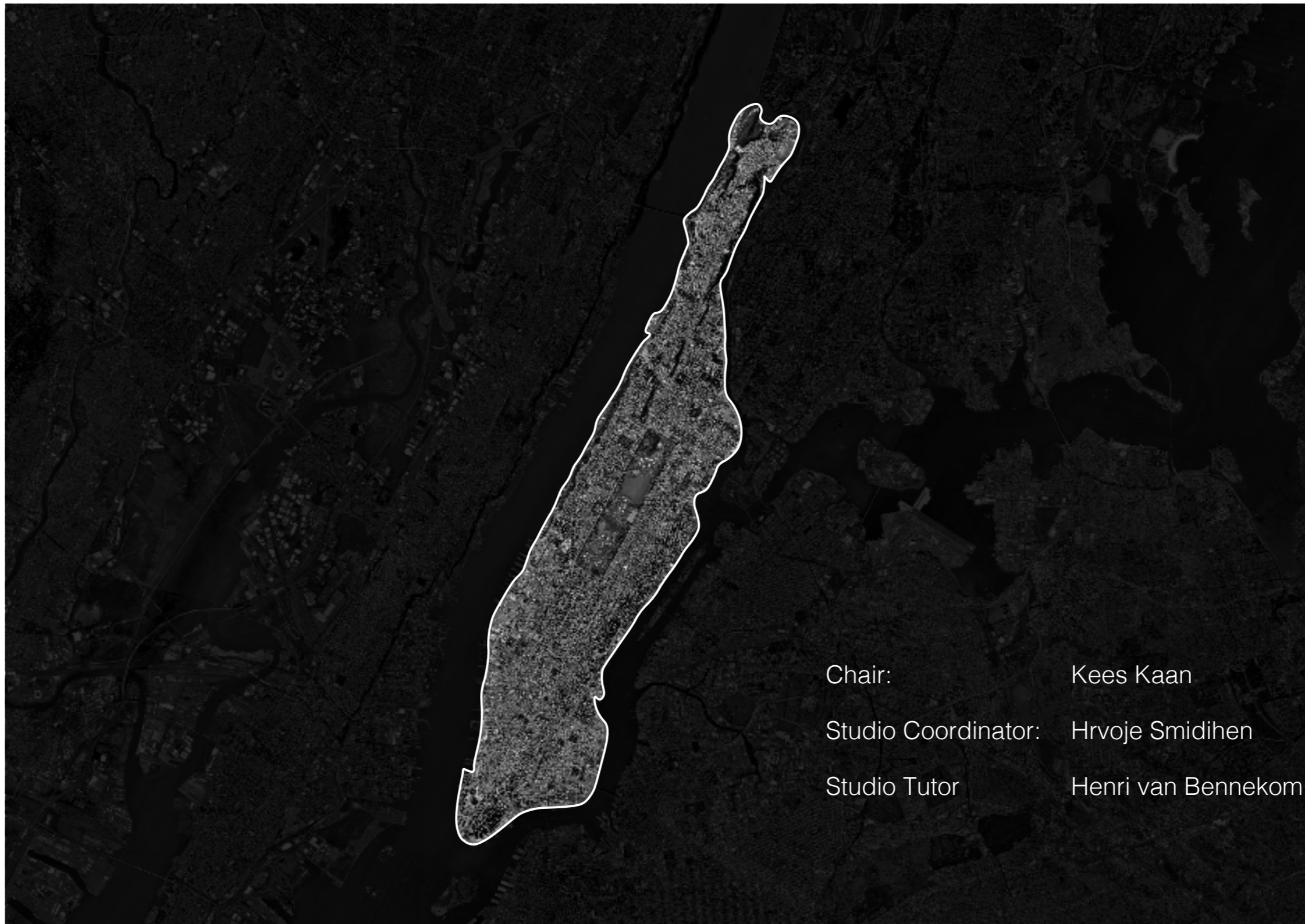


COUNTER
THE
FAST
BUILDING
REFRESH
RATE

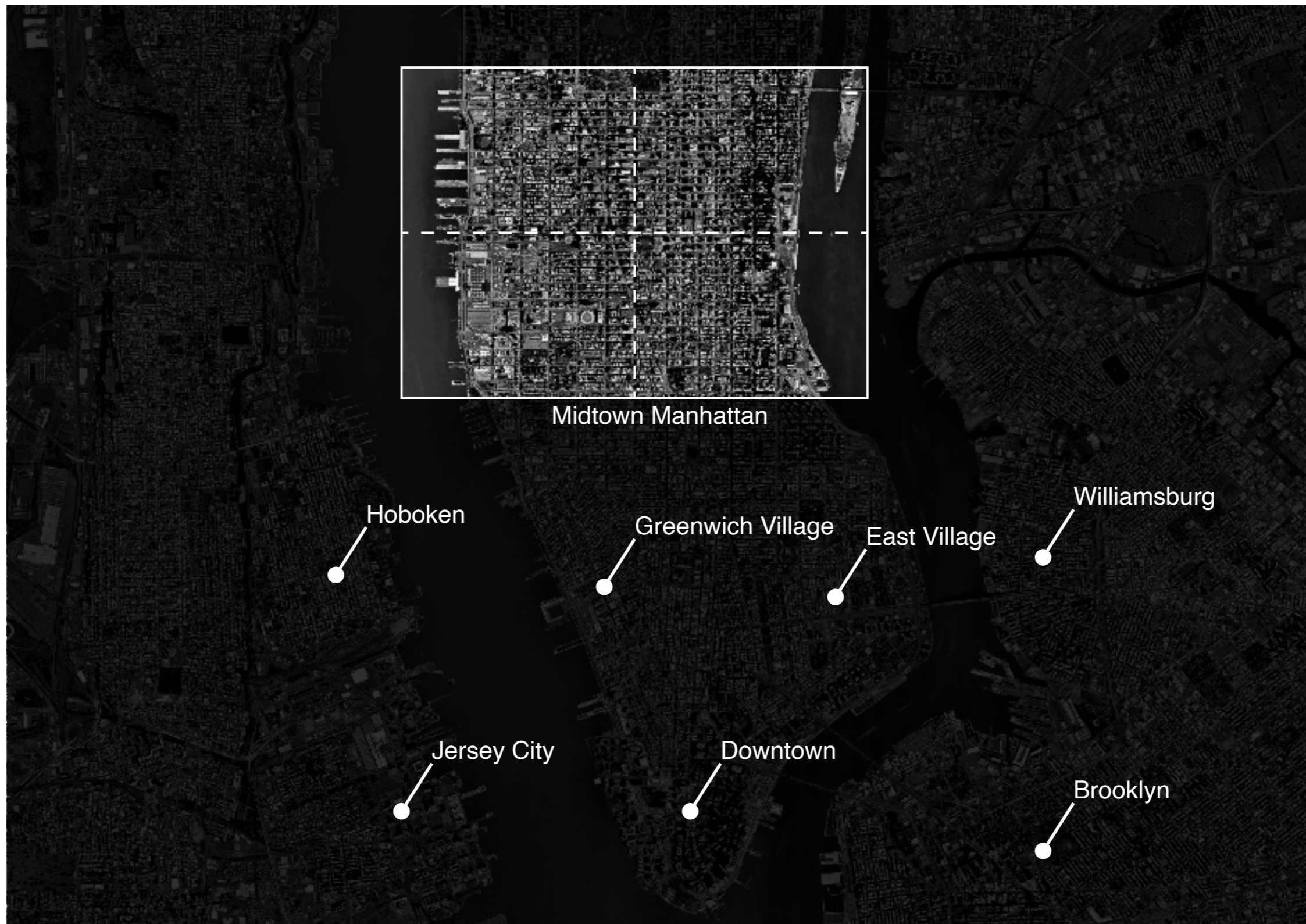
DAAN RIJNDERS
07-07-2020

P5

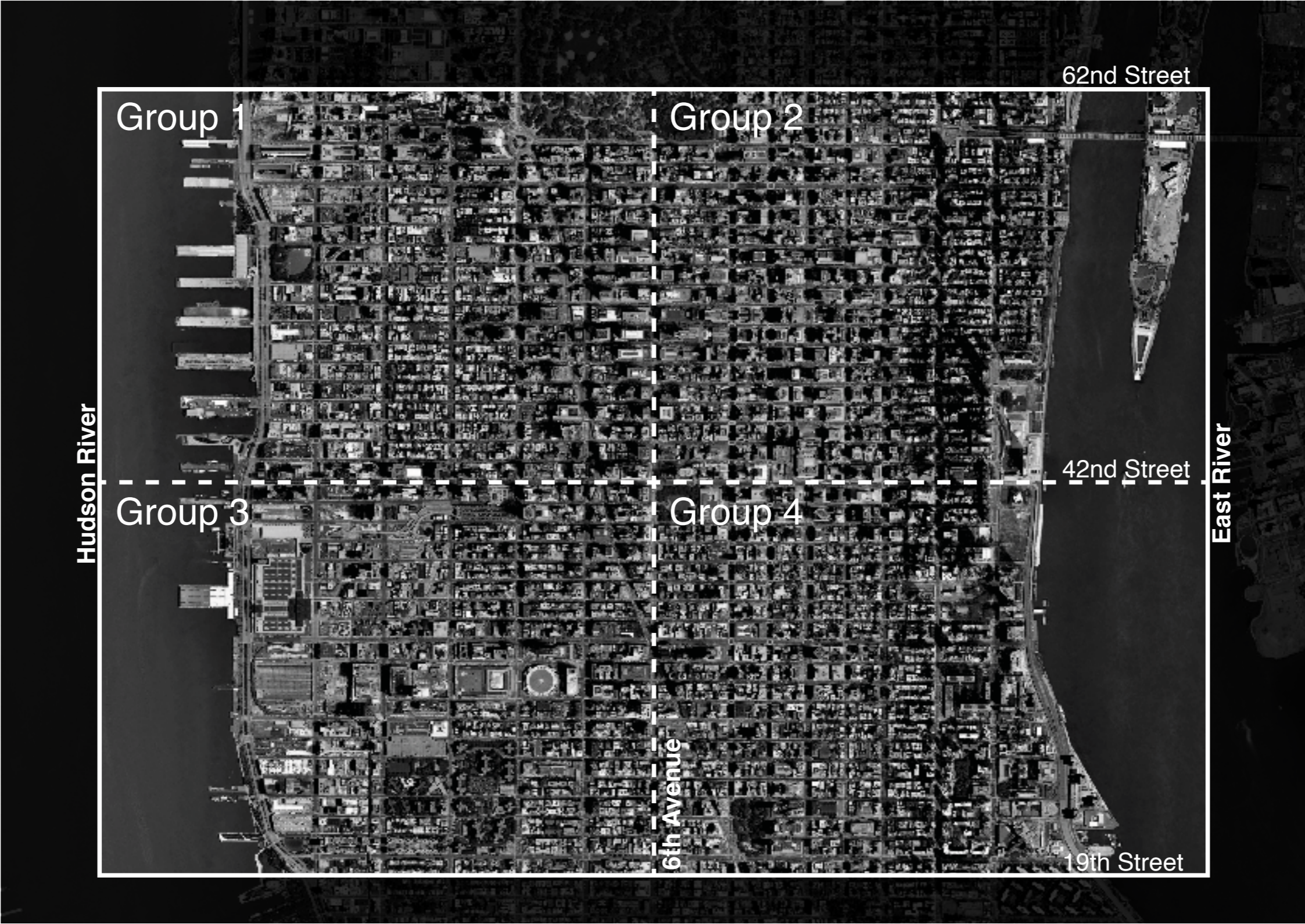
Complex Projects. New York



Complex Projects. New York



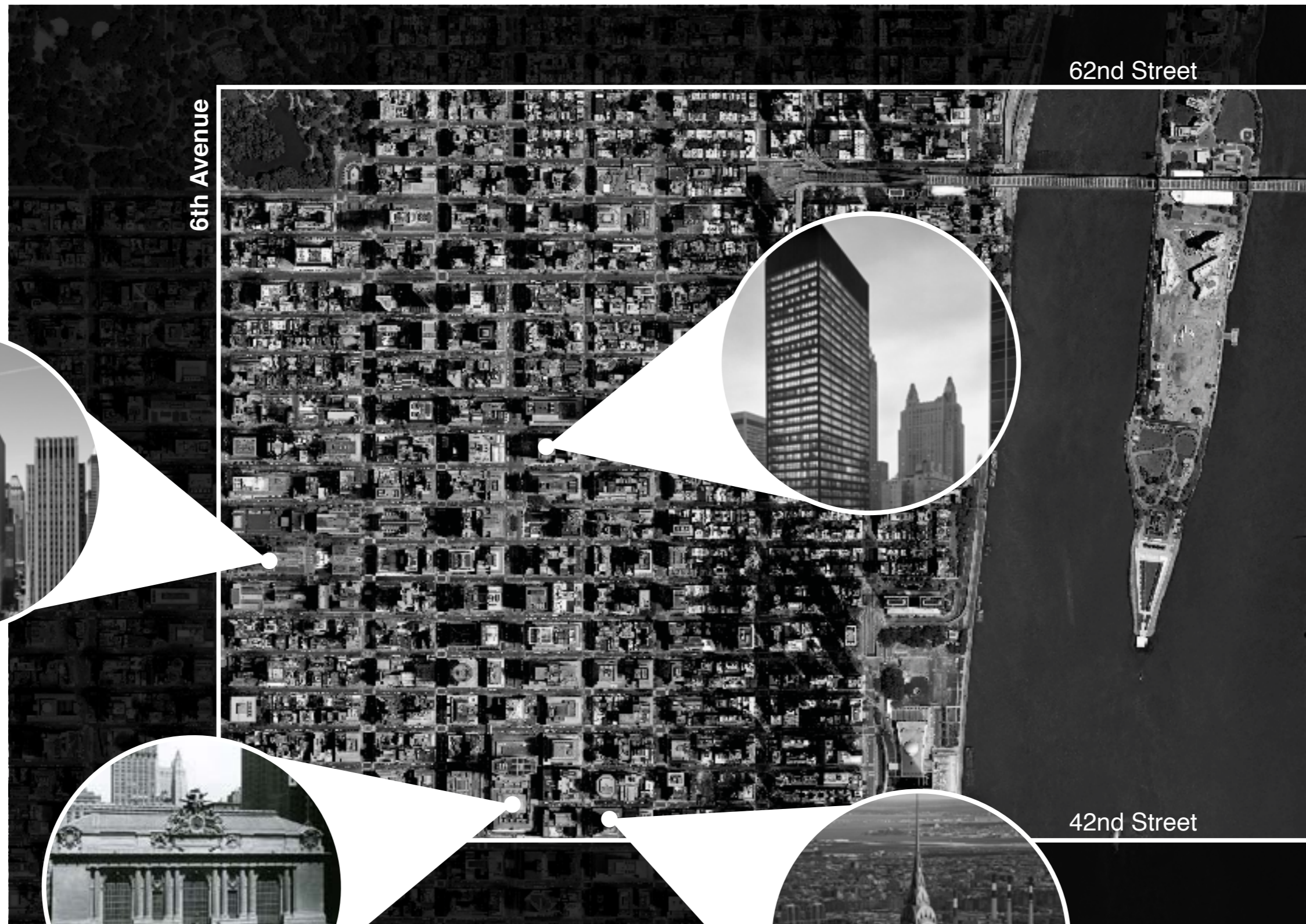
Midtown Sites



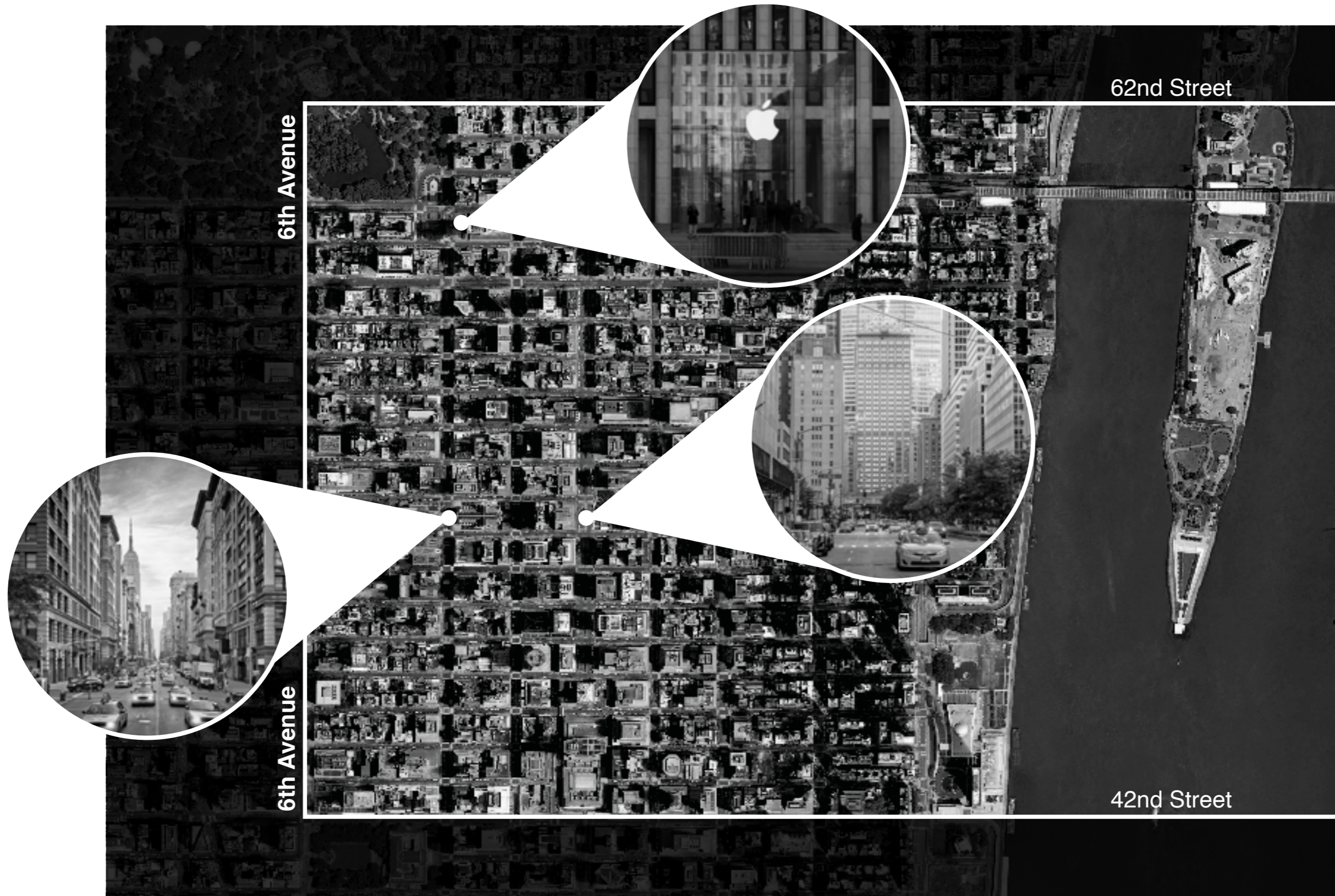
North East Midtown



North East Midtown



North East Midtown

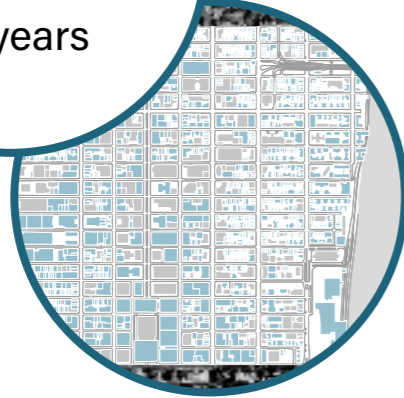


Valley of Giants, the 20th Century Central Business District

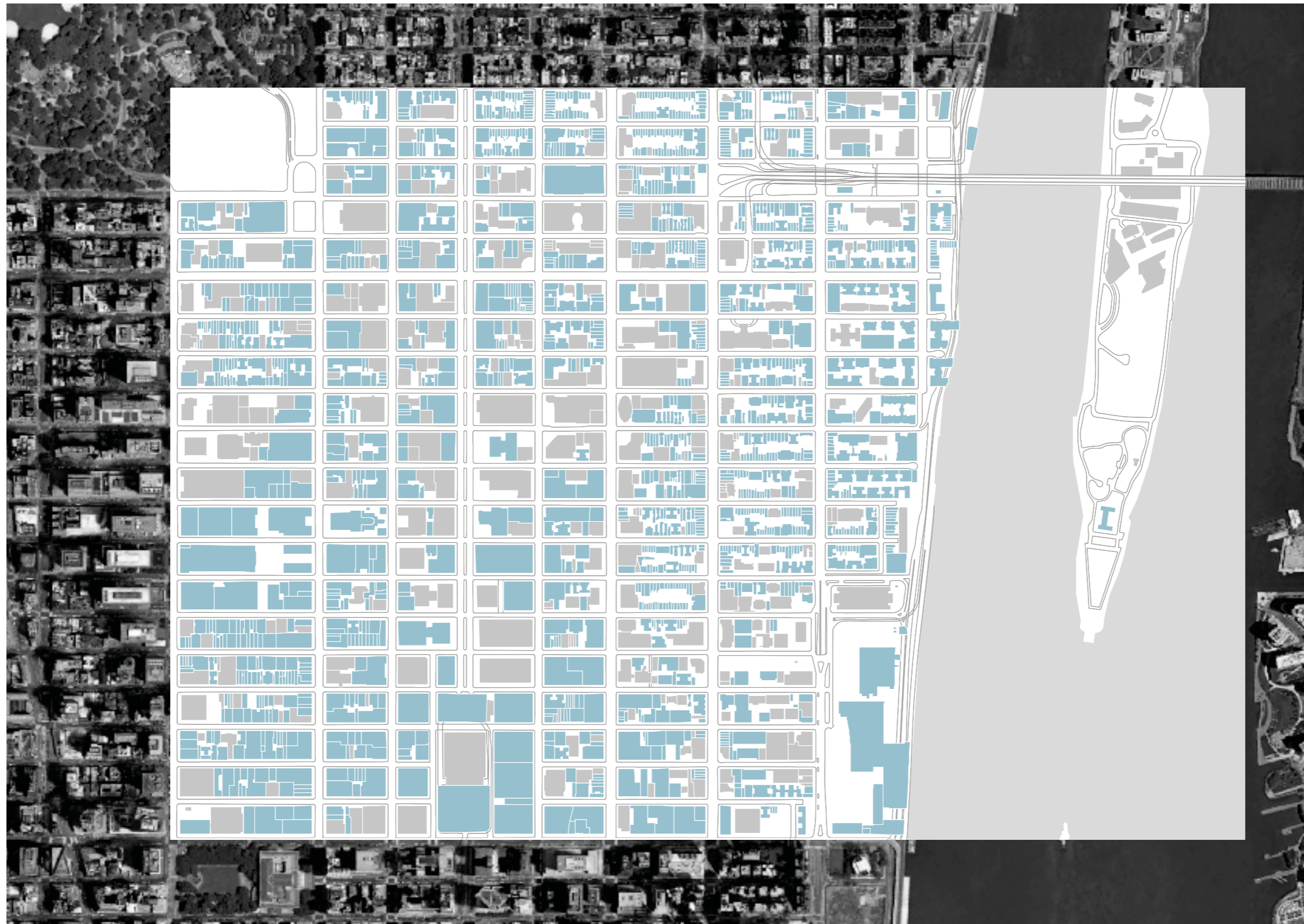


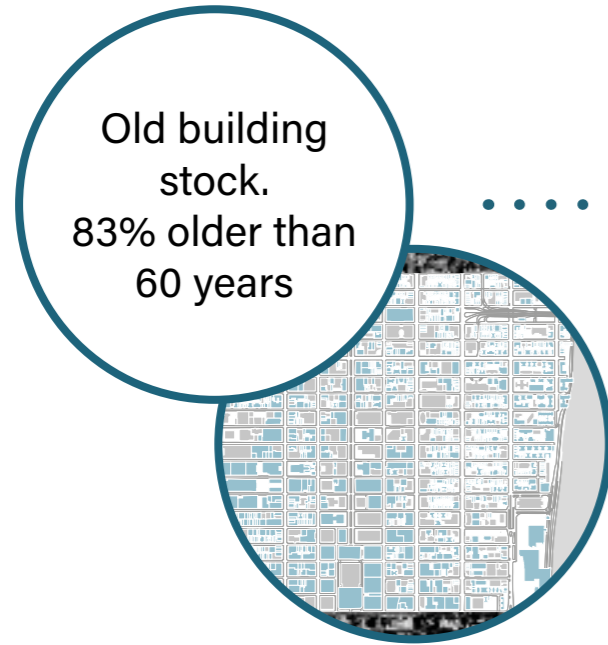
Own picture

Old building
stock.
83% older than
60 years



Buildings Stock 60 Years Old





Uninspired Public Amenities



“Buildings are increasingly less competitive with the office building inventory in other global business centers”

Department of City Planning

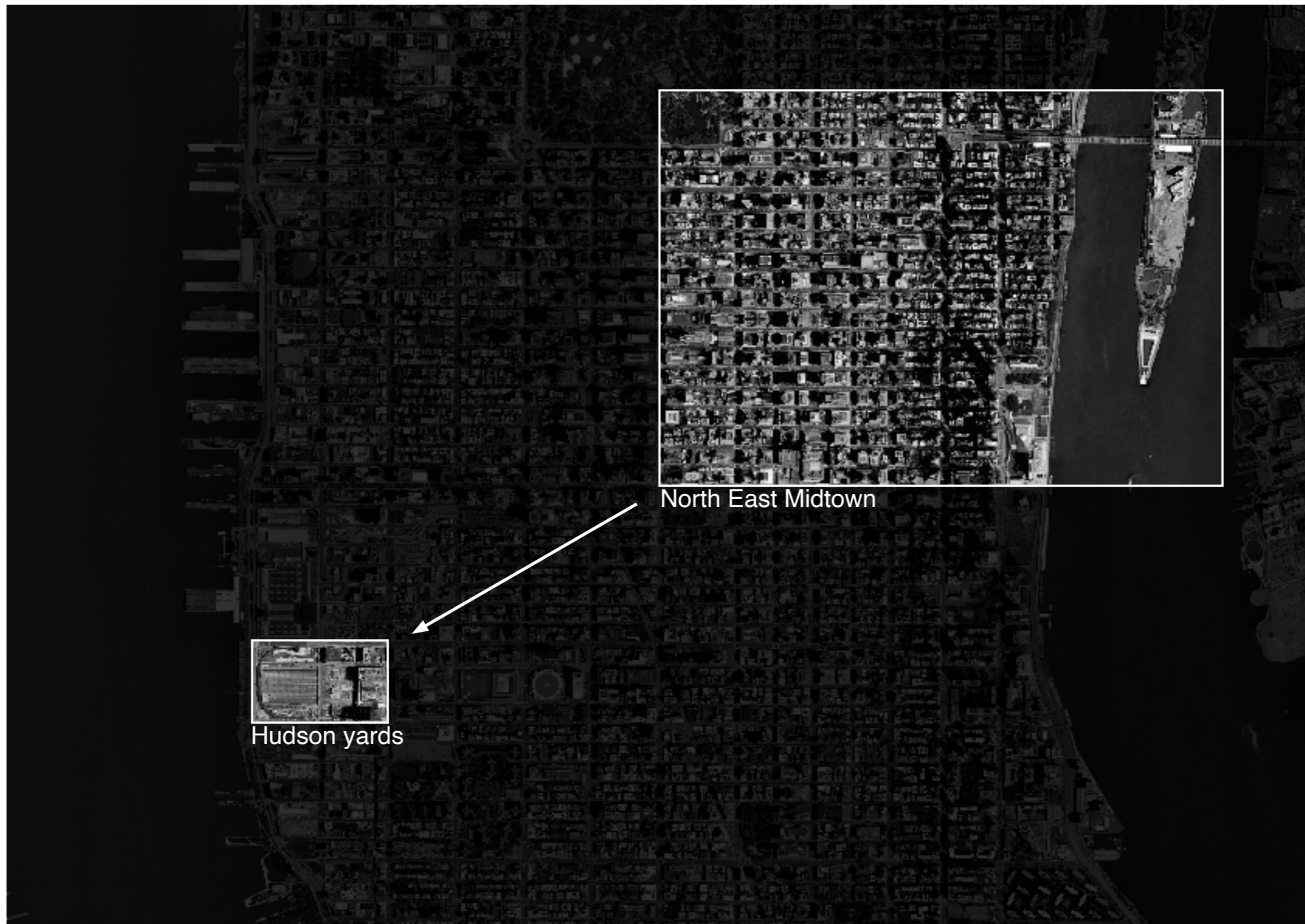


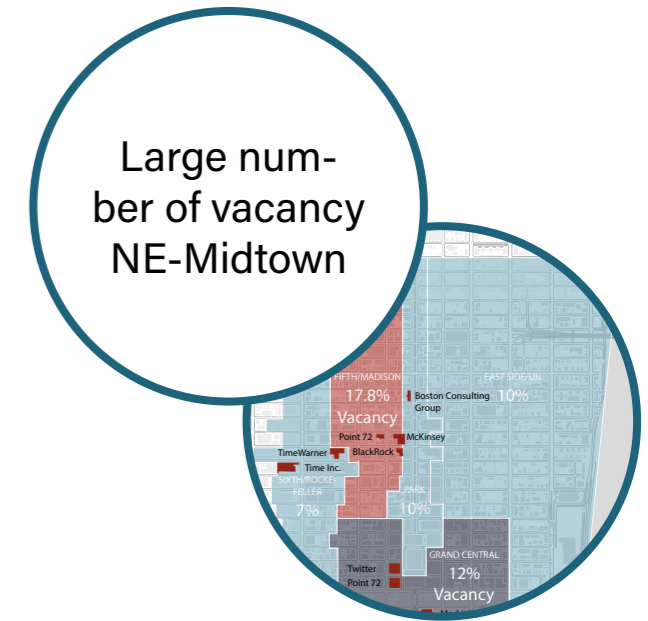
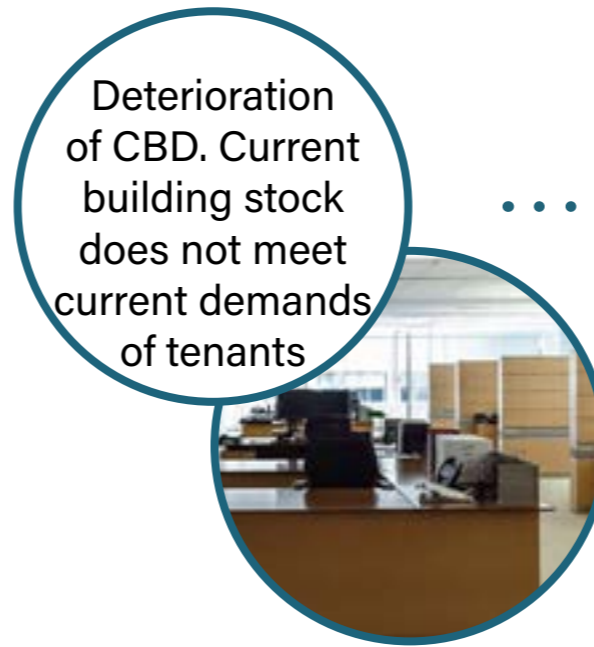
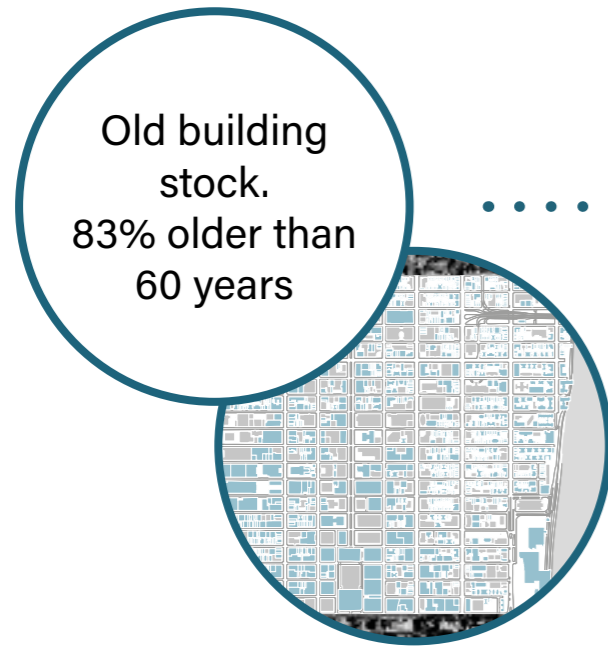
A New Typology, The 21st Central Business District

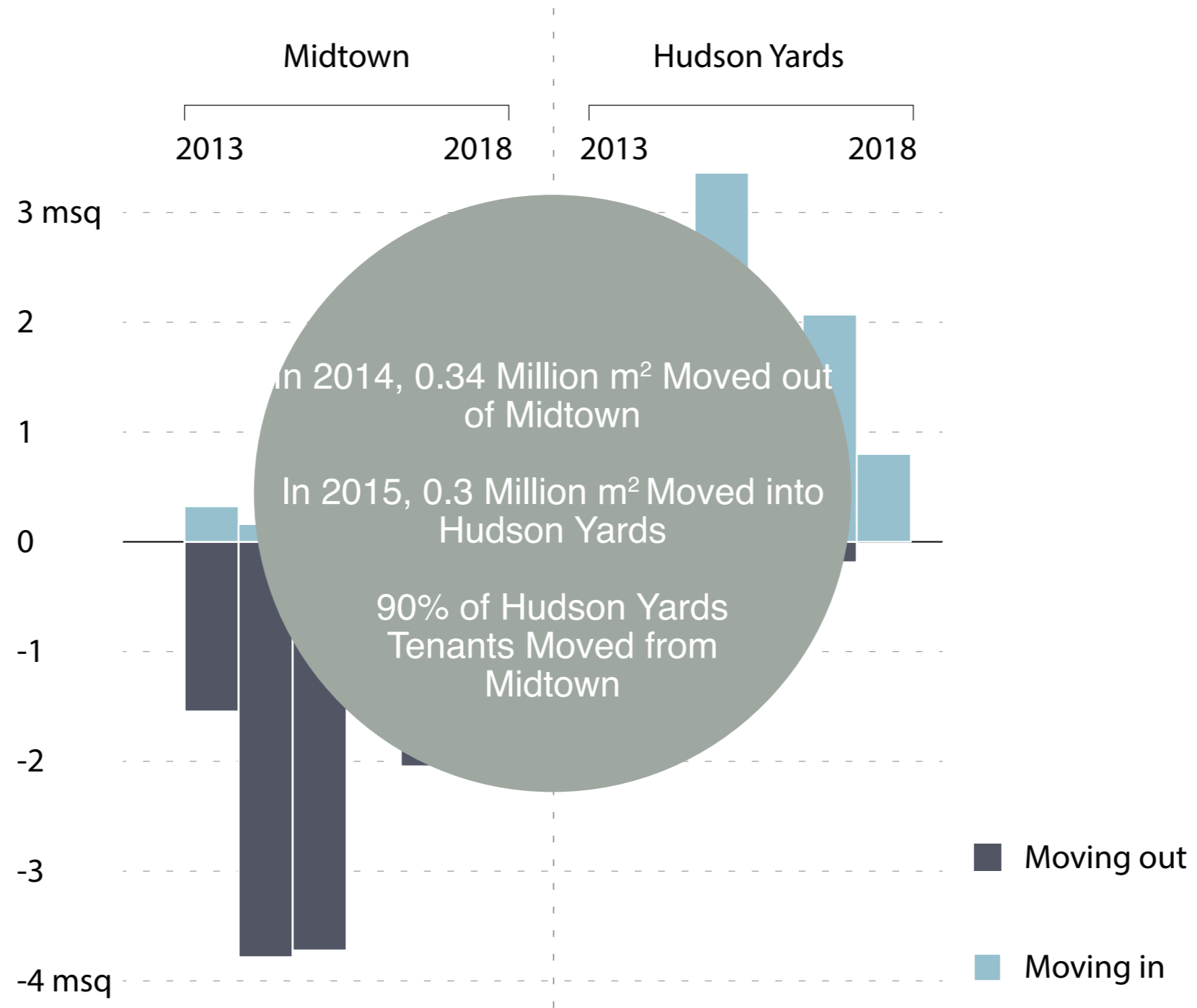




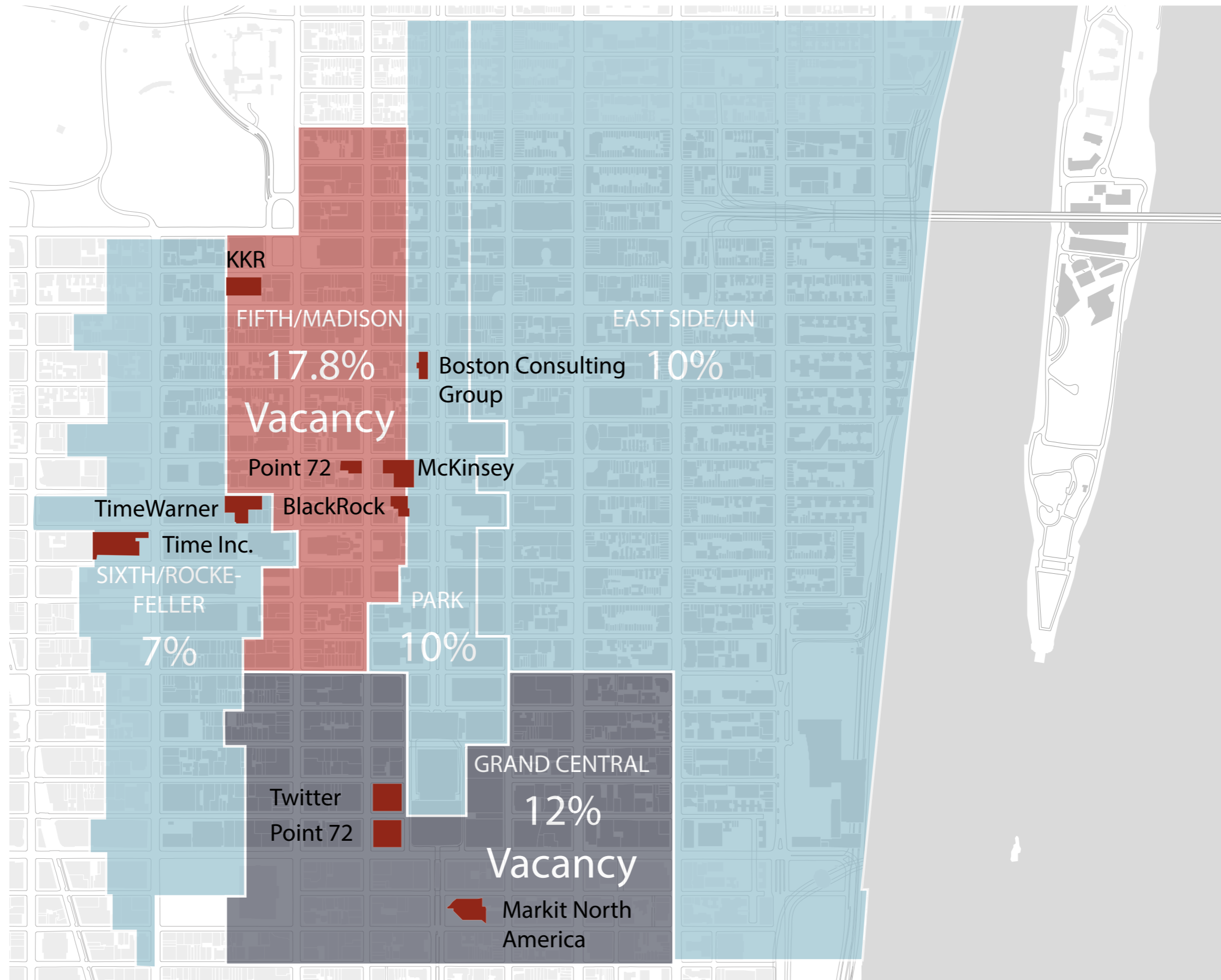
Move from the Valley of Giants to Hudson Yards

