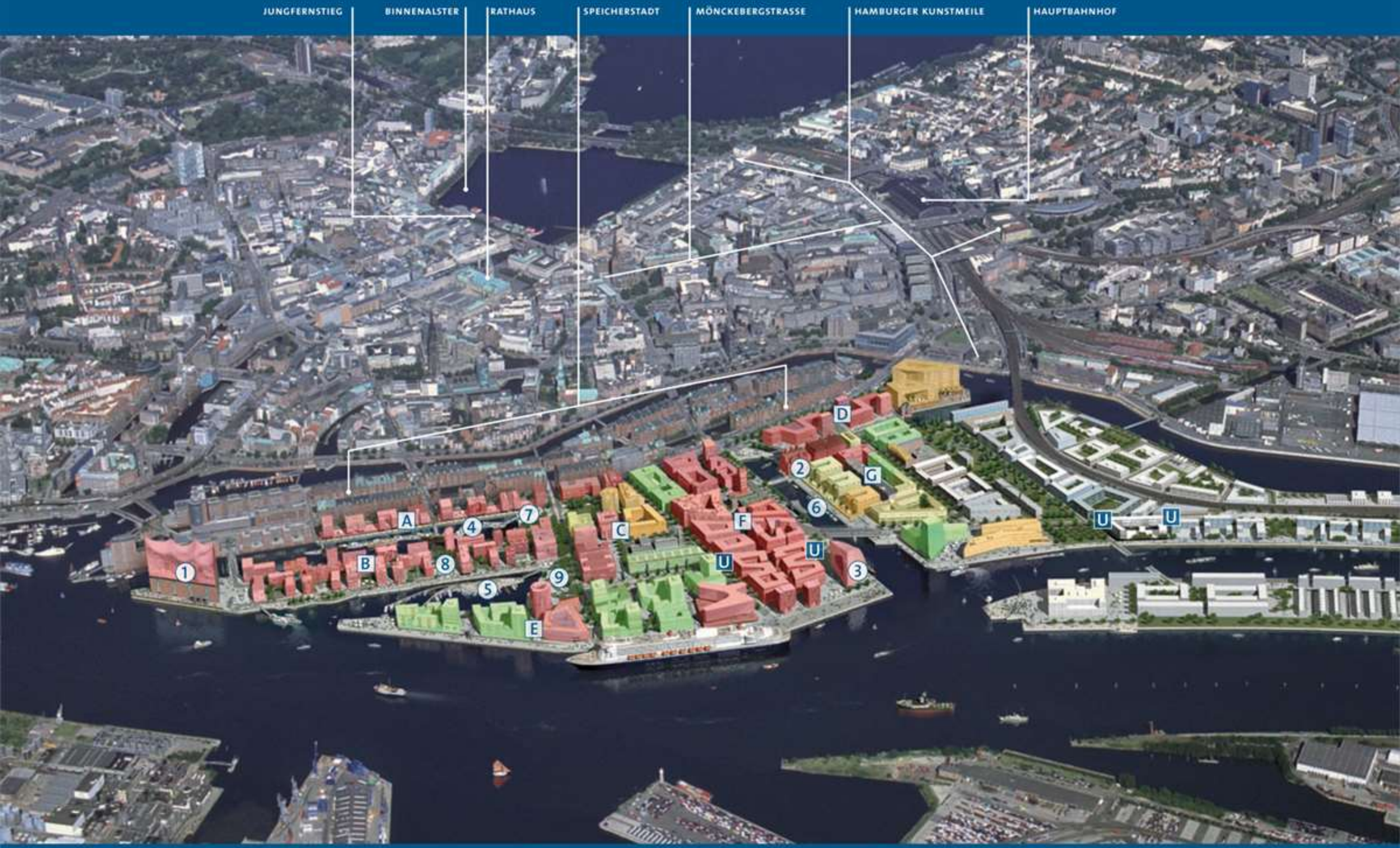
Sustainable Urban Design Symposium
MIT

6 May 2013

BEHNISCH ARCHITEKTEN



A SANDTORKAI
fertiggestellt

B DALMANNKAI
im Bau

C AM SANDTORPARK / GRASBROOK
im Bau

D BROOKTORKAI

E STRANDKAI

F ÜBERSEEQUARTIER

G MAGDEBURGER HAFEN

H BAAKENHAFEN

verkauft/im Bau

Anhandgabe/Architektenwettbewerb

Ausschreibung/Anhandgabereife

Flächenvorbereitung

Quartiere

Projekte

U U-Bahnstation

1 ELBPHILHARMONIE
auf dem Kaispeicher A

2 KAISPEICHER B
Internationales Maritimes Museum Hamburg

3 SCIENCE CENTER / AQUARIUM / WISSENSCHAFTS-THEATER

Competition Site Plan

Public Space

TAXI

DOVE-SPA

SUPERMARKET

CAFÉ

TERRACE

RESTAURANT

TRIAL KITCHEN

FOOD
SOLUTION

DELIVERY
AREA

RESTAURANT KITCHEN

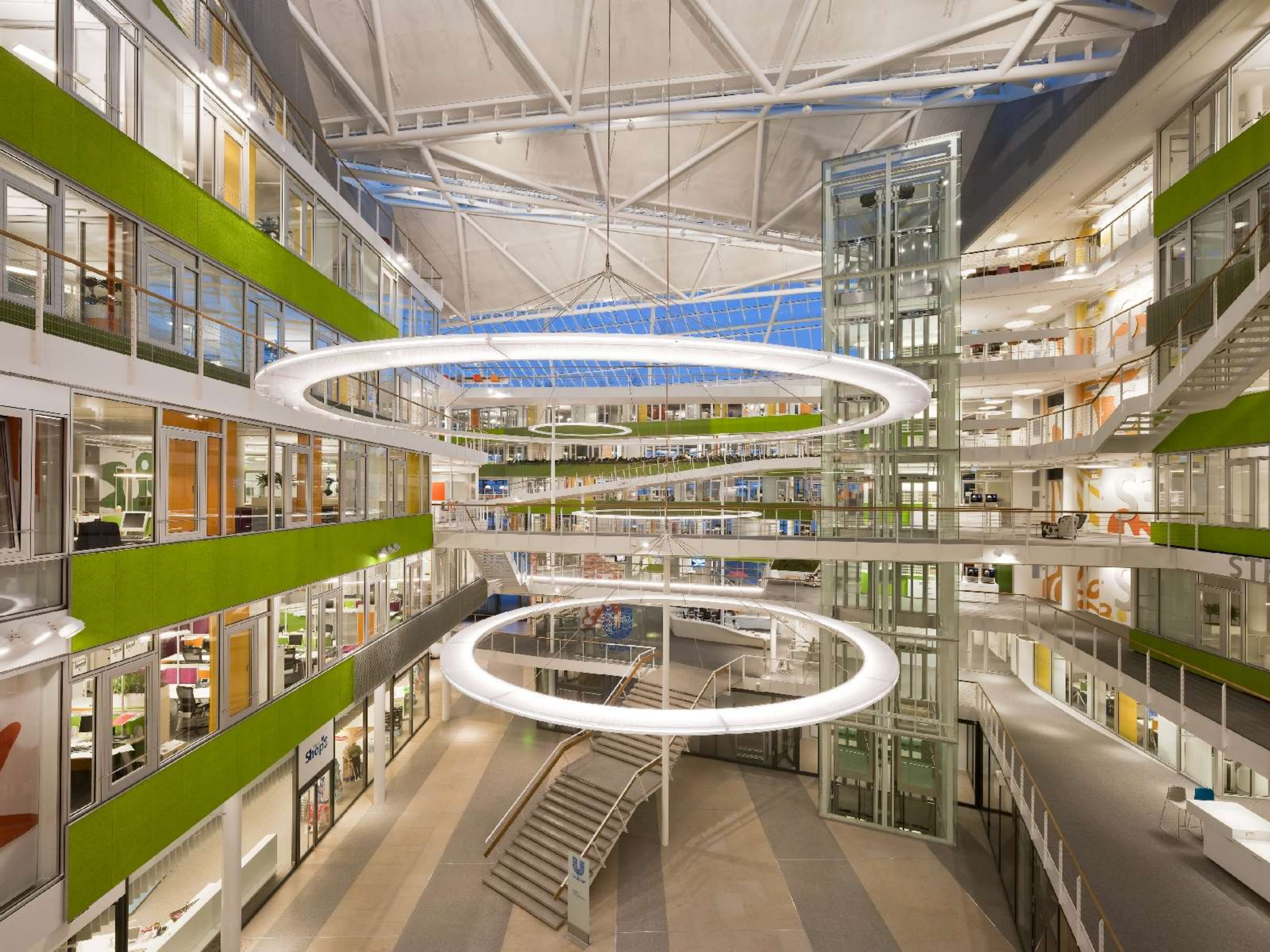
MARCO POLO TOWER

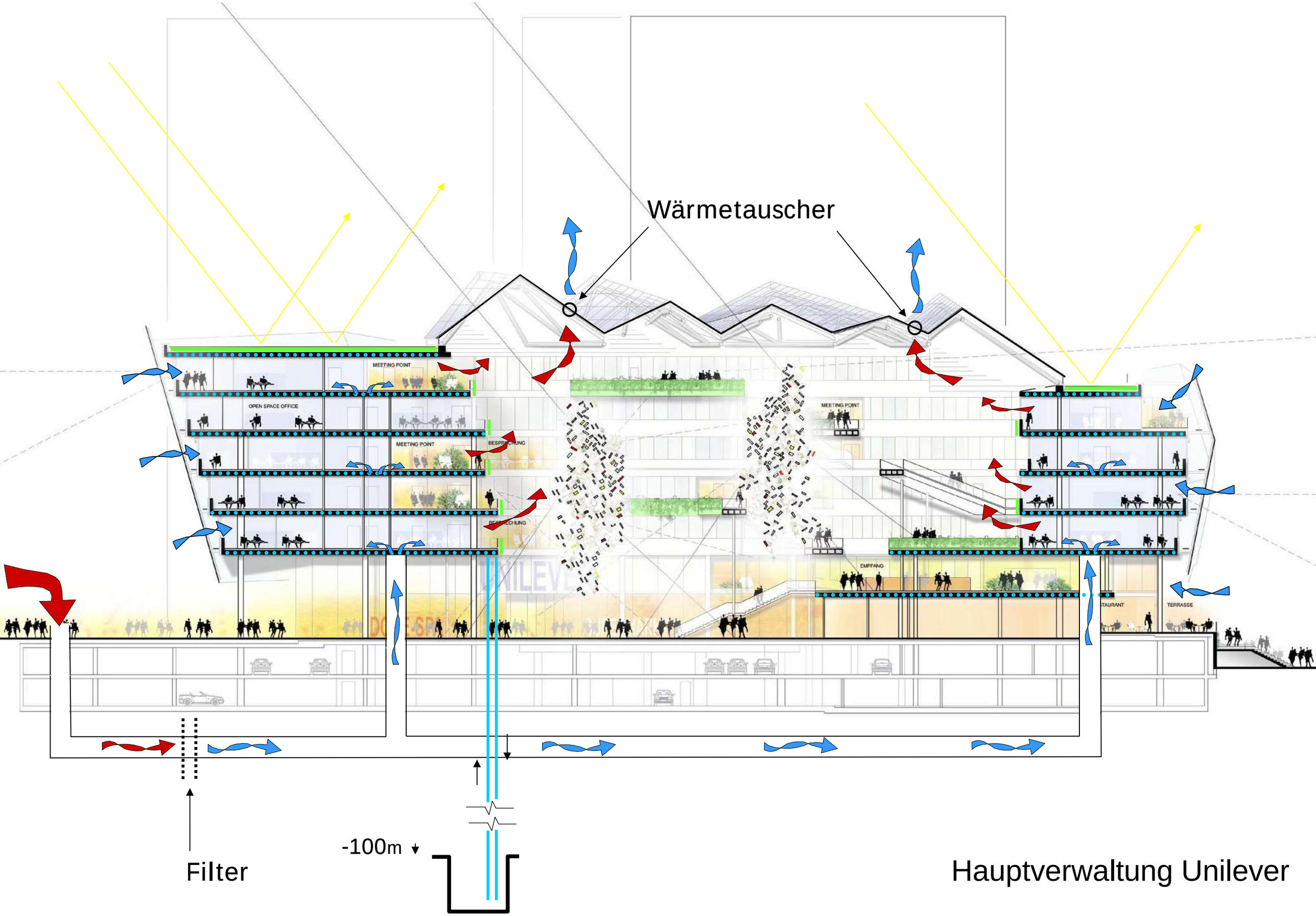
ACCESS
UNDERGROUND
GARAGE

Ground Level

OFFICE
OFFICE
OFFICE
OFFICE
MEETING ROOM
MEETING POINT
MEETING POINT
MEETING ROOM
OFFICE
OFFICE
OFFICE
MEETING POINT
OFFICE
MEETING ROOM
OFFICE
OFFICE
MARCO POLO TOWER