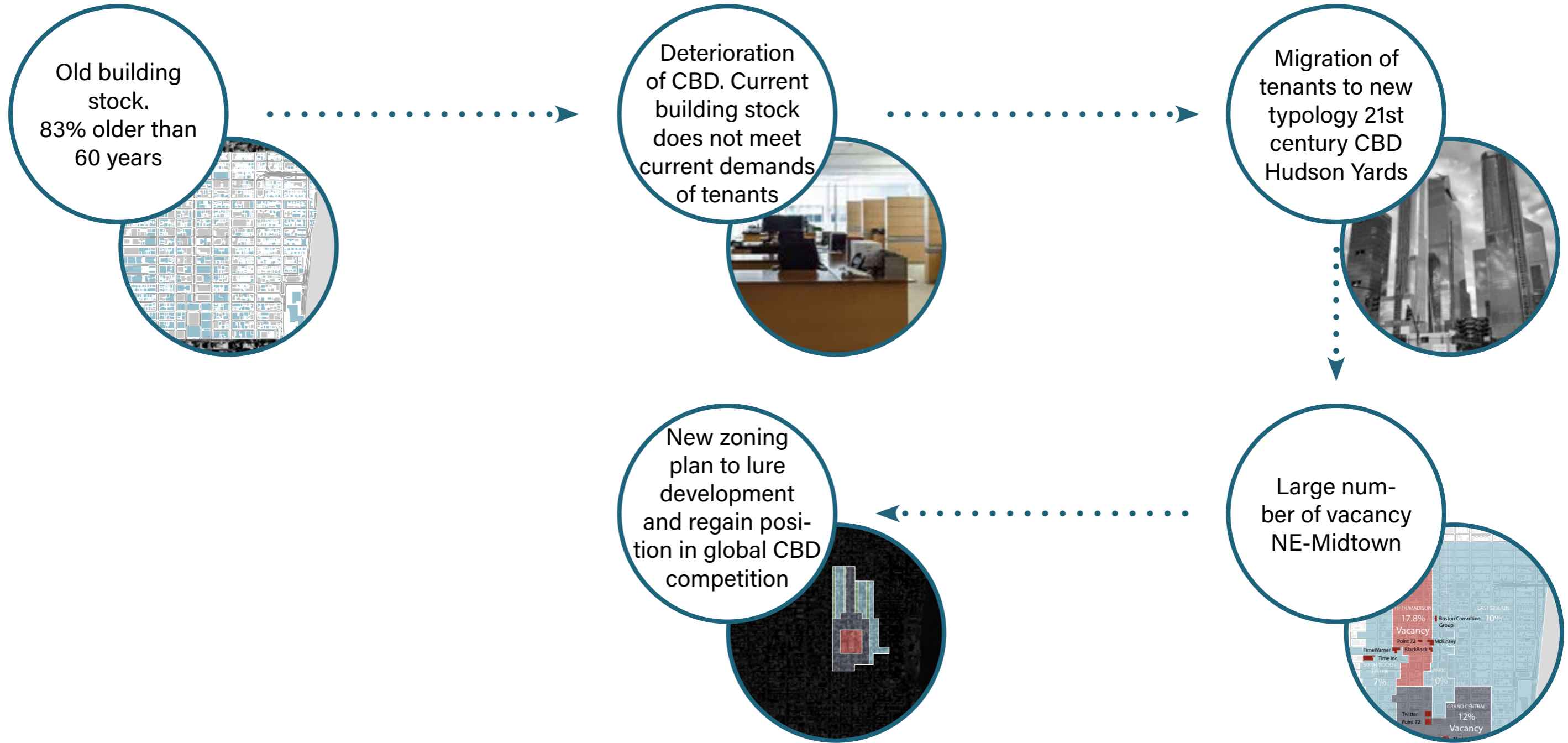




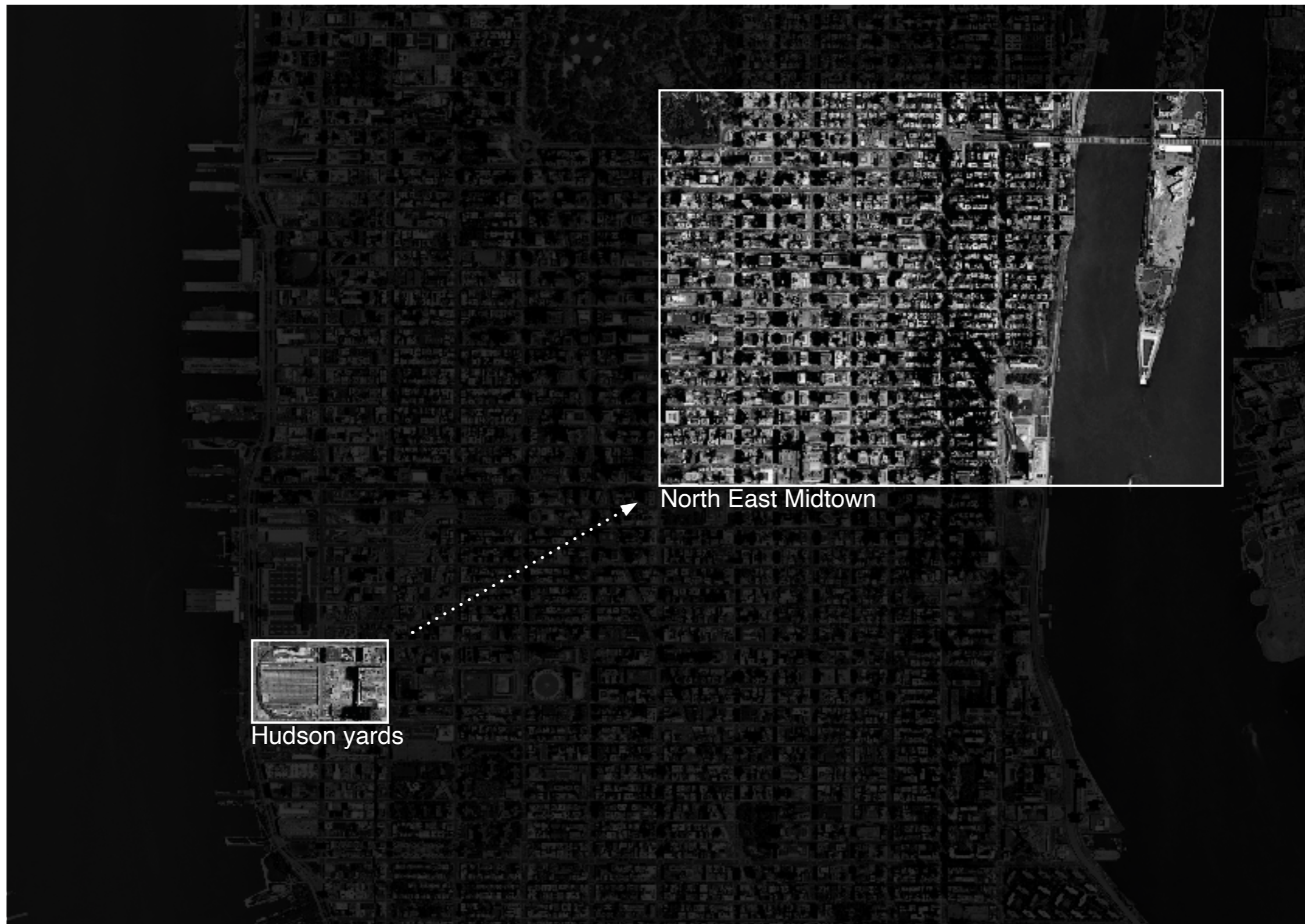


Vacancy

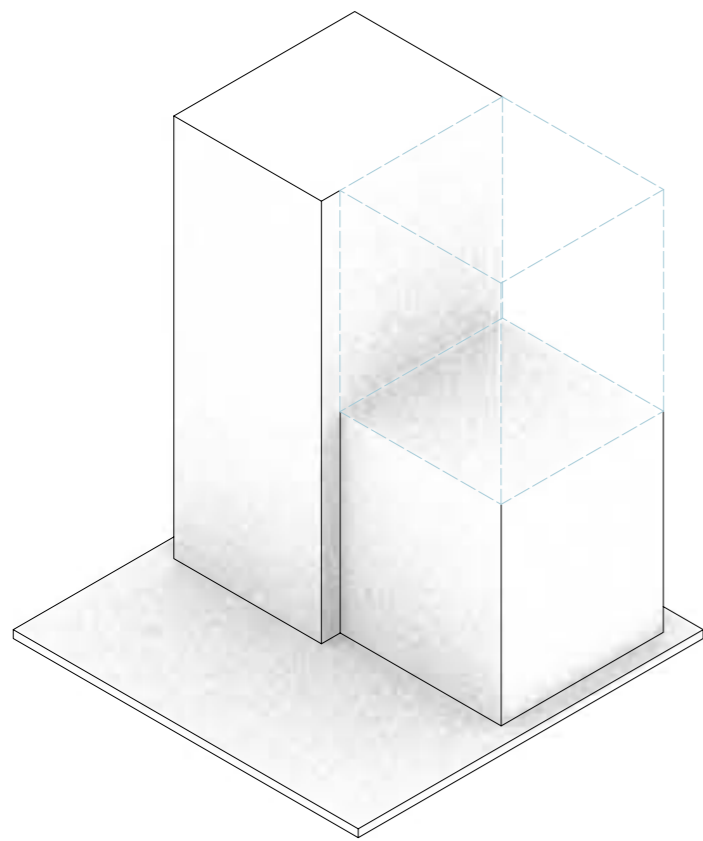




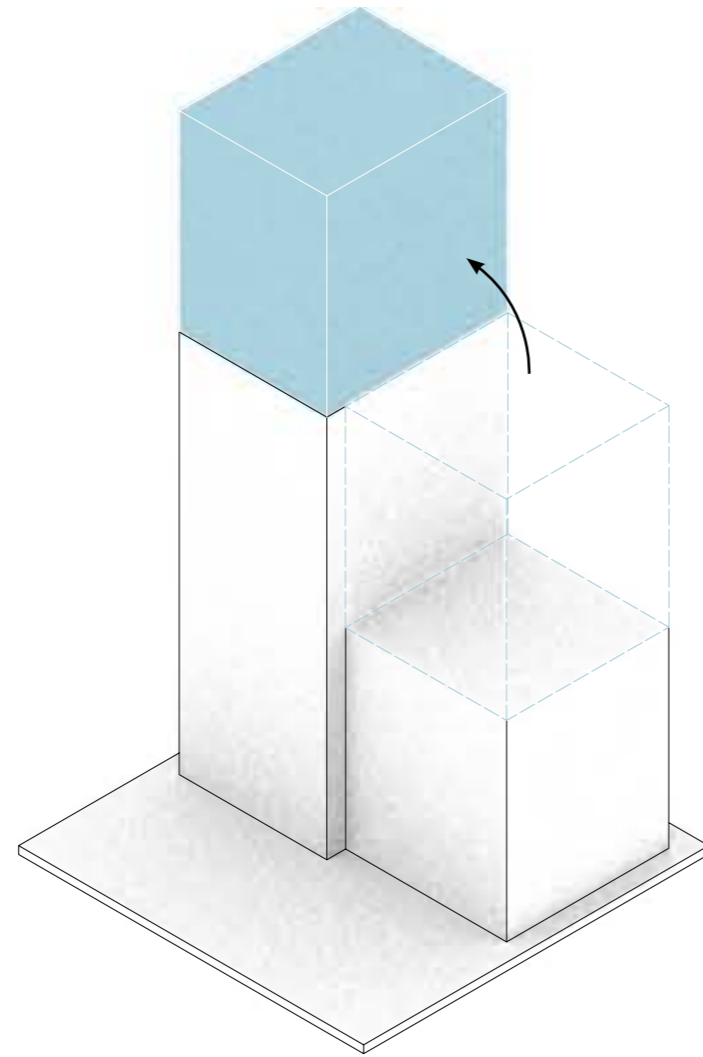
Move from the Valley of Giants to Hudson Yards



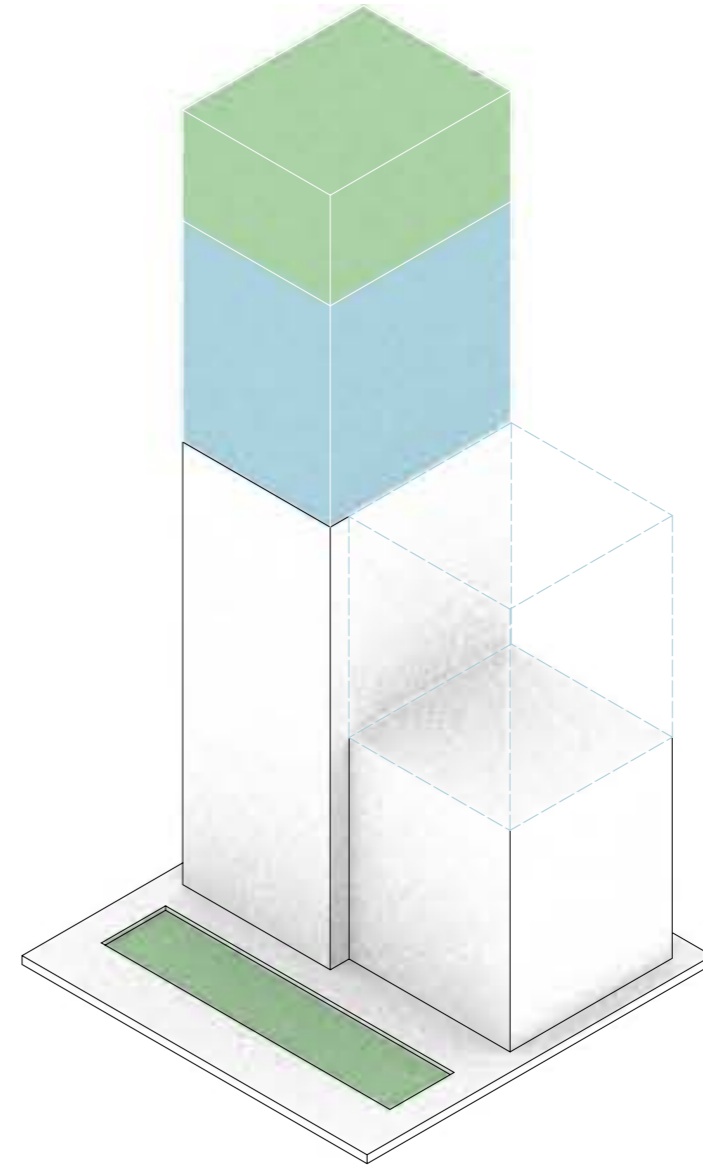
Lure Development with FAR Bonuses



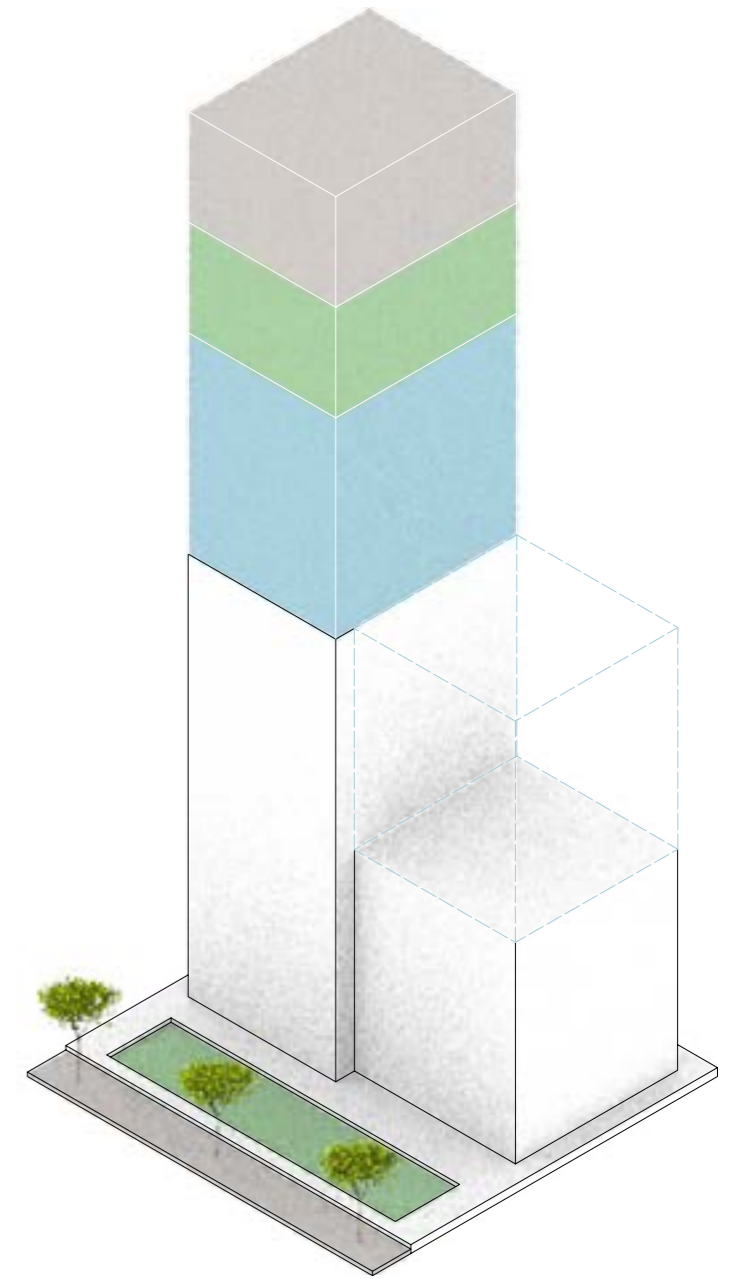
Unused Air Rights
Standard FAR of 15



Buy Air Rights
FAR of 18

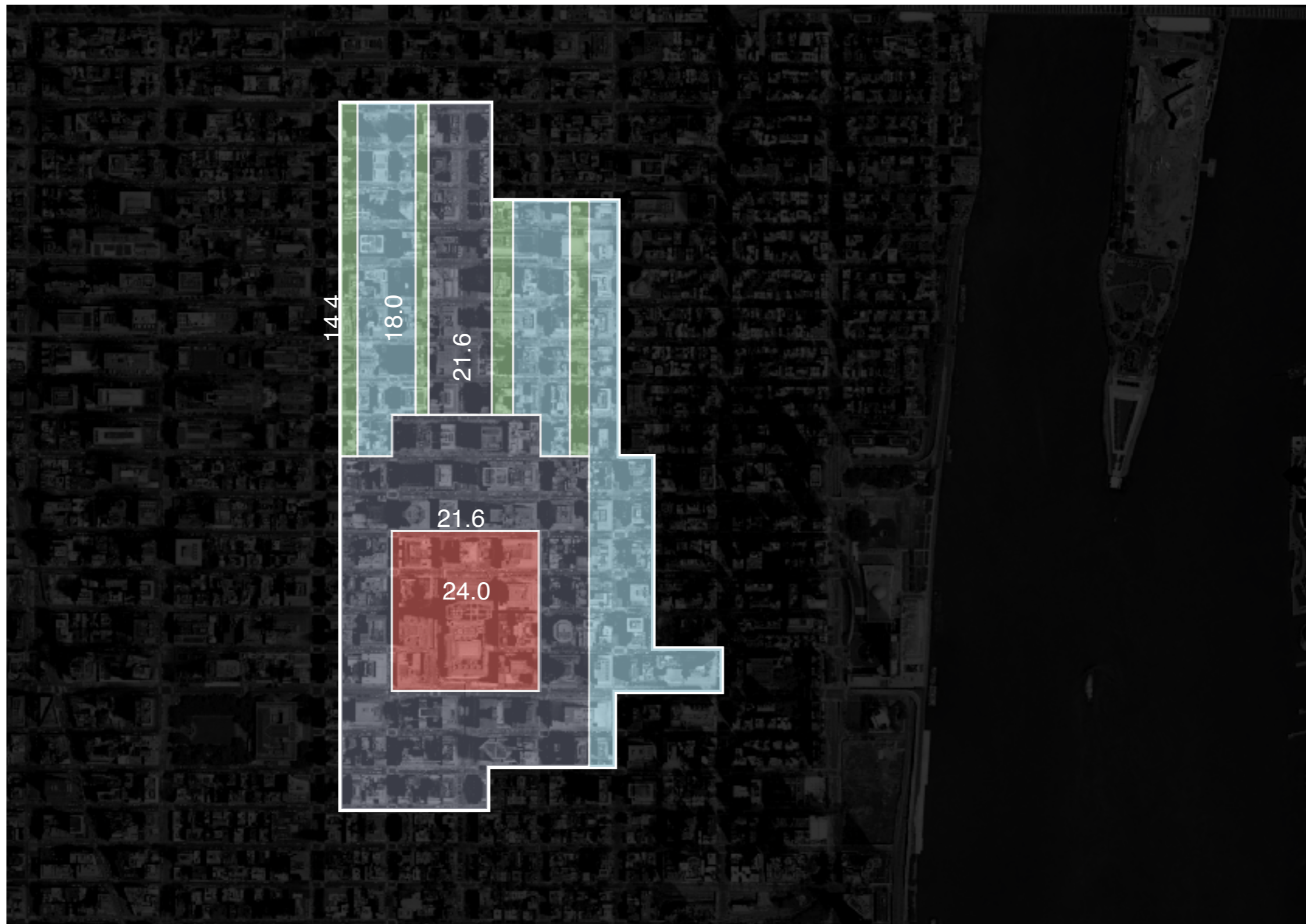


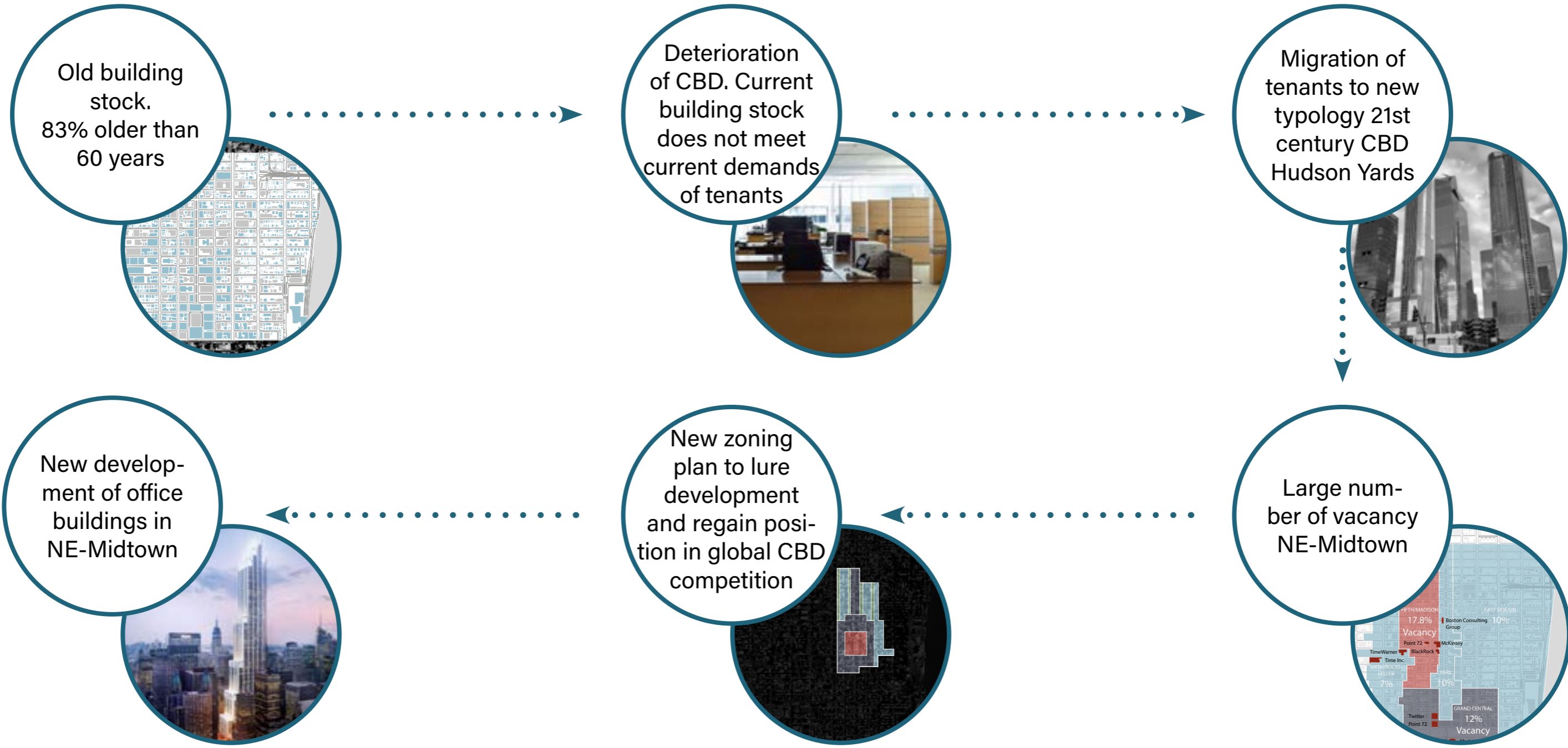
POPS
FAR of 21



District Improvement Fund
FAR of 24

FAR- Bonusses

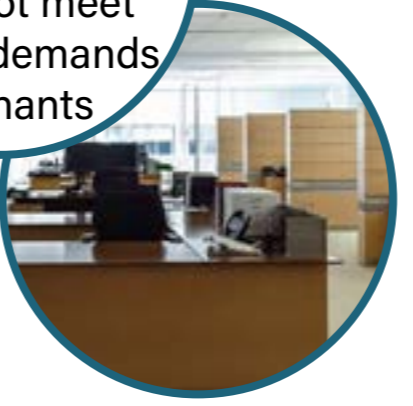




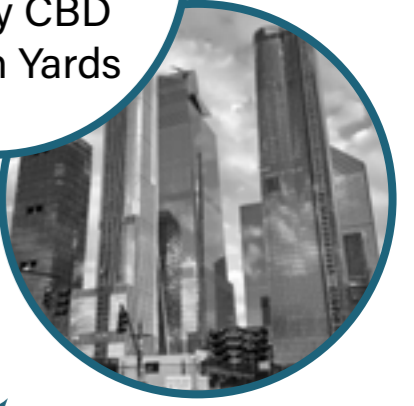
Old building stock. 83% older than 60 years



Deterioration of CBD. Current building stock does not meet current demands of tenants



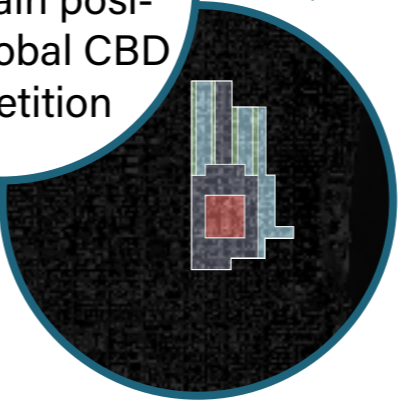
Migration of tenants to new typology 21st century CBD Hudson Yards



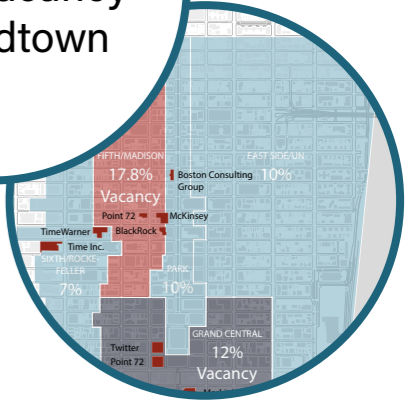
New development of office buildings in NE-Midtown



New zoning plan to lure development and regain position in global CBD competition



Large number of vacancy NE-Midtown



Current development



New Typology; Super Talls



432 Park Avenue




425 Park Avenue



One Vanderbilt


Old building stock.
83% older than 60 years



Deterioration of CBD. Current building stock does not meet current demands of tenants



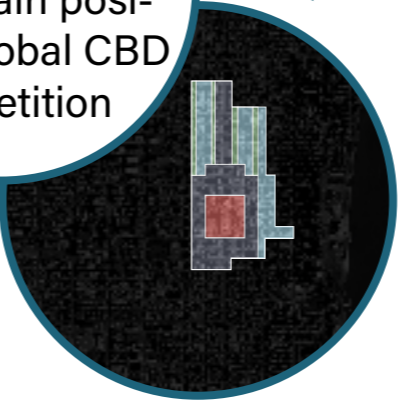
Migration of tenants to new typology 21st century CBD Hudson Yards



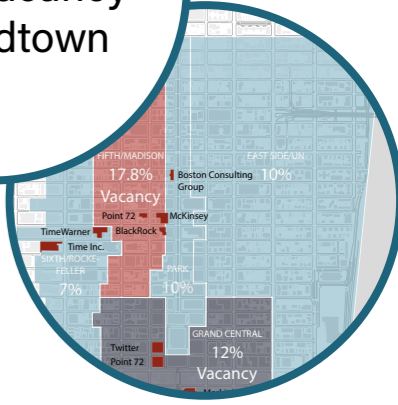
New development of office buildings in NE-Midtown



New zoning plan to lure development and regain position in global CBD competition



Large number of vacancy NE-Midtown



Building	Vacancy Rate
17th/MADISON	17.8%
East Side	10%
Grand Central	12%
Twitter Point 72	7%
Time Warner	7%
BlackRock	10%
McKinsey	10%
Boston Consulting Group	10%

60 year old buildings are being demolished. Fast Building Refresh Rate



Buildings of only 58 years old are being demolished



Current JP Morgan Chase Headquarters, 270 Park Avenue
Built in 1961



New JP Morgan Chase Headquarters
In Construction

Old building stock. 83% older than 60 years

Deterioration of CBD. Current building stock does not meet current demands of tenants

Migration of tenants to new typology 21st century CBD Hudson Yards

New development of office buildings in NE-Midtown

New zoning plan to lure development and regain position in global CBD competition

Large number of vacancy NE-Midtown

Area	Vacancy Rate
FIFTH/MADISON	17.8%
GRAND CENTRAL	12%
Other areas	7%, 10%, 10%

60 year old buildings are being demolished. Fast Building Refresh Rate

Depletion of earth's renewable resources

Depleting the Earth's Resources

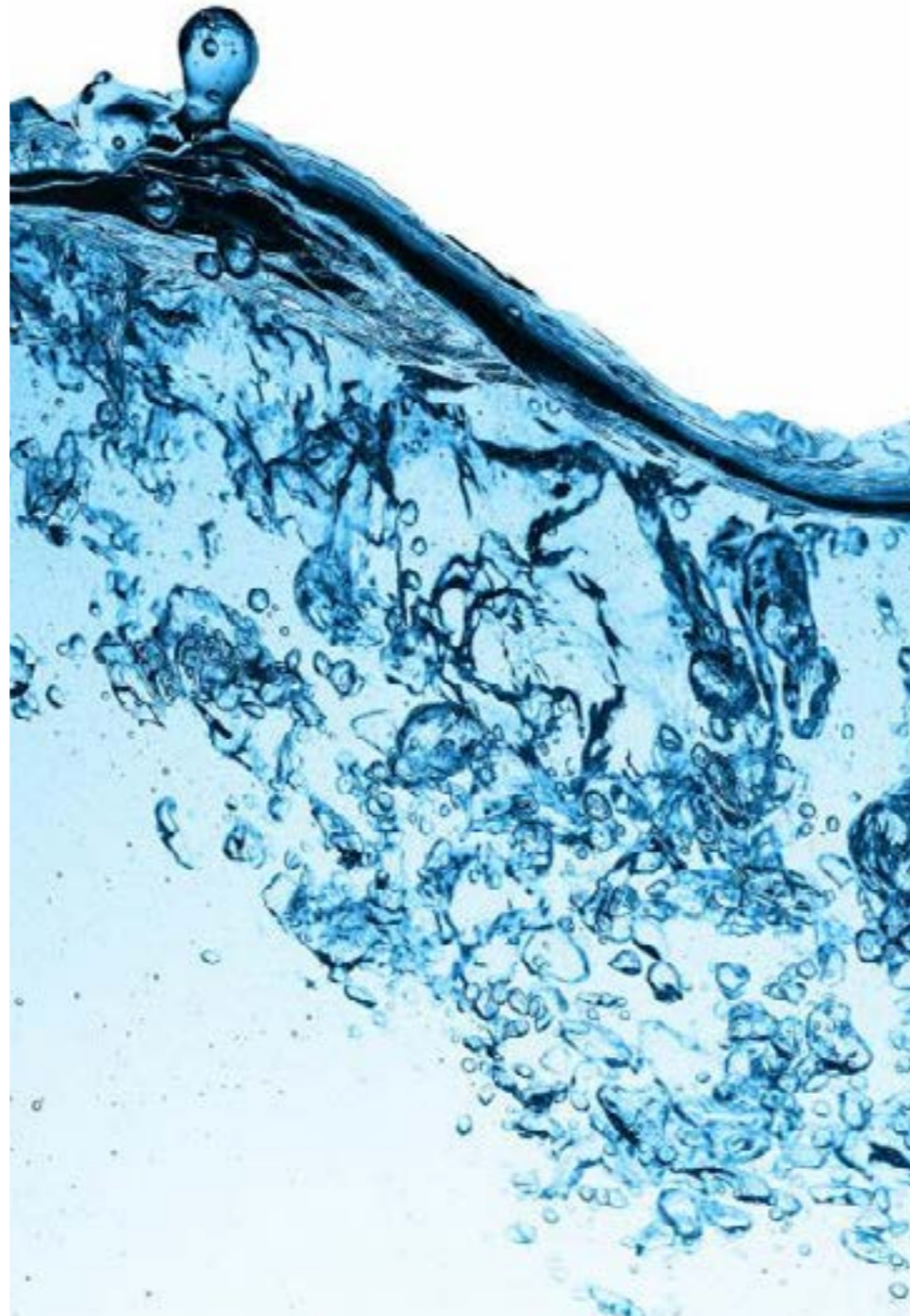


*We are currently using renewable resources of 1.75 earths
Earth overshoot date 1st August*

Depleting the Earth's Resources



Deforestation



1.8 billion people will live with water scarcity



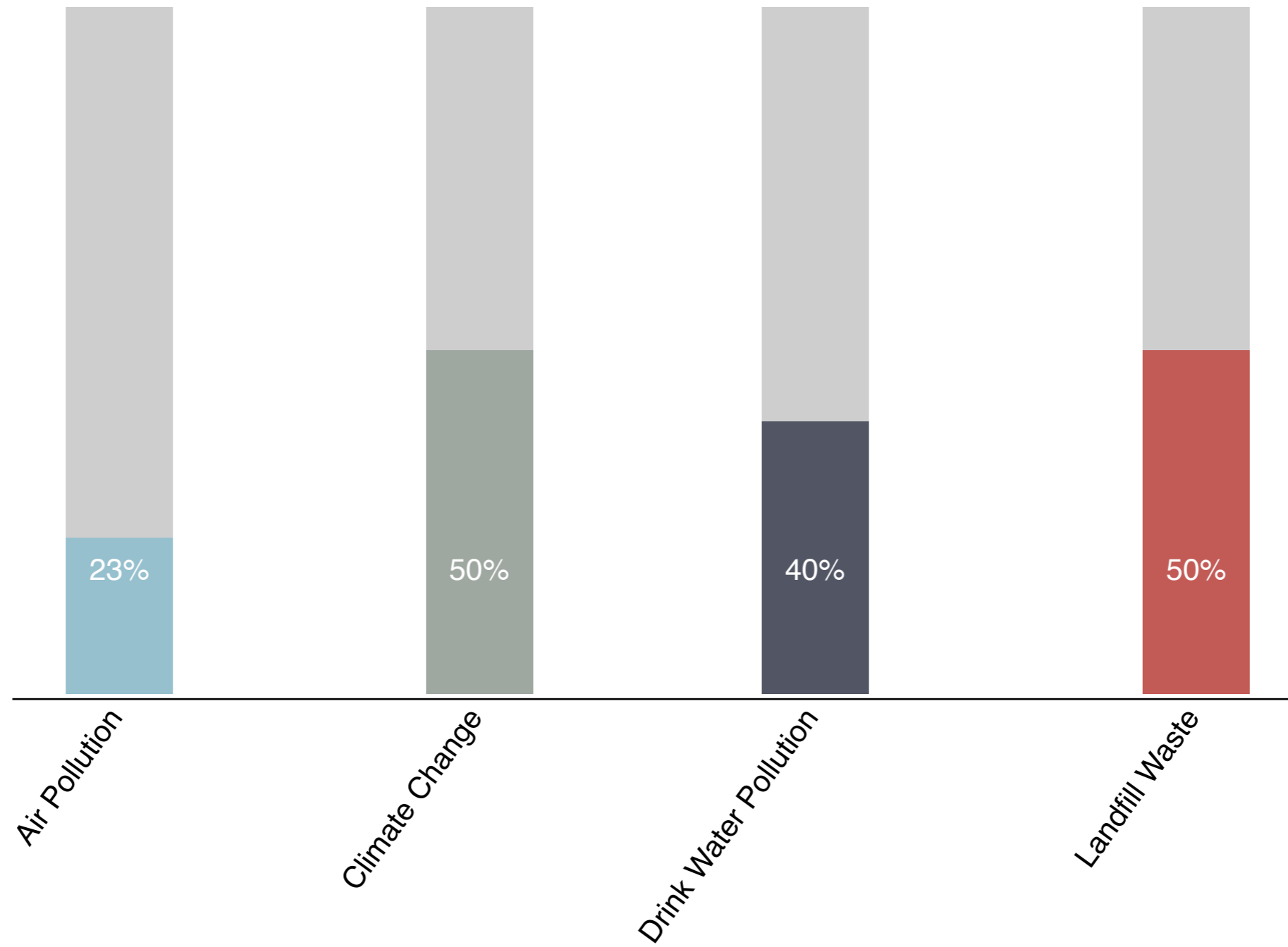
Depleting building materials

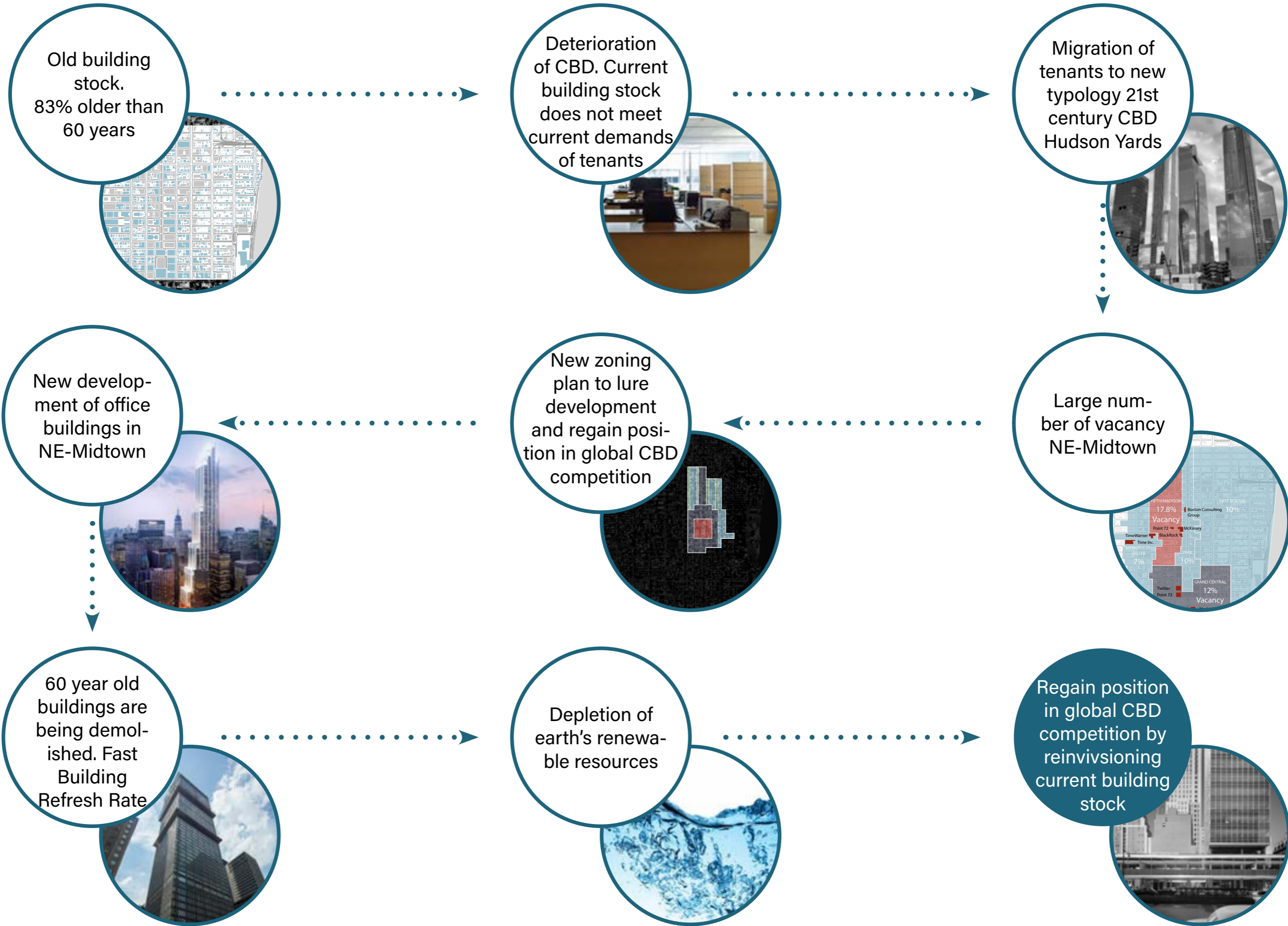
Depleting the Earth's Resources



*By 2050 we need up to 3 earths
Earth overshoot date 1st April due to continuous population growth*

Pollution of our Field of Work





Lever House



Lever House



Lever House



Aby Rosen, RFR Realty

Lease Lever House from Korein Family

Lease of \$6.150.000 per year

After which 50% of building is vacant

Mortgage of \$110.000.000

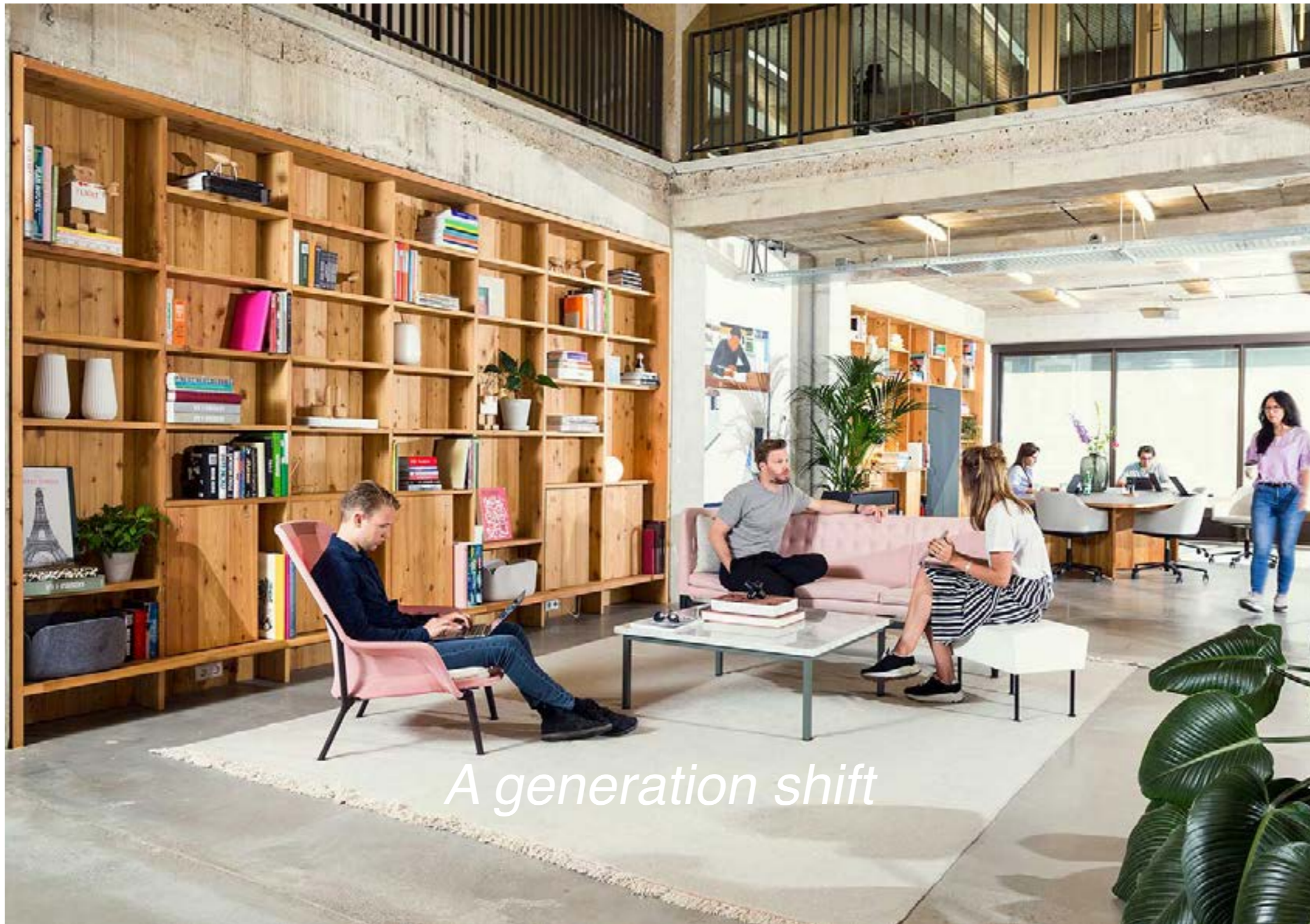
CMBS bank lost \$68.000.000

This loss leads to higher lease of
\$20.000.000 per year

Korein Family back up lease to Brook-
field/Tod Waterman partnership

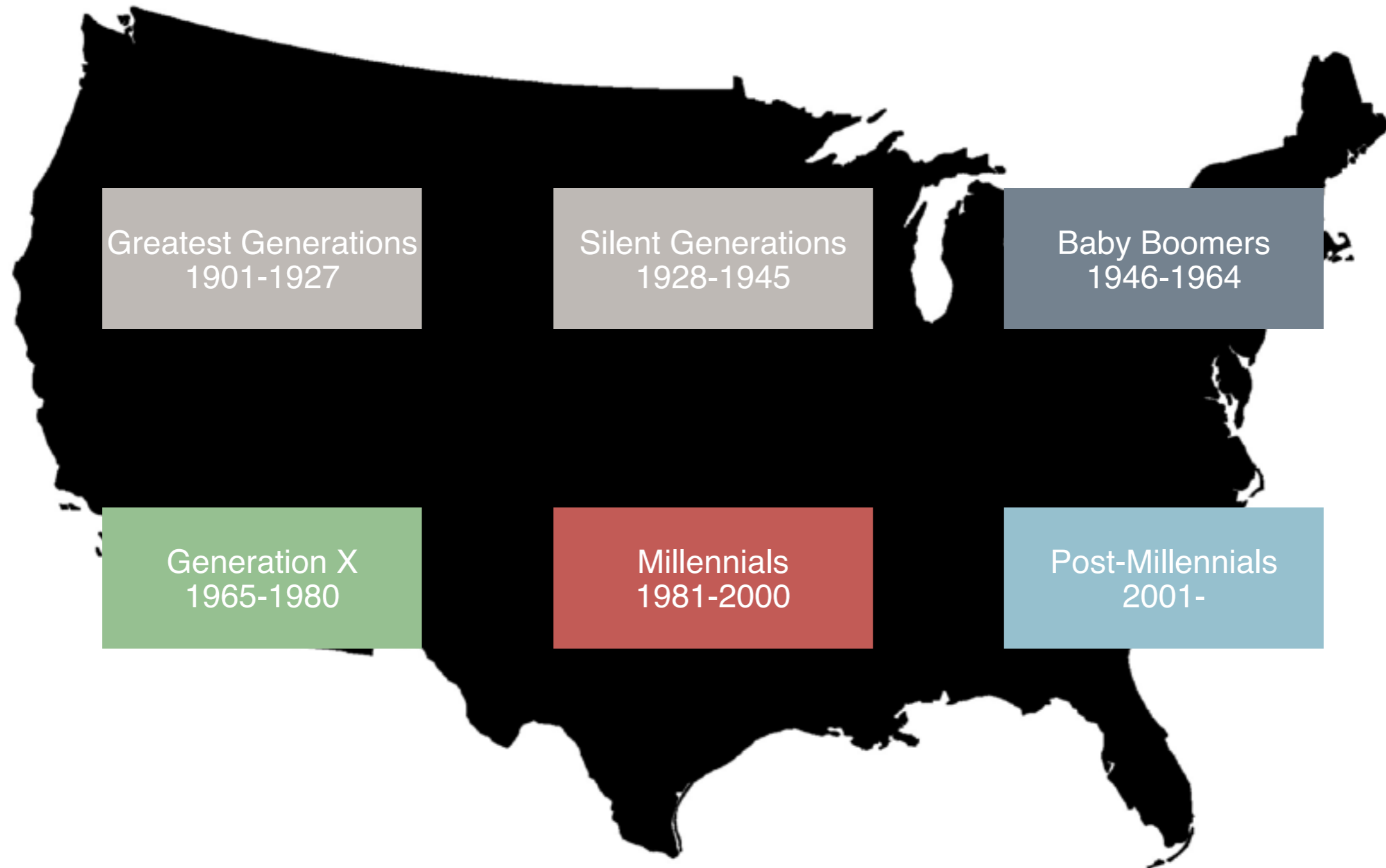
Uncertainty of ownership puts off
potential tenants

Tracing it Back

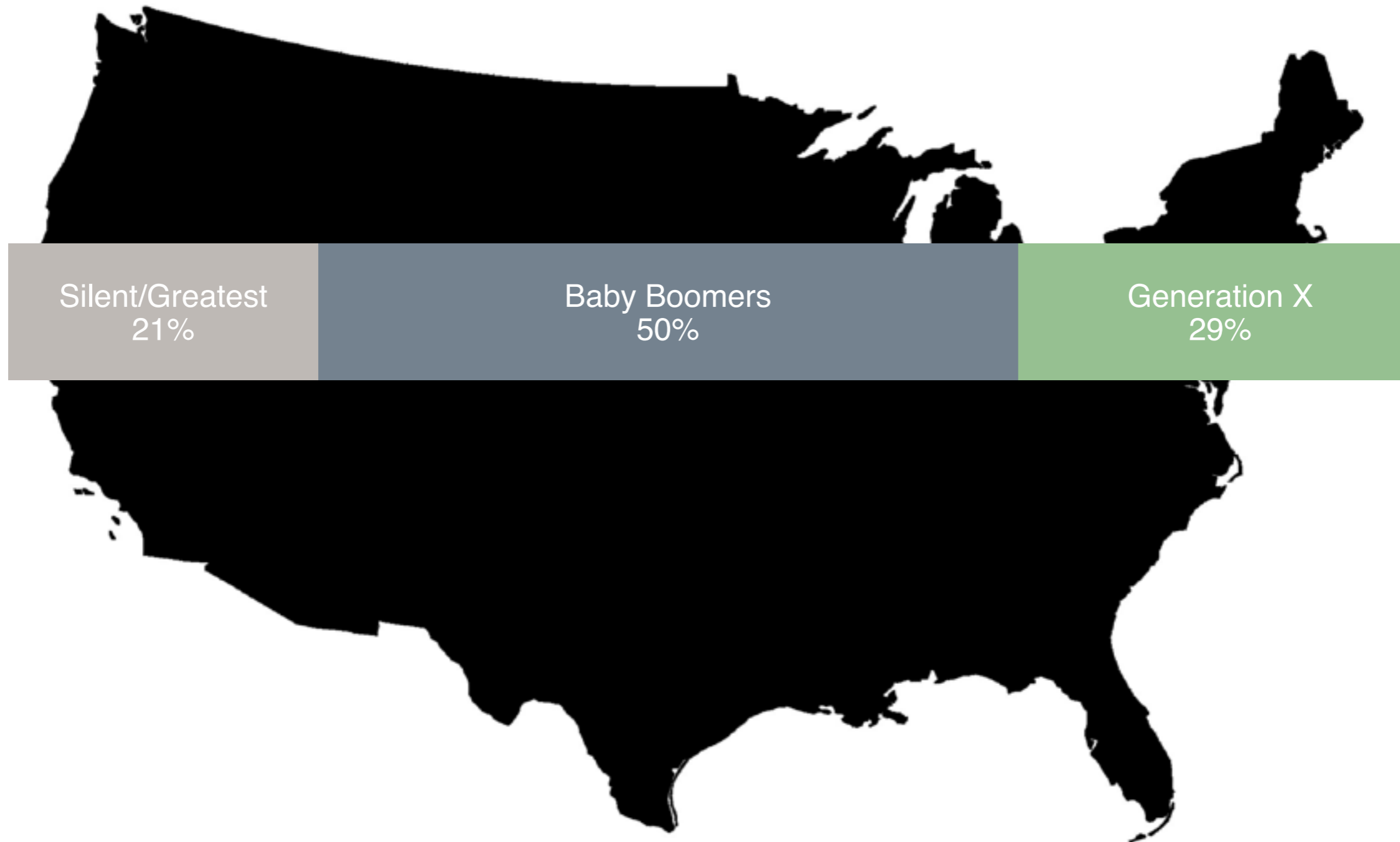


A generation shift

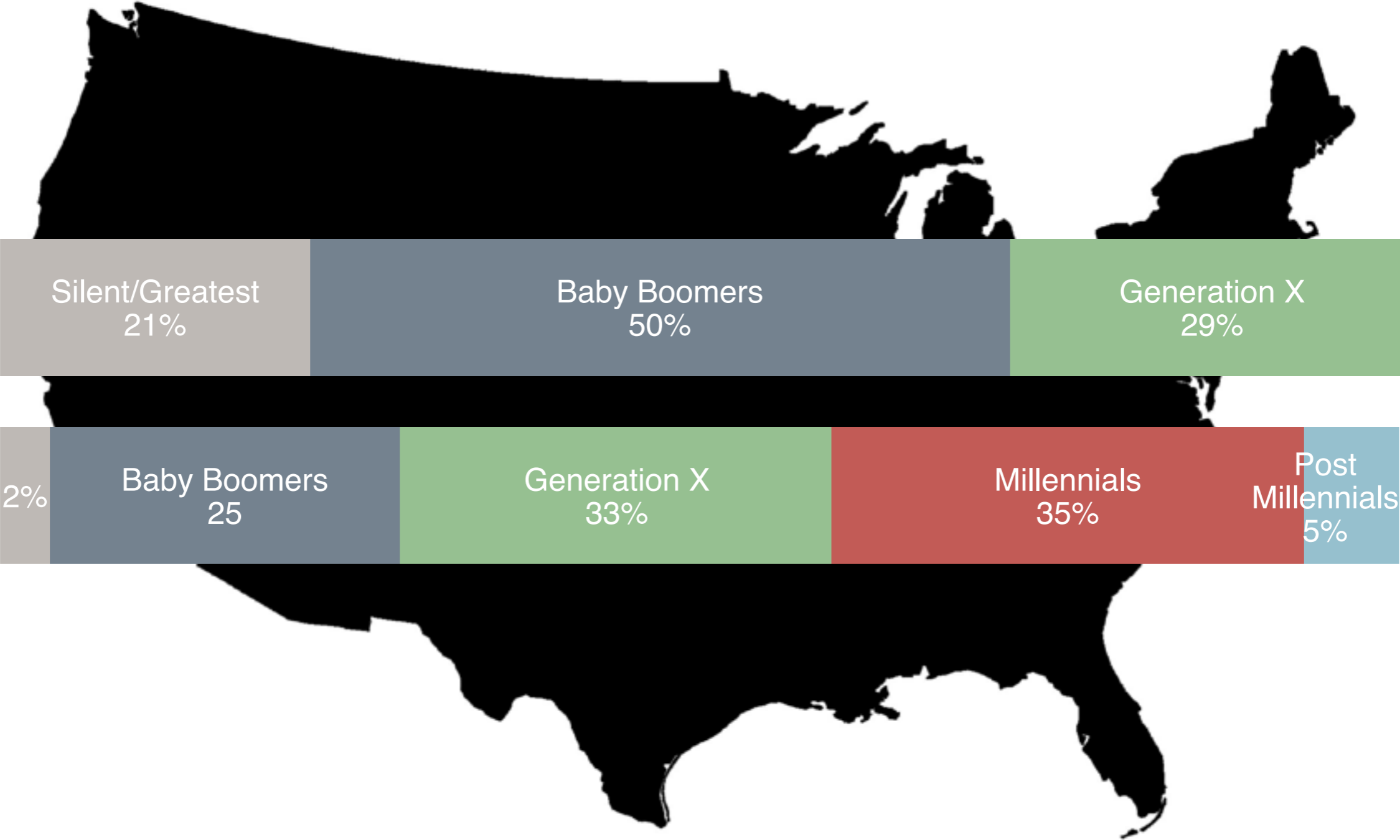
The Generations of the 20th and 21st Century



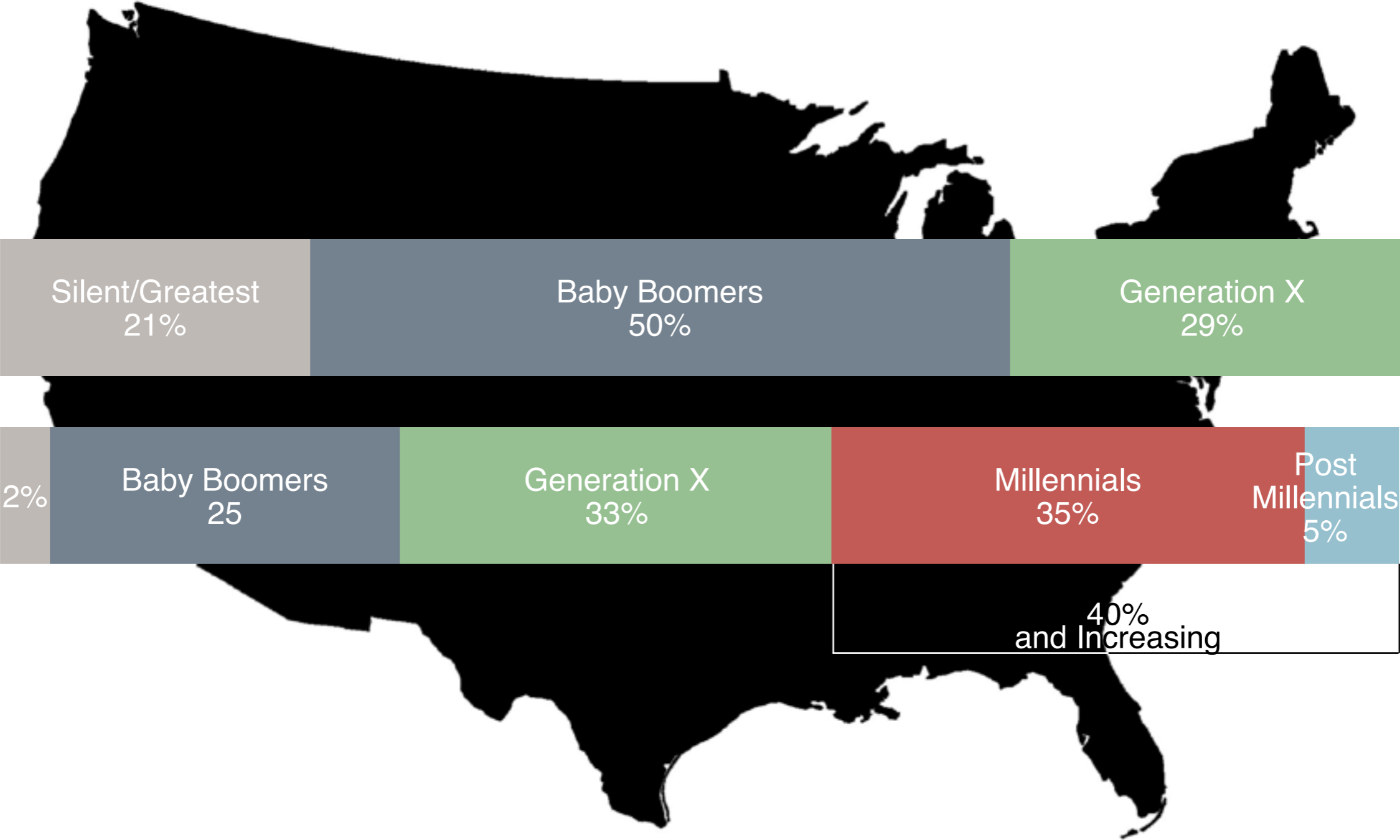
National Labour Force Generations in 1994



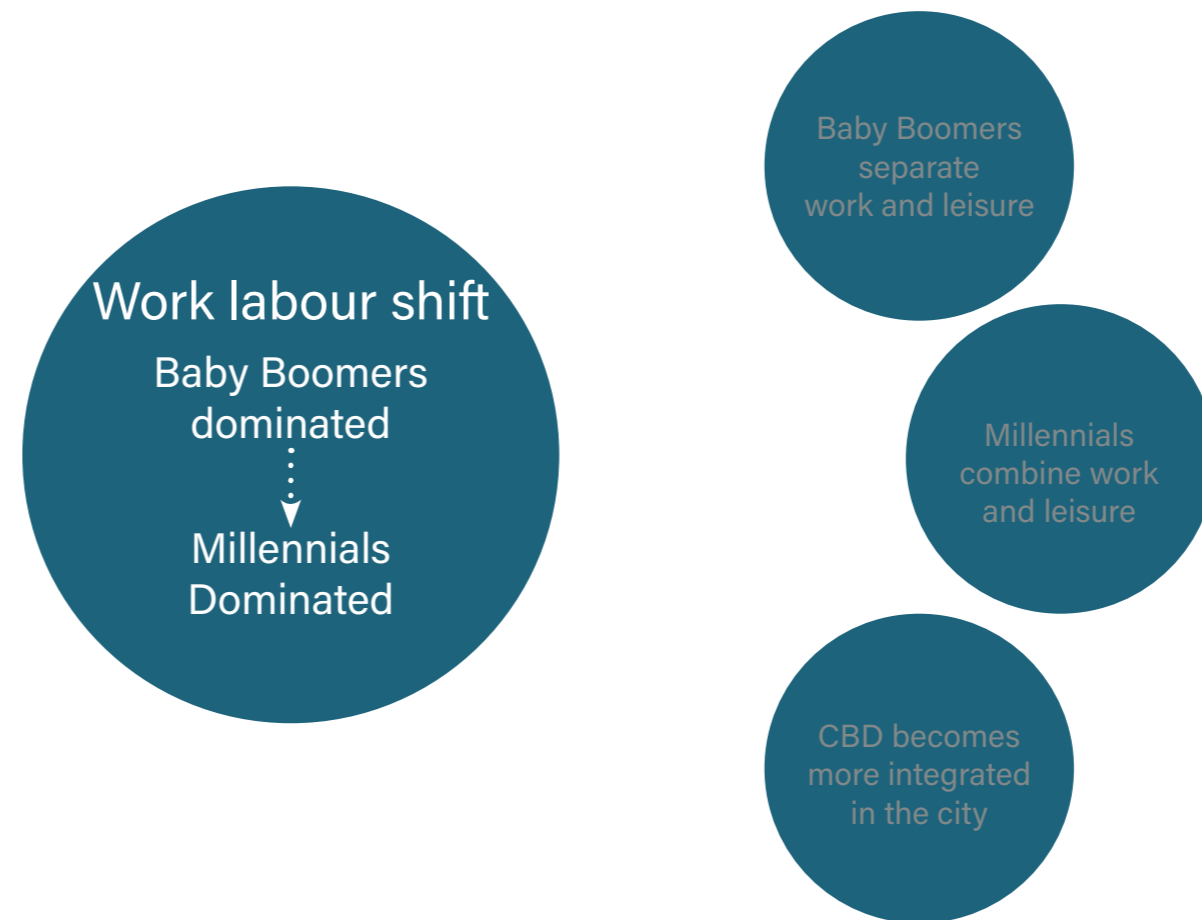
National Labour Force Generations in 2017



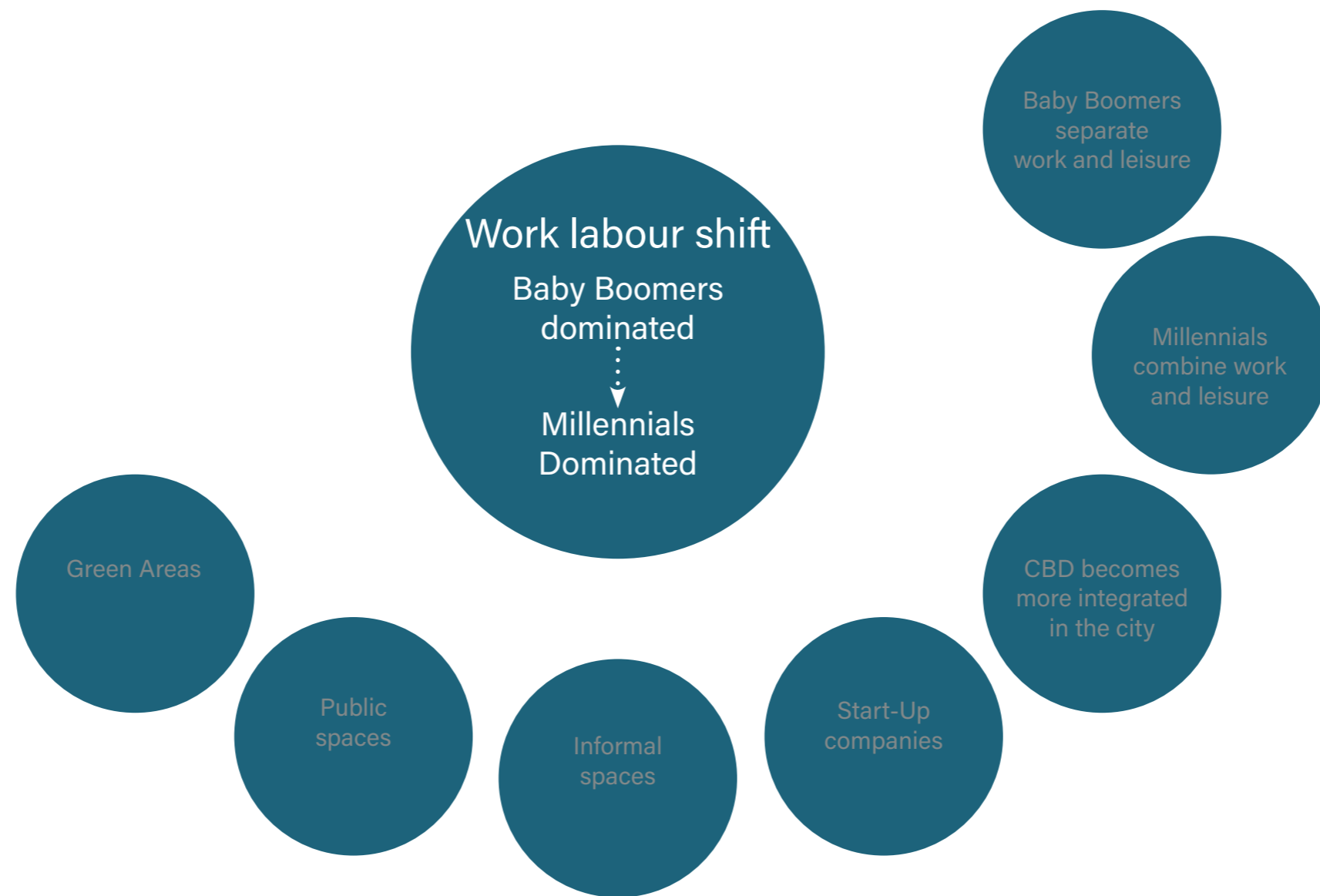
National Labour Force Generations in 2017