3rd Floor


Shops



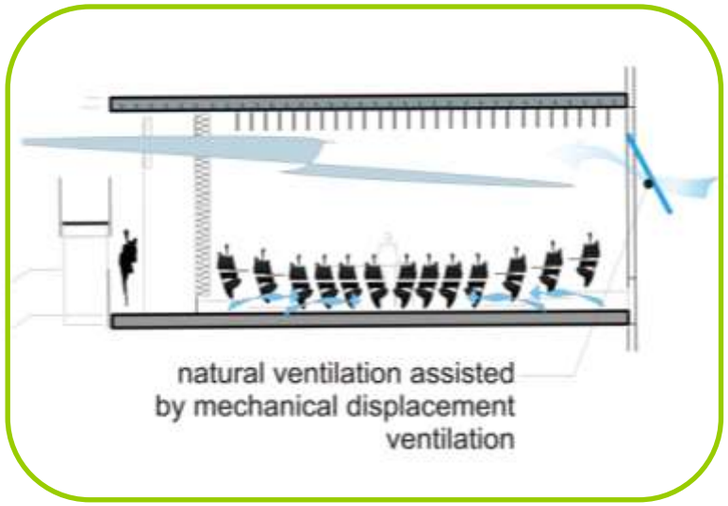
Hauptverwaltung Unilever

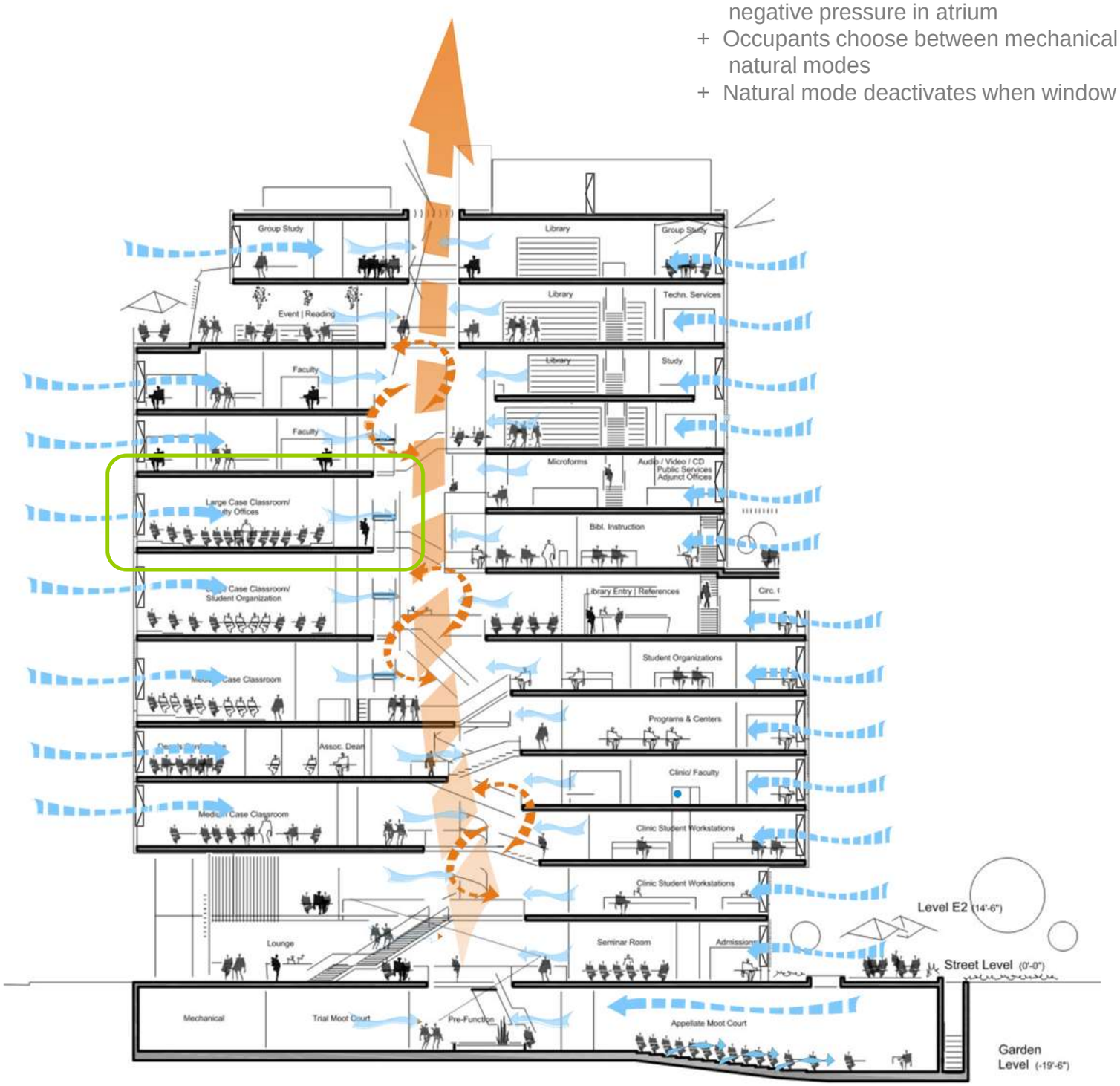
UB Campus Connectivity Study, Competition Diagram

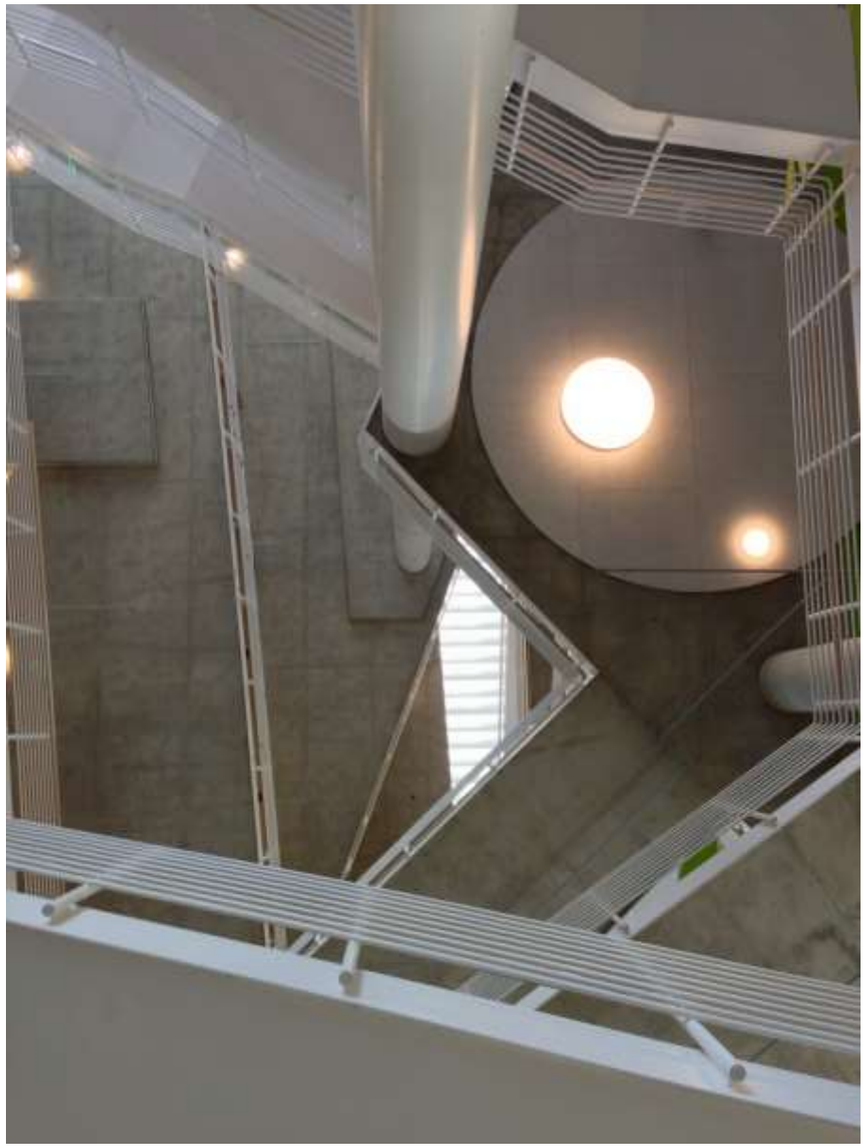
Site Plan

INDOOR CLIMATE CONCEPT
Natural Ventilation Mode

+ Operable windows can be used for ~4 months a year
+ Smoke Exhaust fans @ skylight maintain negative pressure in atrium
+ Occupants choose between mechanical and natural modes
+ Natural mode deactivates when window opens