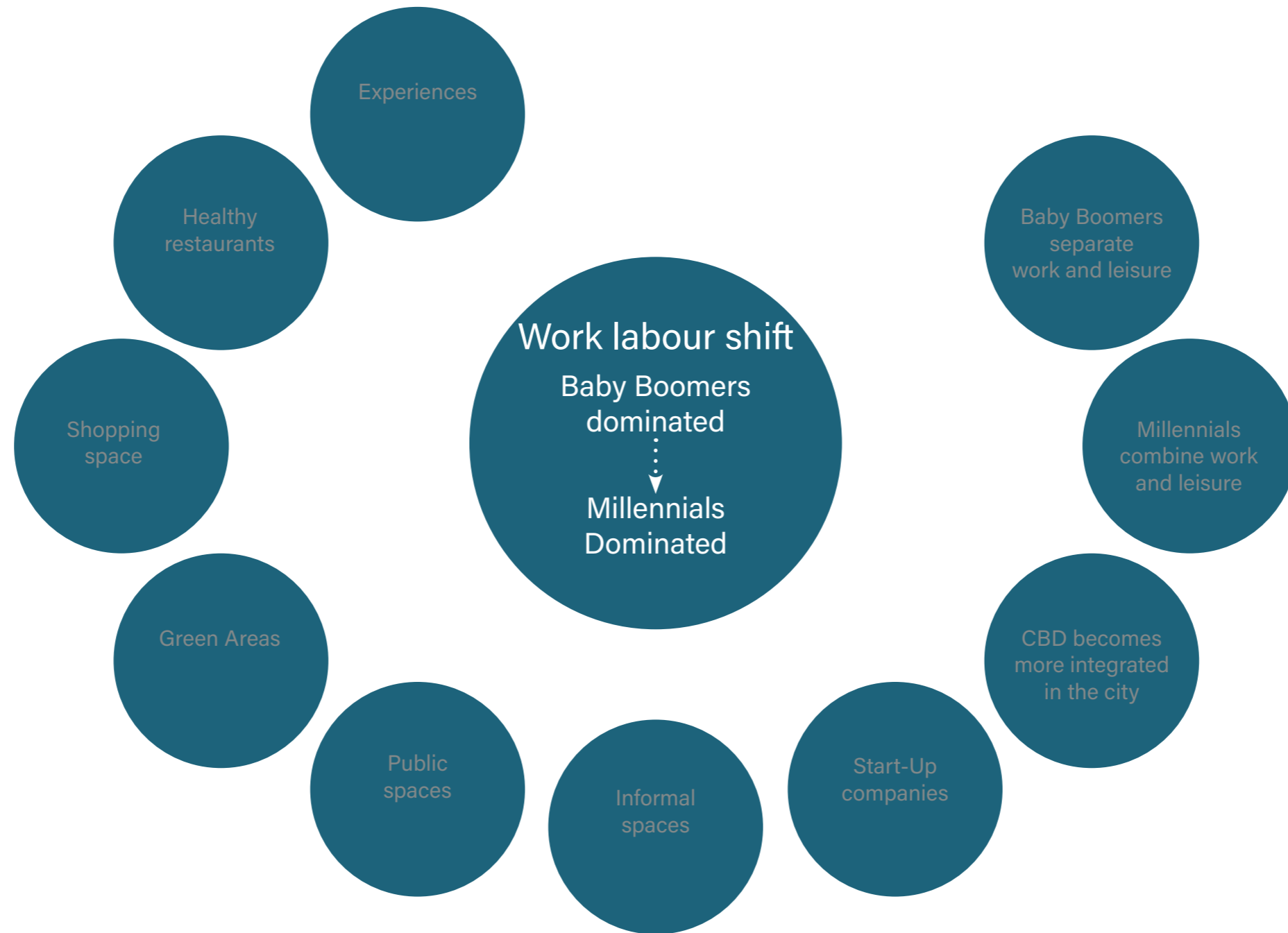
The new Generation



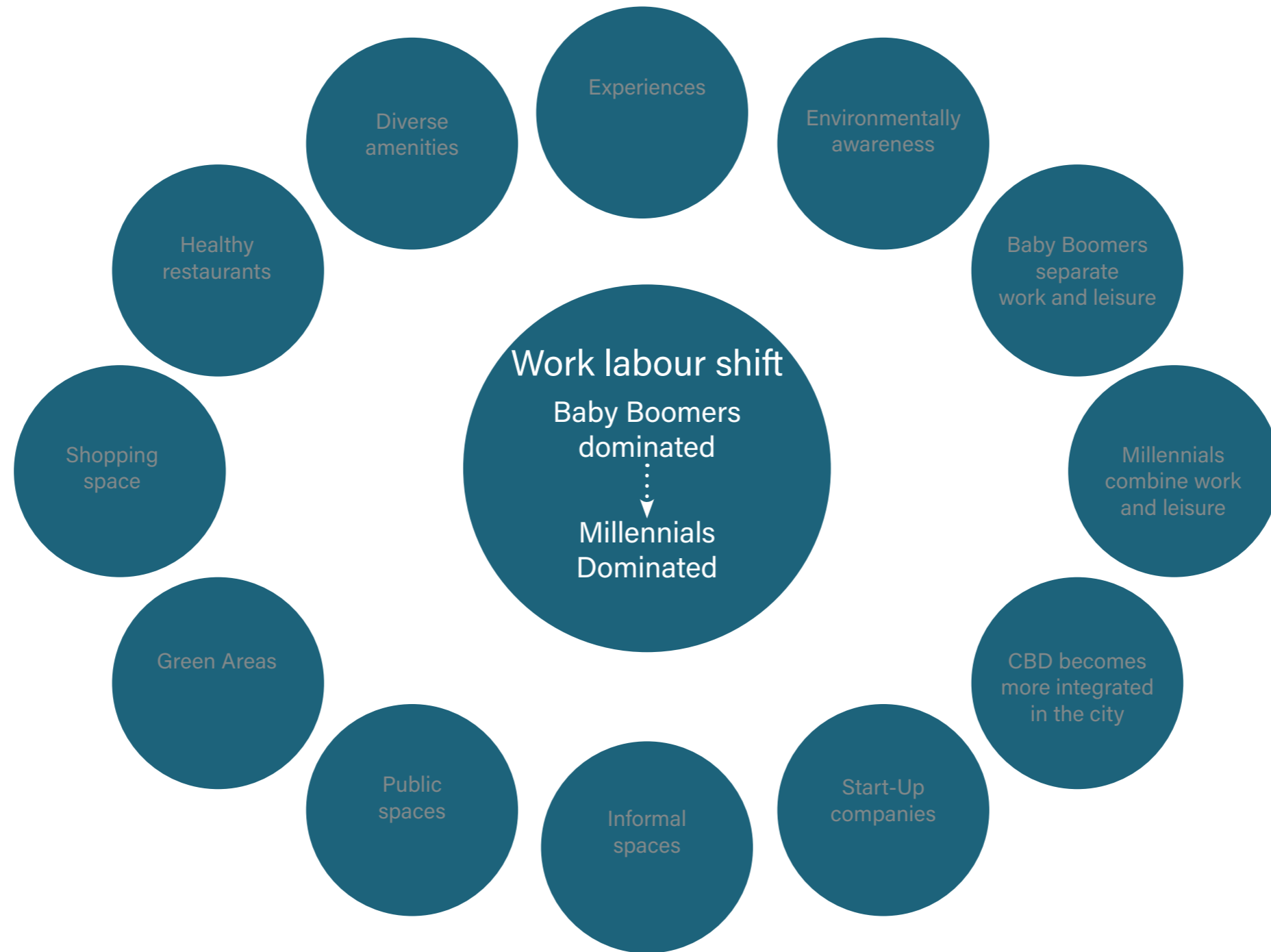
The new Generation



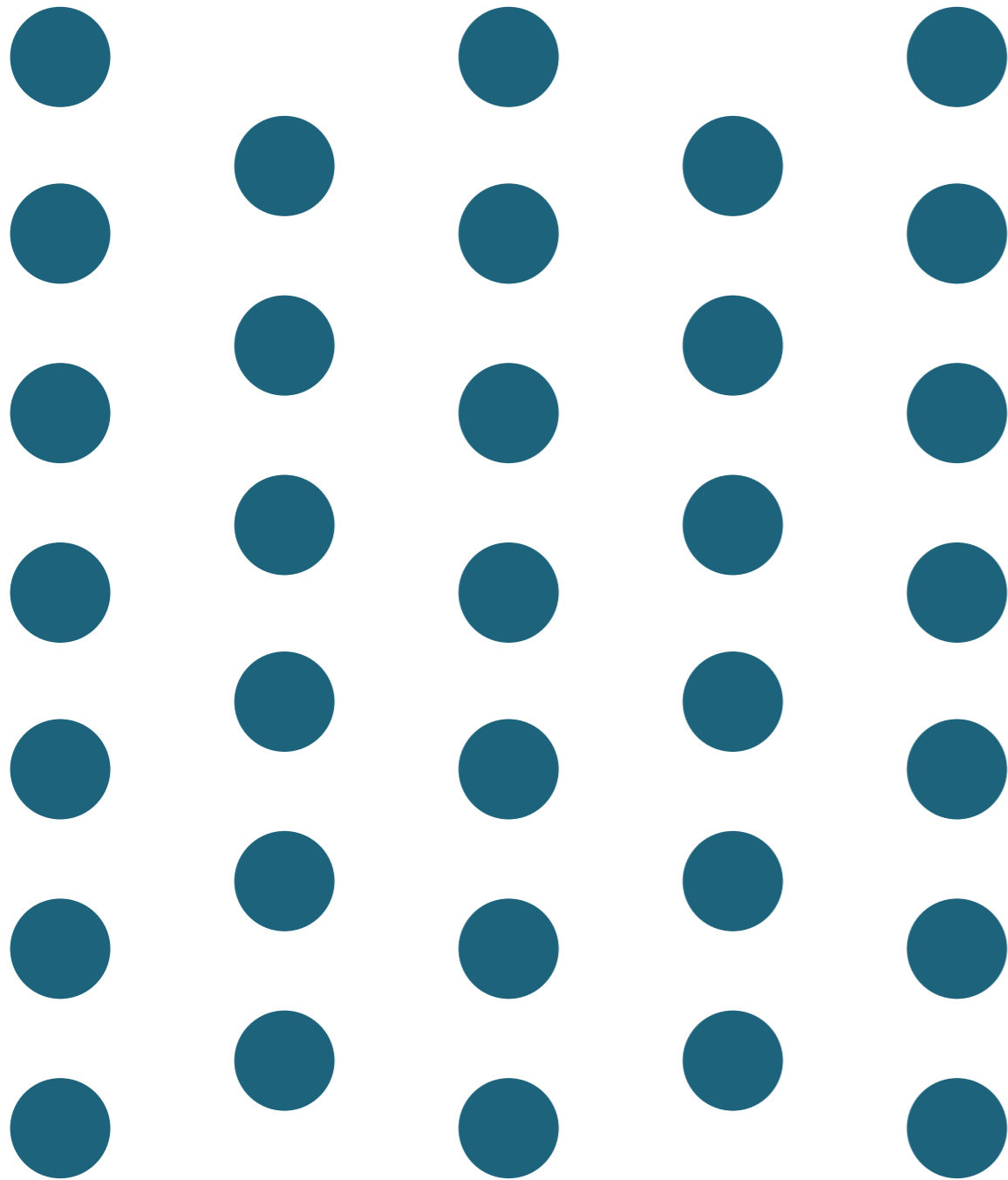
The new Generation



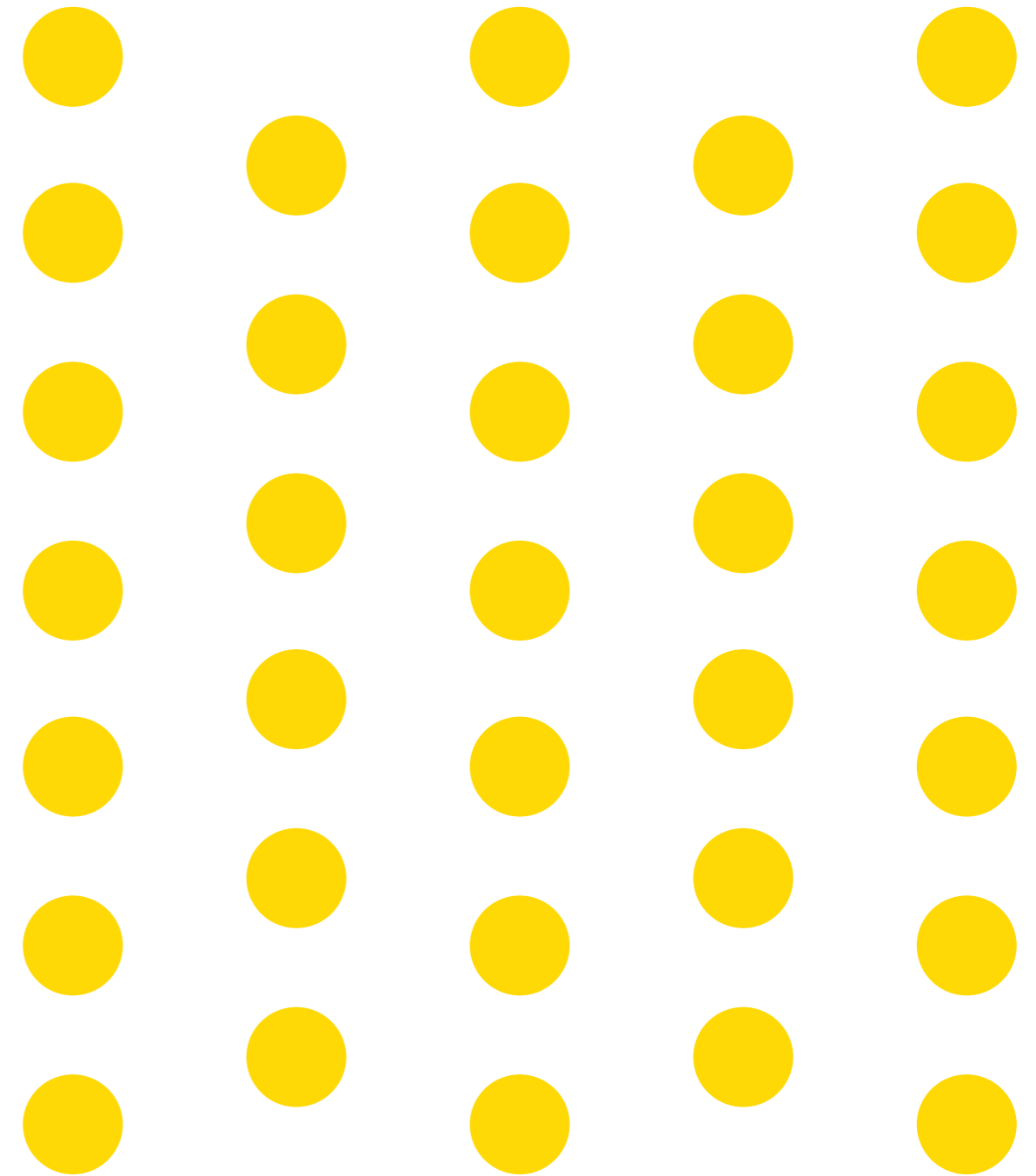
The new Generation



The new Generation

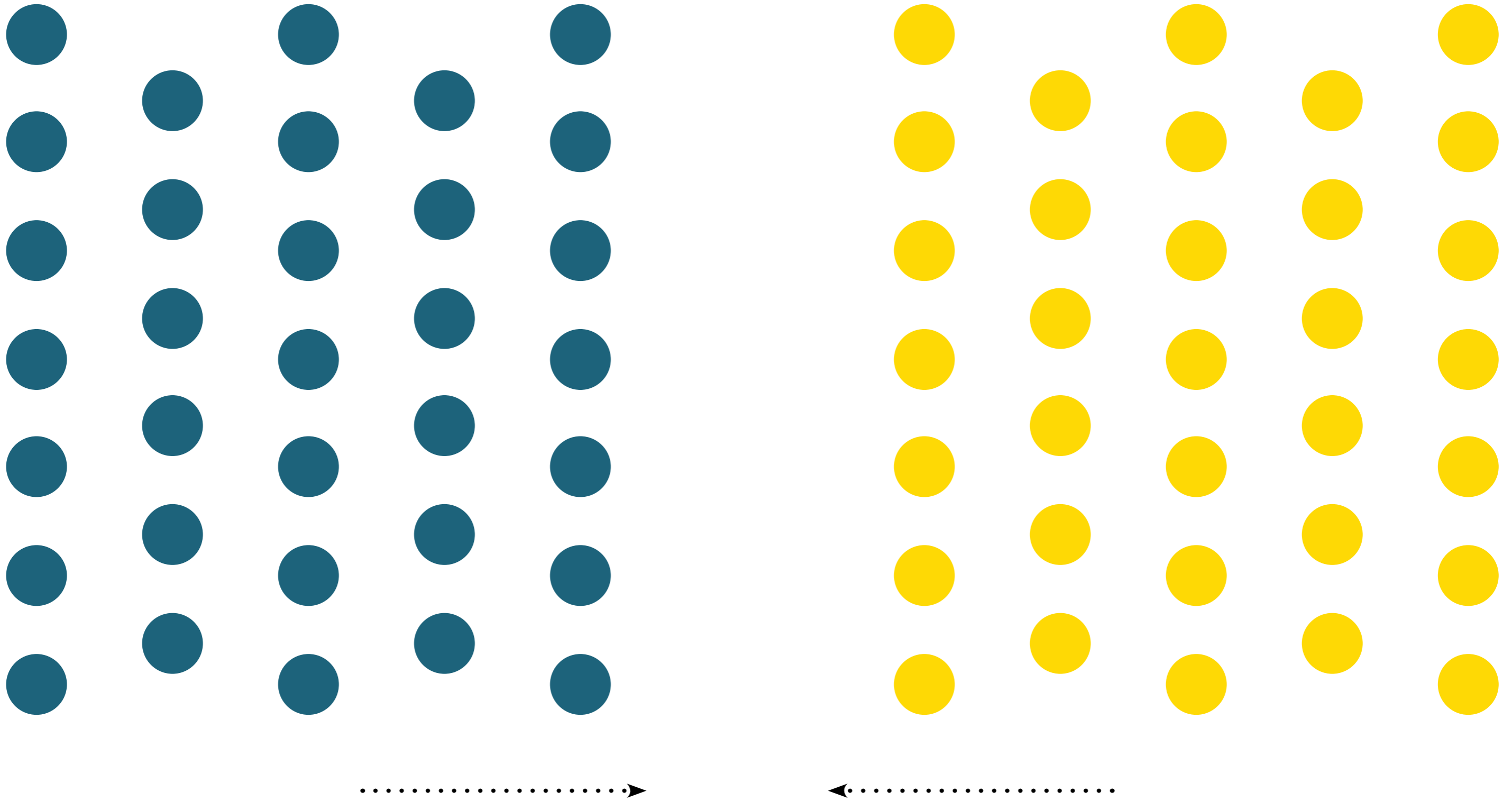


Central Business District

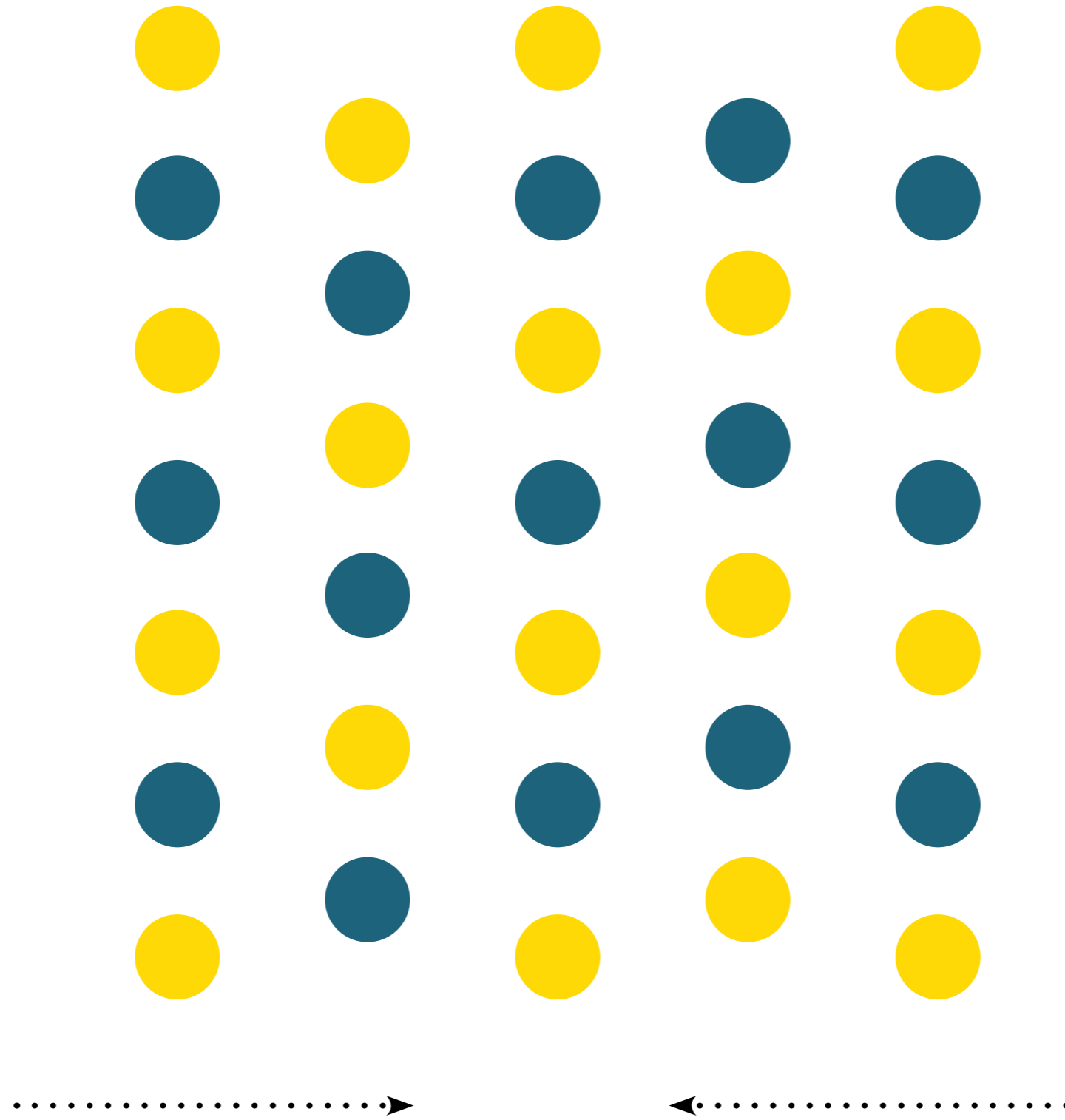


Urban City life

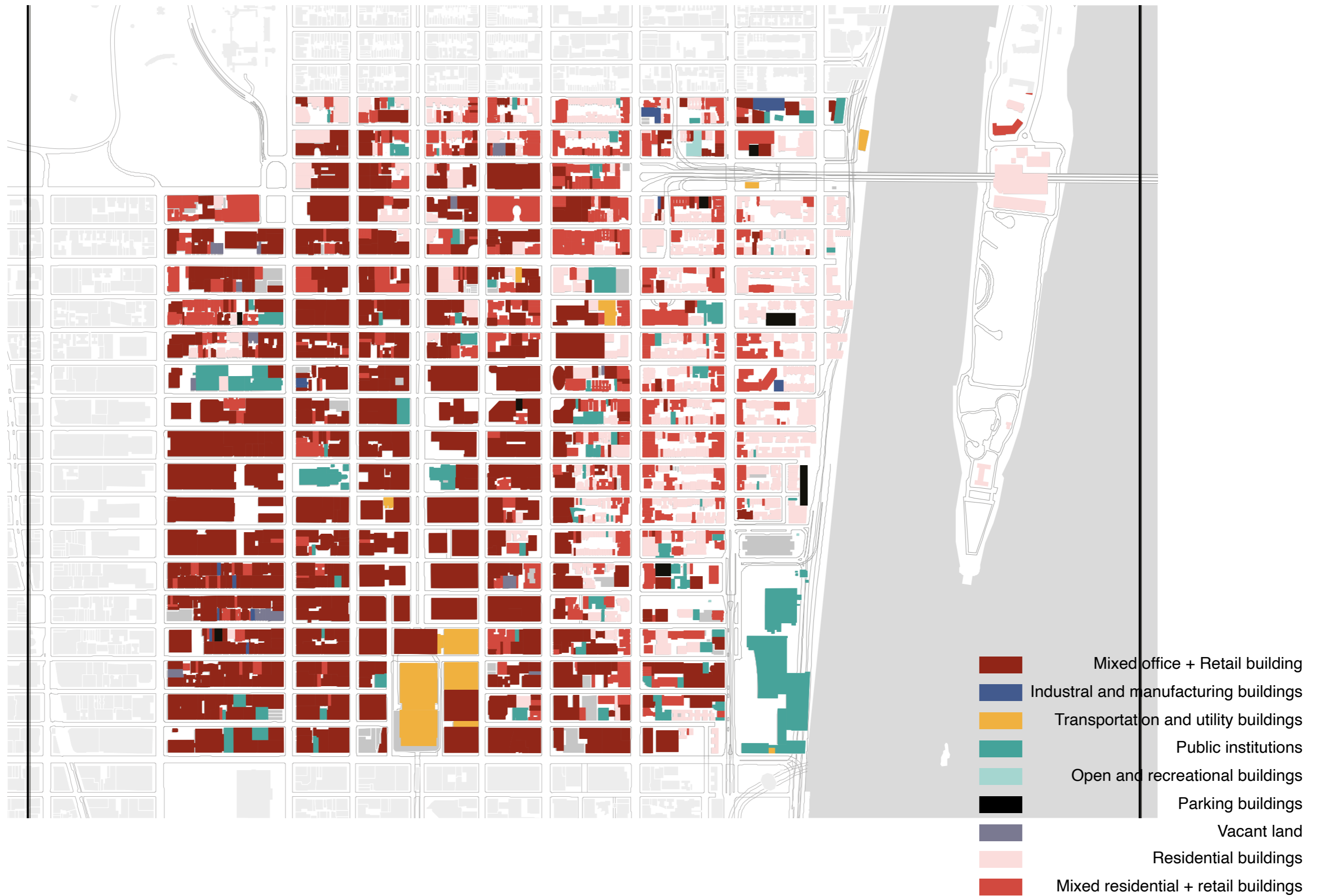
The new Generation



The 21st century Central Business District



Unintegrated Central Business District

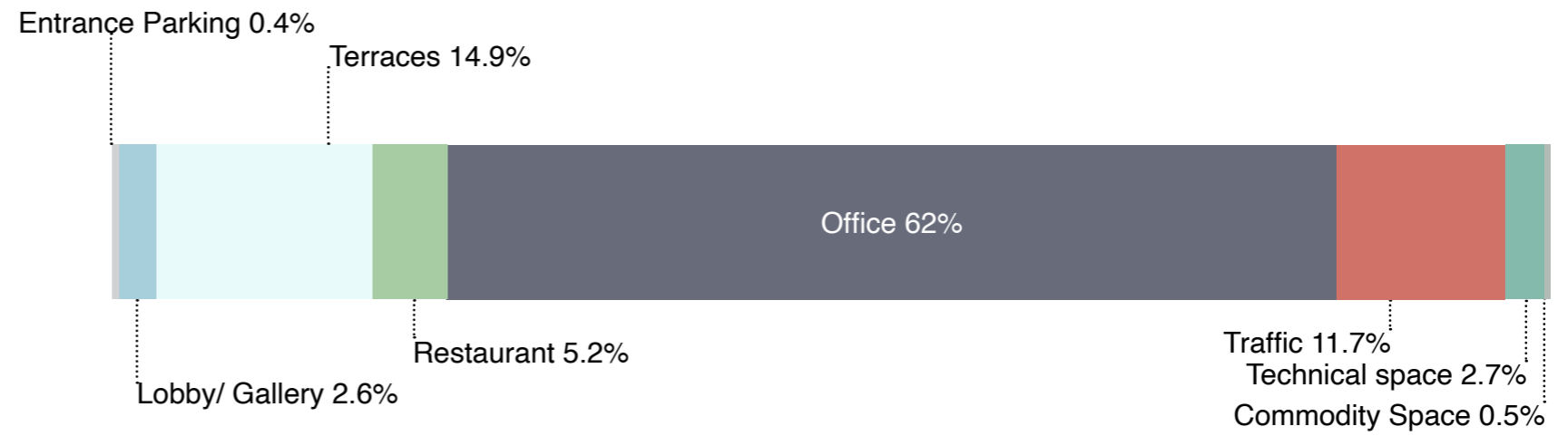
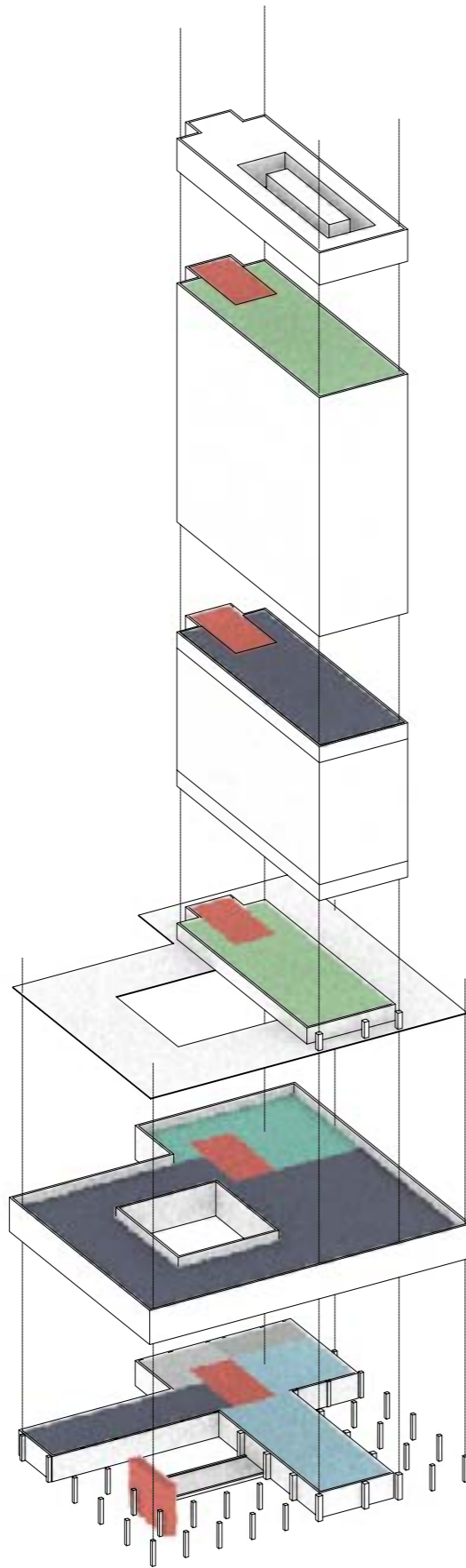


Devided Local Central Business District



- Store
- Office
- Restaurant /café
- Hotel
- POPS
- Parking
- Metro
- Storage
- College
- Banks

Unitegrated Leverhouse



- Traffic Space
- Entrance Parking
- Commodity Space
- Lobby/ Gallery
- Office Space
- Technical Space
- Restaurant



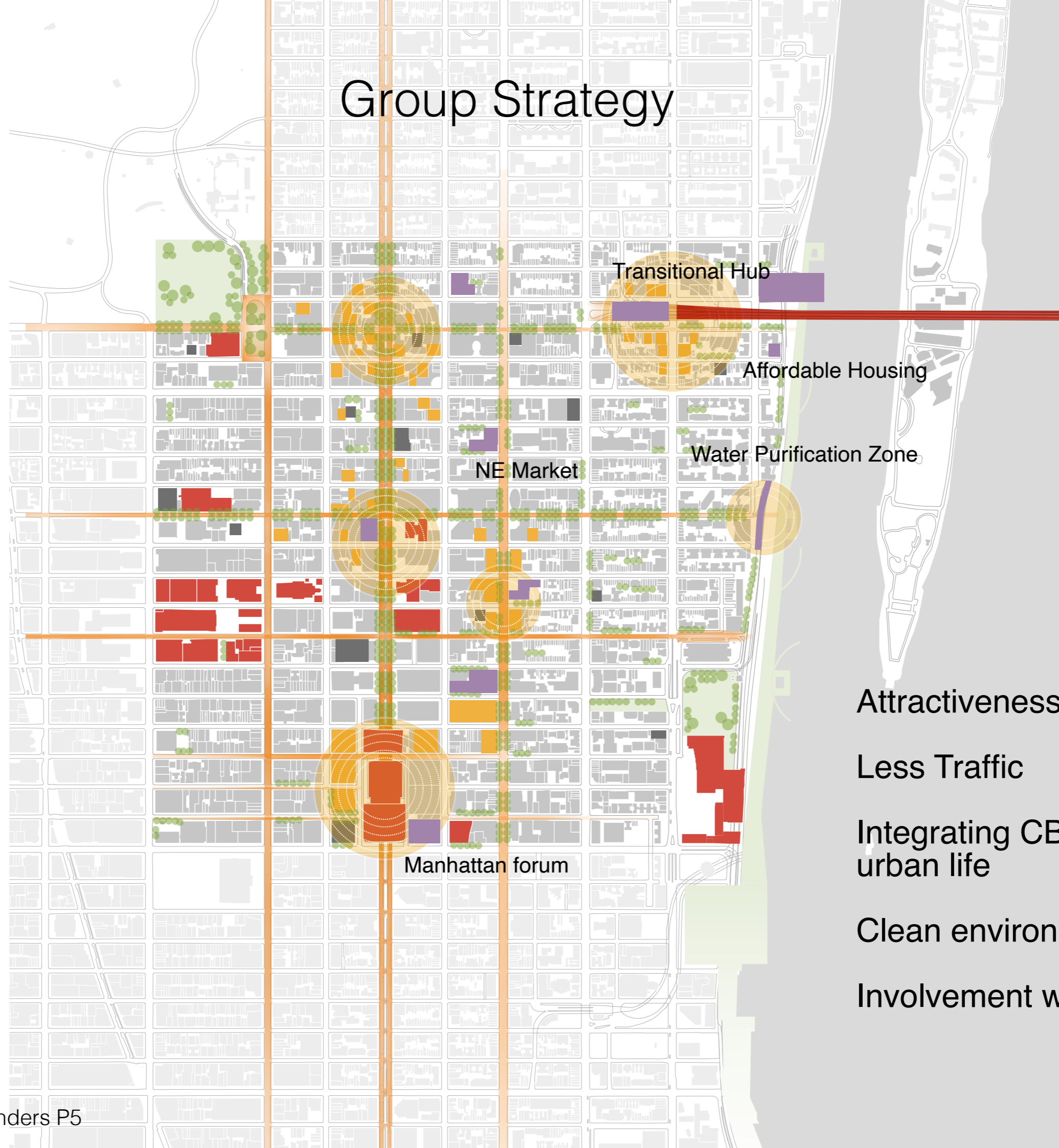
How can we integrate the new generation of Labour Force?

Group Strategy



- Trees
- Widened pavement
- Bike lanes
- Less cars
- Seating

Group Strategy



Transitional Hub

Affordable Housing

NE Market

Water Purification Zone

Manhattan forum

Attractiveness in:

Less Traffic

Integrating CBD with urban life

Clean environment

Involvement with locals

Group Strategy

Enhance the attractiveness of VoG by rein-visioning central nodes located on key intersections and entry points.

Following the 2017 rezoning, VoG is expected to densify.

Attracting new talent, the VoG needs to provide an advanced working environment



A new social hotspot





Opportunity for Social Hotspot

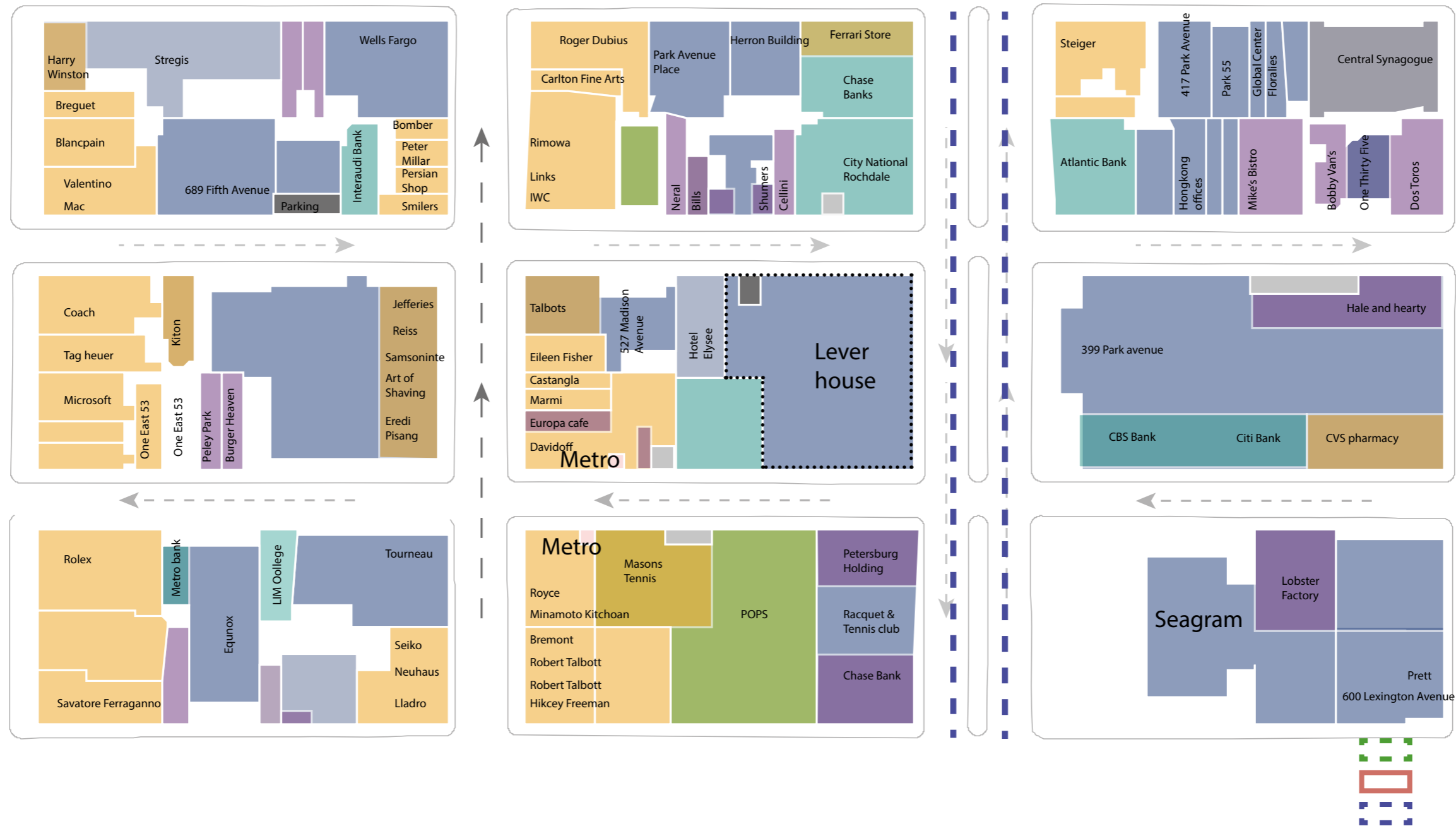
Urban characteristic



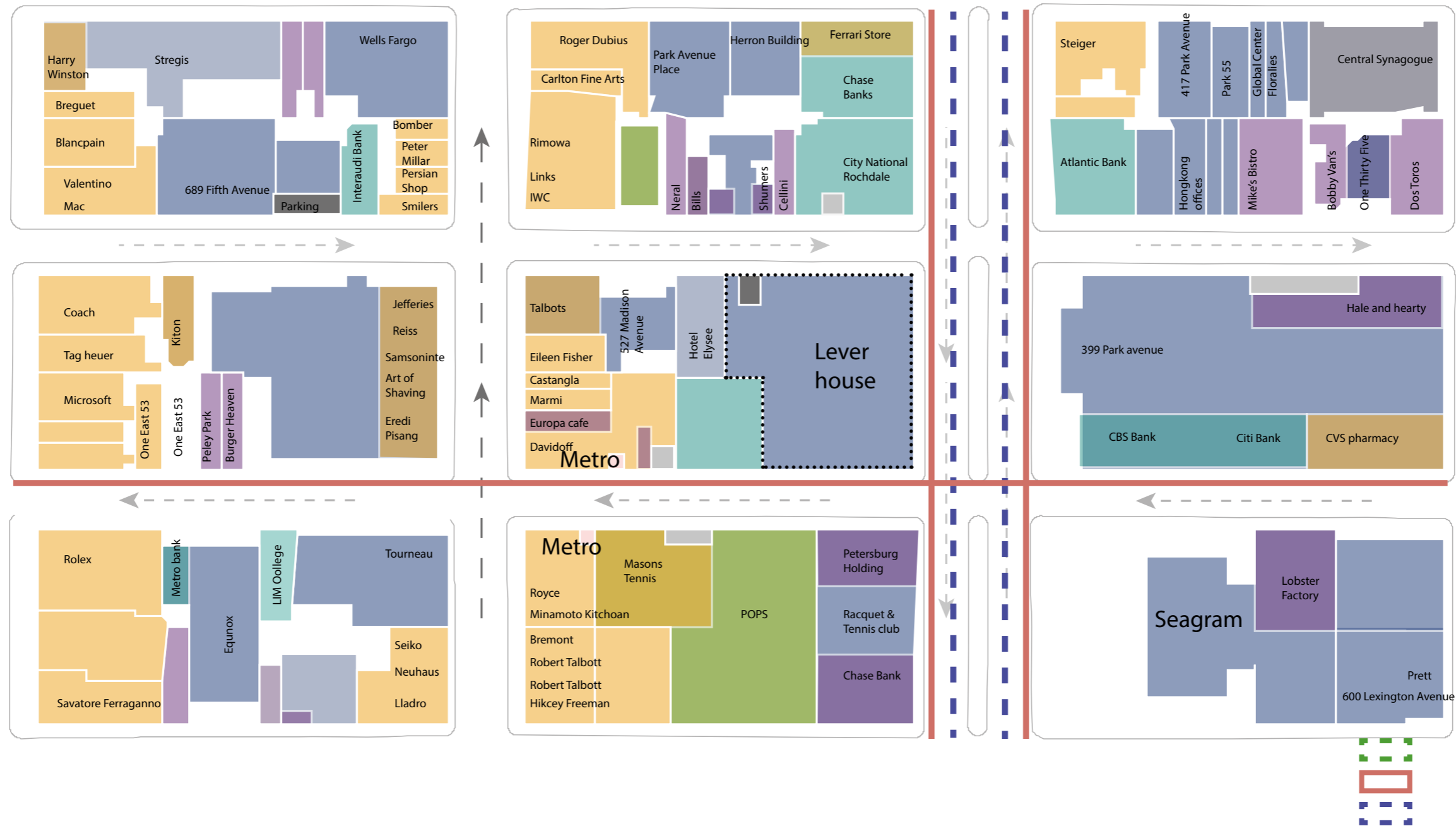
Urban characteristic



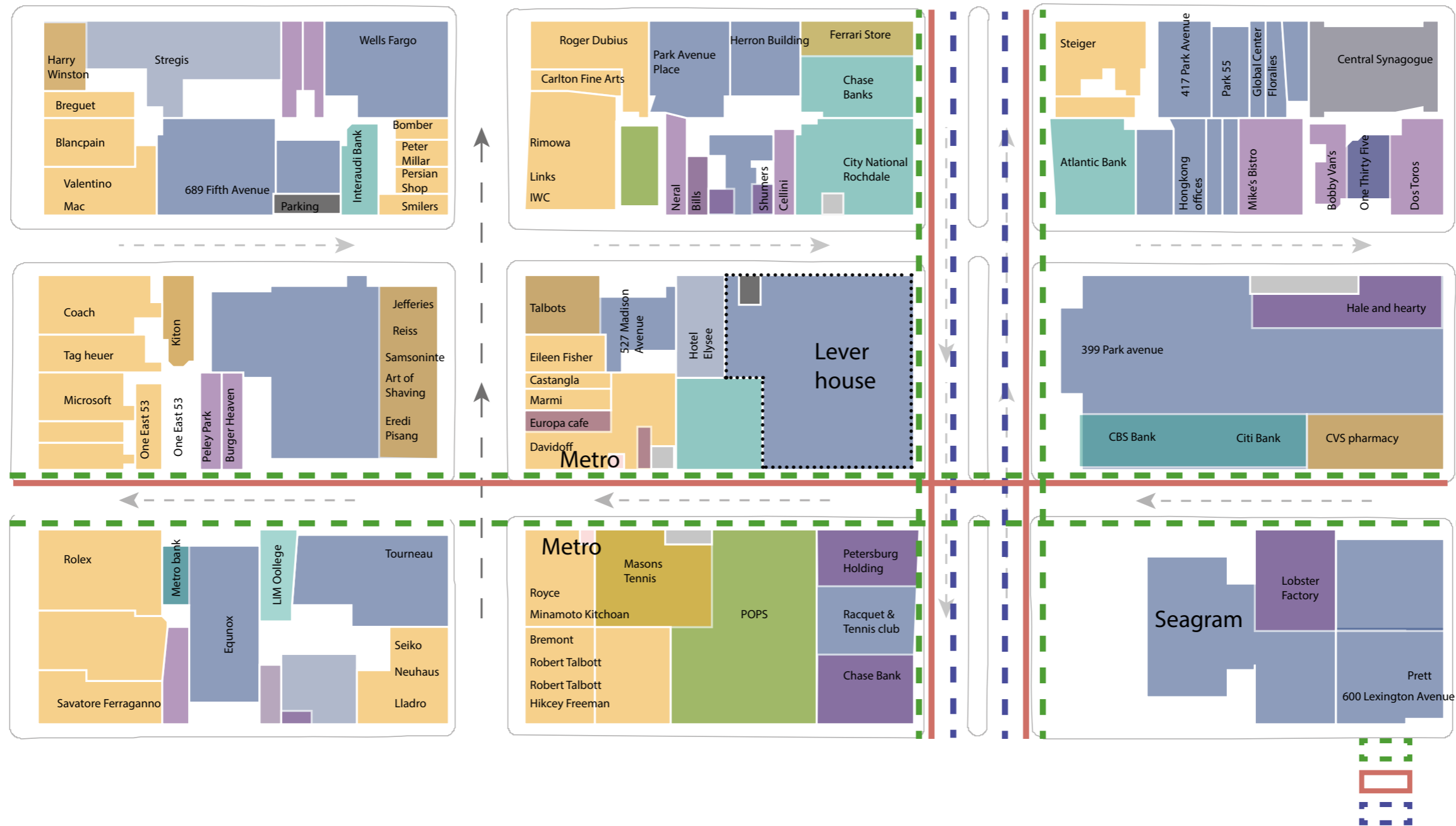
Urban characteristic



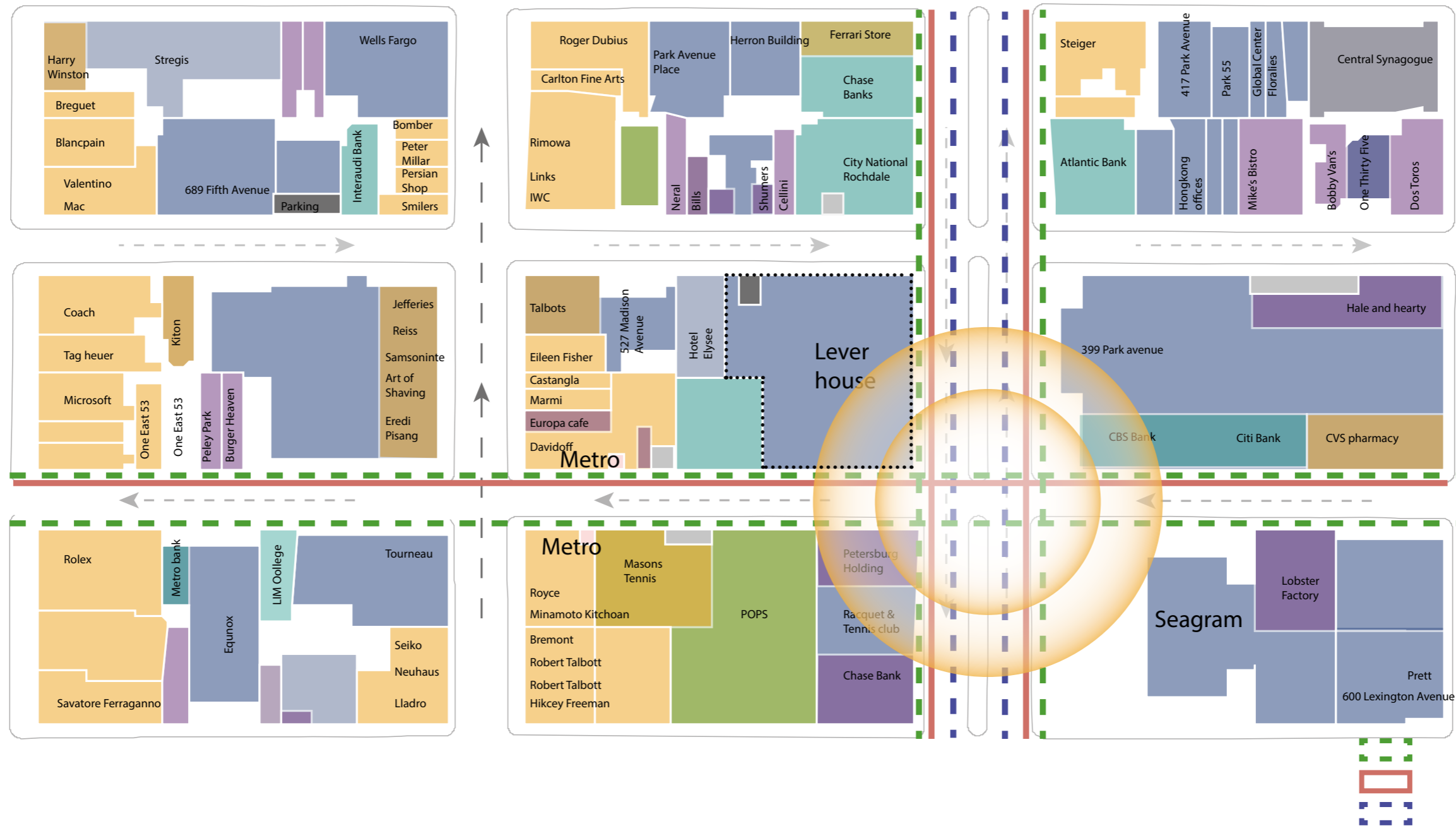
Urban characteristic



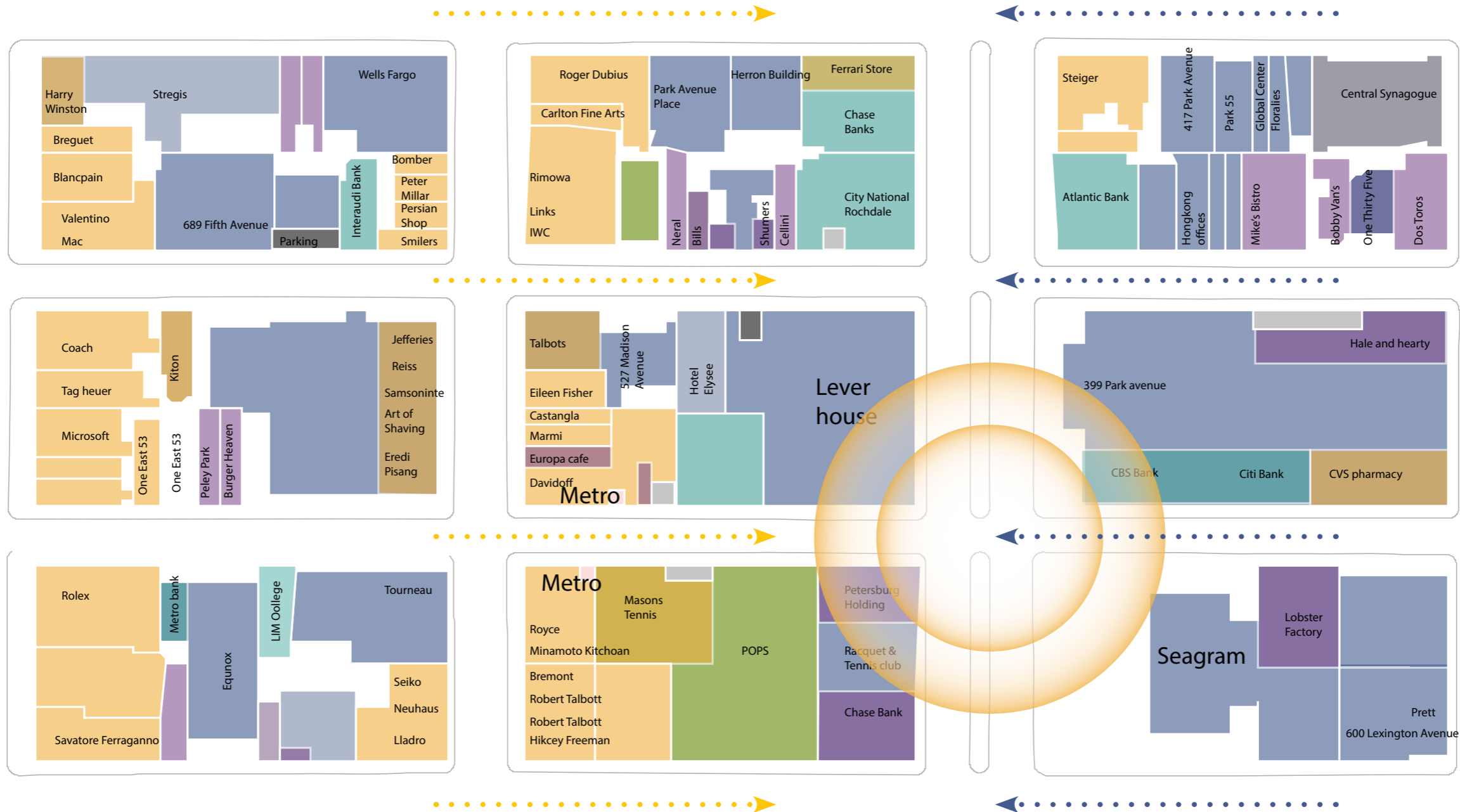
Urban characteristic



Central hotspot



Central Hotspot



Intervention Concept

By adding an intervention to the Lever House it's life span can be prolonged saving energy, waste and materials. This creates the change to revitalize the Lever House and the Central Business District so it can regain it's prominent position within the global competition of CBD's

Intervention Concept

New Volume with Leas-able office space (enhance profits, prevent becoming commodity space)

Intervention Concept

New Volume with Leas-able office space (enhance profits, prevent becoming commodity space)

Utilize FAR bonuses (respecting well known volume lever house)

Intervention Concept

New Volume with Leas-able office space (enhance profits, prevent becoming commodity space)

Utilize FAR bonuses (respecting well known volume lever house)

Respect Landmark characteristics

Intervention Concept

New Volume with Leas-able office space (enhance profits, prevent becoming commodity space)

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Integrate changing work labour force

Intervention Concept

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Create exchange between old and new

Intervention Concept

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Integrate changing work labour force

Create exchange between old and new

Integrated durability within new volume

Intervention Concept

New Volume with Leas-able office space (enhance profits, prevent becoming commodity space)

Utilize FAR bonuses (respecting well known volume lever house)

Respect Landmark characteristics

Integrate changing work labour force

Create exchange between old and new

Integrated durability within new volume

Project environmental intervention to surroundings

Intervention Concept

Provide

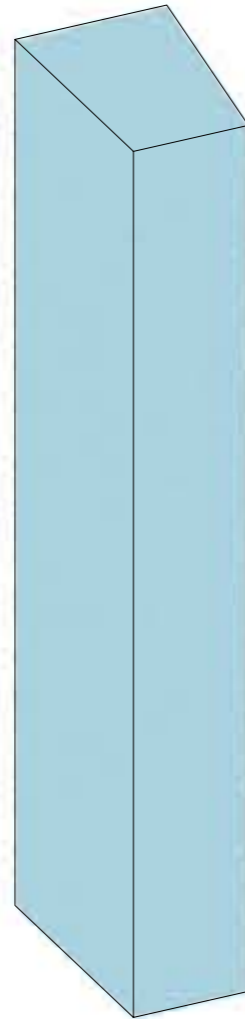
International company office space

Flexibility to cope with changing labour force

Private green space

Private amenities

Energy



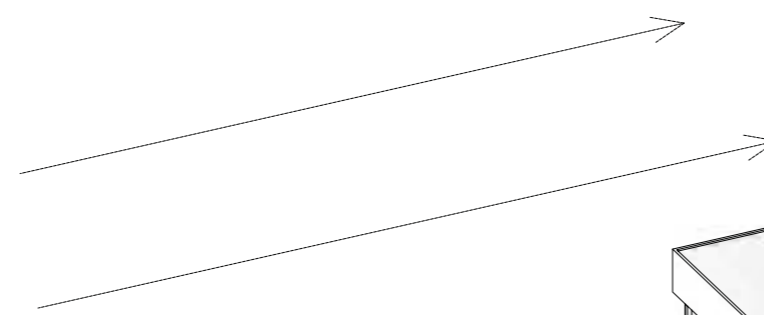
Exchange

Energy

Labour force variety

Interior Program

Physical connection to illustrate collaboration



Provide

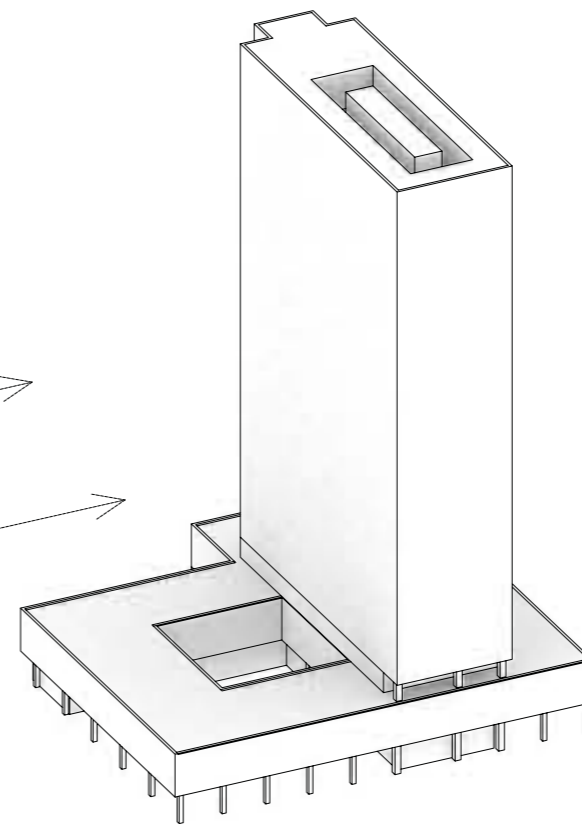
Start-up space

Public green space

Public restaurants/cafés

Public Gallery

Public amenities



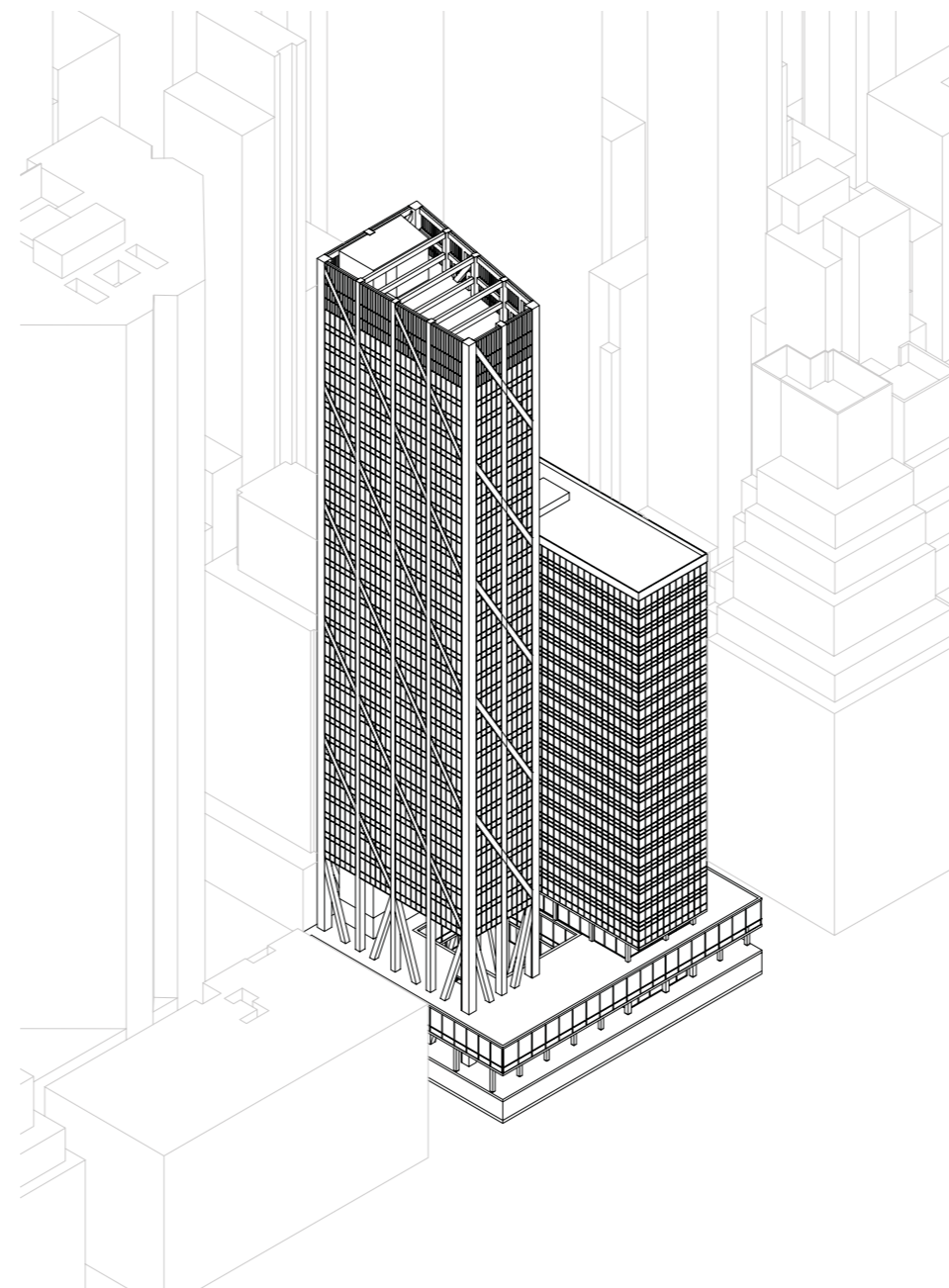
Intervention Concept



Intervention Concept



Intervention Concept



How can existing architecture be used to make NE-Midtown more attractive to the new generation of businesses so that the CBD of NE-Midtown will be revitalised and regain its position as premium business district?

Lever House

Design by Nathaniel Owings from SOM

Two parts, vertical horizontal

First stories entire building block

Ground floor retail.

Oasis of green on top

Flush unbroken surface

A single important unit



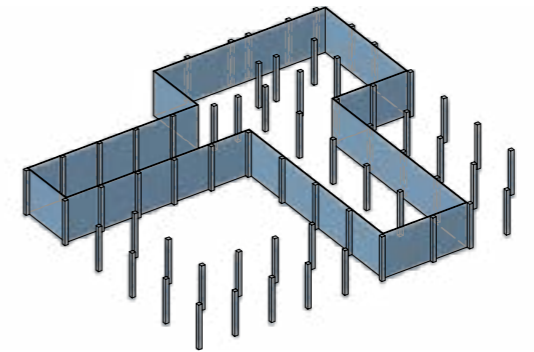


Lever House



Lever House

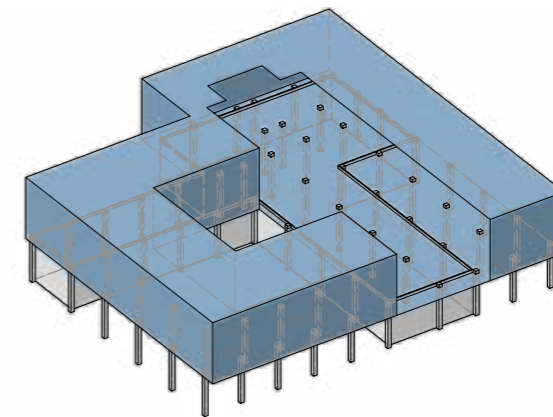
Pedestrians must be able to walk through an open garden on Park Avenue and into the glass-enclosed lobby of the building saying welcome to all people.



Lever House

Pedestrians must be able to walk through an open garden on Park Avenue and into the glass-enclosed lobby of the building saying welcome to all people.

Two story rectangular box

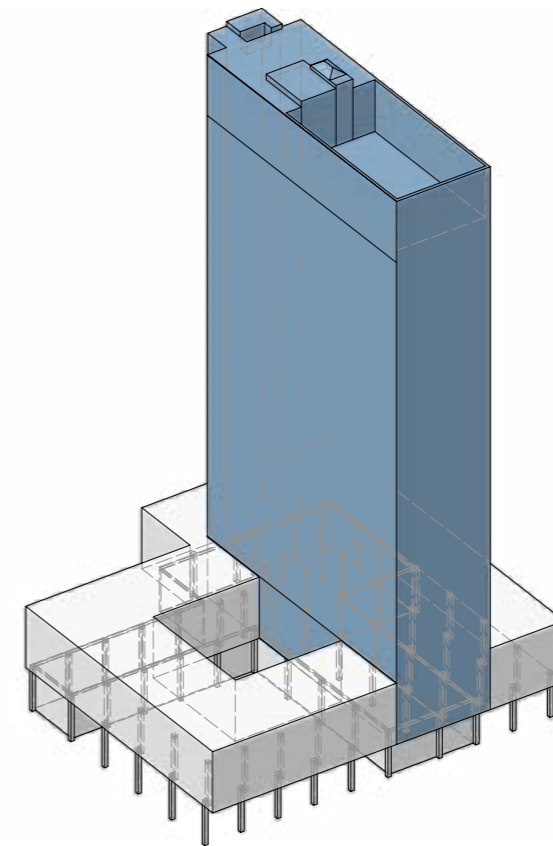


Lever House

Pedestrians must be able to walk through an open garen on Park Avenue and into the glass-enclosed lobby of the building saying welcome to all people.

Two story rectangular box

24 story tower



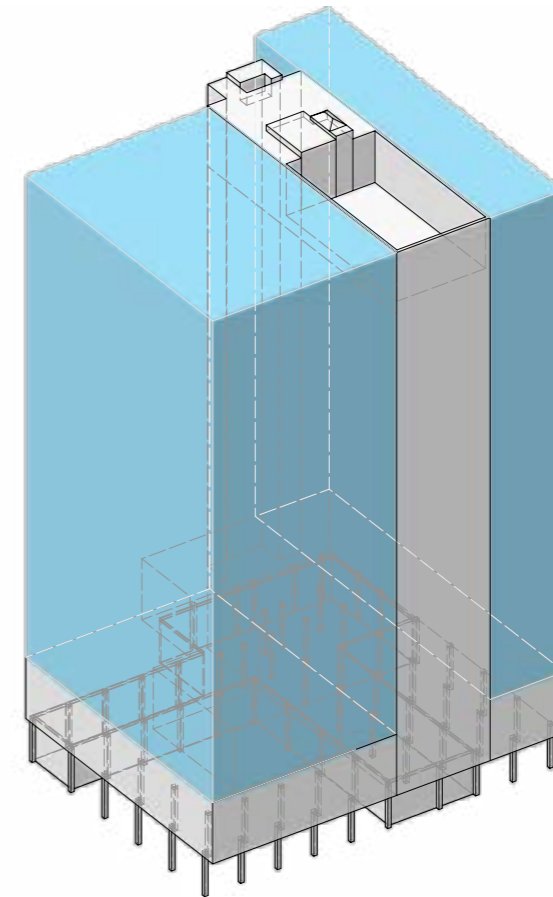
Lever House

Pedestrians must be able to walk through an open garen on Park Avenue and into the glass-enclosed lobby of the building saying welcome to all people.

Two story rectangular box

24 story tower.

The building was designed with the air space surrounding it in mind. That alone would make it stand out on Park Avenue (not a full block building)



Lever House

Pedestrians must be able to walk through an open garen on Park Avenue and into the glass-enclosed lobby of the building saying welcome to all people.

Two story rectangular box

24 story tower.

The building was designed with the air space surrounding it in mind. That alone would make it stand out on Park Avenue (not a full block building)

Curtain wall blue tinted heat-absorbing glass (Solex) 100% fully air-conditioned. Top three floors house air-conditioning equipment, water cooling tower and elevator machinery.



Lever House

Pedestrians must be able to walk through an open garen on Park Avenue and into the glass-enclosed lobby of the building saying welcome to all people.

Two story rectangular box

24 story tower.

The building was designed with the air space surrounding it in mind. That alone would make it stand out on Park Avenue (not a full block building)

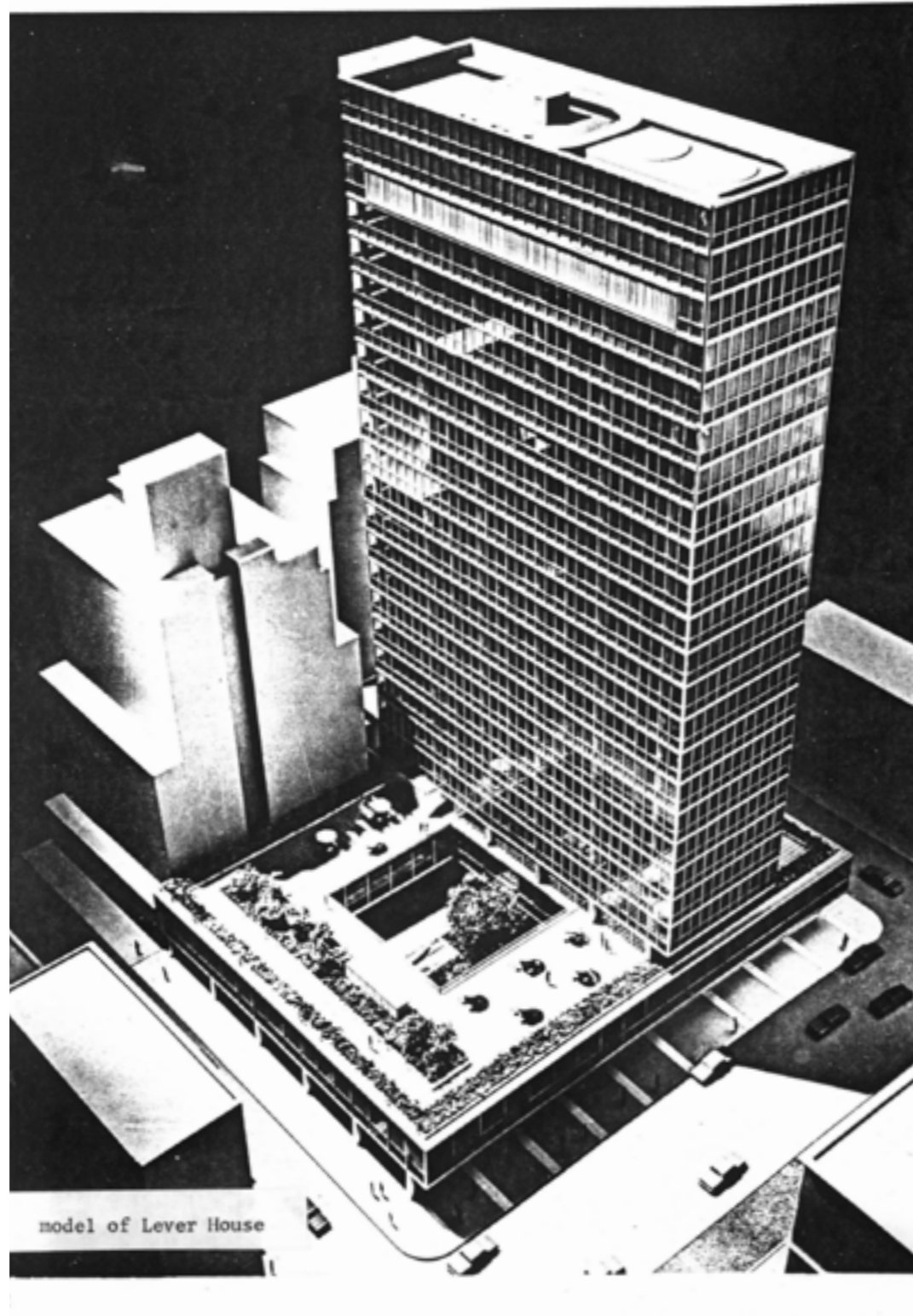
Turned tower to provide the opening with air and light. Enlightened form of urban business development

Curtain wall blue tinted heat-absorbing glass (Solex) 100% fully air-conditioned. Top three floors house air-conditioning equipment, water cooling tower and elevator machinery.

Materials emphasize the most modern American technology.



Landmark Lever House



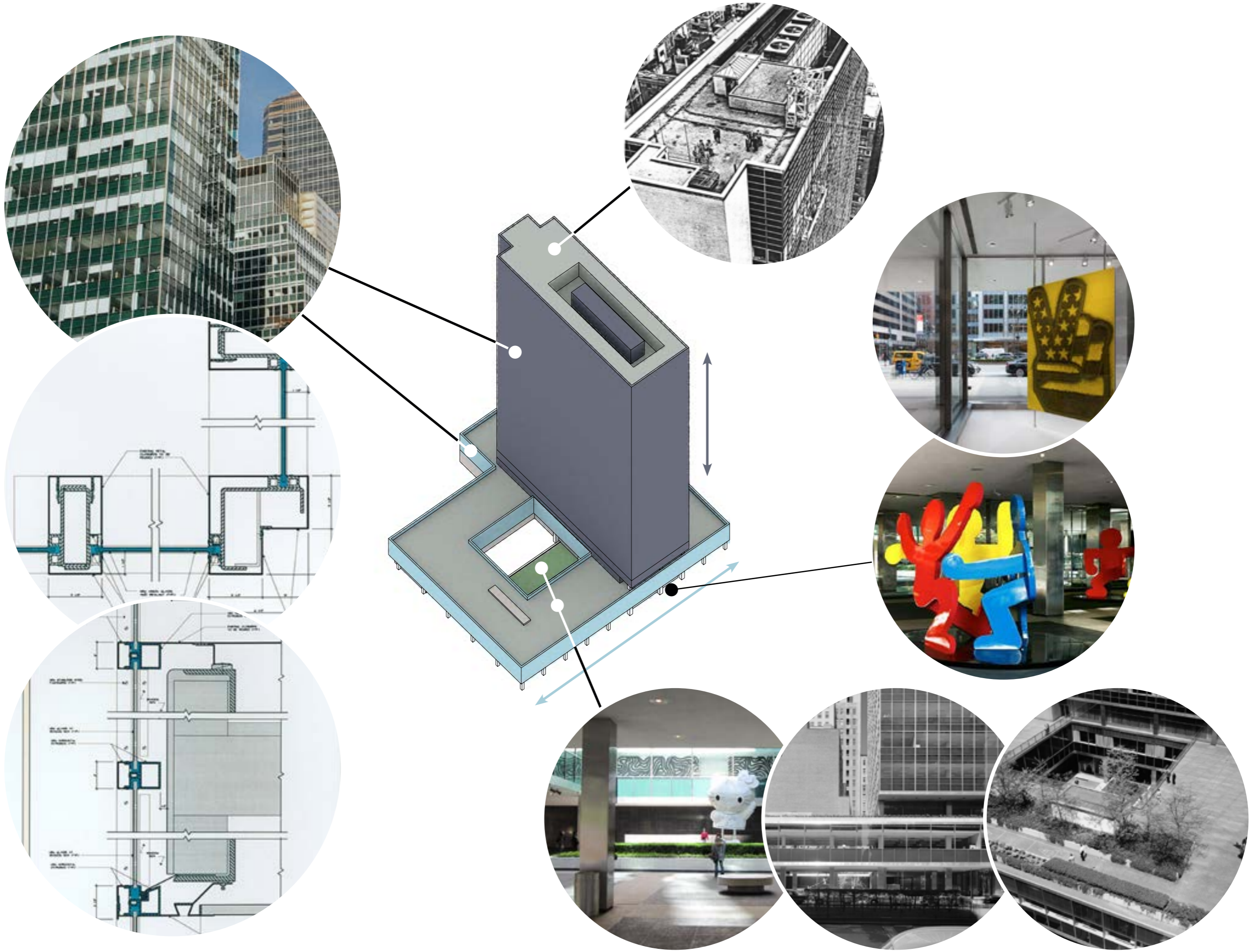
Key monument in the evolution of the international style

Lever House started a large transition at Park Avenue from traditional masonry apartment houses to glass and steel office buildings

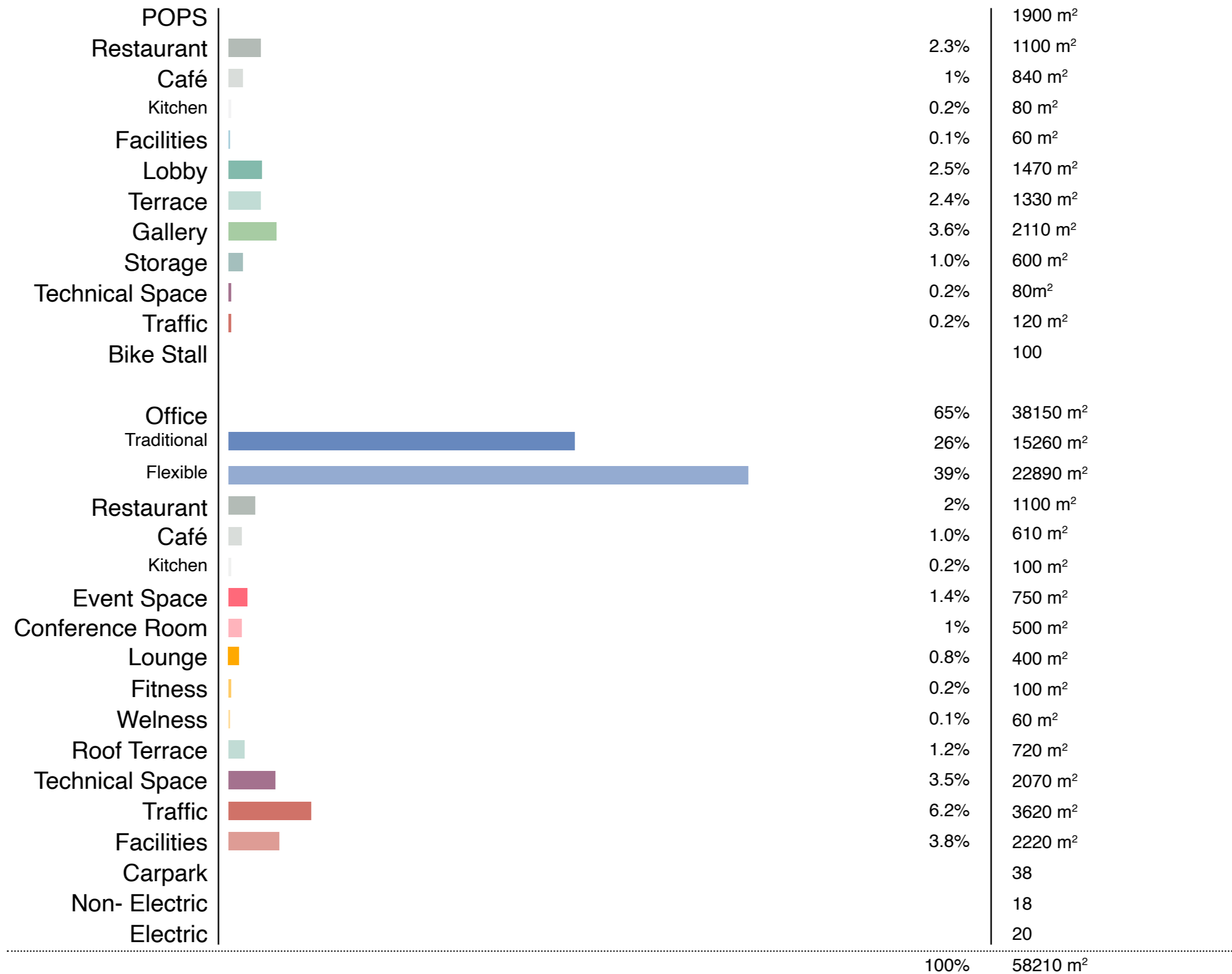
Large fixed curtain wall facade
Innovative cleaning gondola

30% of ground floor is open space

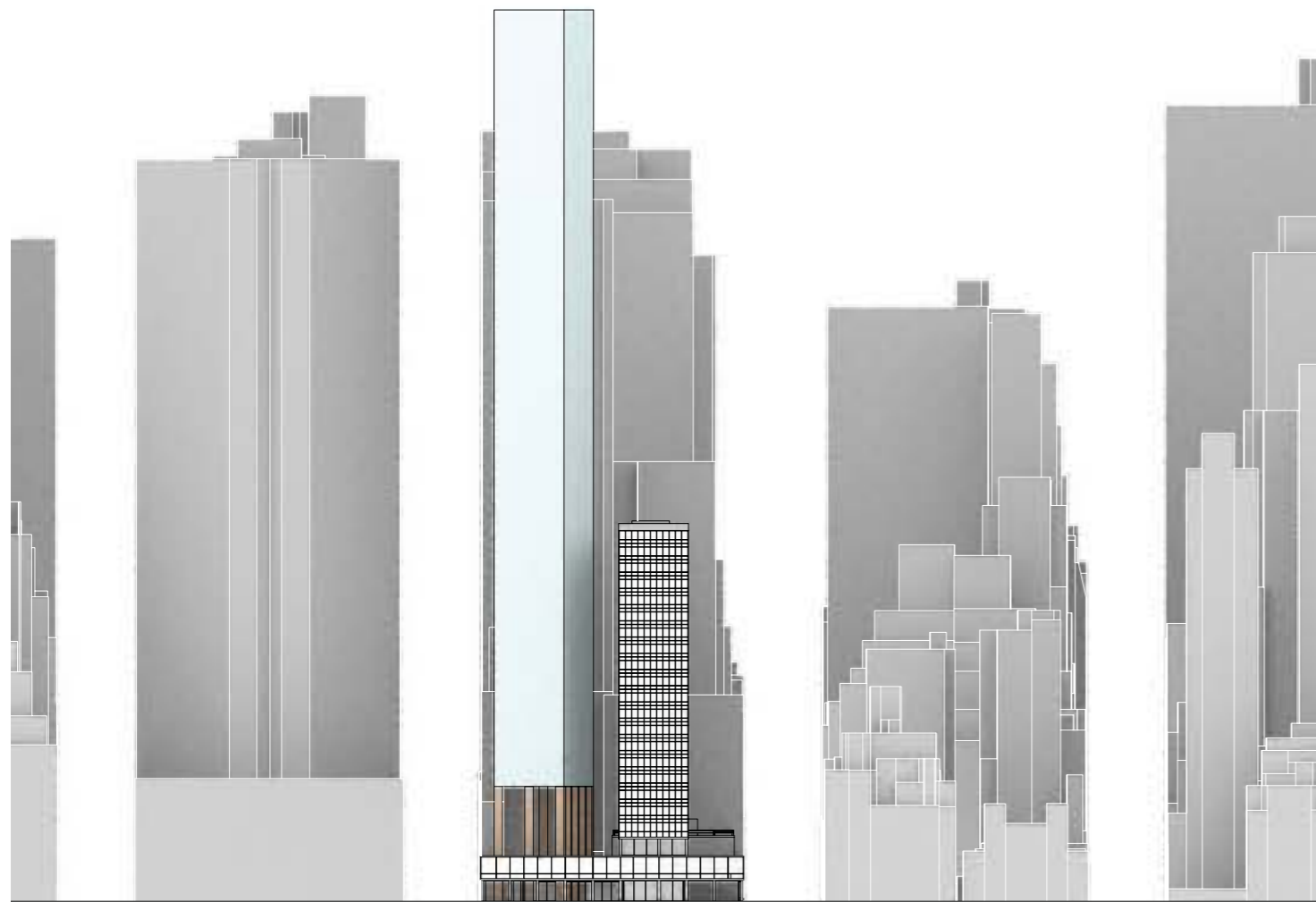
In 1983 Lever House was appointed as a Landmark