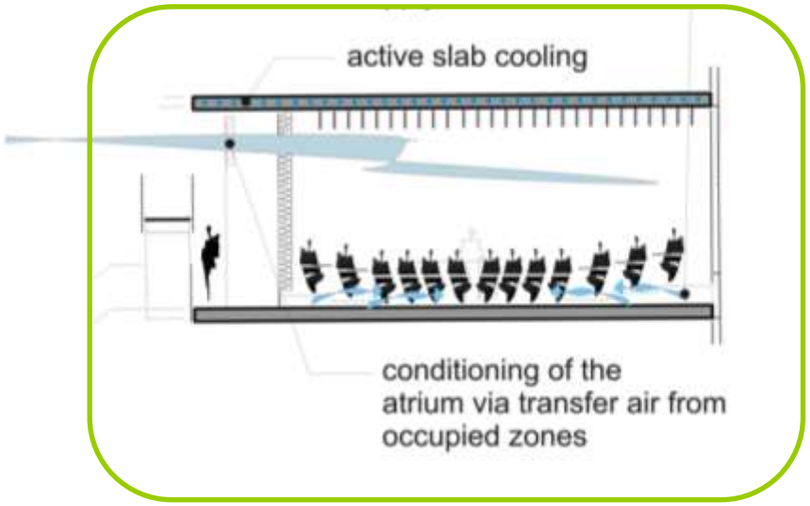


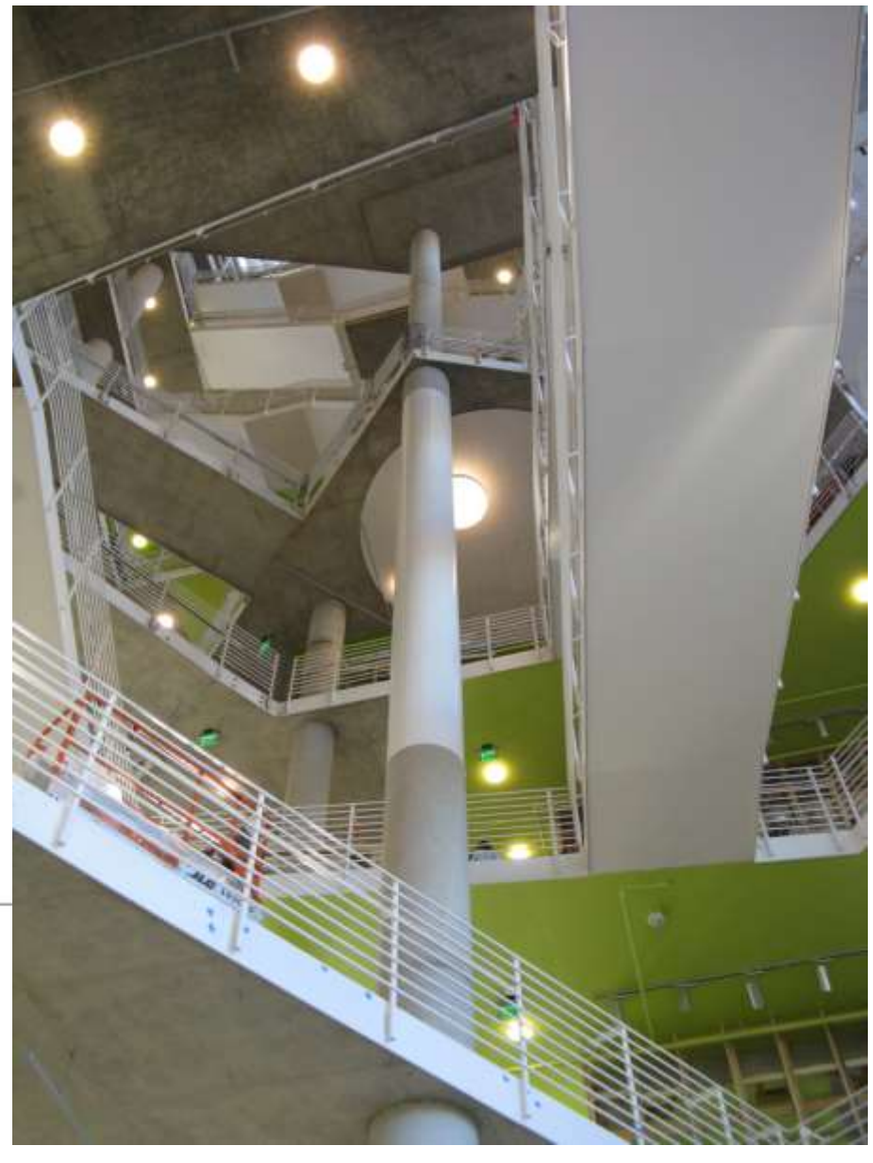


TRANS SOLAR

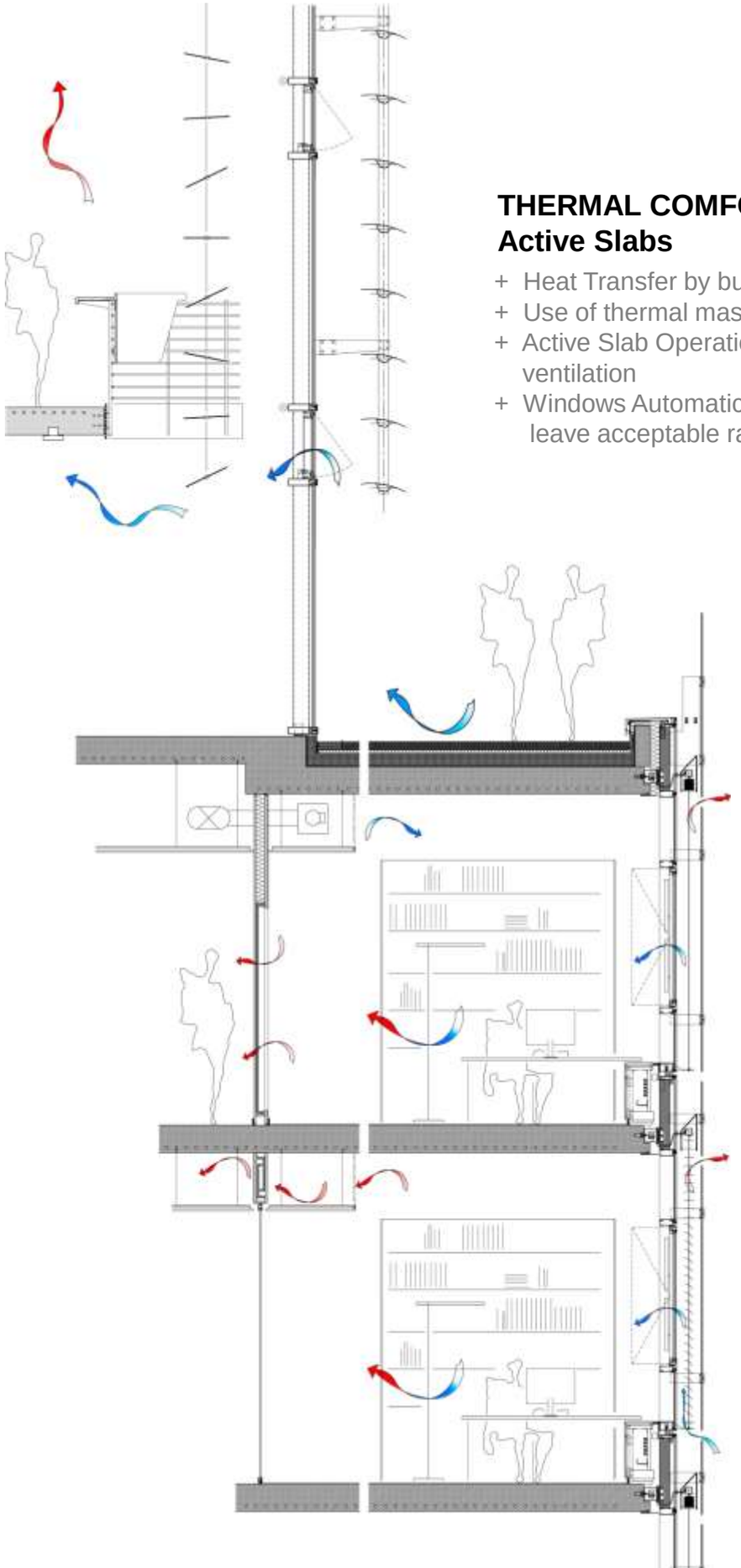
INDOOR CLIMATE CONCEPT
Cooling Mode

+ Provided by active slabs in occupied spaces
+ AHU delivers minimum outside air – Air Quality & Dehumidification
+ Classrooms are delivered air via displacement air
+ Office fed air via windows or overhead systems monitored by VAV
+ Transfer air sent to atrium



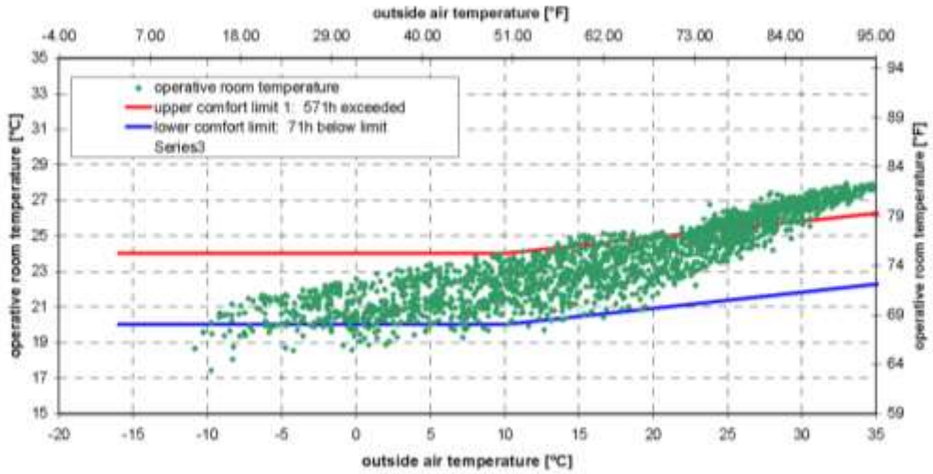


TRANS SOLAR

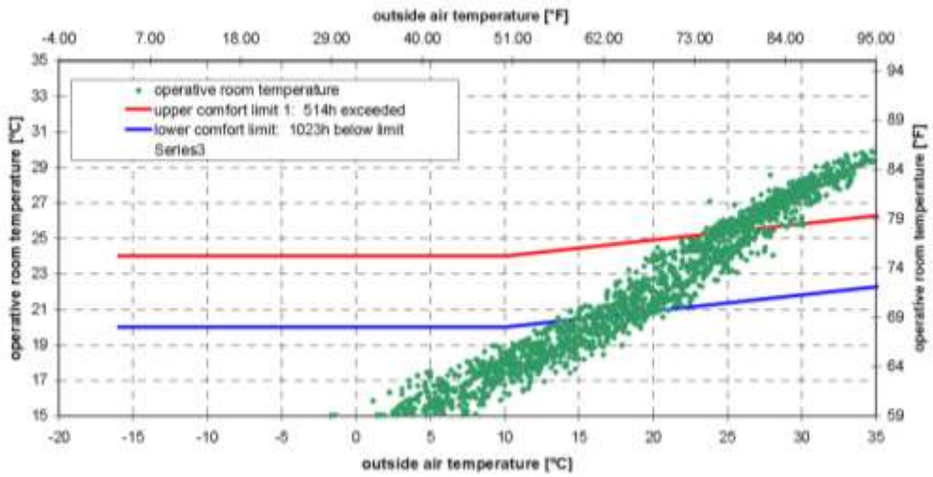


THERMAL COMFORT
Active Slabs

+ Heat Transfer by building occupancy
+ Use of thermal mass
+ Active Slab Operation allowed during natural ventilation
+ Windows Automatically close when conditions leave acceptable range



(a) overall U-value 0.18 Btu/h-ft²-°F



TRANS SOLAR

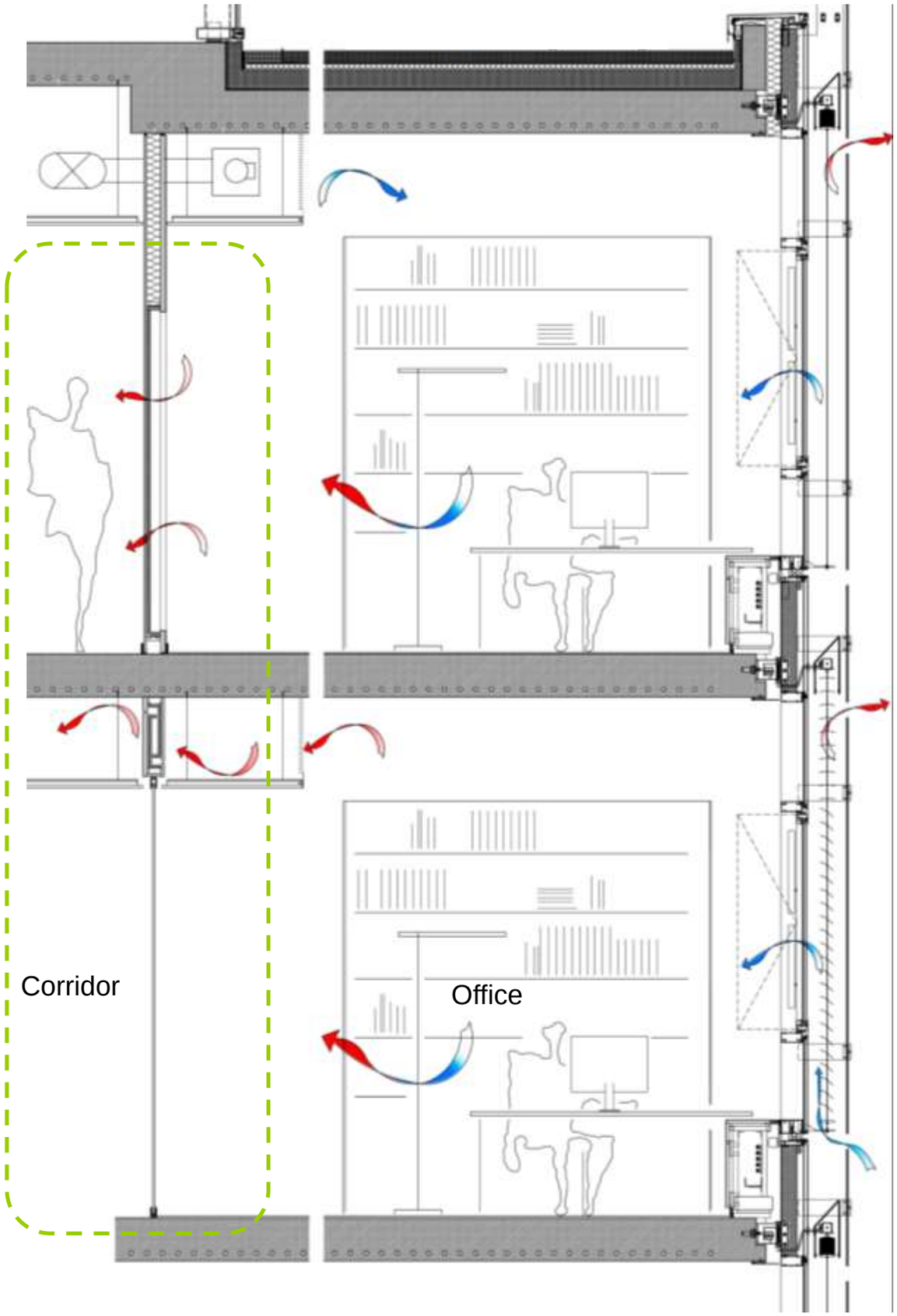
OFFICE/CLASSROOM FAÇADE

ALL WORKSPACES HAVE OPERABLE WINDOWS AND INDIVIDUALLY CONTROLLABLE, EXTERNALLY MOUNTED, SUN PROTECTION.

A GLASS RAINSCREEN PROTECTS THE PROGRAMMATIC INTERIOR WORKSPACES AND THE SUN SHADING DEVICES FROM STRONG WINDS

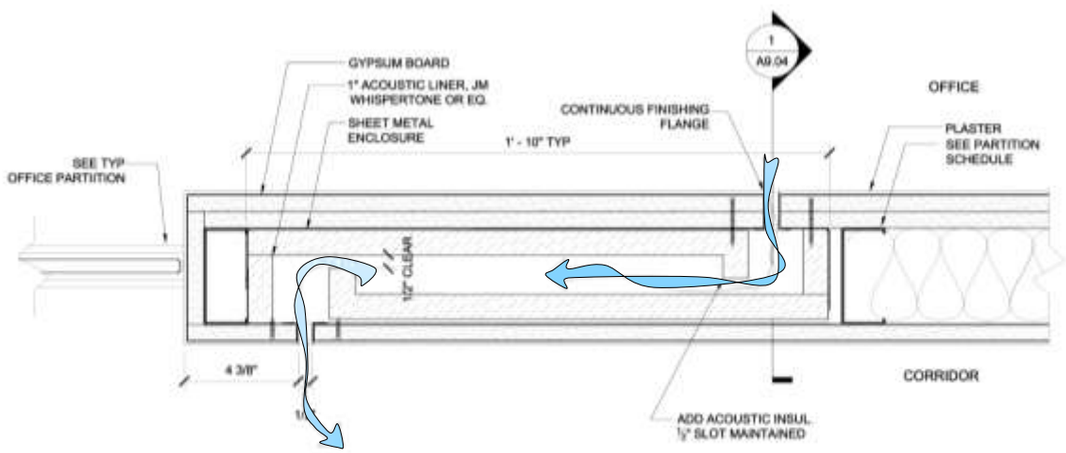
ASSEMBLY
Double Skin Facade

+ Insulating Low-E Coated Low-Iron Glazing
+ ½” Tempered Laminated Low-Iron Glazing
+ Opaque Metal Composite Panels
+ Operable Windows
+ External Shading



THERMAL COMFORT
Window Automation

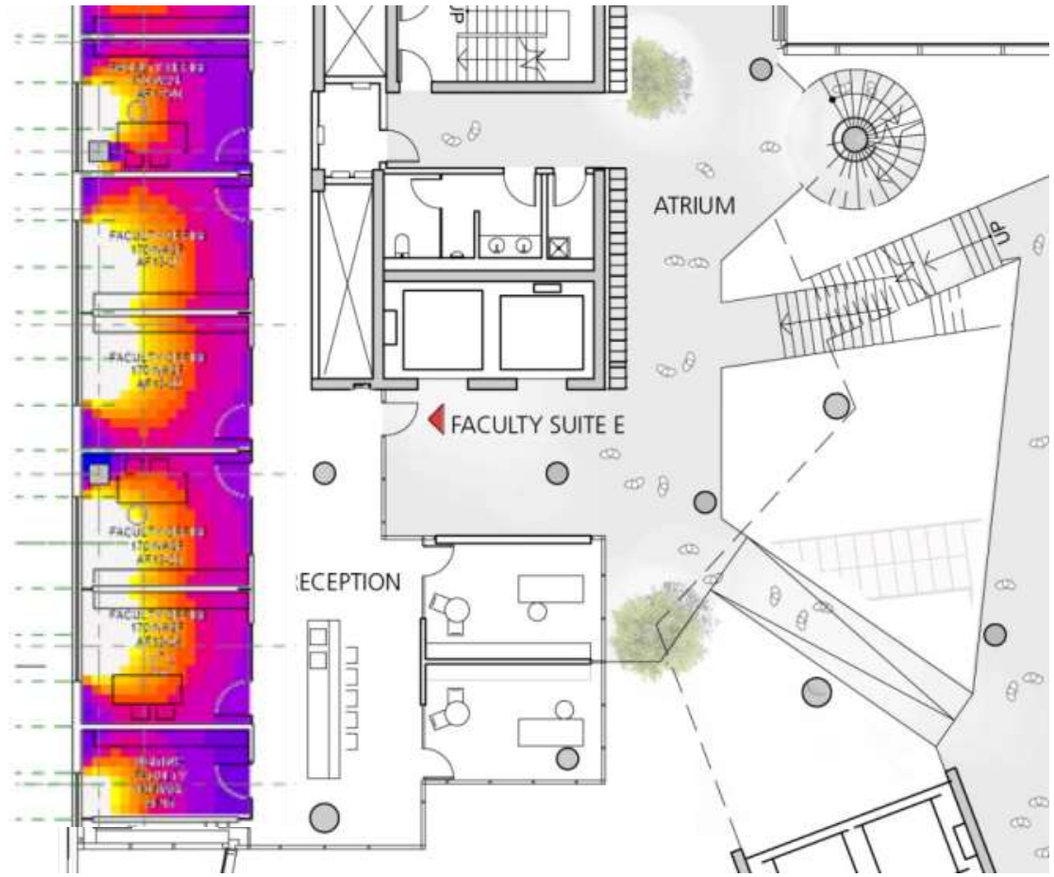
+ Manual Operation of Vents – Notified by Indicator Light



Enlarged Plan @ Vertical Passive Transfer Air Slot

DAYLIGHTING
Spatial Organization & Local Control

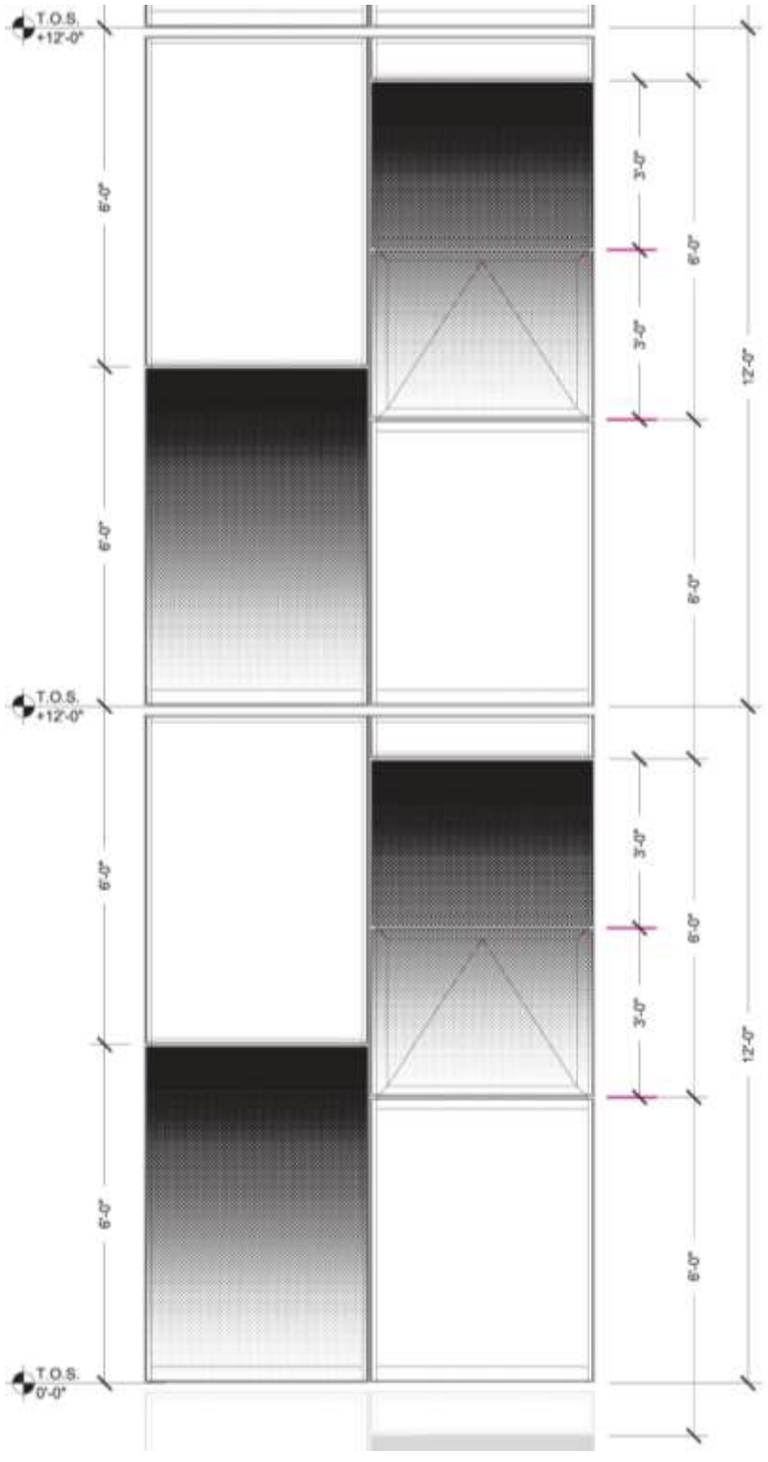
+ Daylight Factor Level +3%
+ Outside retractable louvers reduce glare
+ Exterior blinds tilt angles vary to allow daylighting to be redirected in upper 1/3rd
+ Up & down when façade radiation passes certain limits
+ Local override for daylight

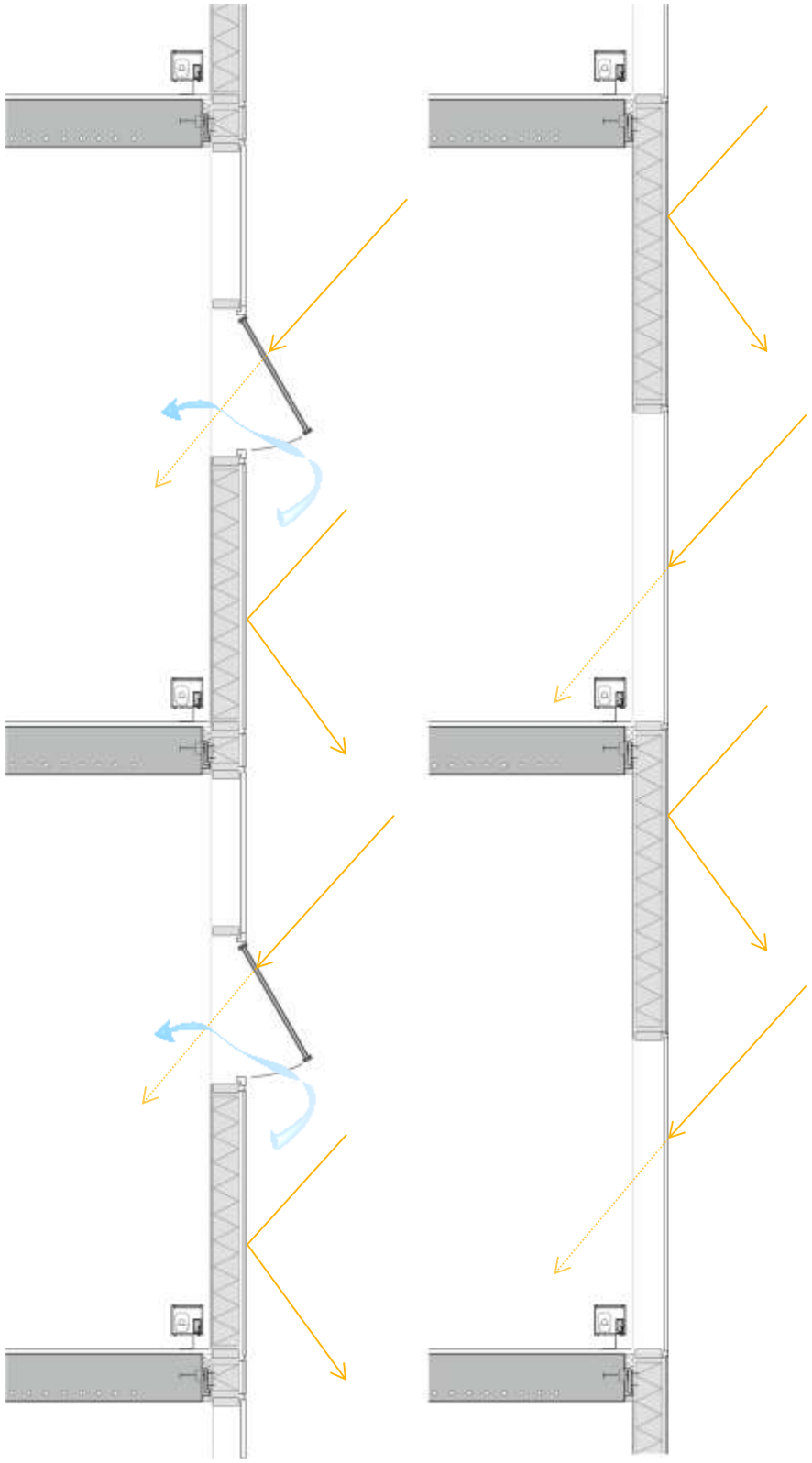


LIBRARY FAÇADE

ASSEMBLY
Checkerboard Unitized System

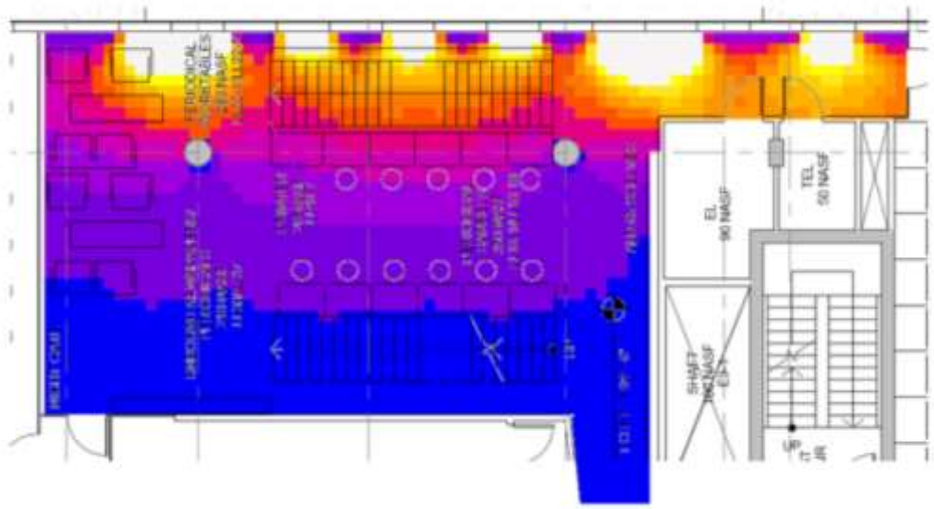
+ Insulating Low-E Coated Low-Iron Glazing w/ gradient frit pattern
+ Insulating Low-Iron Full Ceramic Frit Spandrel Glazing
+ Insulated Operable Awning Vent