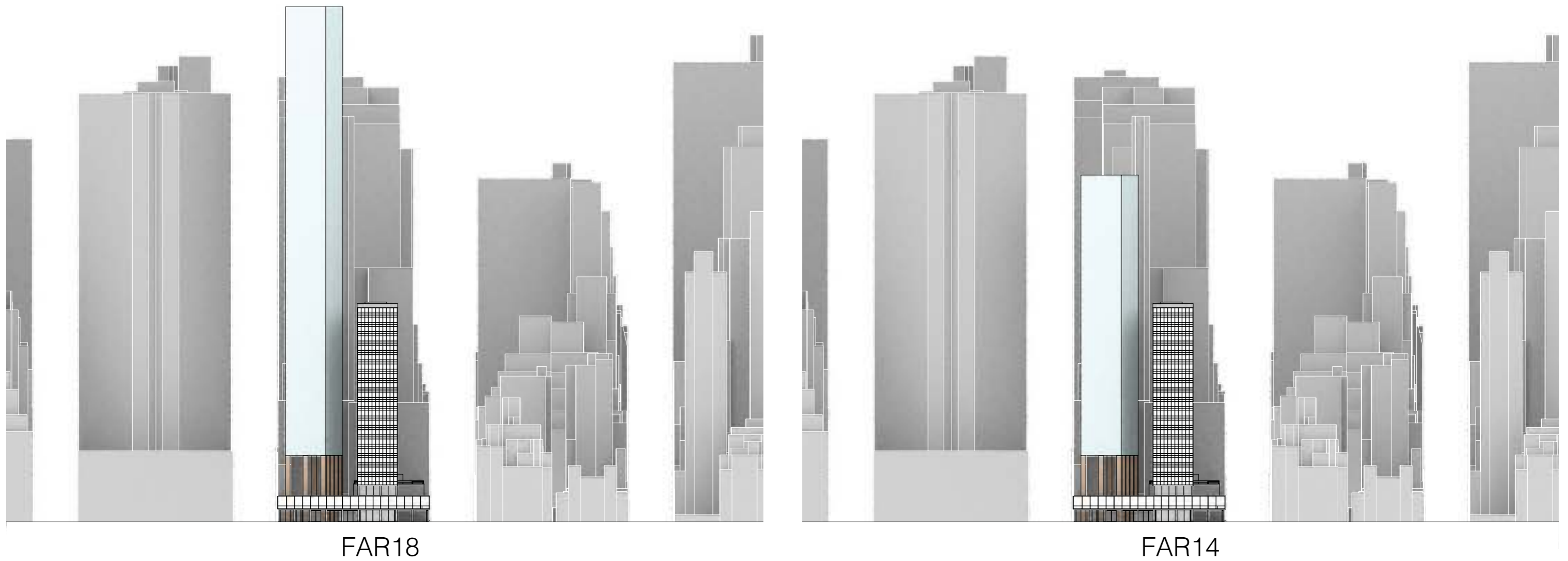
Program FAR 18



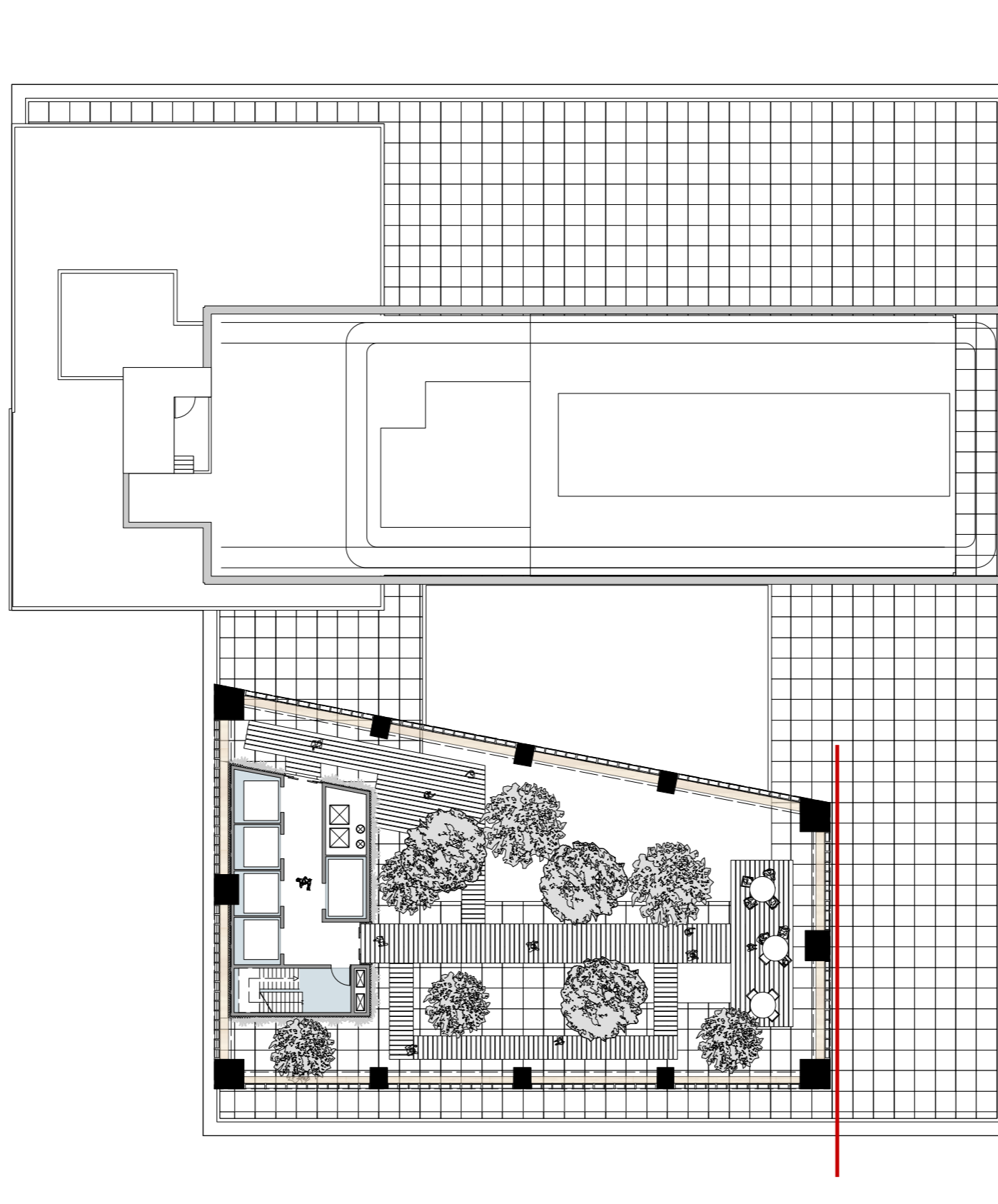
Utilizing FAR



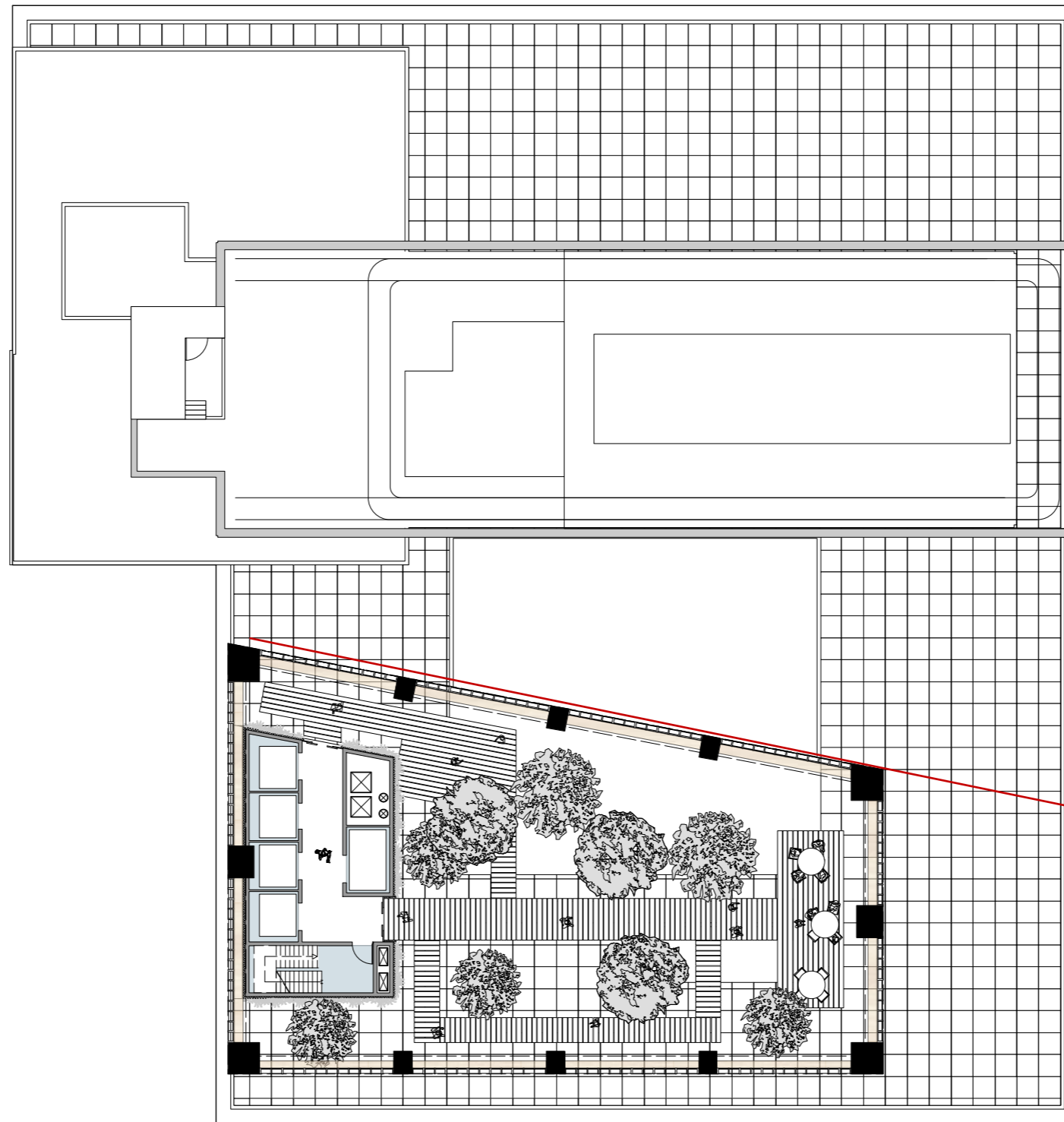
Respecting existing volume



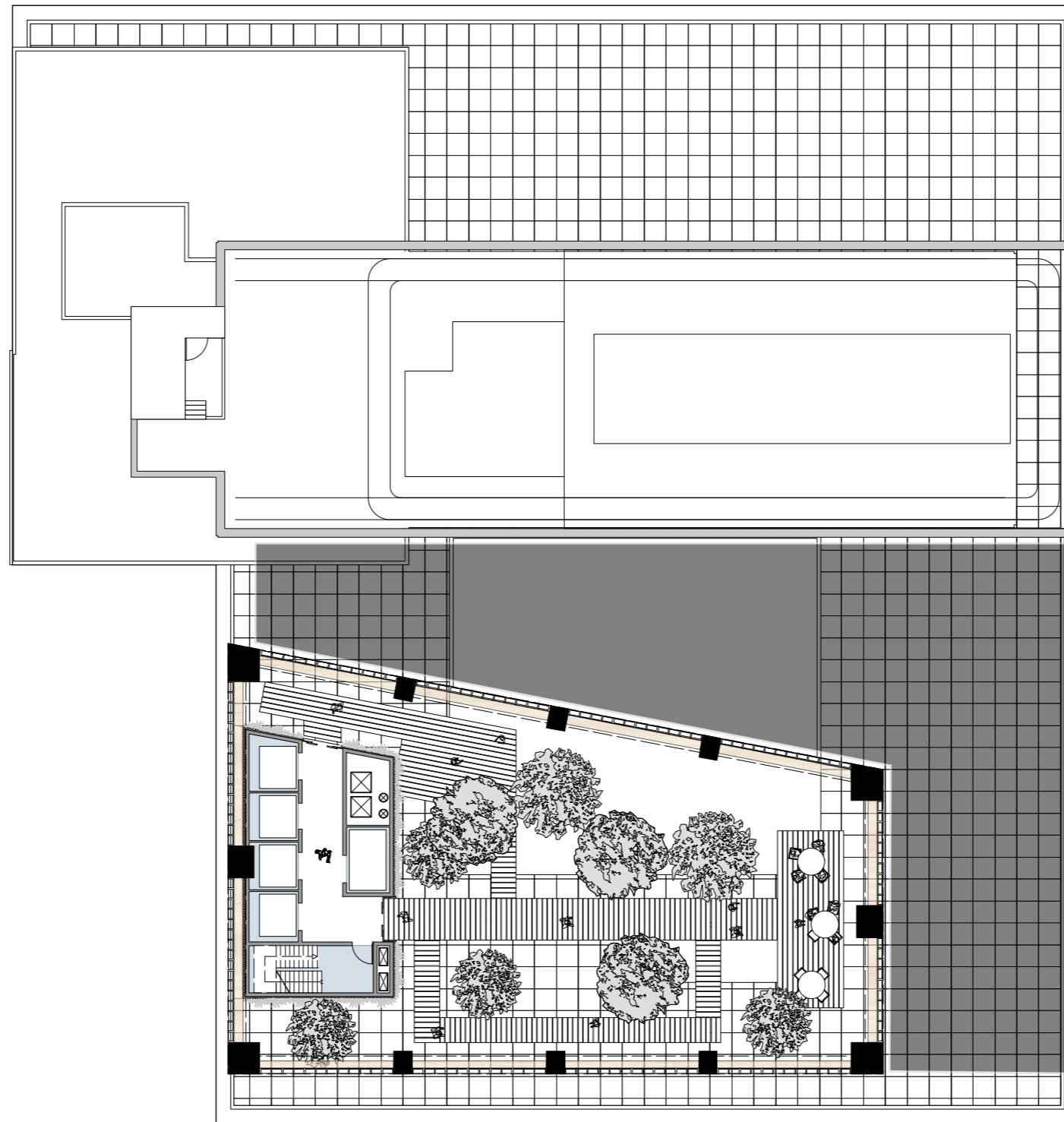
Respecting existing volume



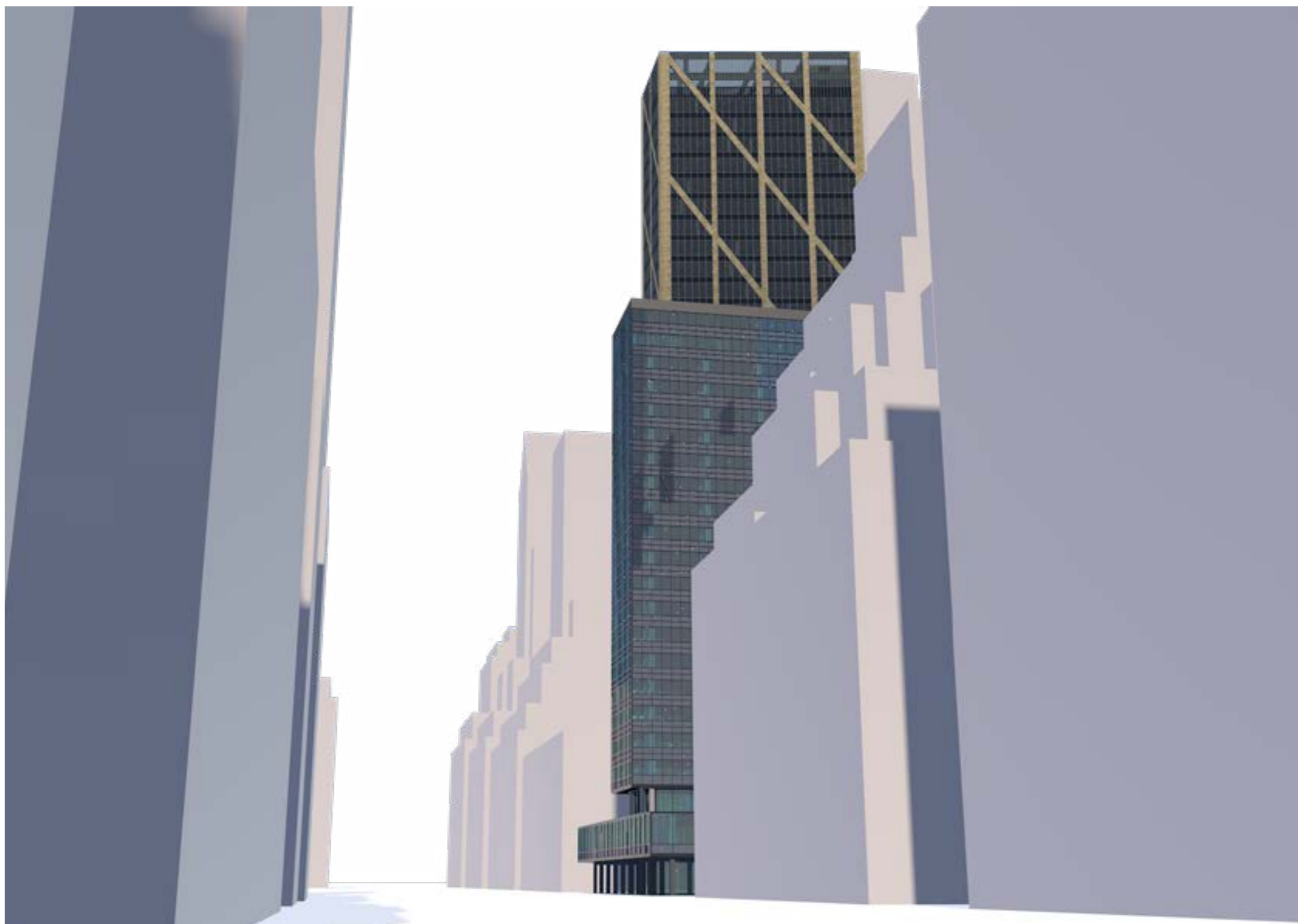
Respecting existing volume



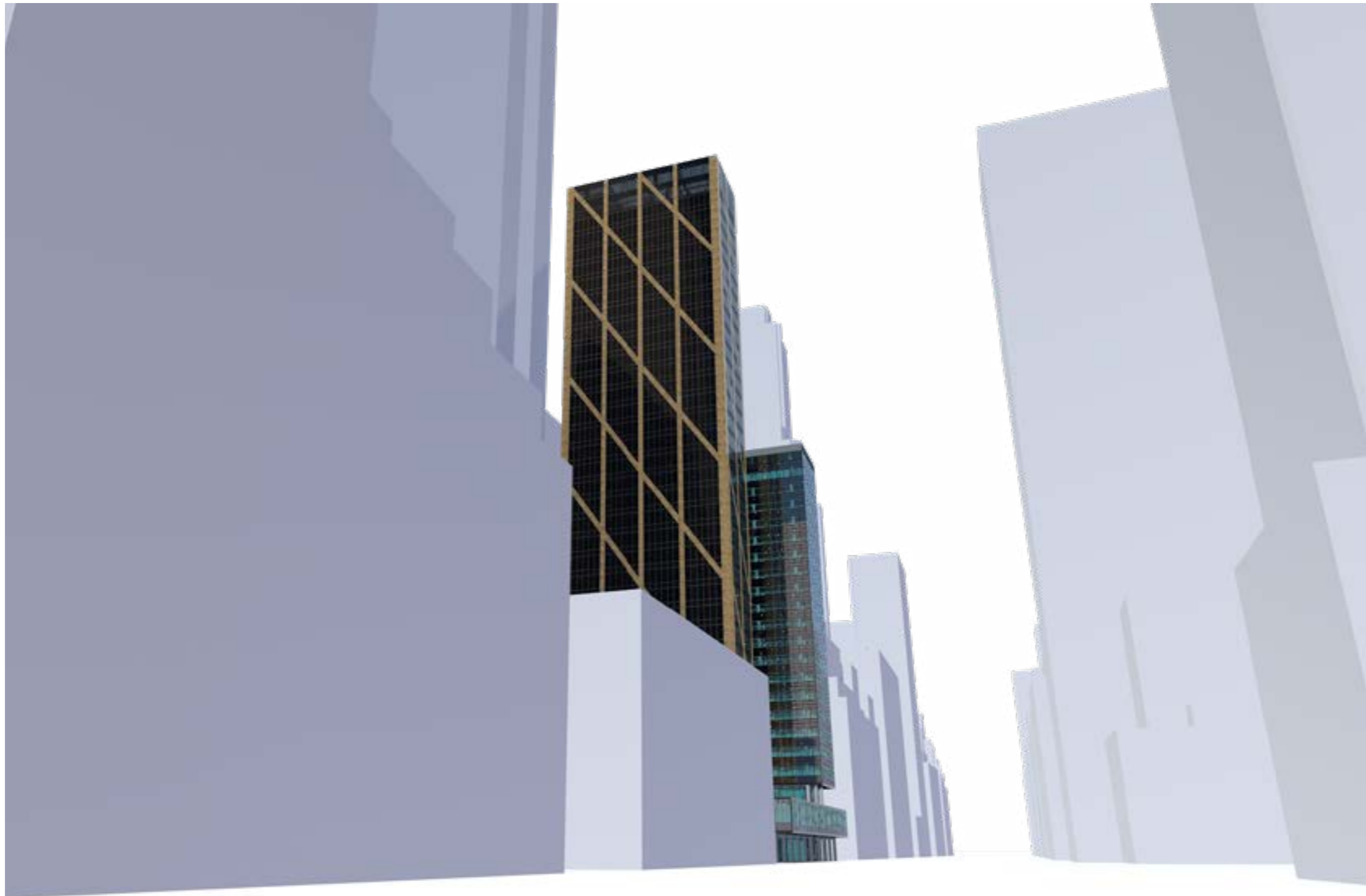
Respecting existing volume



Respecting existing volume

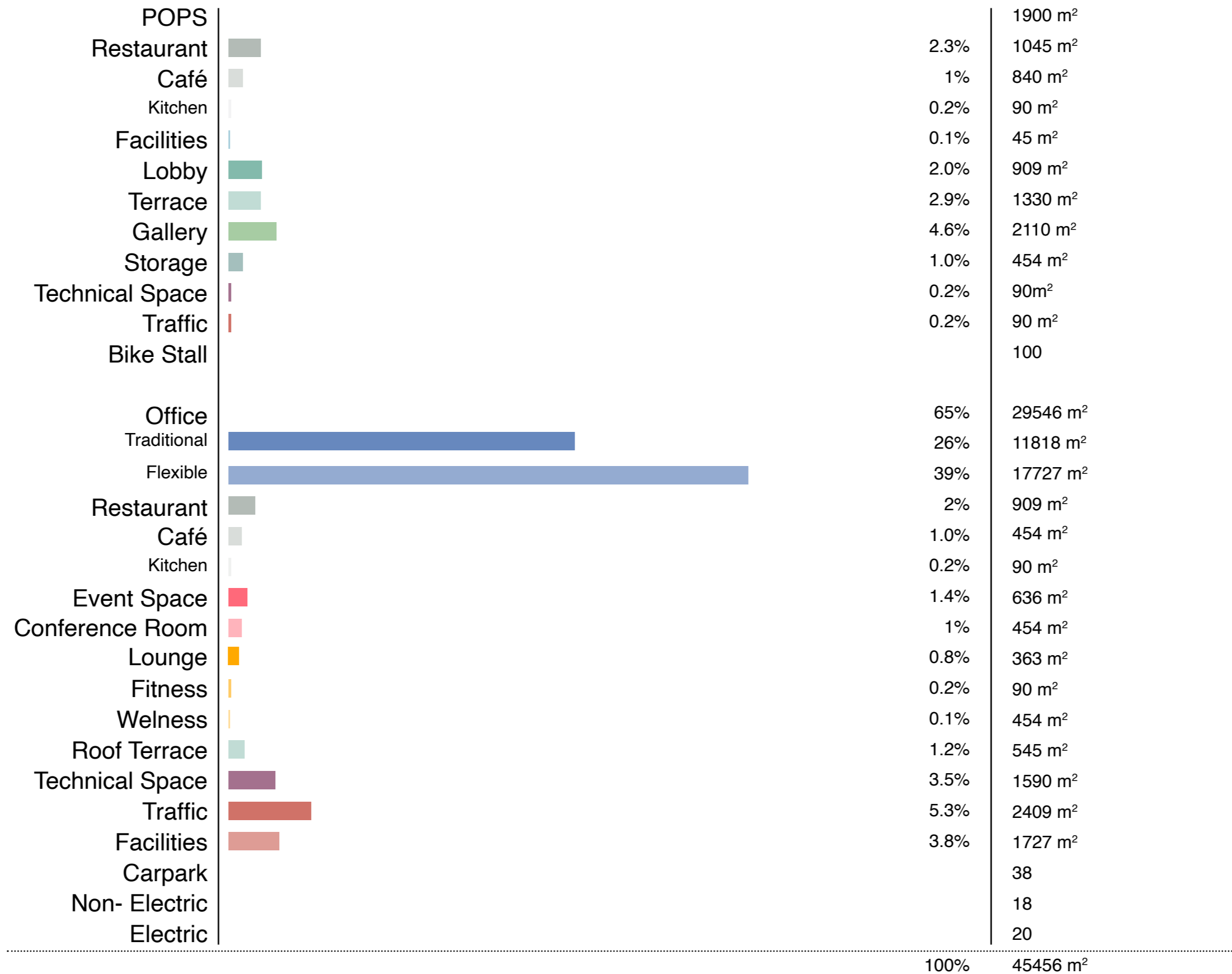


Respecting existing volume

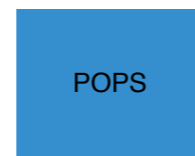


“International companies remain the main target clients for business districts, but start-ups increasingly form part of their ecosystem. To attract start-ups, business districts have to offer facilities that appeal to entrepreneurs, who seek flexible leases and space, quality of life, distinctive buildings and affordable costs.” EY ULI