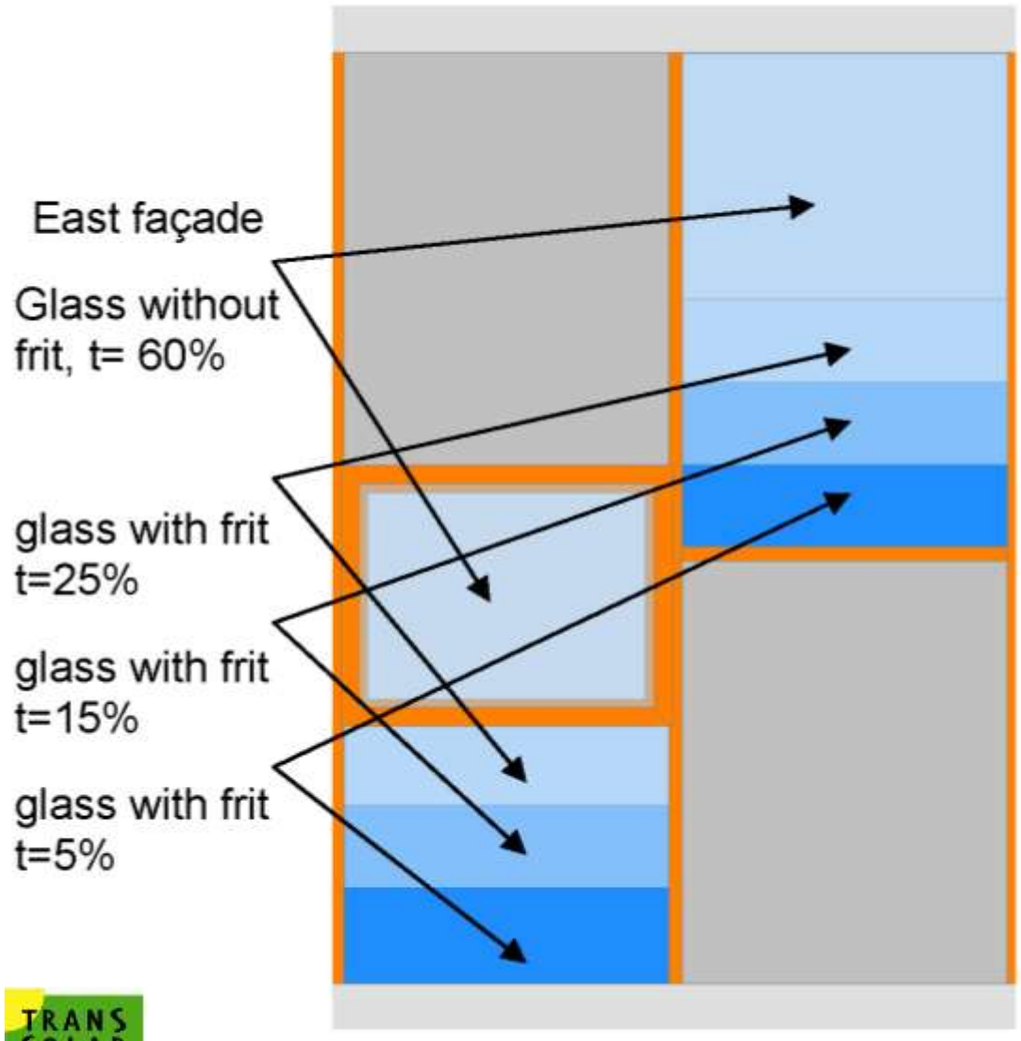


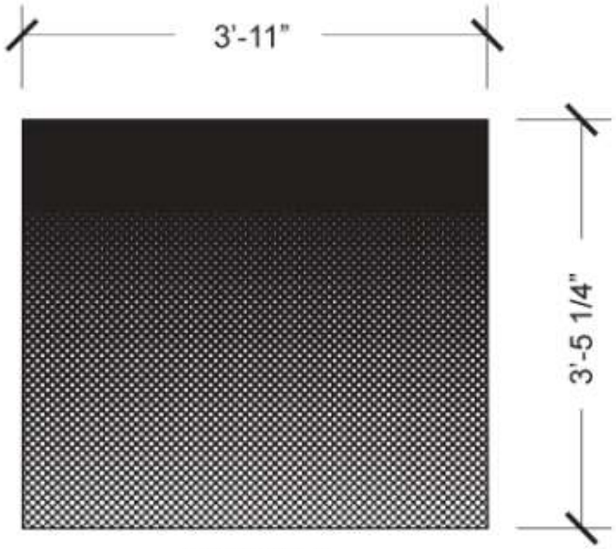


DAYLIGHT AND THERMAL CONTROL
Silkscreen Pattern

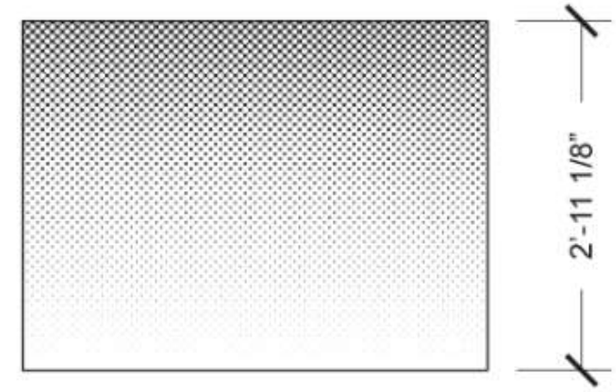
+ No external shading
+ Pattern minimizes coverage near ceiling
+ Deep spaces force strategic programmatic layouts – Stacks & circulation toward interior while reading reading rooms and group studies near façade.
+ Interior programs benefit from daylight from atrium
+ Glare protection achieved with interior screens