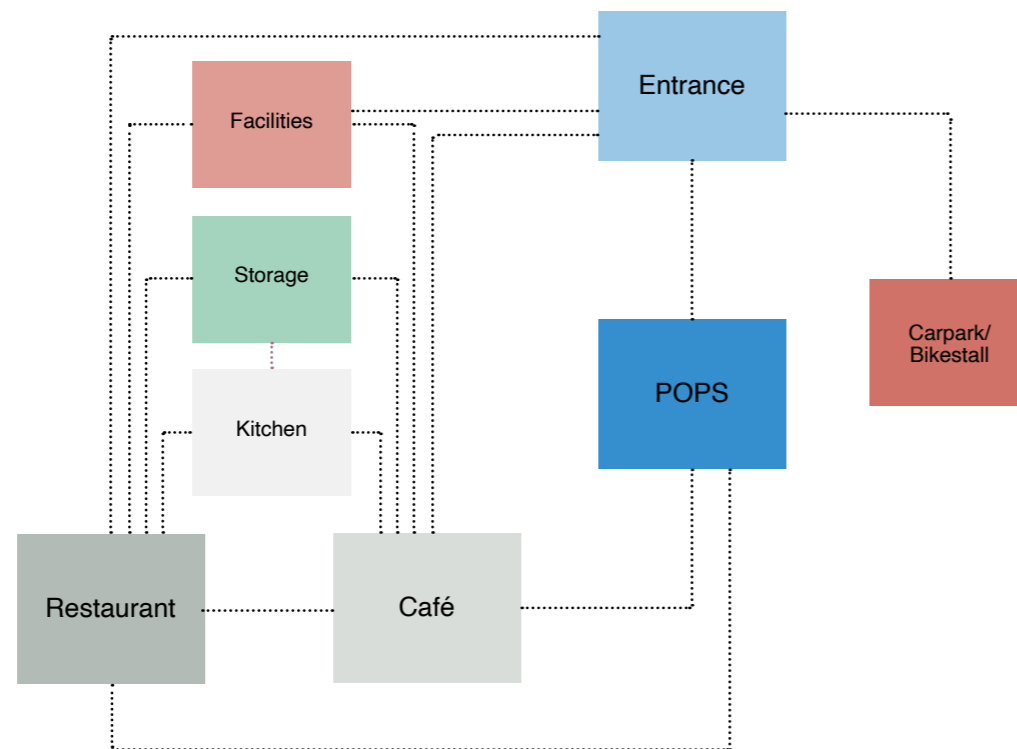
Program FAR 18



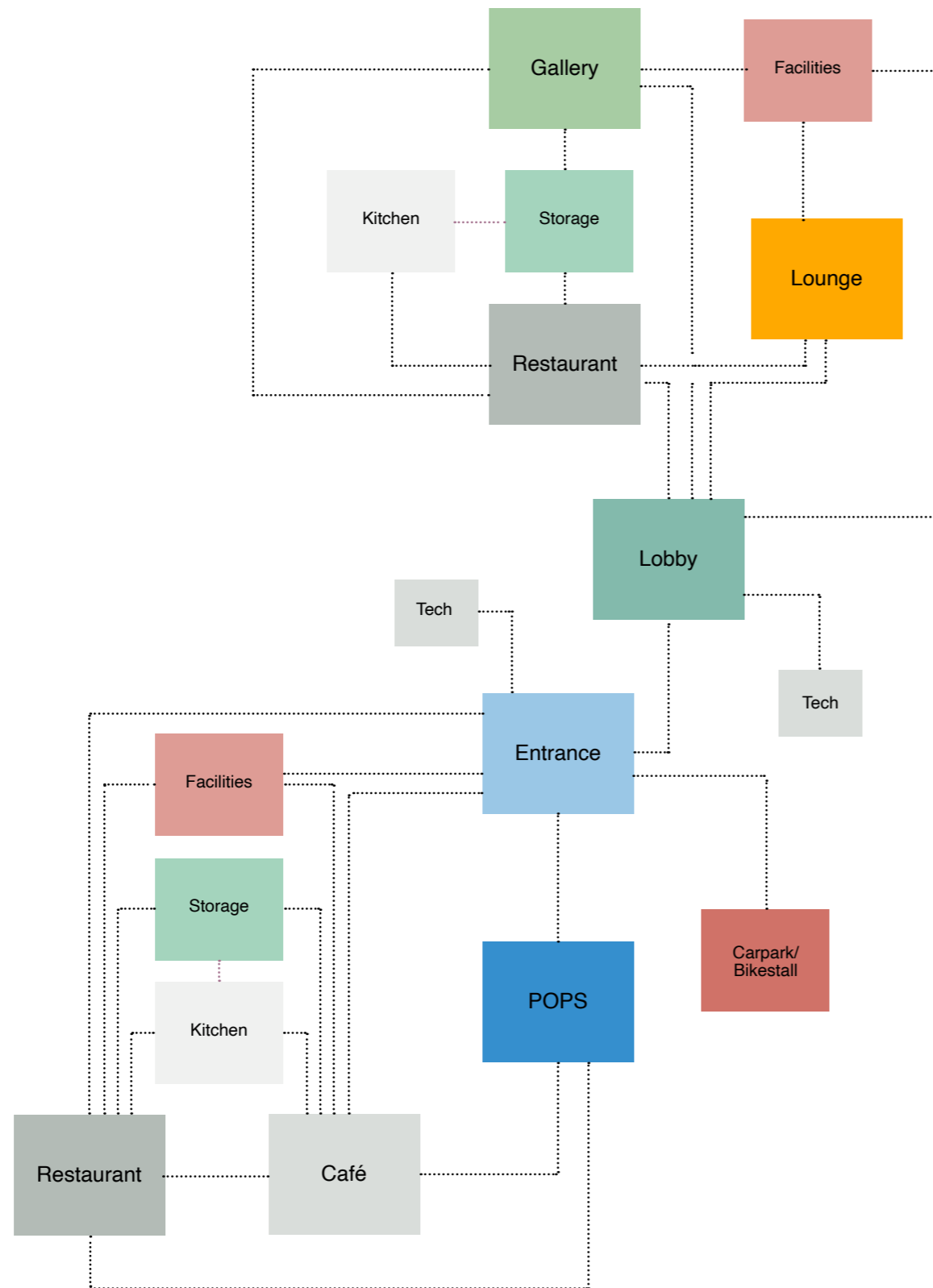
Program scheme



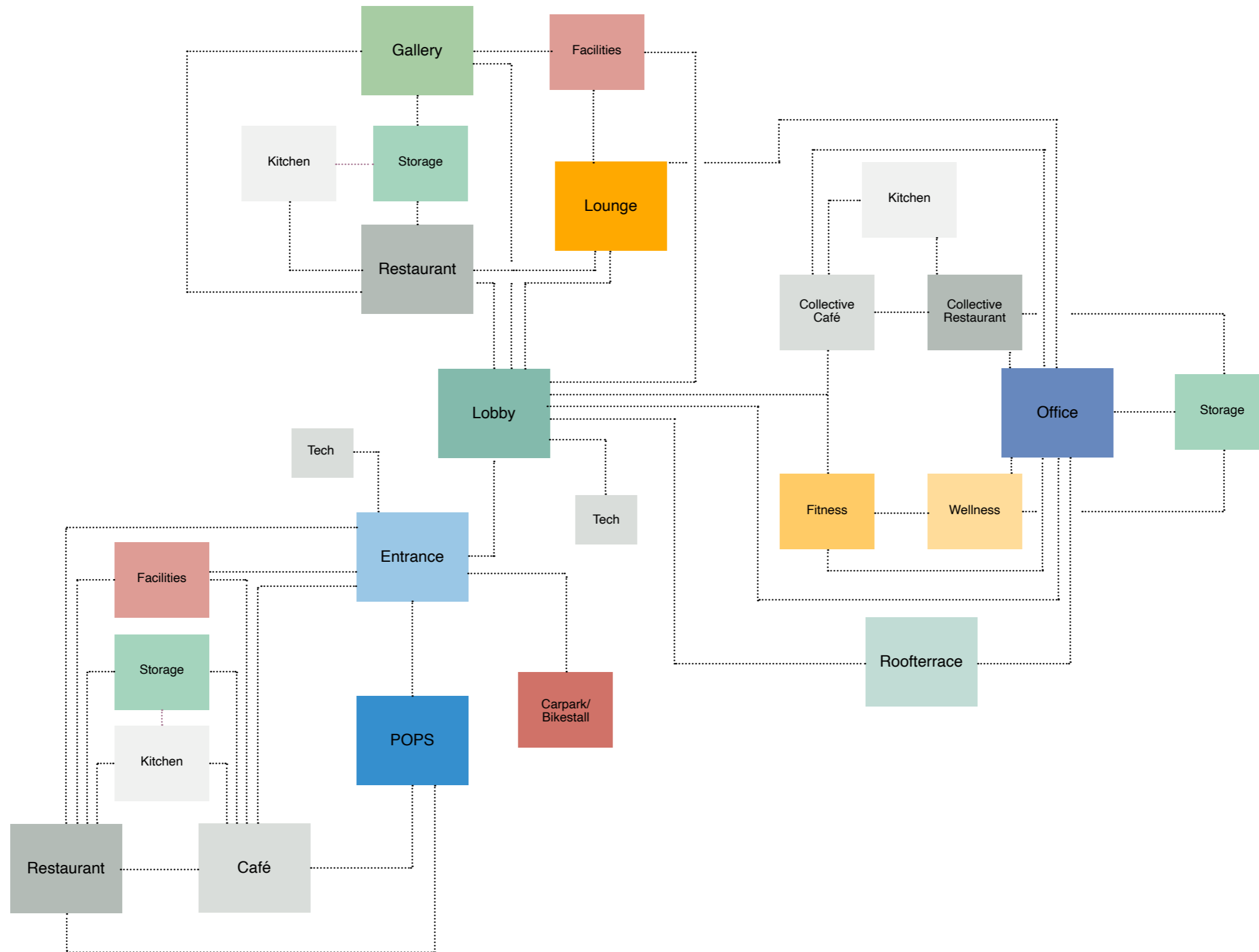
Program scheme

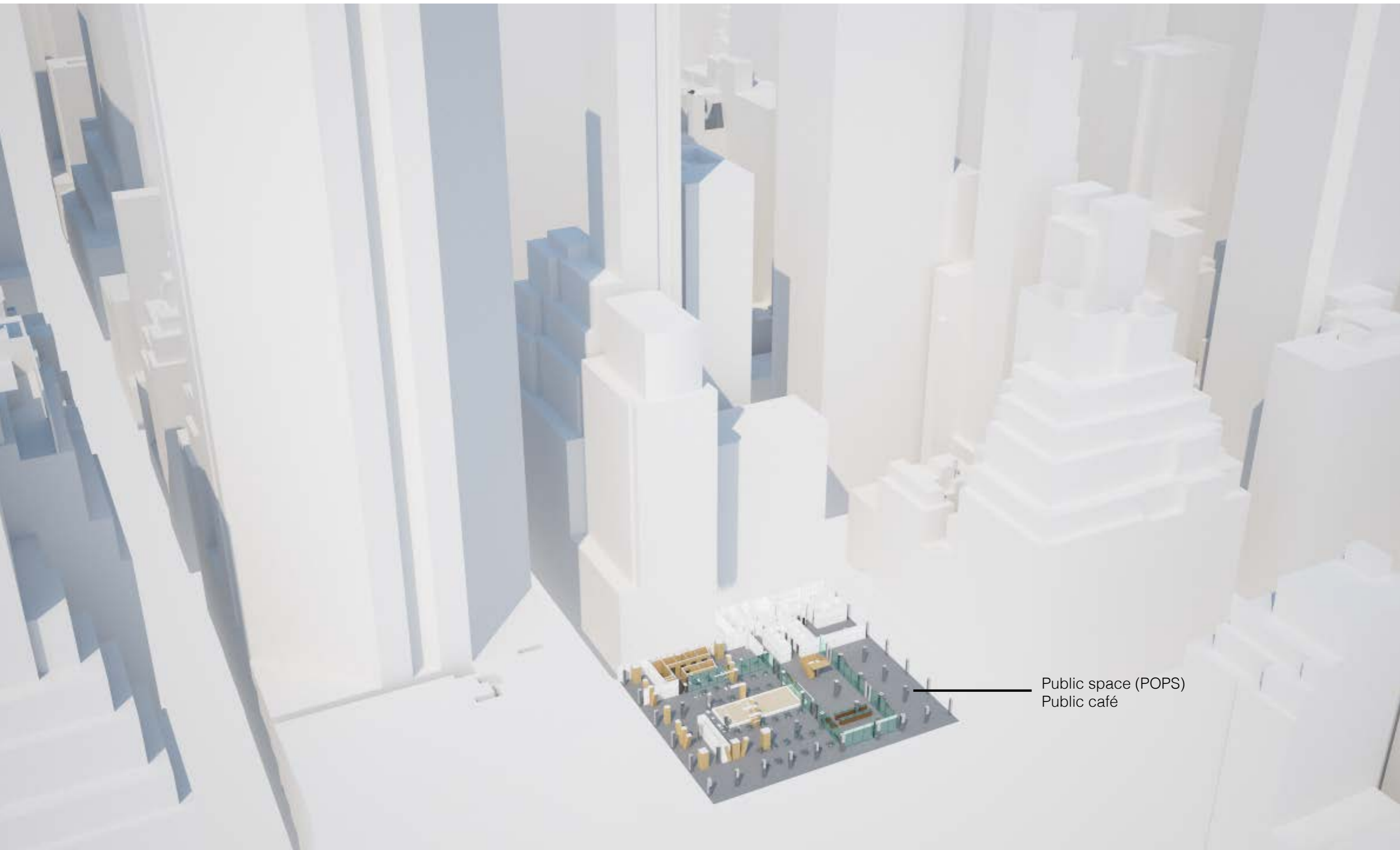


Program scheme

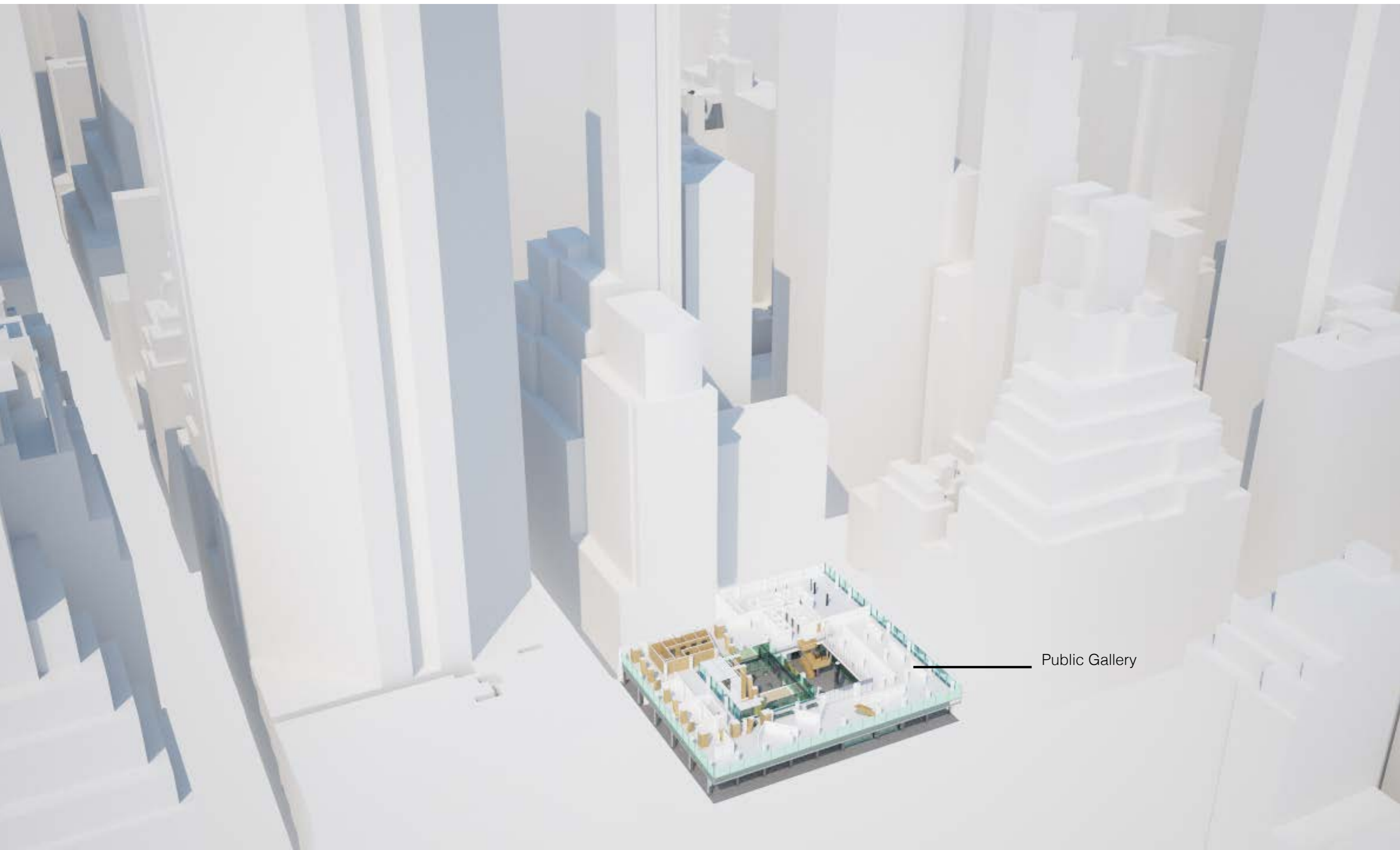


Program scheme

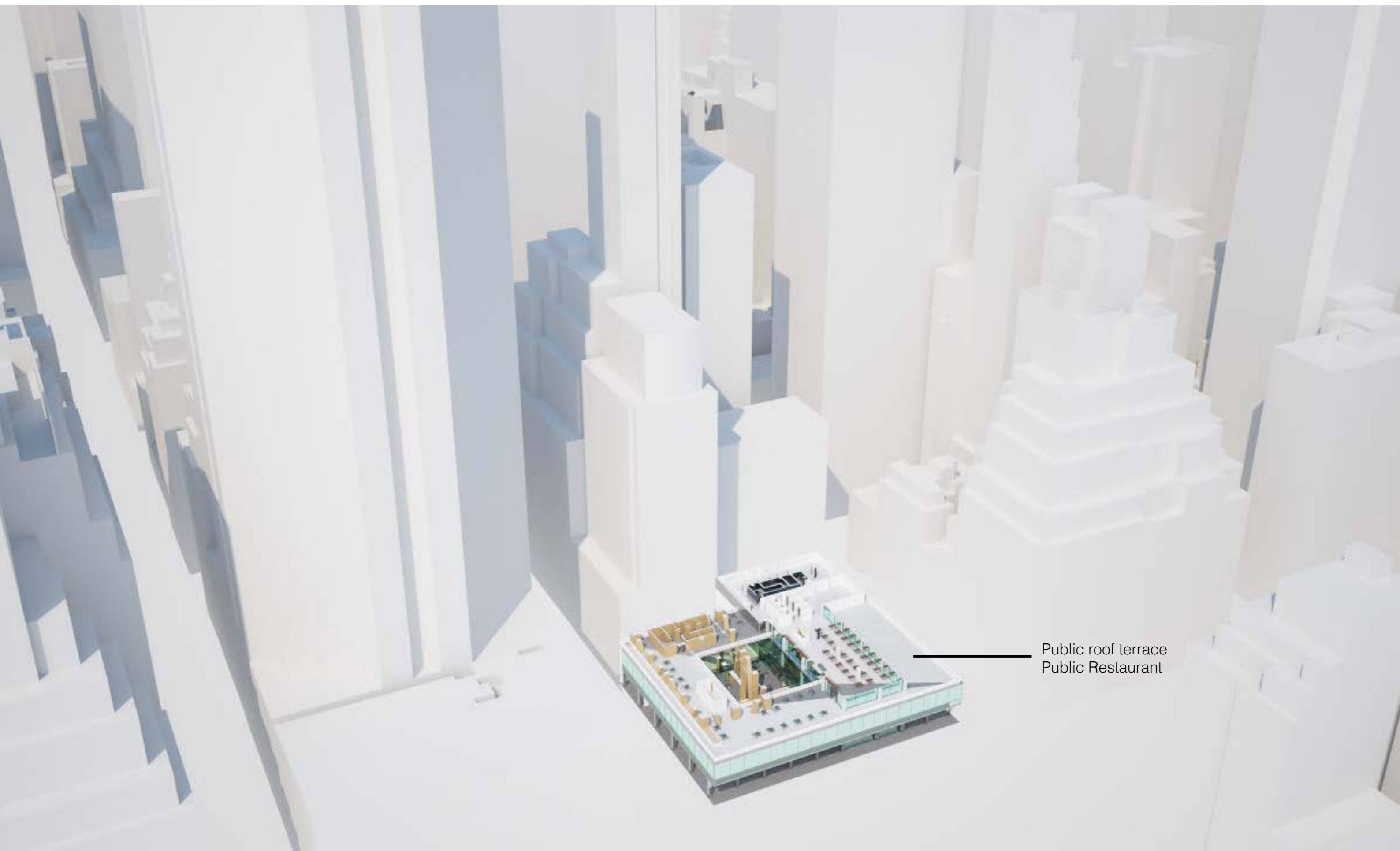




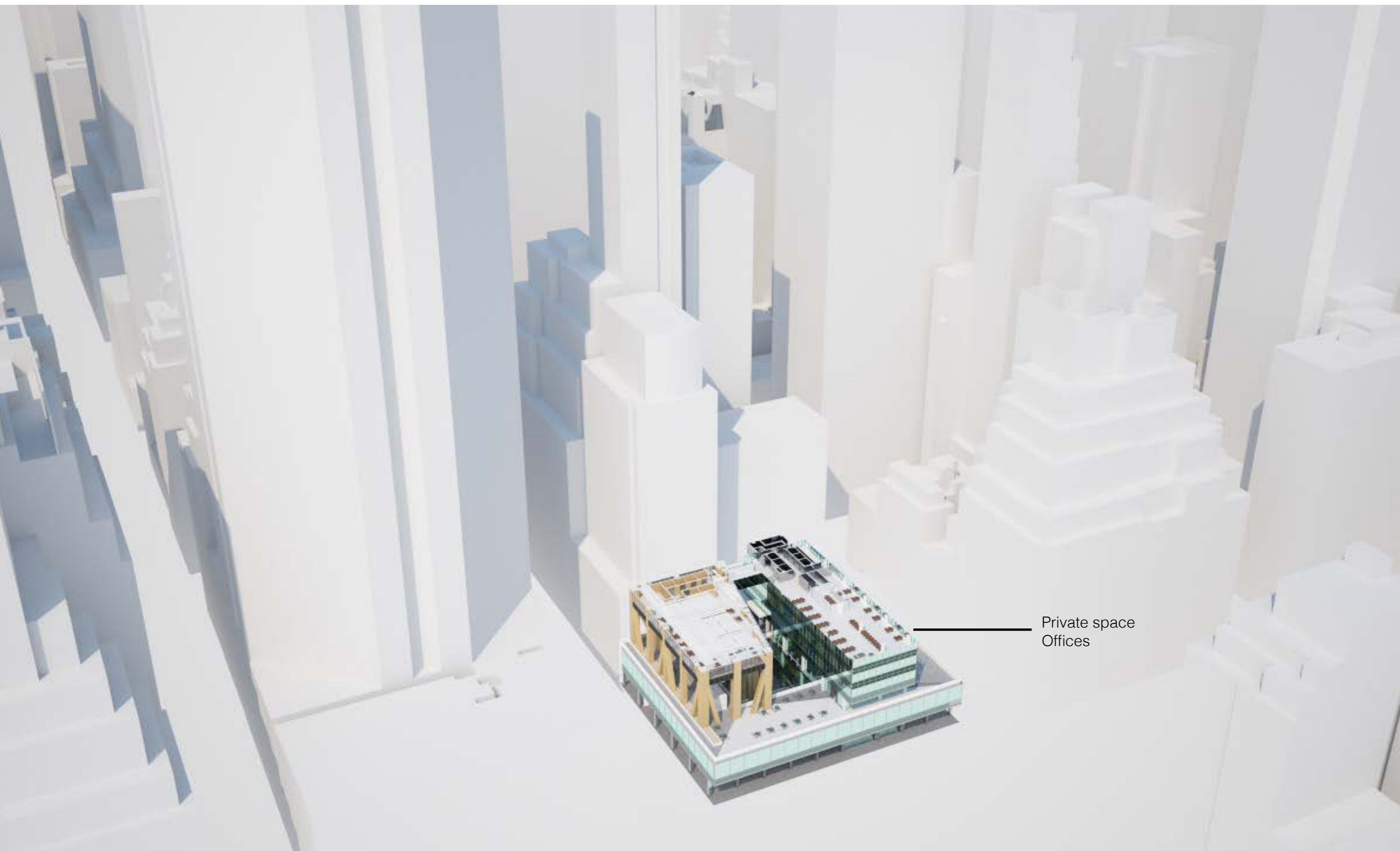
Public space (POPS)
Public café



Public Gallery



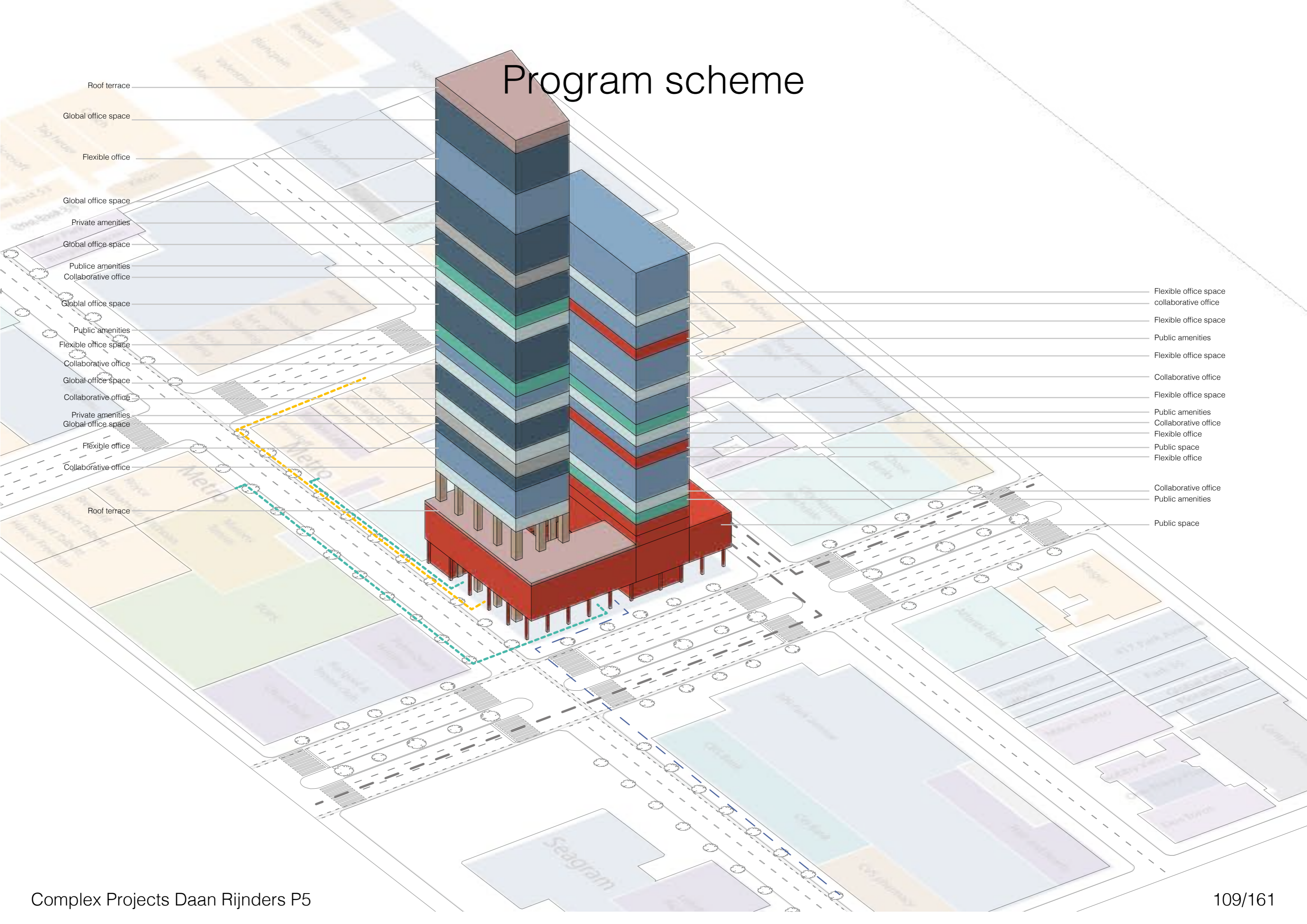
Public roof terrace
Public Restaurant



Private space
Offices



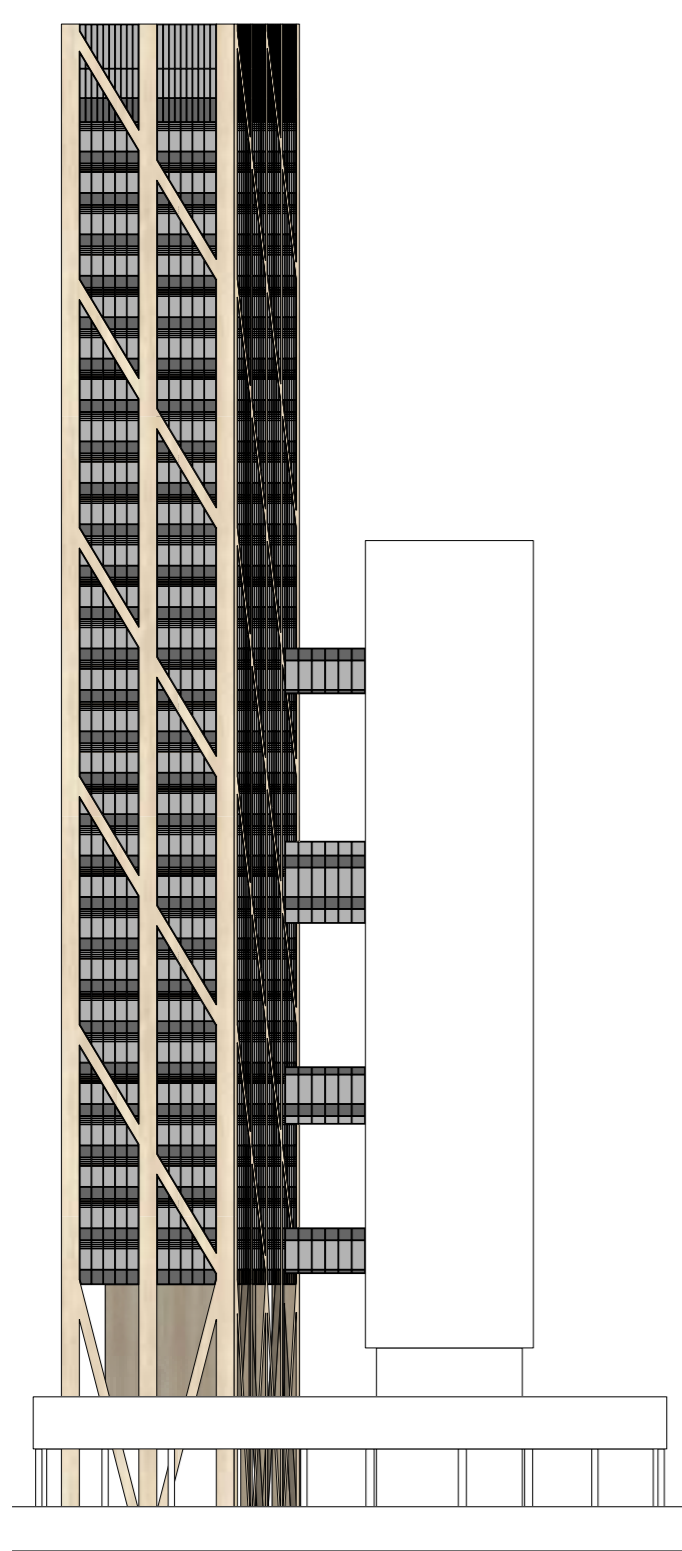
Program scheme



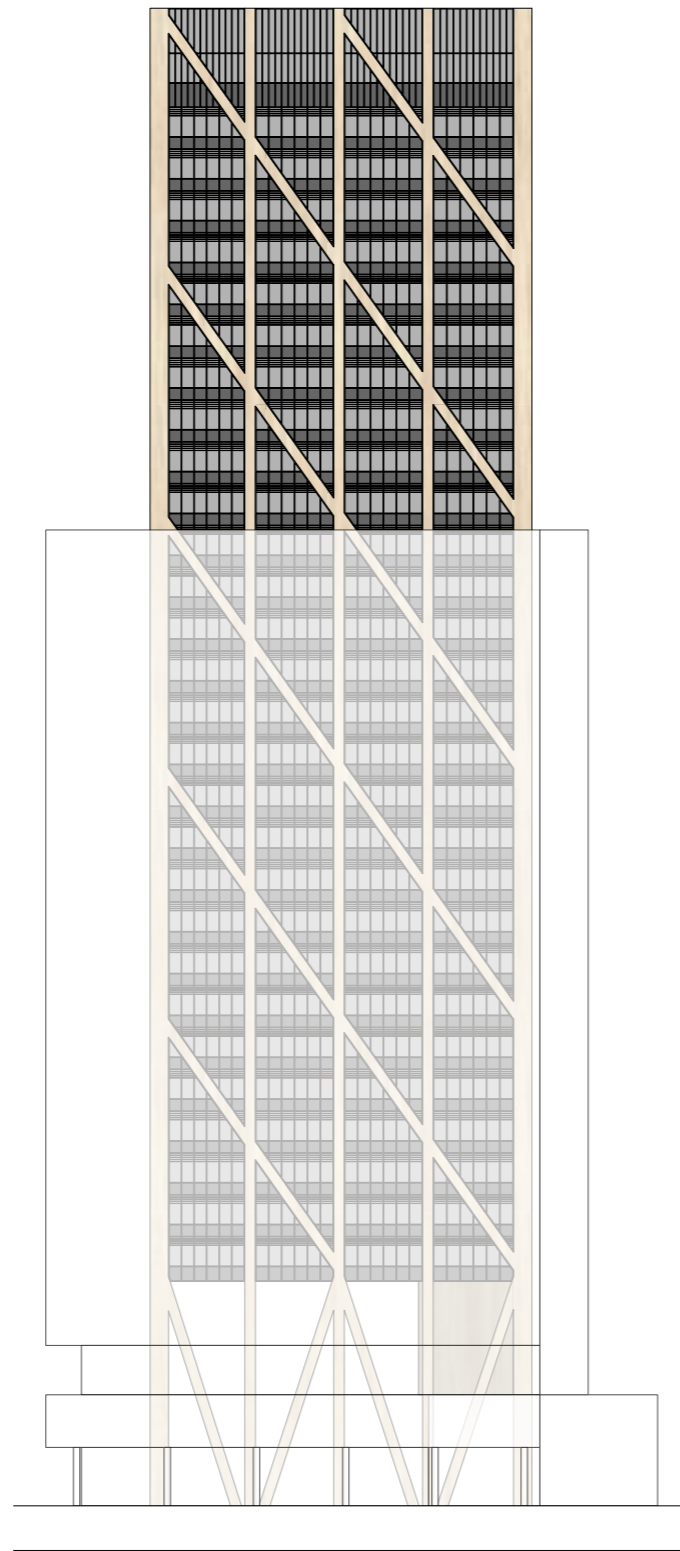
The Design



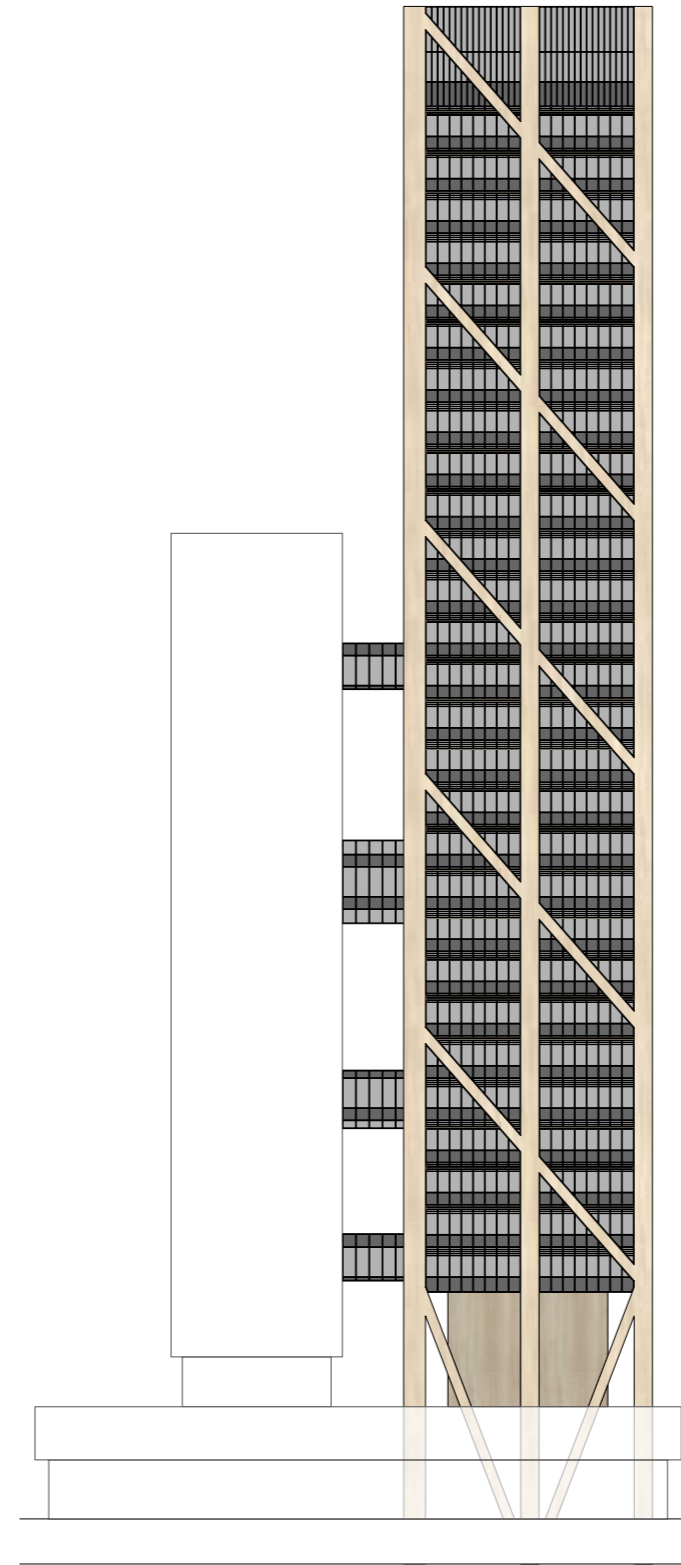
The Design



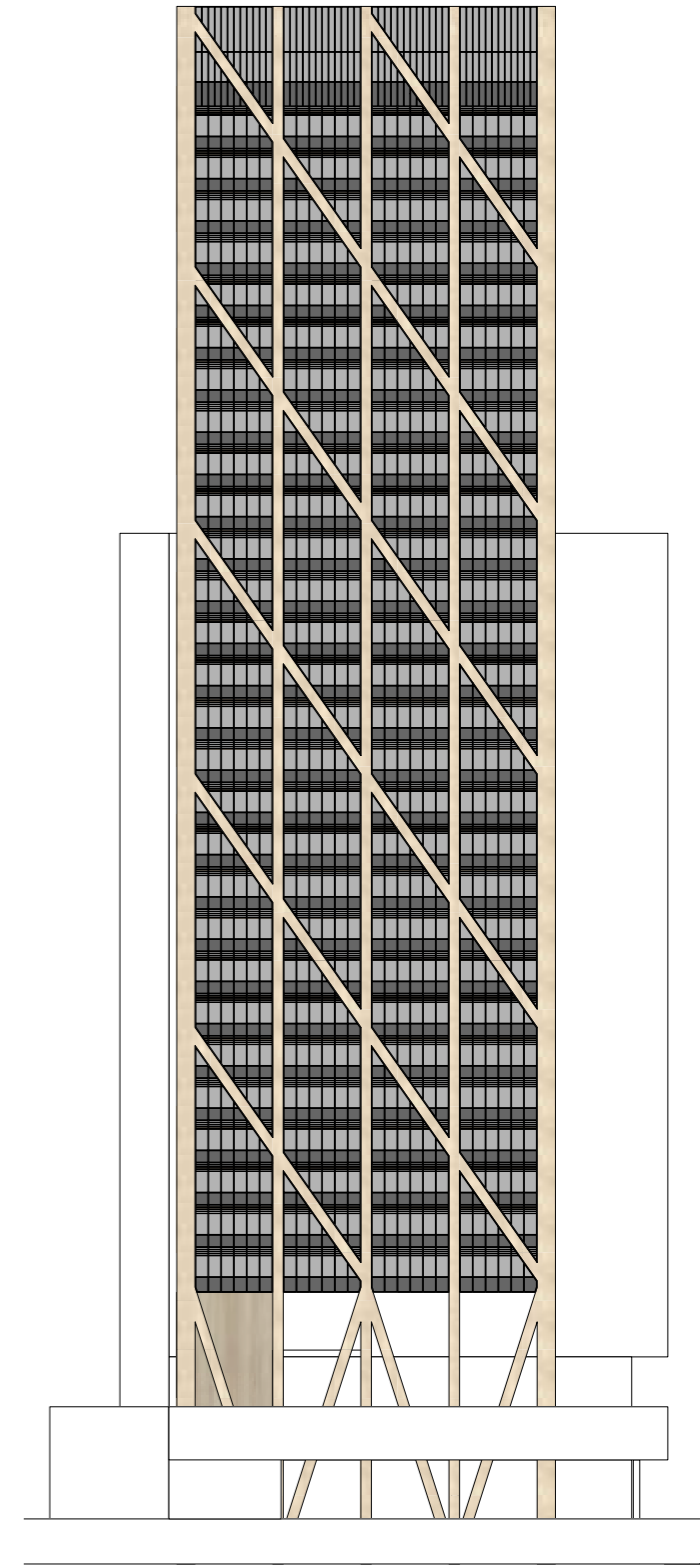
East facade



North Facade

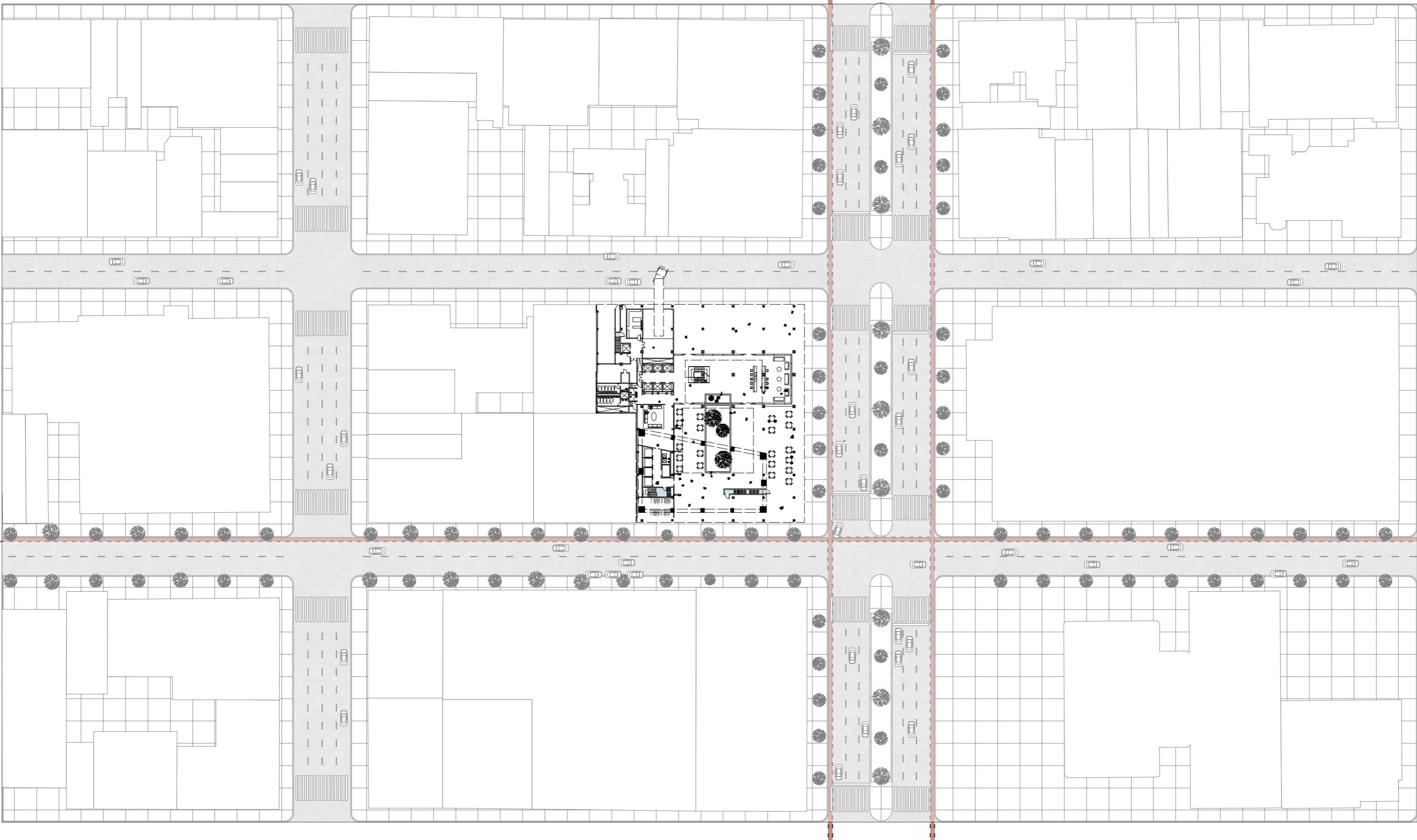


West Facade

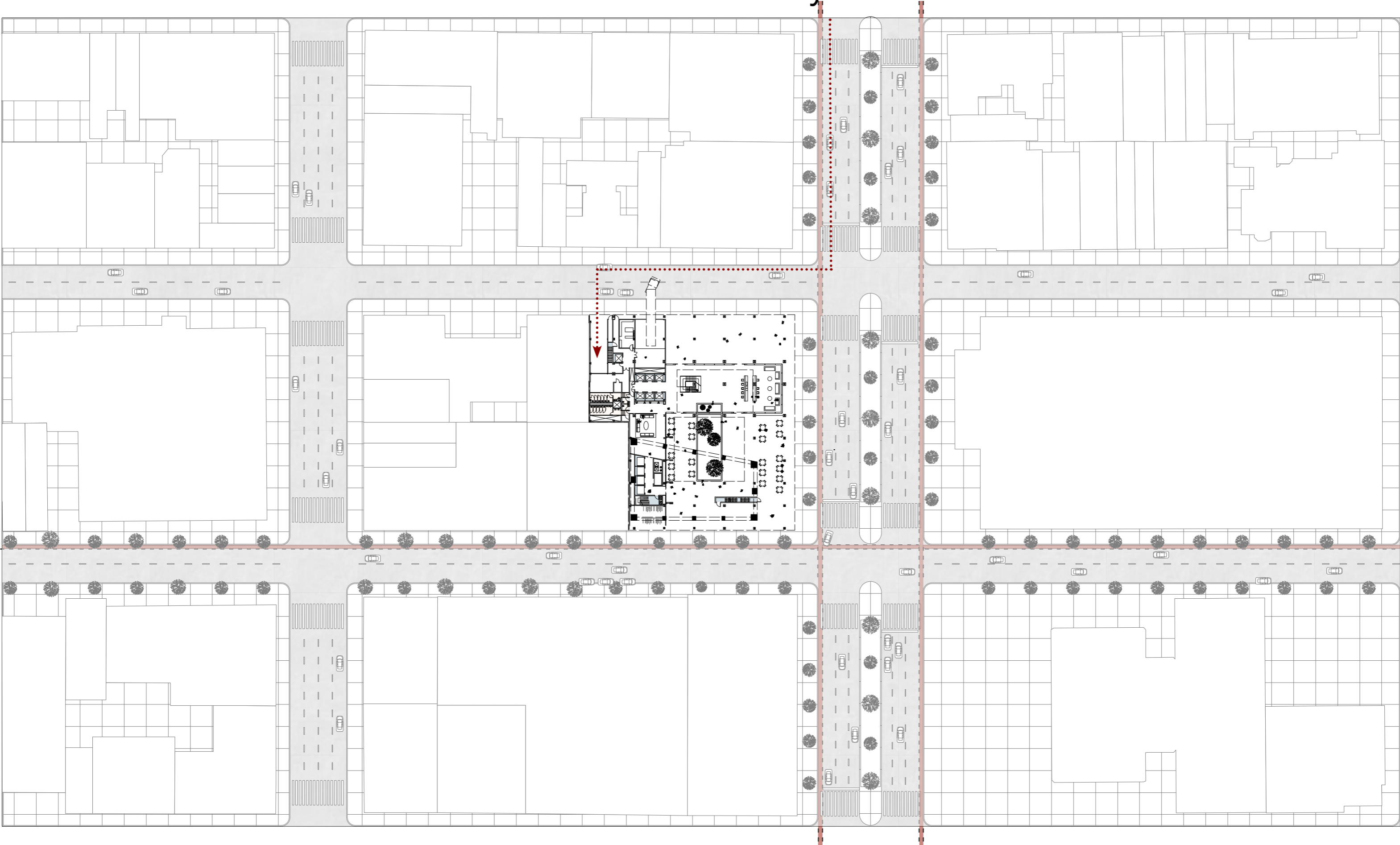


South Facade

Accessibility



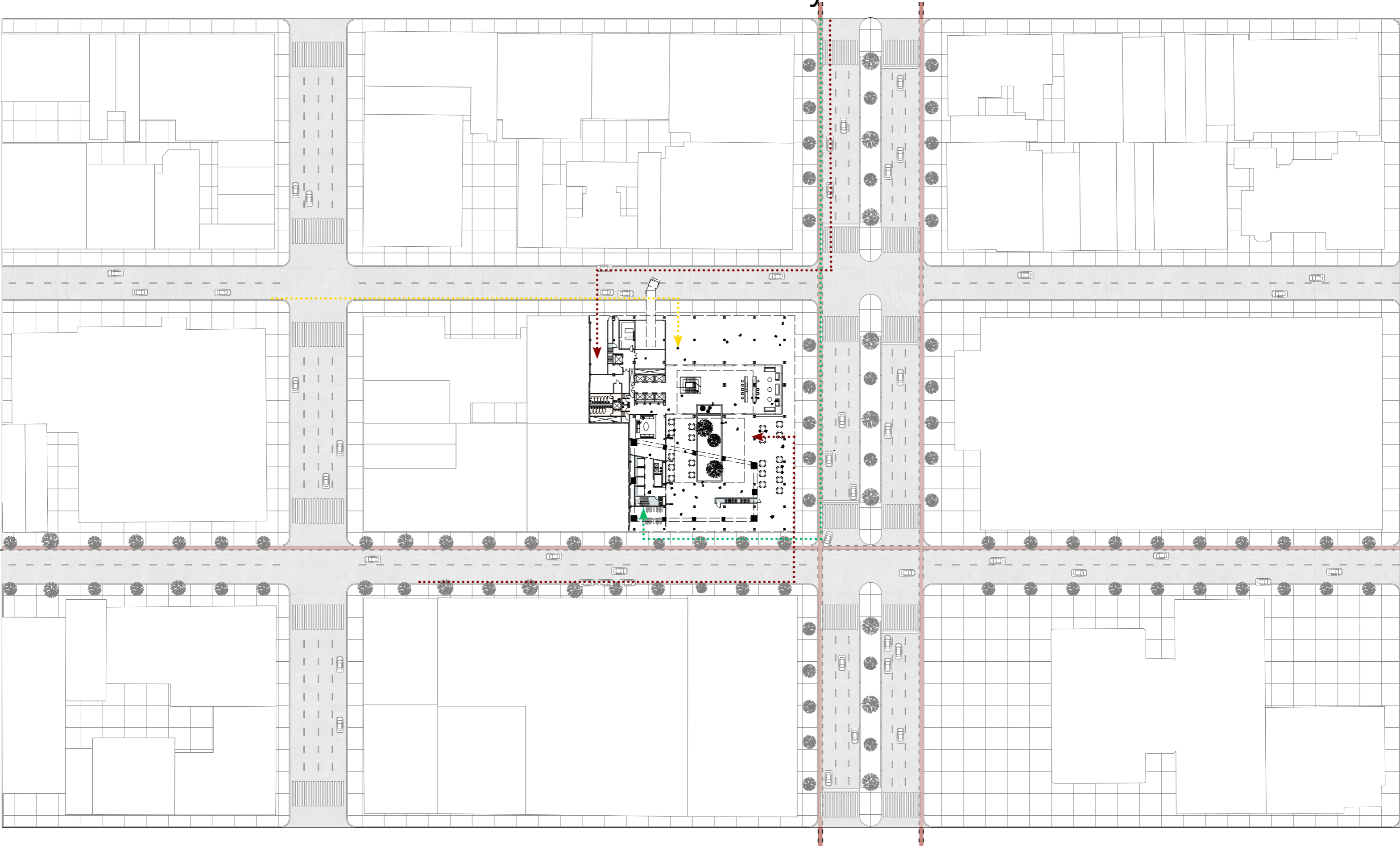
Accessibility



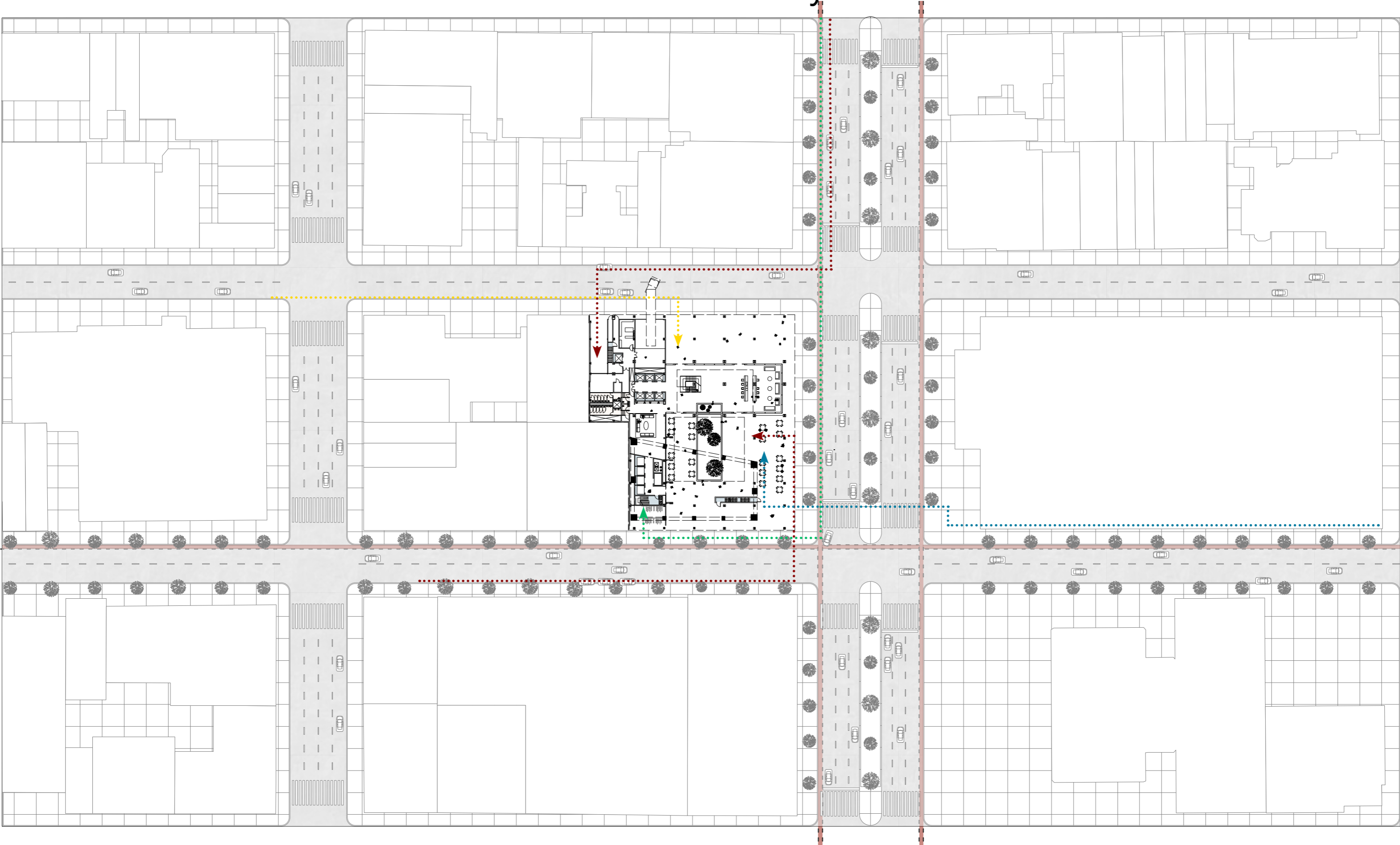
Accessibility



Accessibility



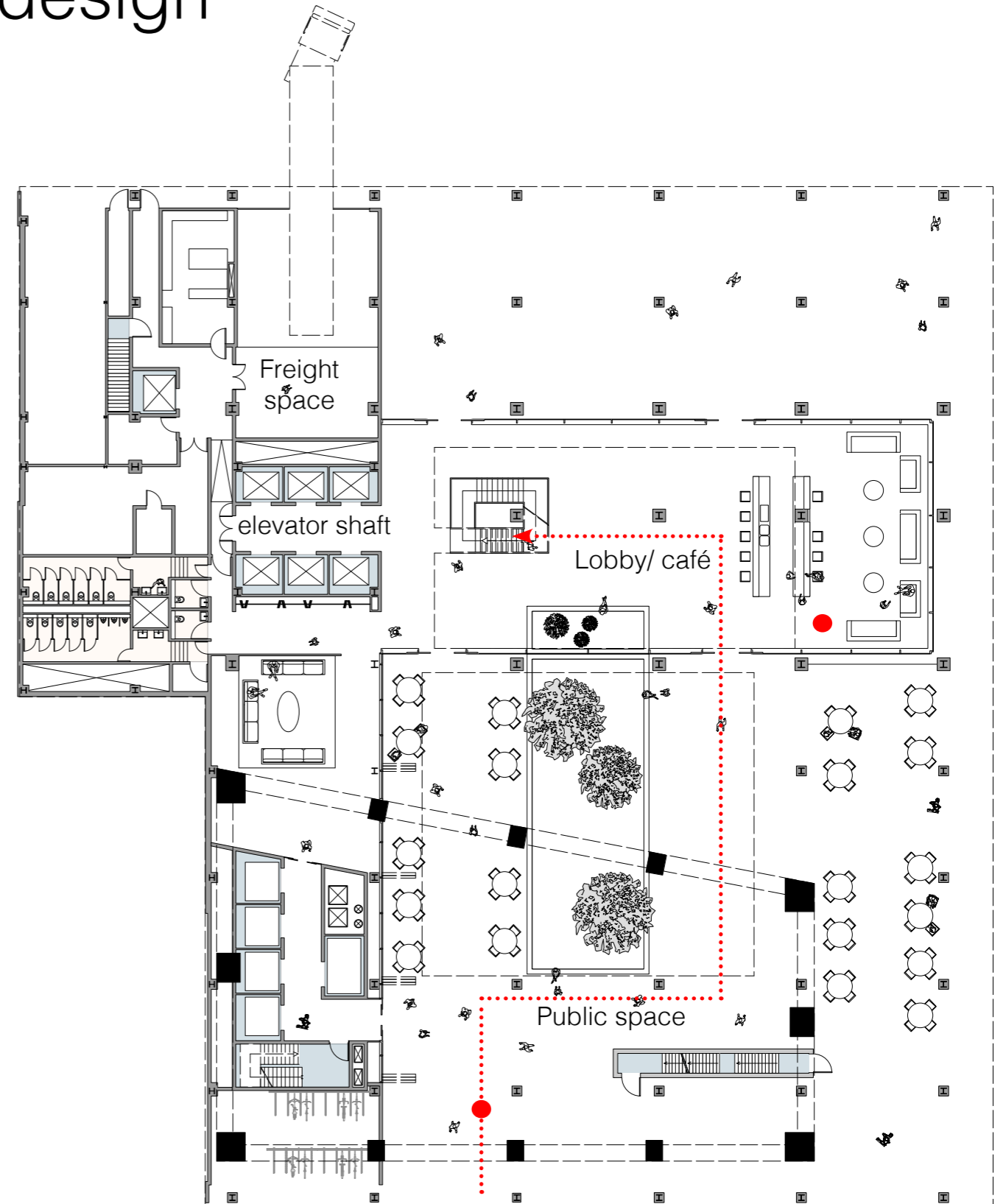
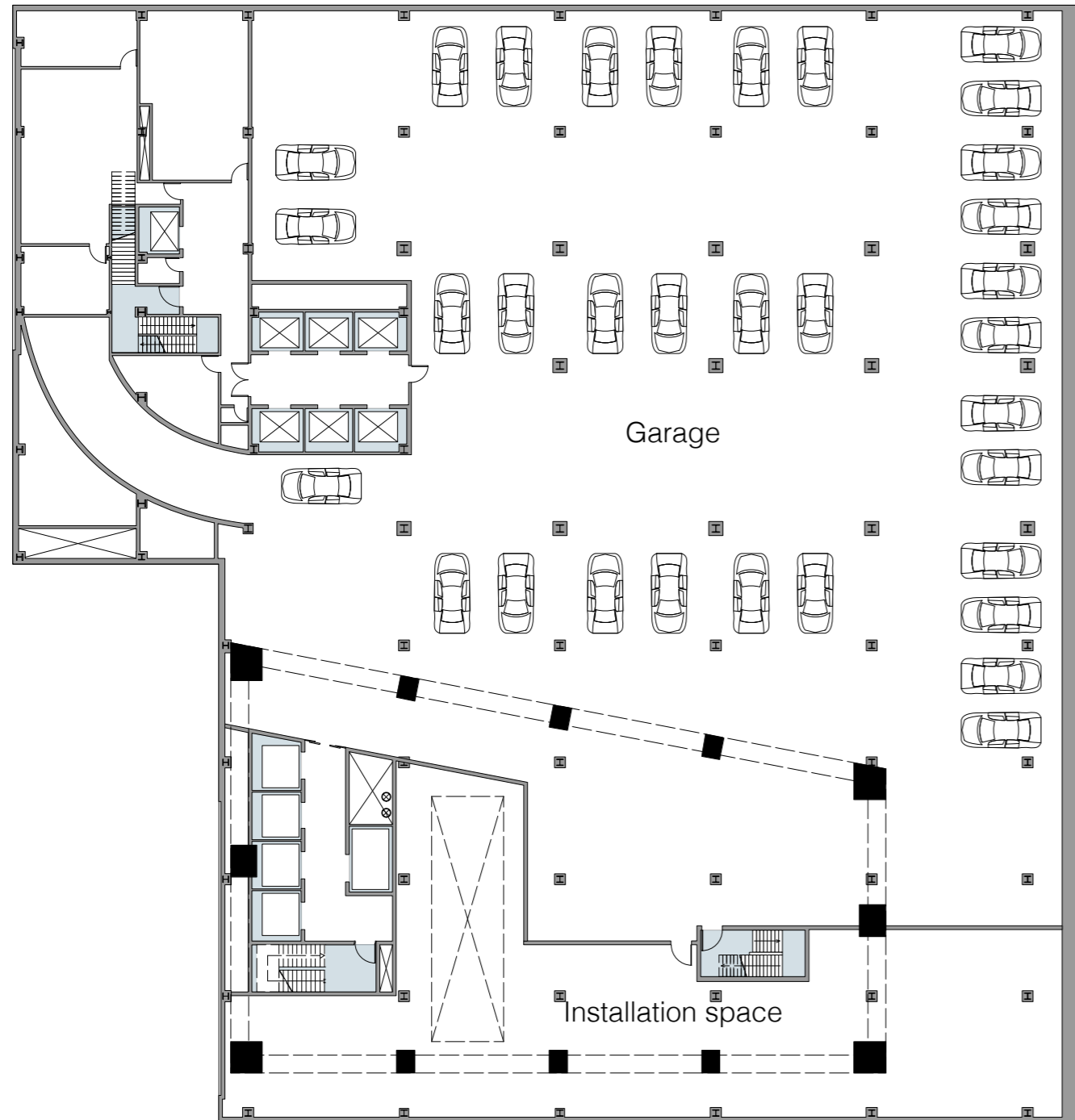
Accessibility