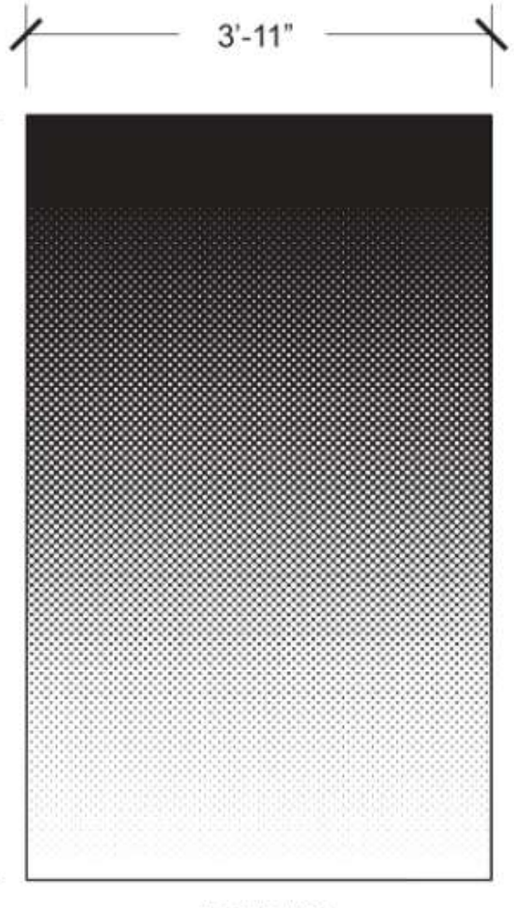




PATTERN 13 C

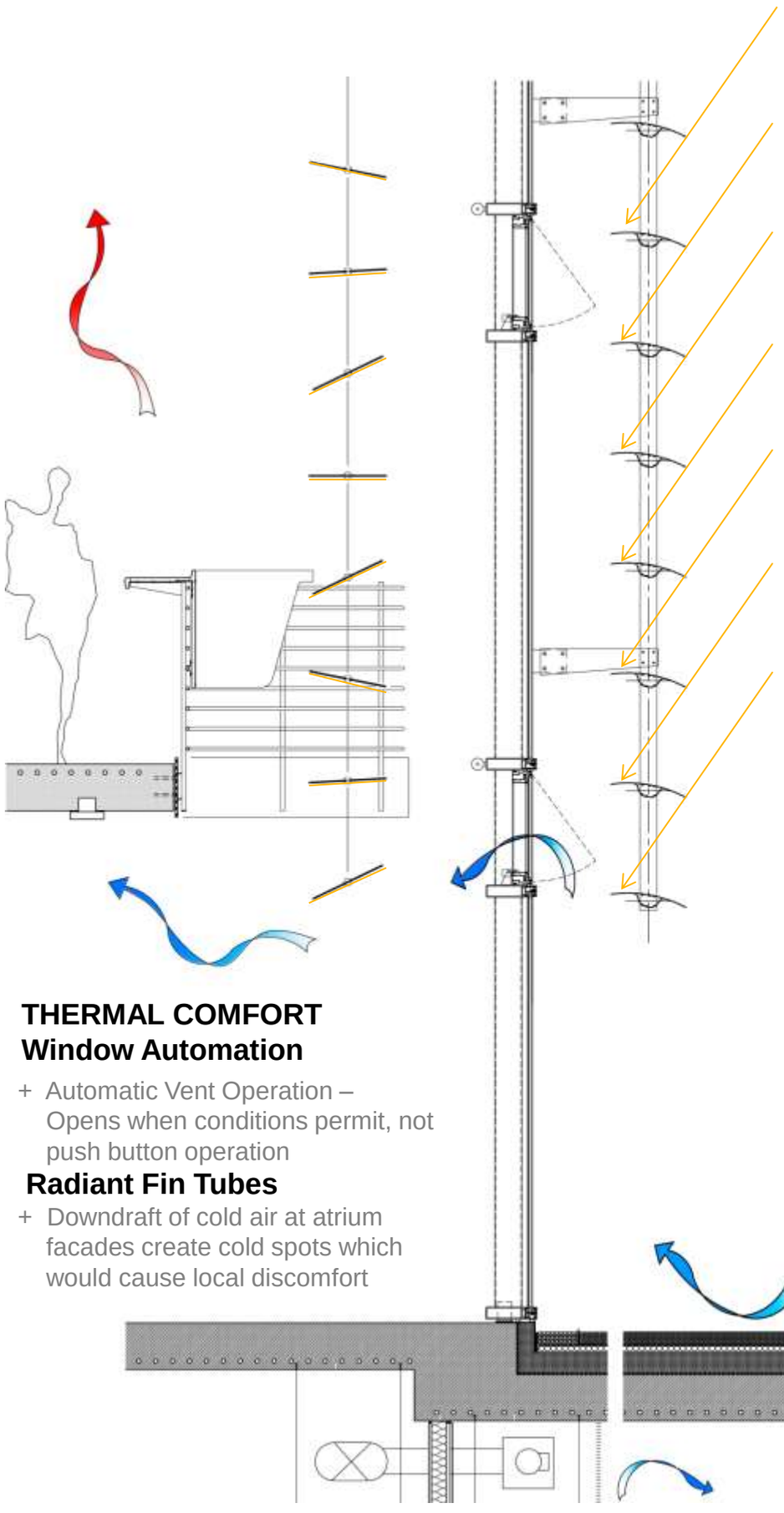


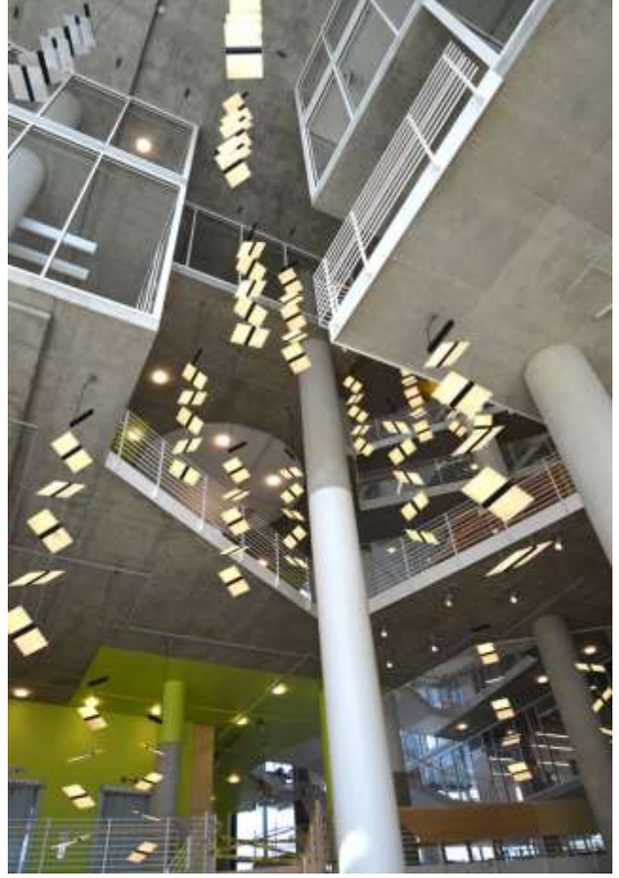
PATTERN 13 B



PATTERN 13 A

ATRIUM FAÇADE





DAYLIGHTING
Fixed Blade Louvers

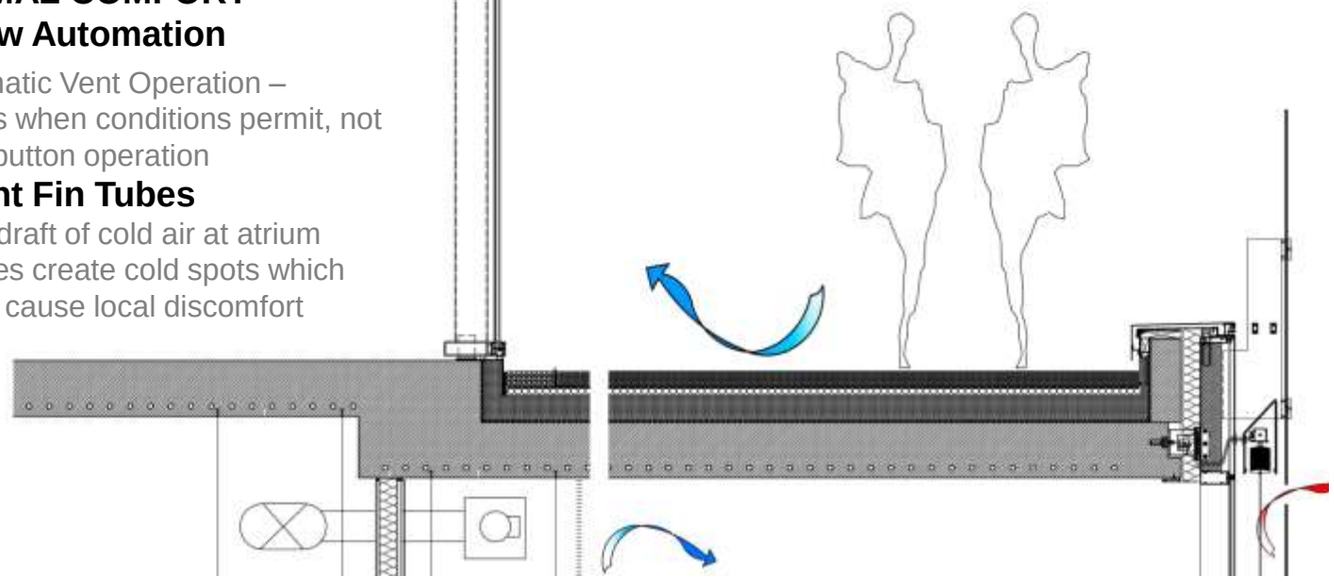
+ Spacing to block intense
  allow plenty of views out
+ Minimal reliance on artific
  allows for more creative d

THERMAL COMFORT
Window Automation

+ Automatic Vent Operation –
  Opens when conditions permit, not
  push button operation

Radiant Fin Tubes

+ Downdraft of cold air at atrium
  facades create cold spots which
  would cause local discomfort



Louver Study 2

A VISION FOR PITTSBURGH

A
THE PUBLIC SPACE NETWORK
8TH STREET

8TH STREET:
THE ATTRACTIVE WAY TO THE RIVERFRONT!

A
THE PUBLIC SPACE NETWORK
8TH STREET

THREE SISTER‘S GALLERY

RESTAURANT

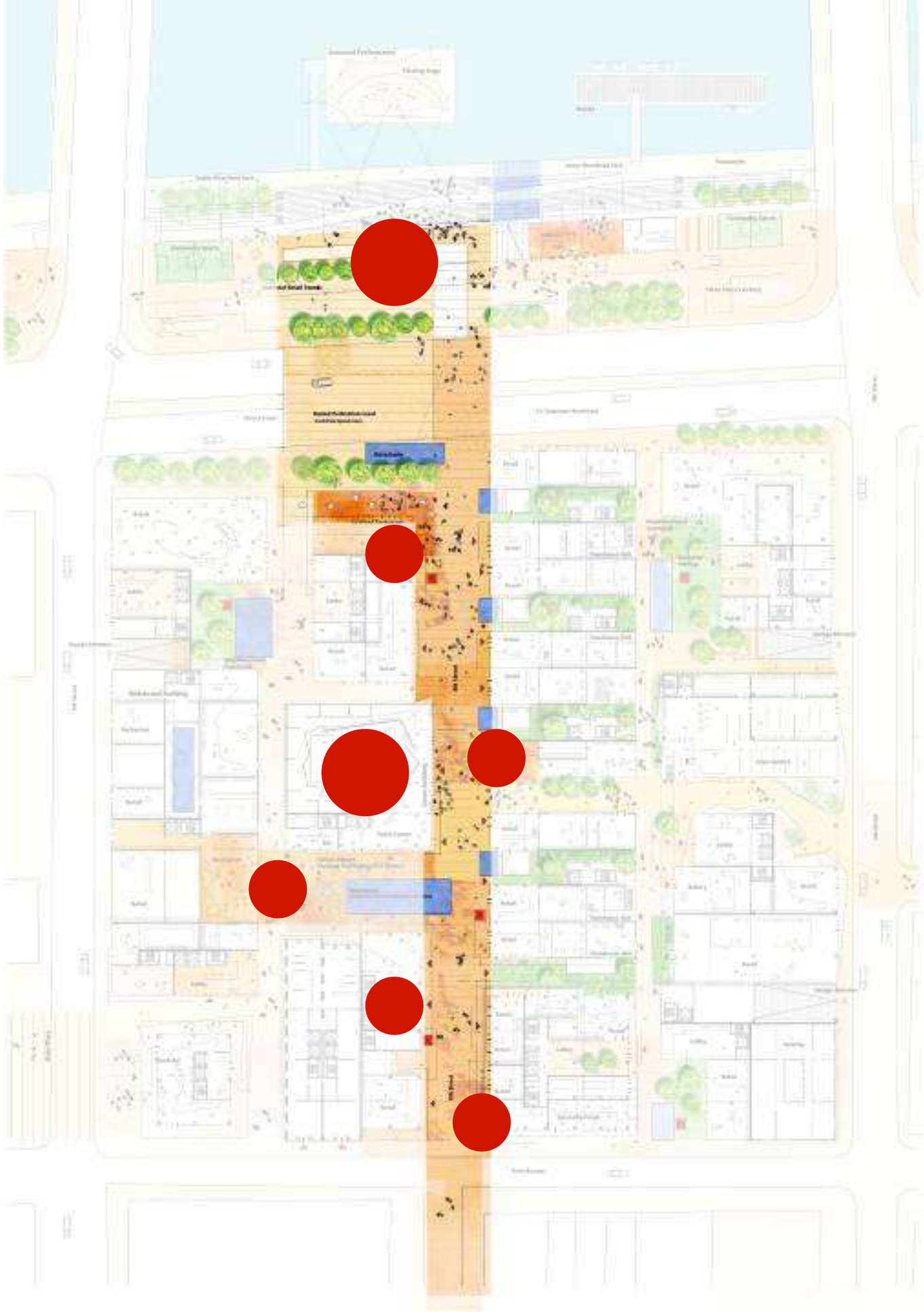
CAFE

THEATER

OUTDOOR PERFORMING

HOTEL

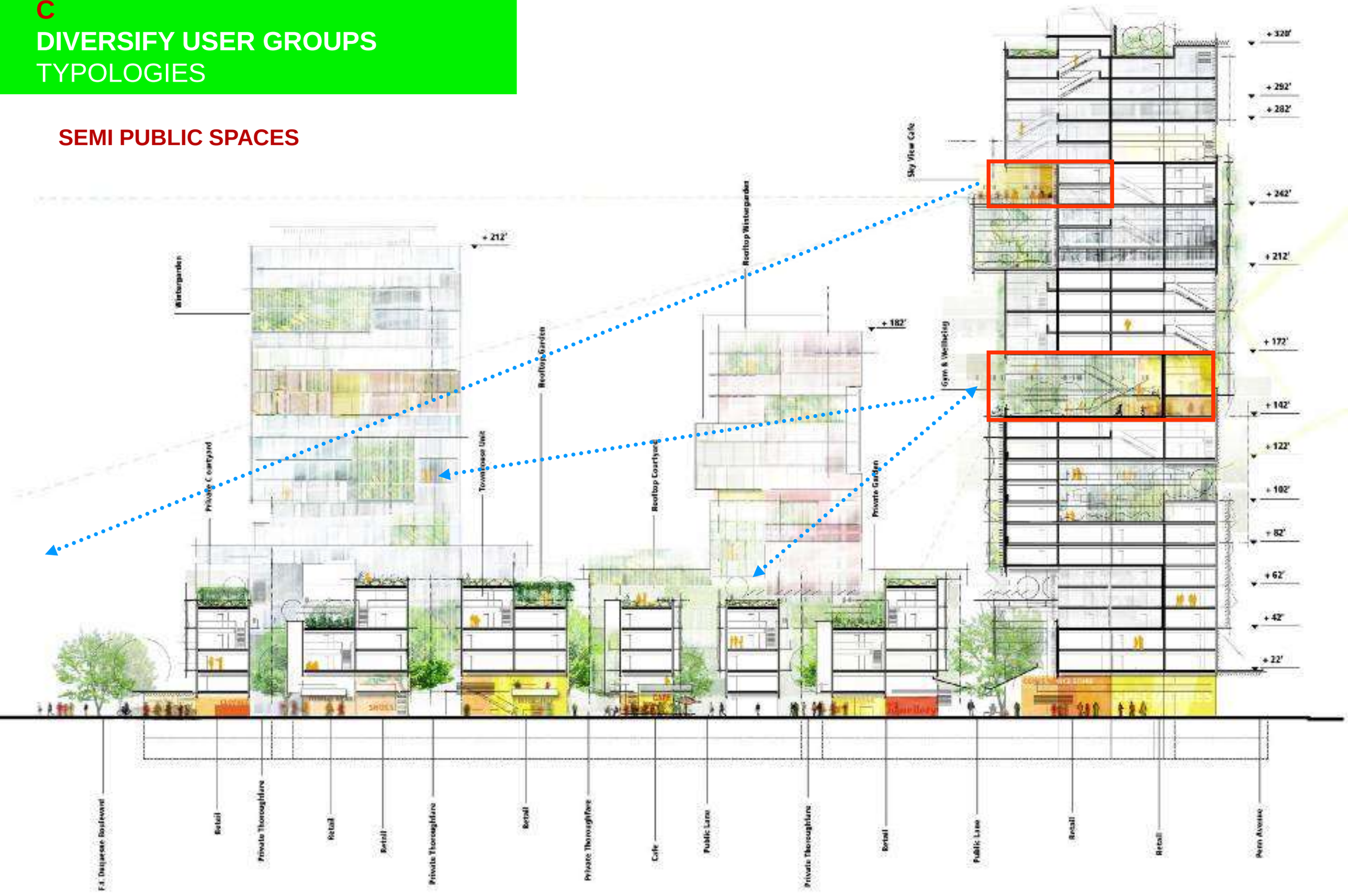
RETAIL ATTRACTIONS



C

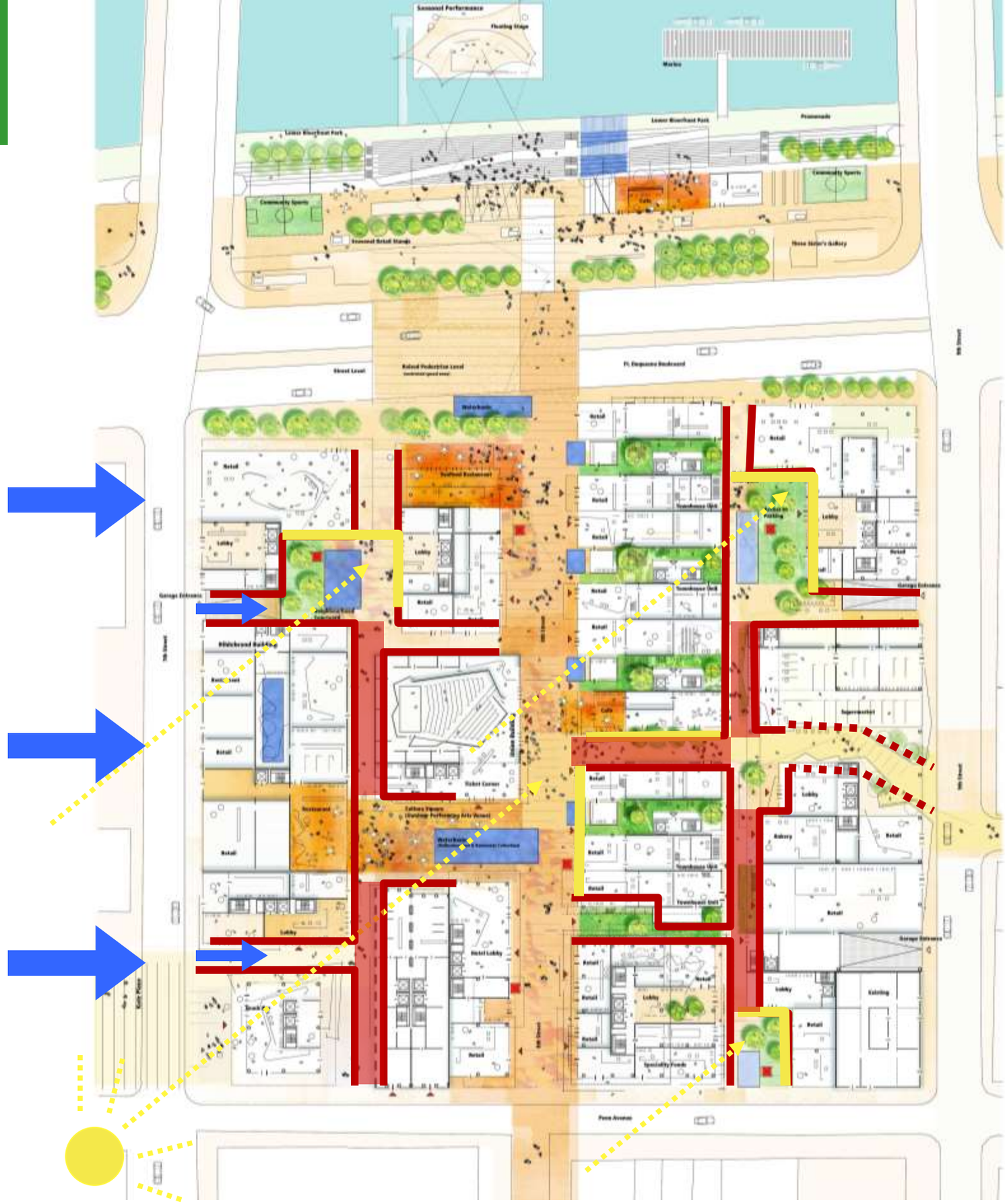
DIVERSIFY USER GROUPS
TYPOLOGIES

SEMI PUBLIC SPACES



A
THE PUBLIC SPACE NETWORK

THE LANES:
A FINER GRAIN



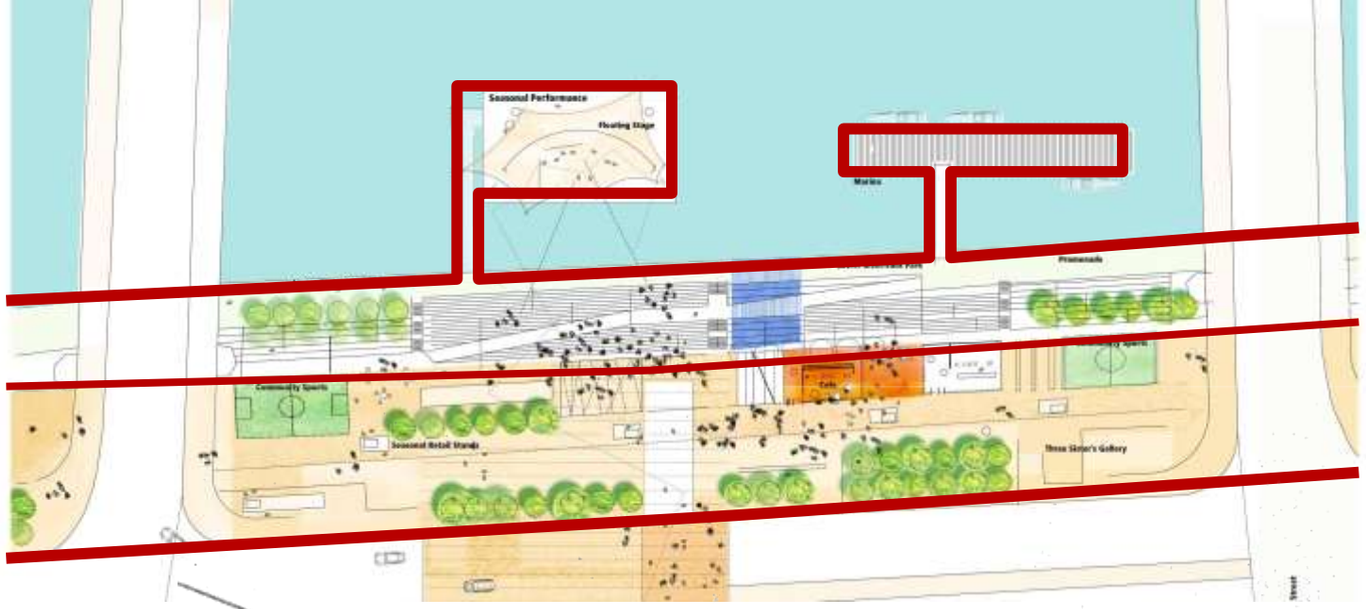
B
DESTINATIONS

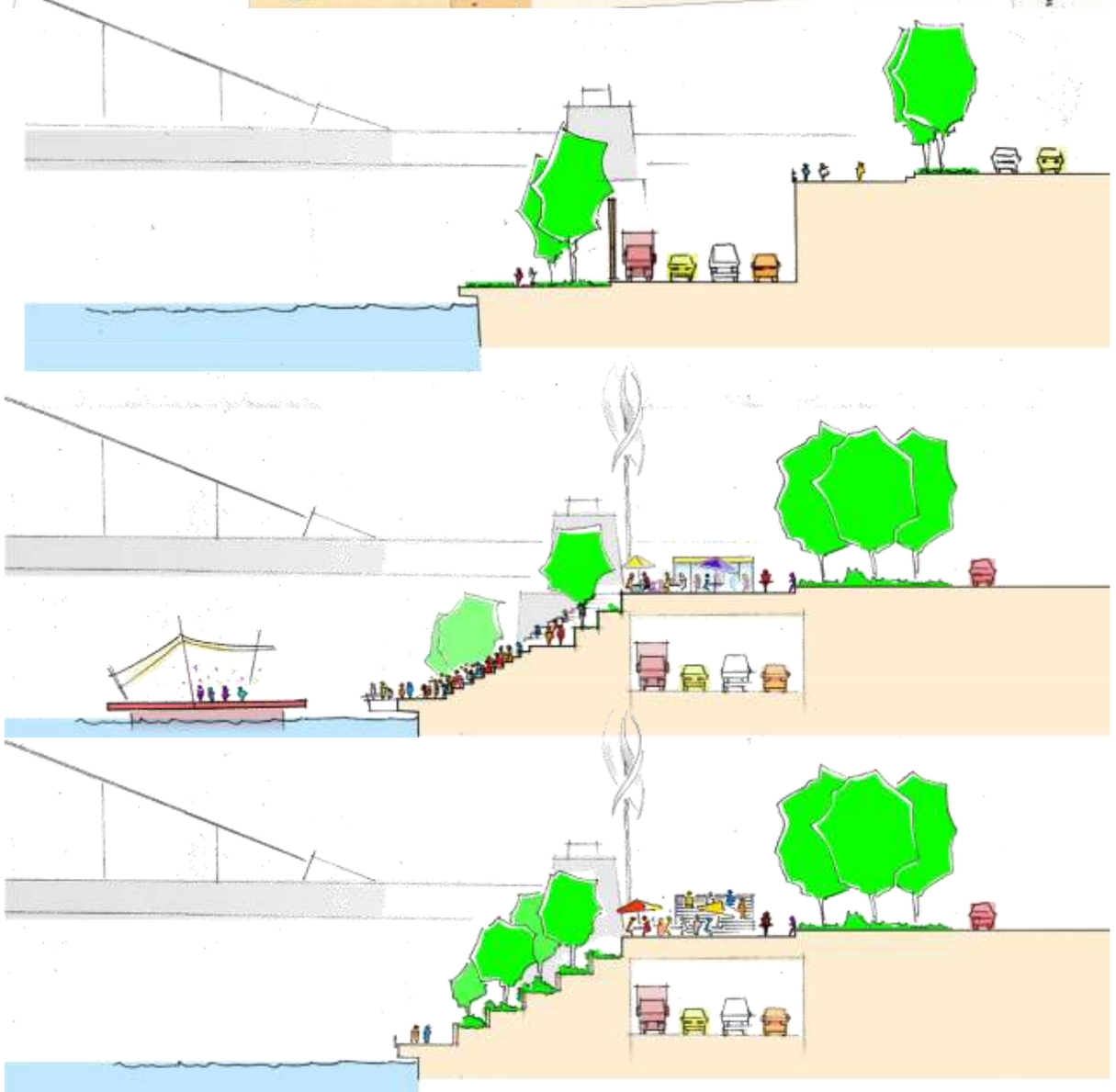
-CURRENT SITUATION

-COVERAGE OVER BYPASS

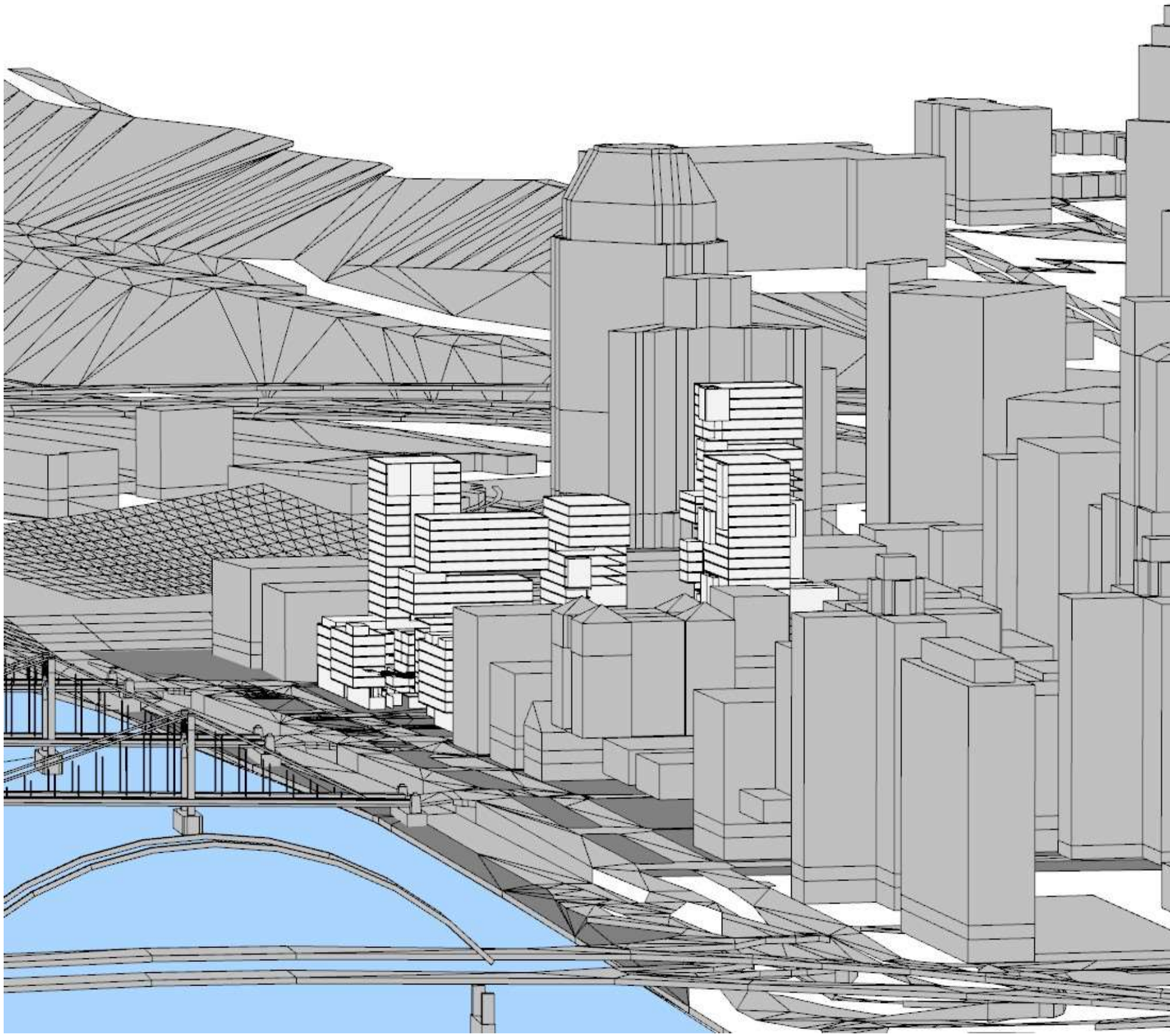
-DIRECT ACCESS TO THE WATER

-NEW OPPORTUNITIES FOR THE RIVERFRONT

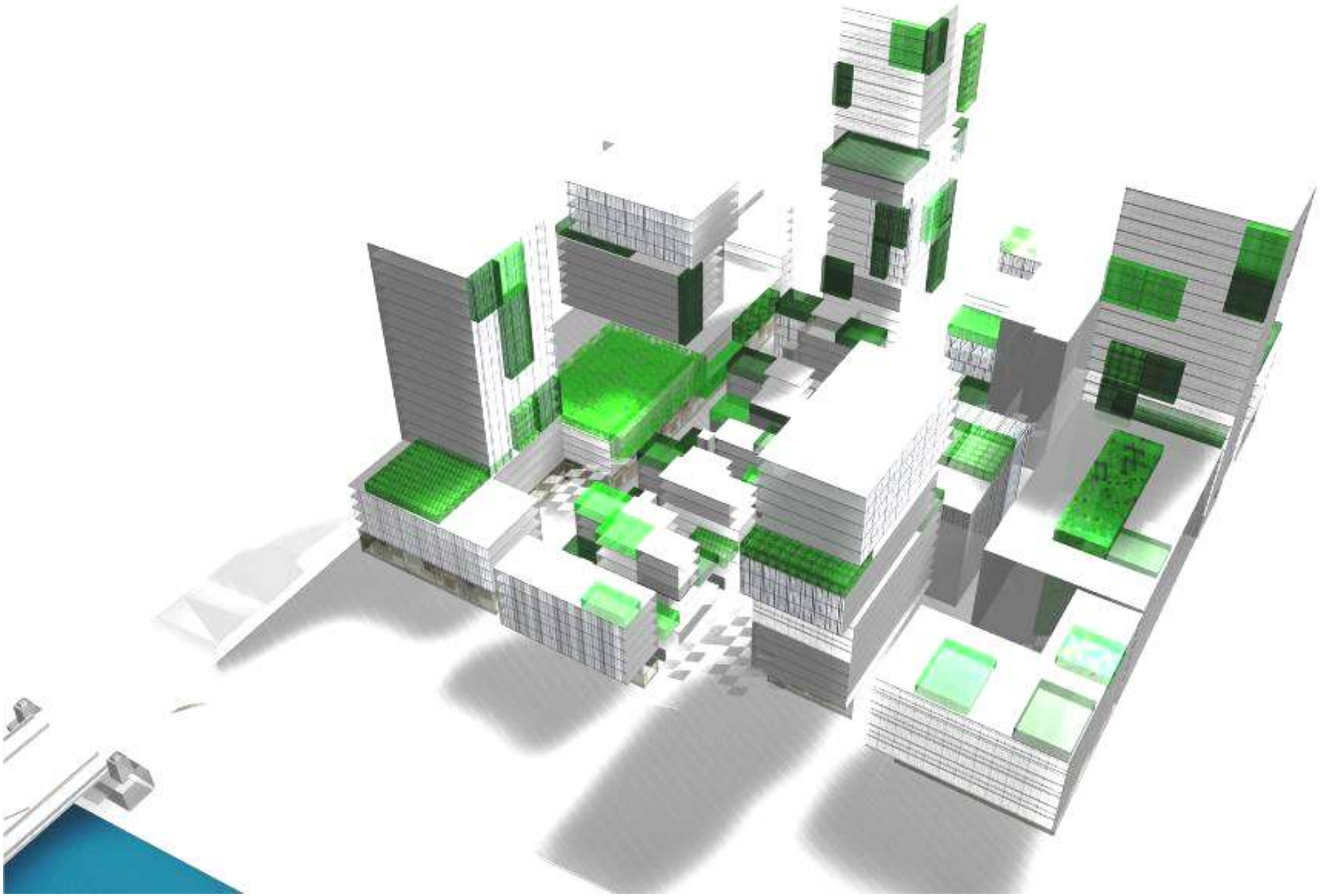




View from sun position
21st March/September



D
HIGH QUALITY ENVIRONMENT



BEHNISCH ARCHITEKTEN

früher

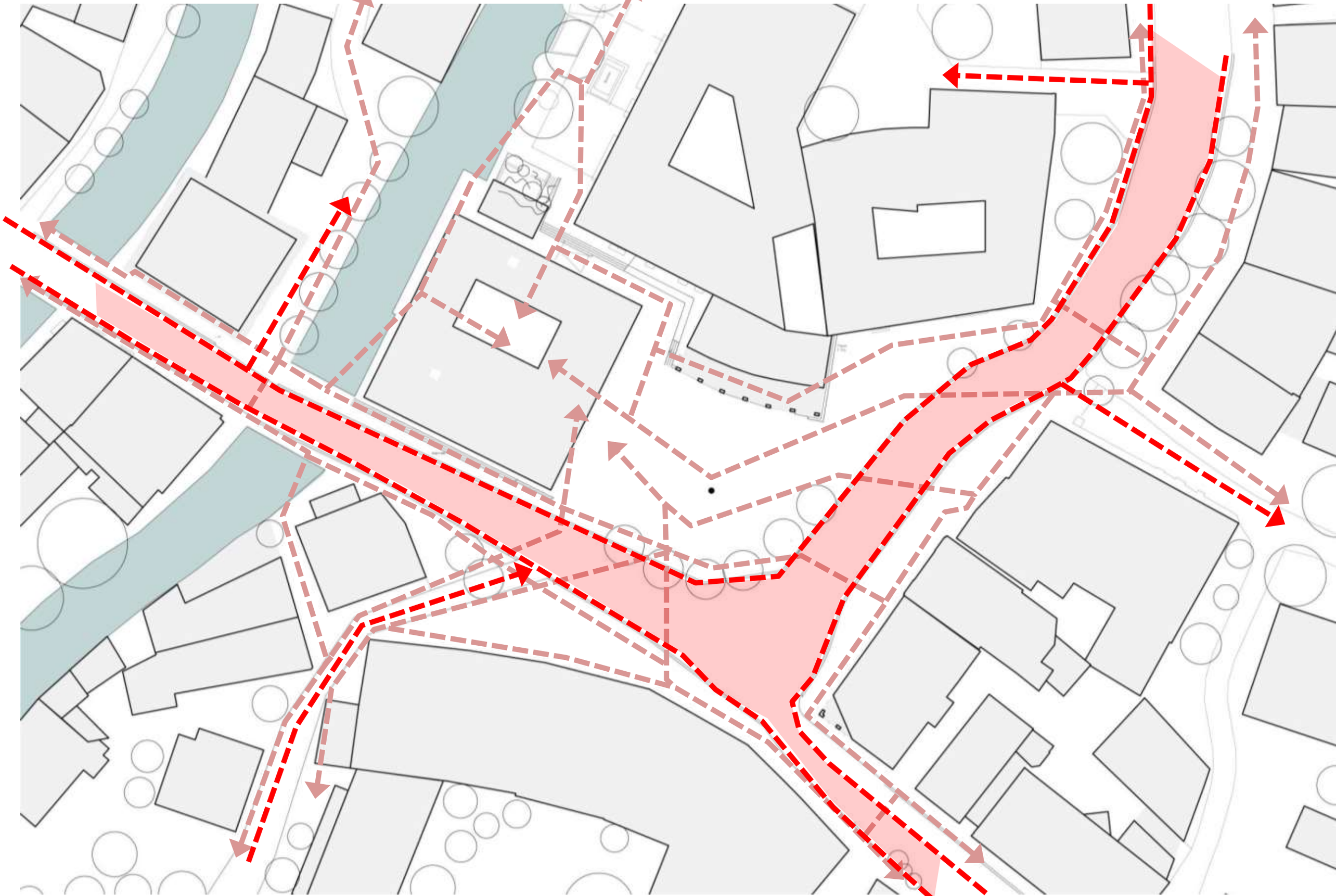
ODER / UND ?

Fussgängerverkehr

Fahrverkehr

BEHNISCH ARCHITEKTEN

traffic



BEHNISCH ARCHITEKTEN

Überlagerung

Unterbrechung der Fahrwege - Fußgängeraktivitäten

Belagsmuster überlagert gesamte Platzfläche einschliesslich der Fahrbahn

Idee Gestaltungskonzept

Marienplatz

Kastanie

Hecke

Weissdorn

BEHNISCH ARCHITEKTEN

Grün am Marienplatz

BEHNISCH ARCHITEKTEN

Möblierung - Sitzbänke

Heimatfeste

Faschingsumzug

Wochenmarkt

BEHNISCH ARCHITEKTEN

Nutzungen am Marienplatz

15 W Energy-Saving

20 € Savings/Lantern
(operation cost a year)

6,000 Lanterns

EXISTING LANTERN
SON-T 50W

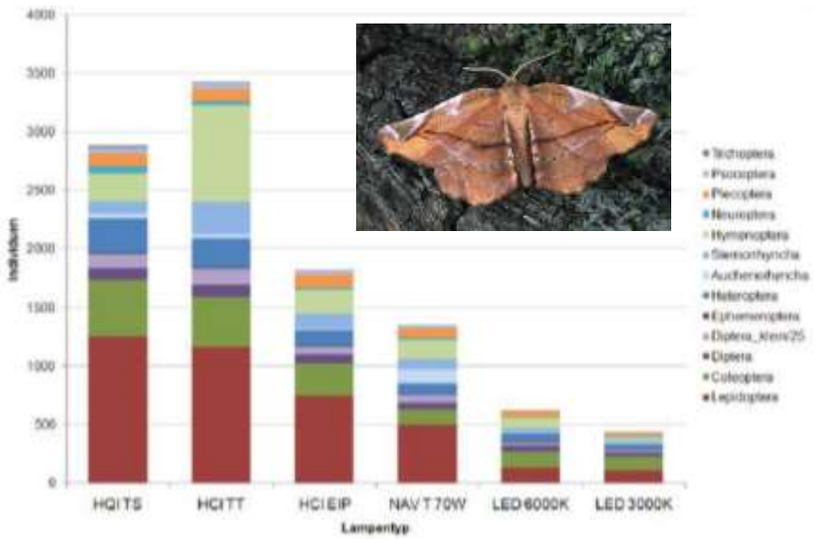
$E_{mean/street} = 2.6$ lx

Power: x 0,66

Illuminance: x 3

NEW RITTER LANTERN
CDM-T 35W

$E_{mean/street} = 7.5$ lx



BEHNISCH ARCHITEKTEN

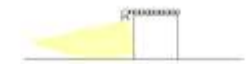
Bad Aibling
Stadtplatzbeleuchtung
Letztstand

Leuchte - Typ 1

Bestandsleuchten mit optimierter Lichttechnik

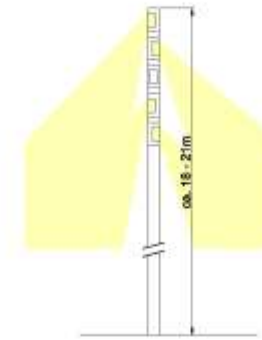
Leuchte - Typ 2

Sitzbankbeleuchtung



Leuchte - Typ 3

freie Bestückung mit Leuchtenköpfen ermöglicht Kombination aus Fahrbahnaufhellung und freier Platzbeleuchtung

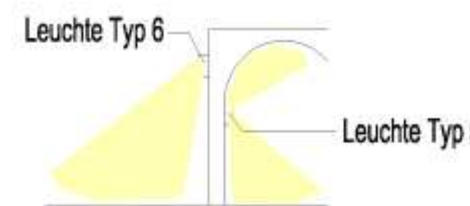


Leuchte - Typ 4

Baumleuchten im bodeneinbau

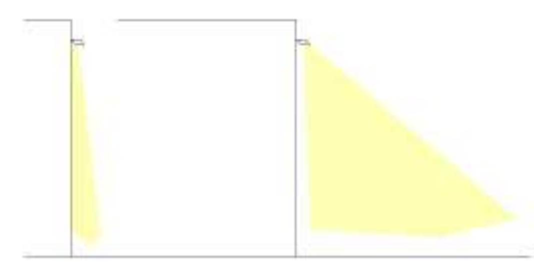
Leuchte - Typ 5 und Typ 6

Kombination aus zwei Komponenten möglich
- direkt und indirekt Beleuchtung



Leuchte - Typ 7

Kombination aus zwei Komponenten möglich
- Gehweg- und Fahrbahnbeleuchtung
- Fassadenaufhellung



Erläuterung:

optimierte Leuchte - Typ 1	optimierte Leuchte - Typ 4	optimierte Leuchte - Typ 7
optimierte Leuchte - Typ 2	optimierte Leuchte - Typ 5	Fassadenaufhellung
optimierte Leuchte - Typ 3	optimierte Leuchte - Typ 6	

Bad Aibling
Stadtplatzbeleuchtung - Letztstand
Entwurf

Bartenbach LichtLabor


Ravensb


Romantik
HOTEL

BEHNISCH ARCHITEKTEN