Integrated design



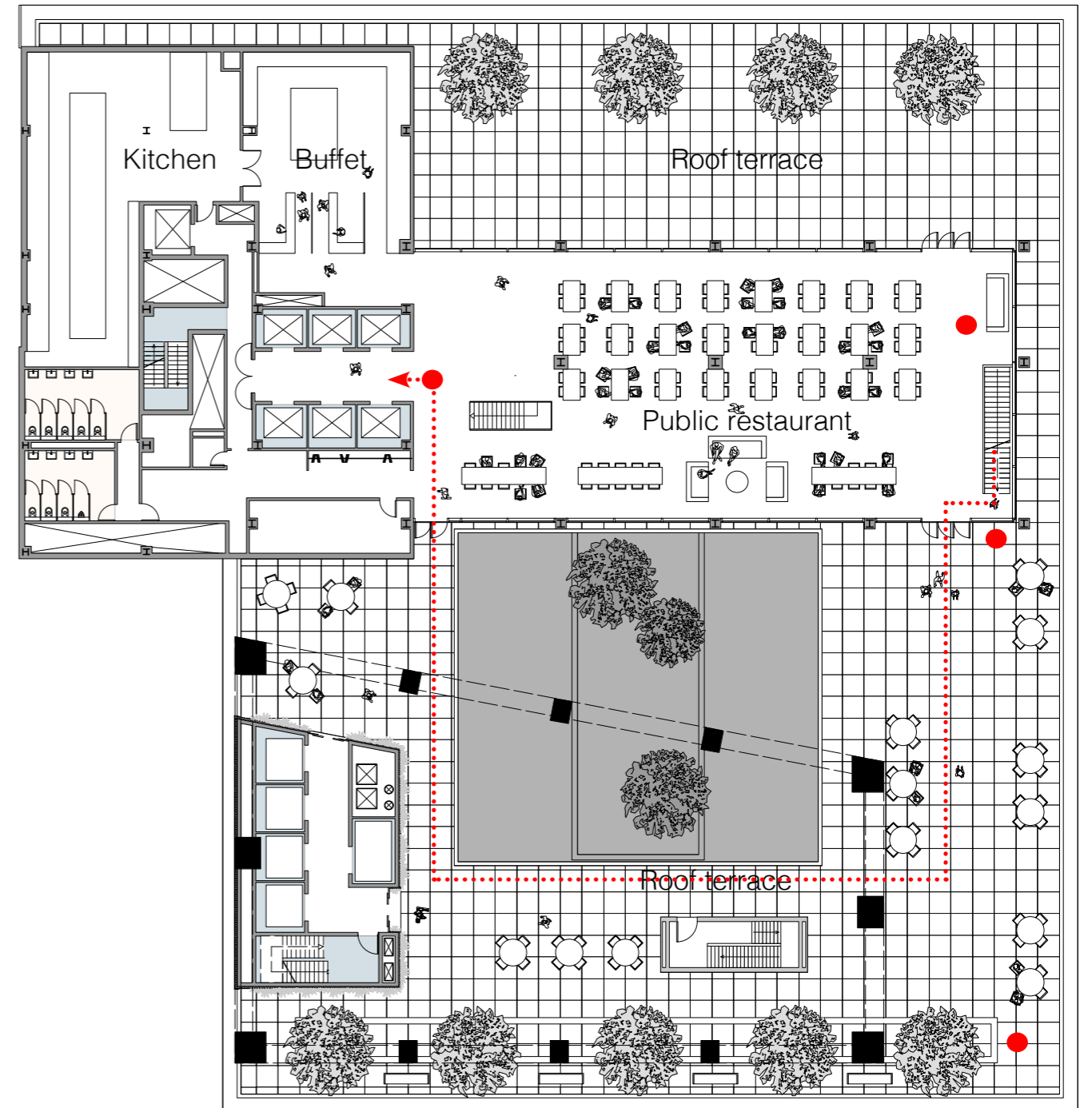
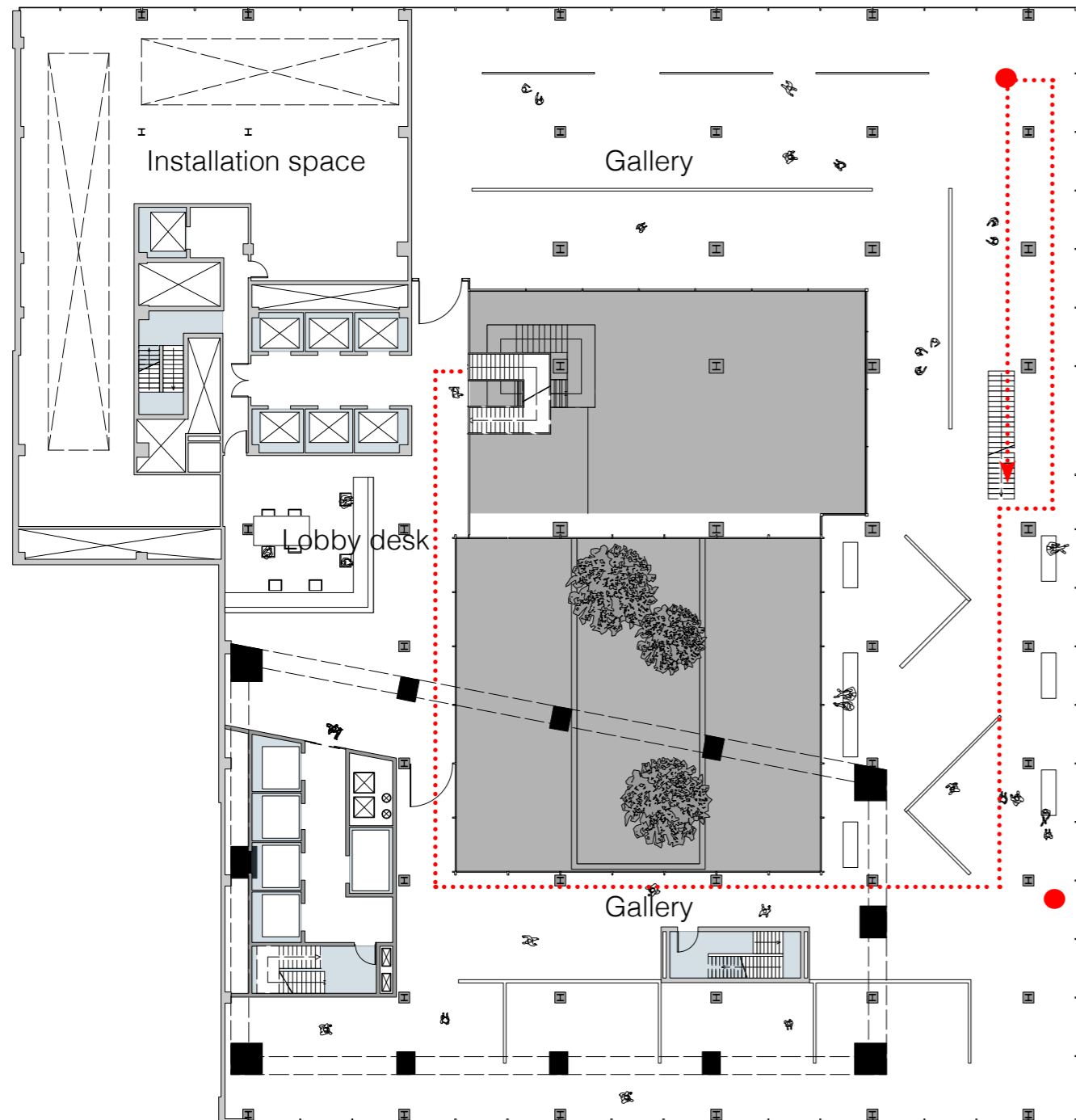
Integrated design







Integrated design



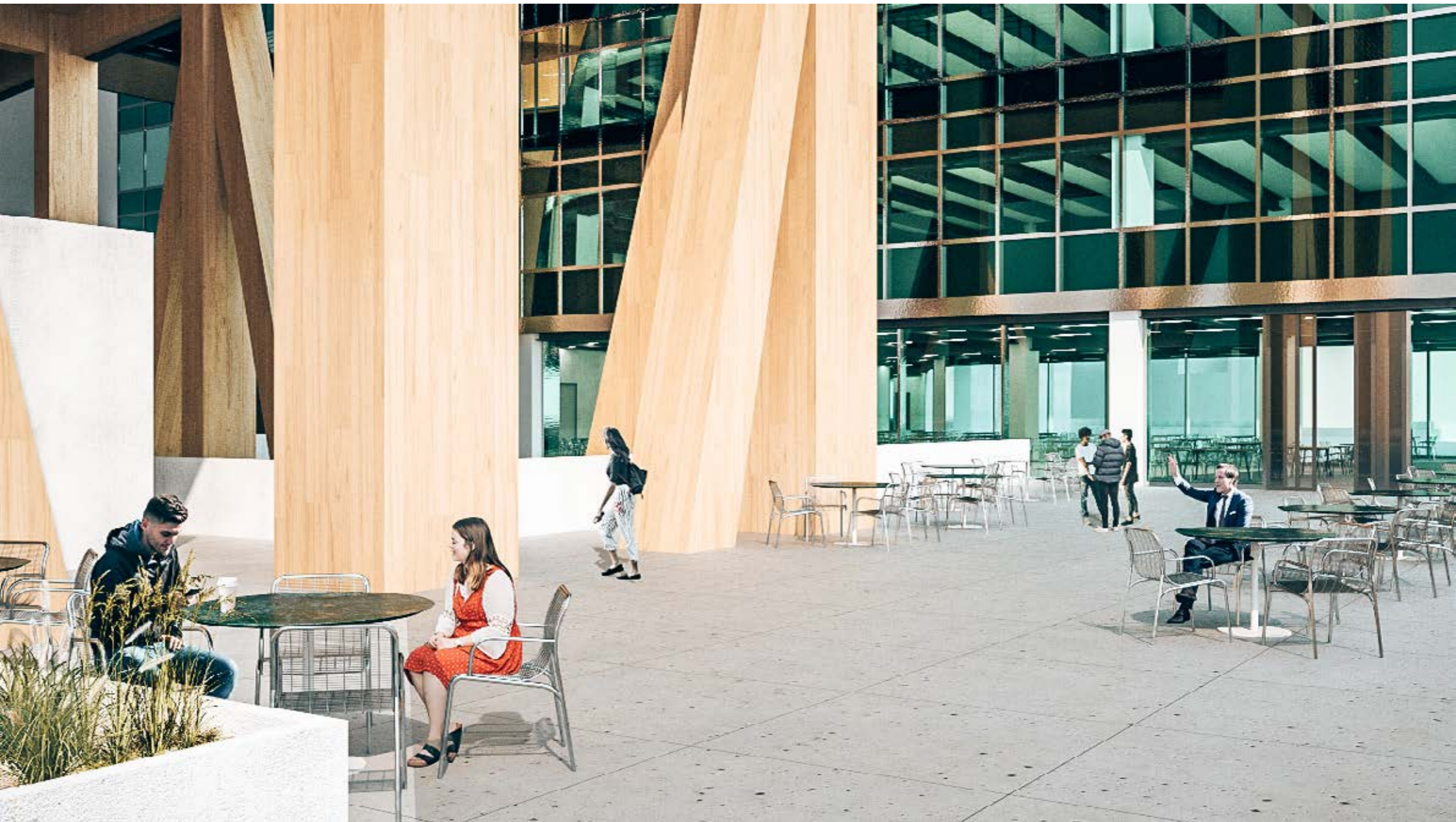






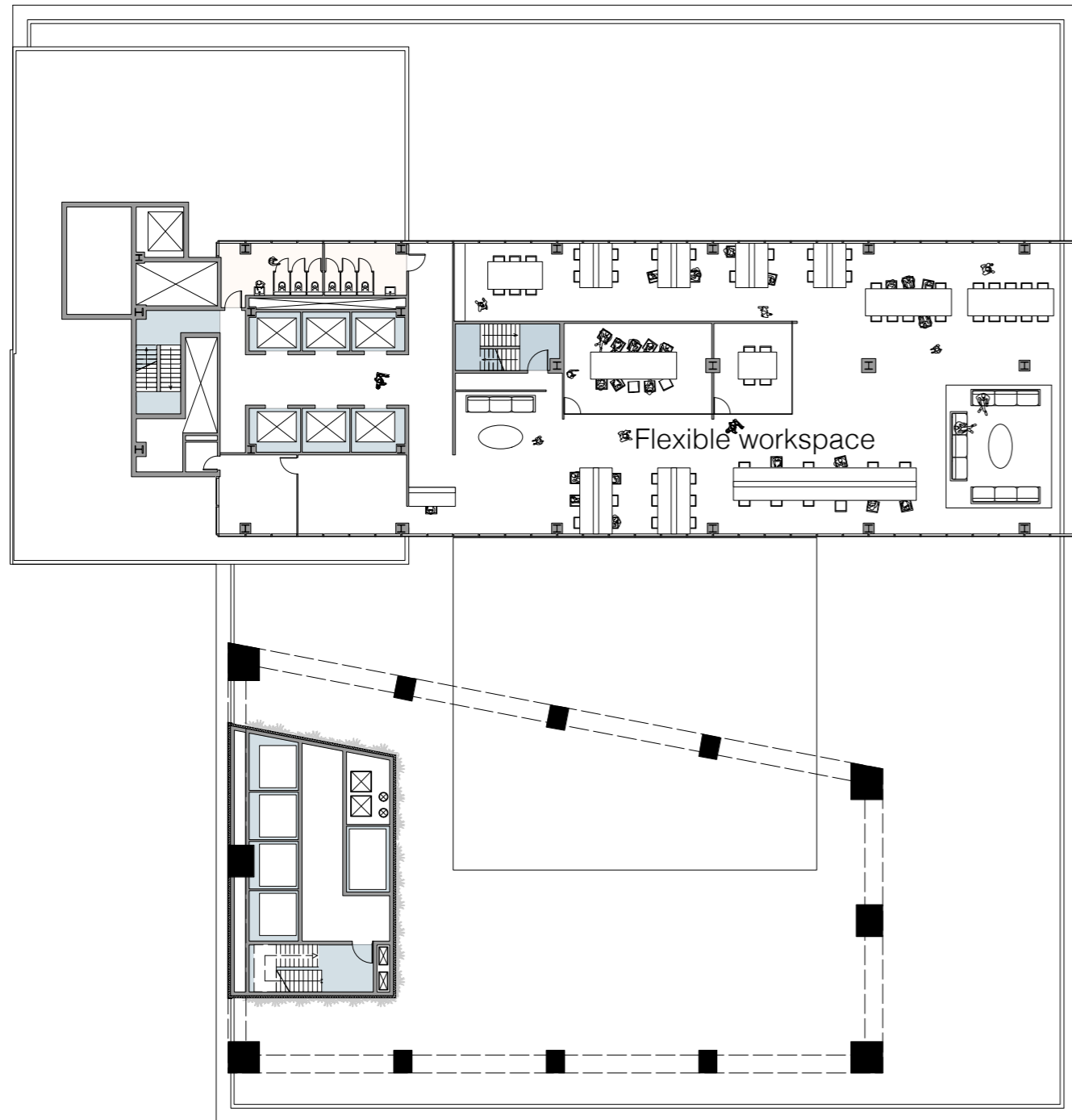








Integrated design

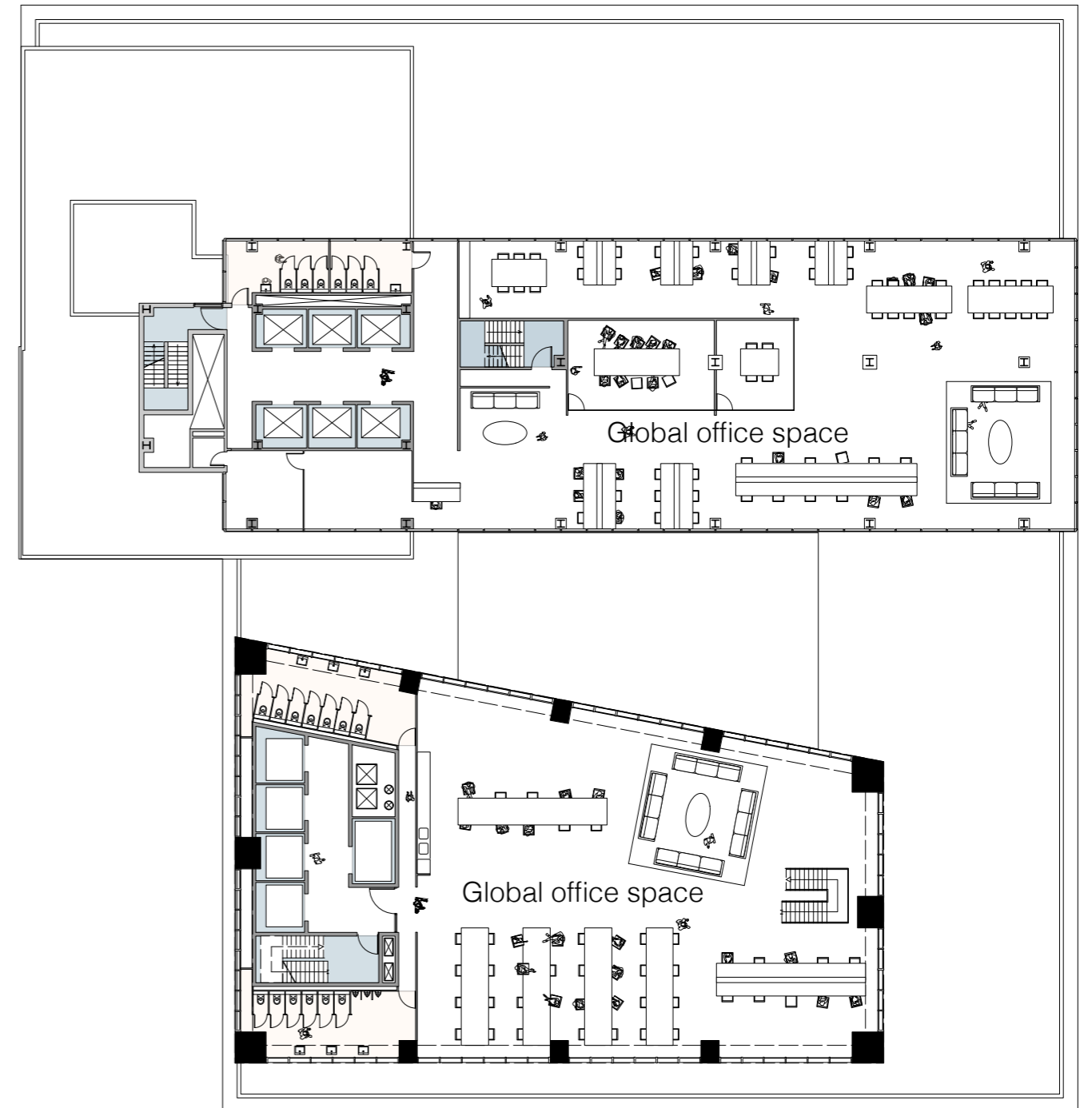
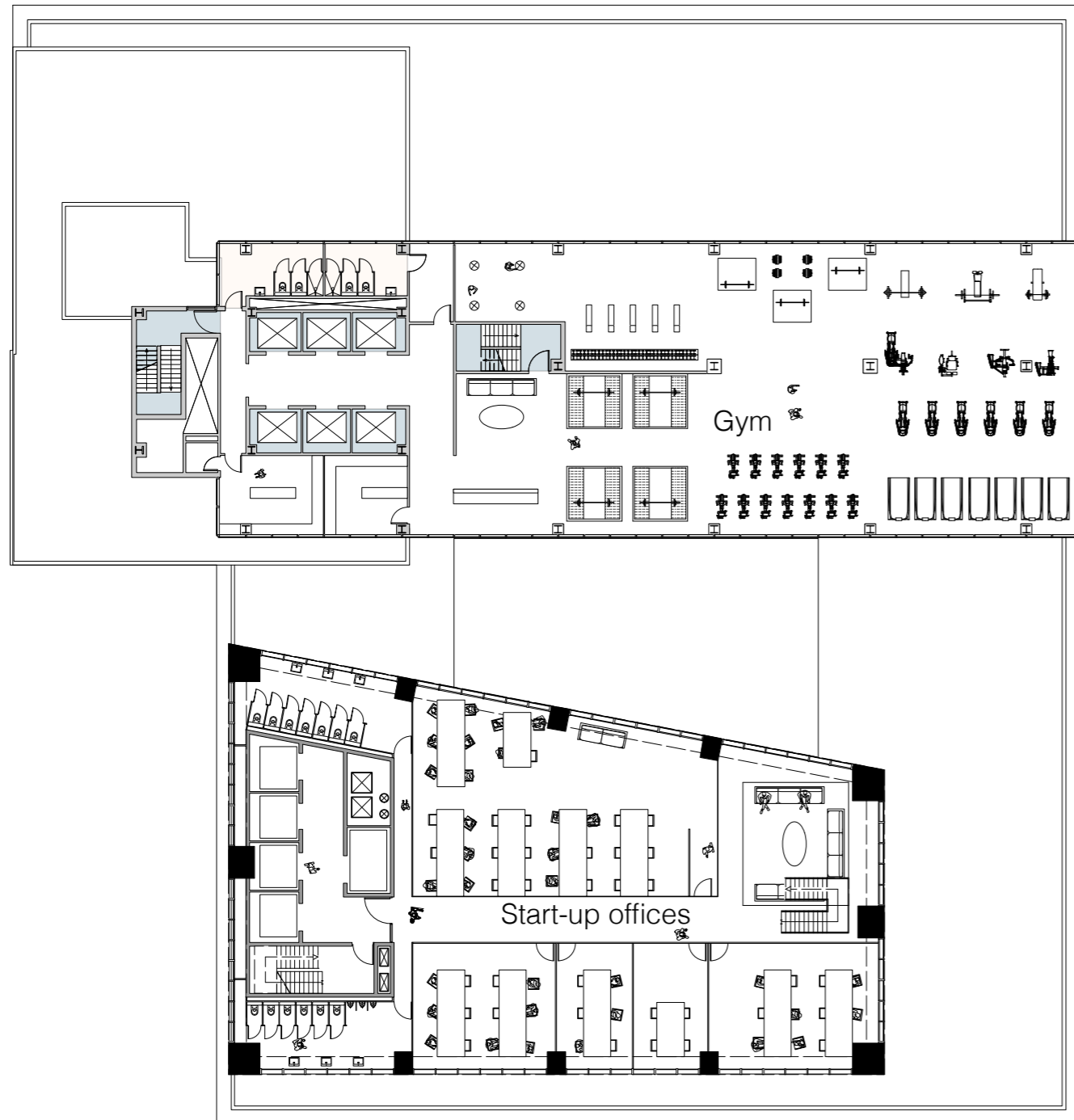




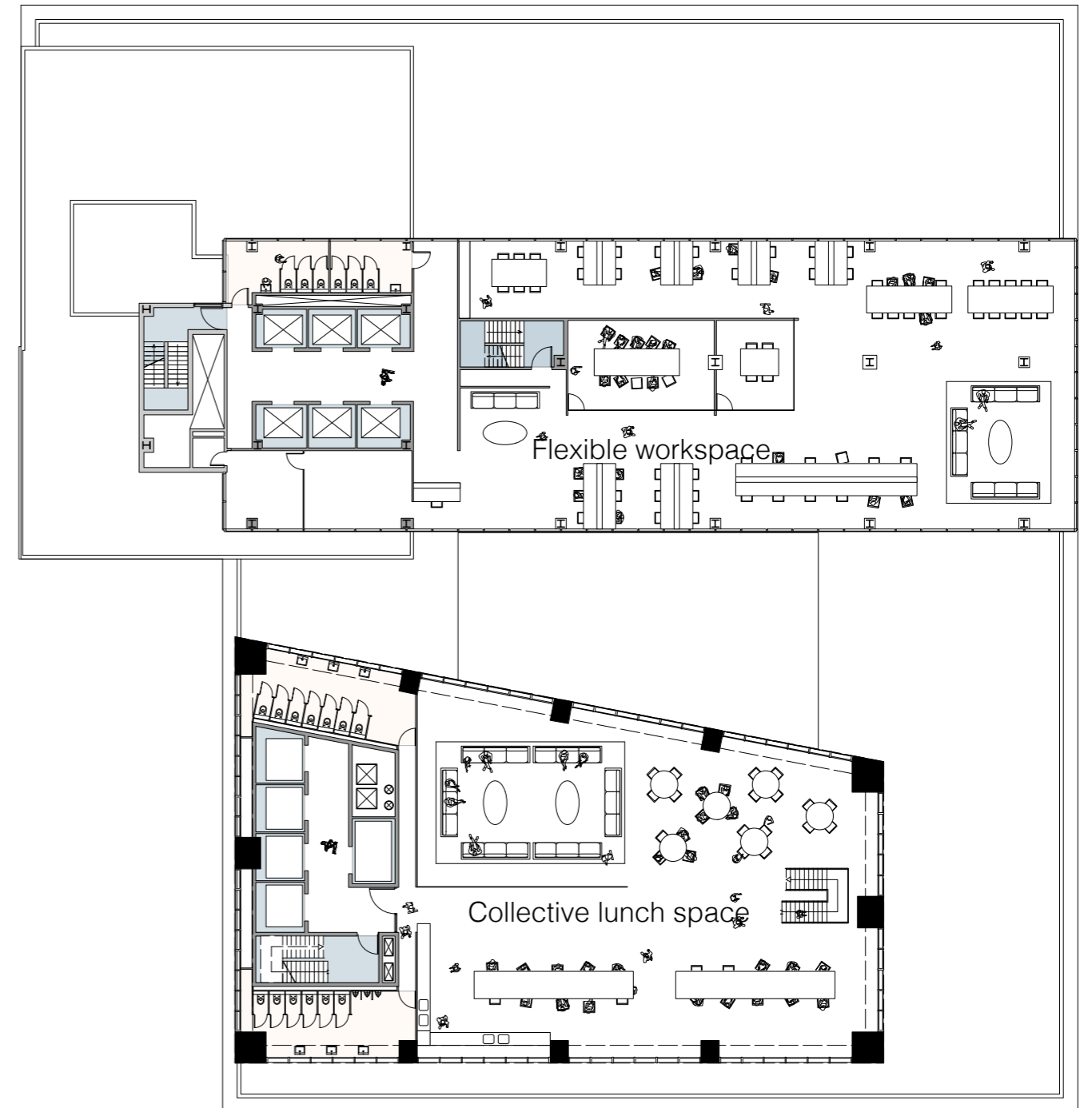




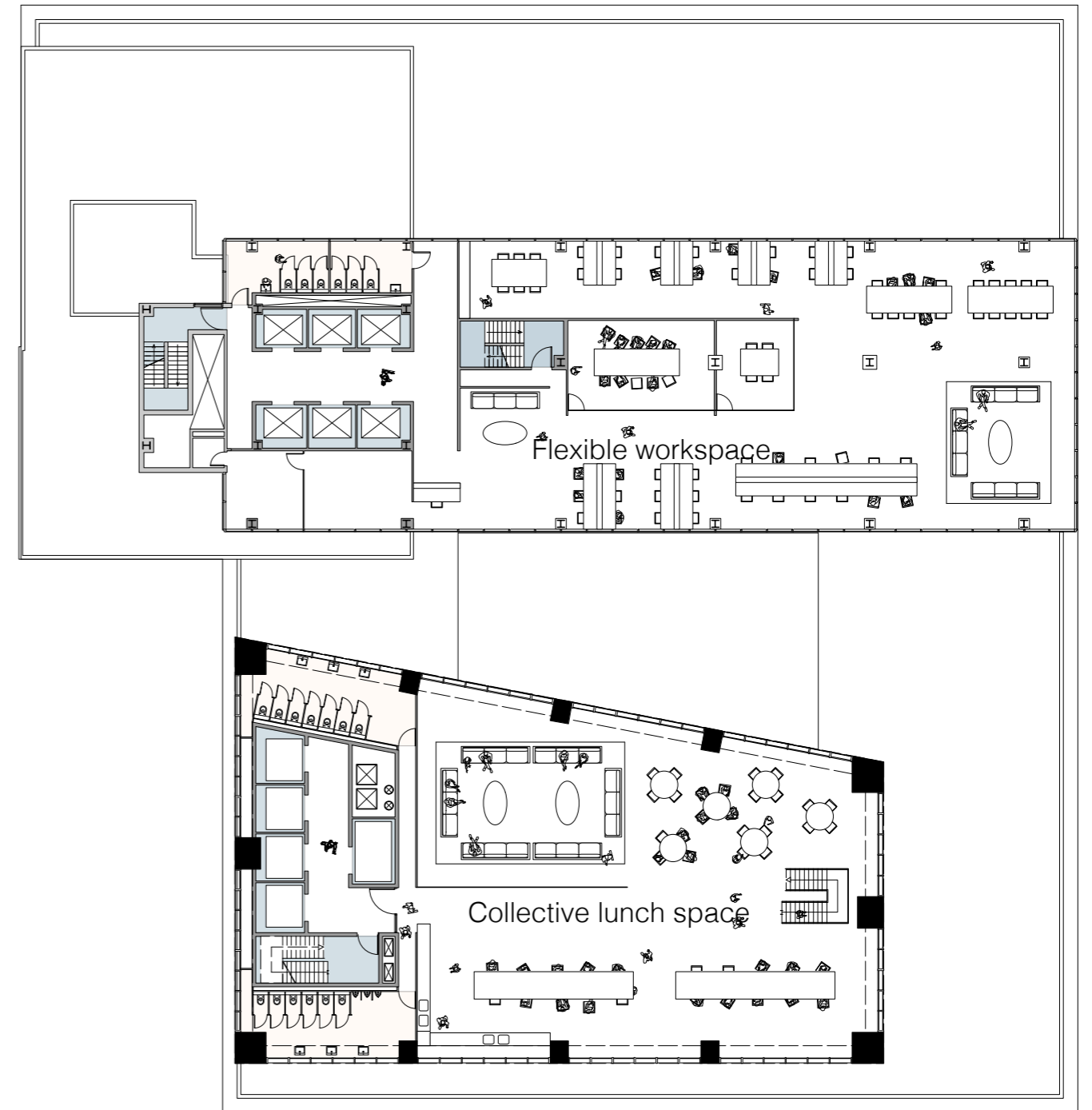
Integrated design



Integrated design

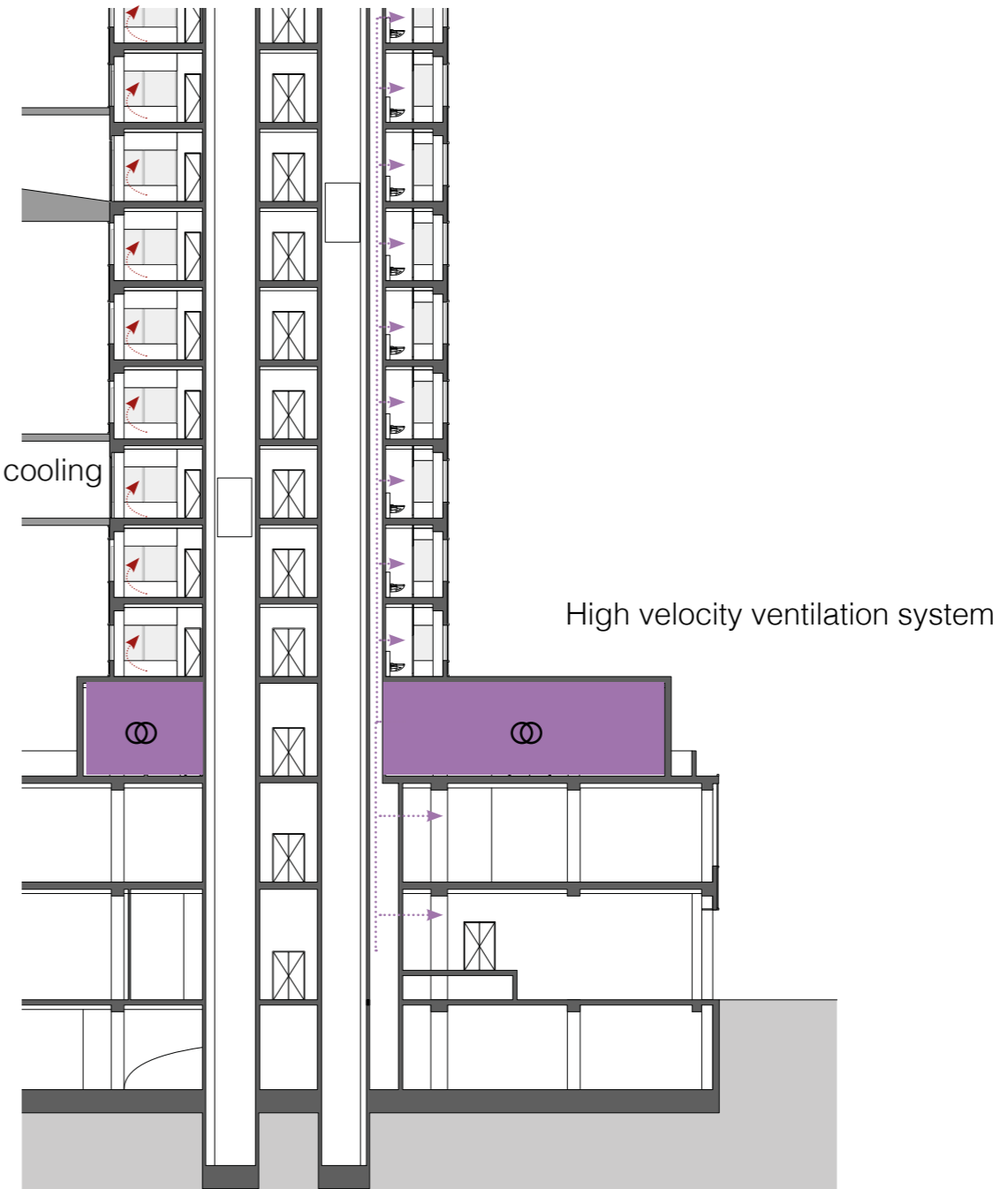
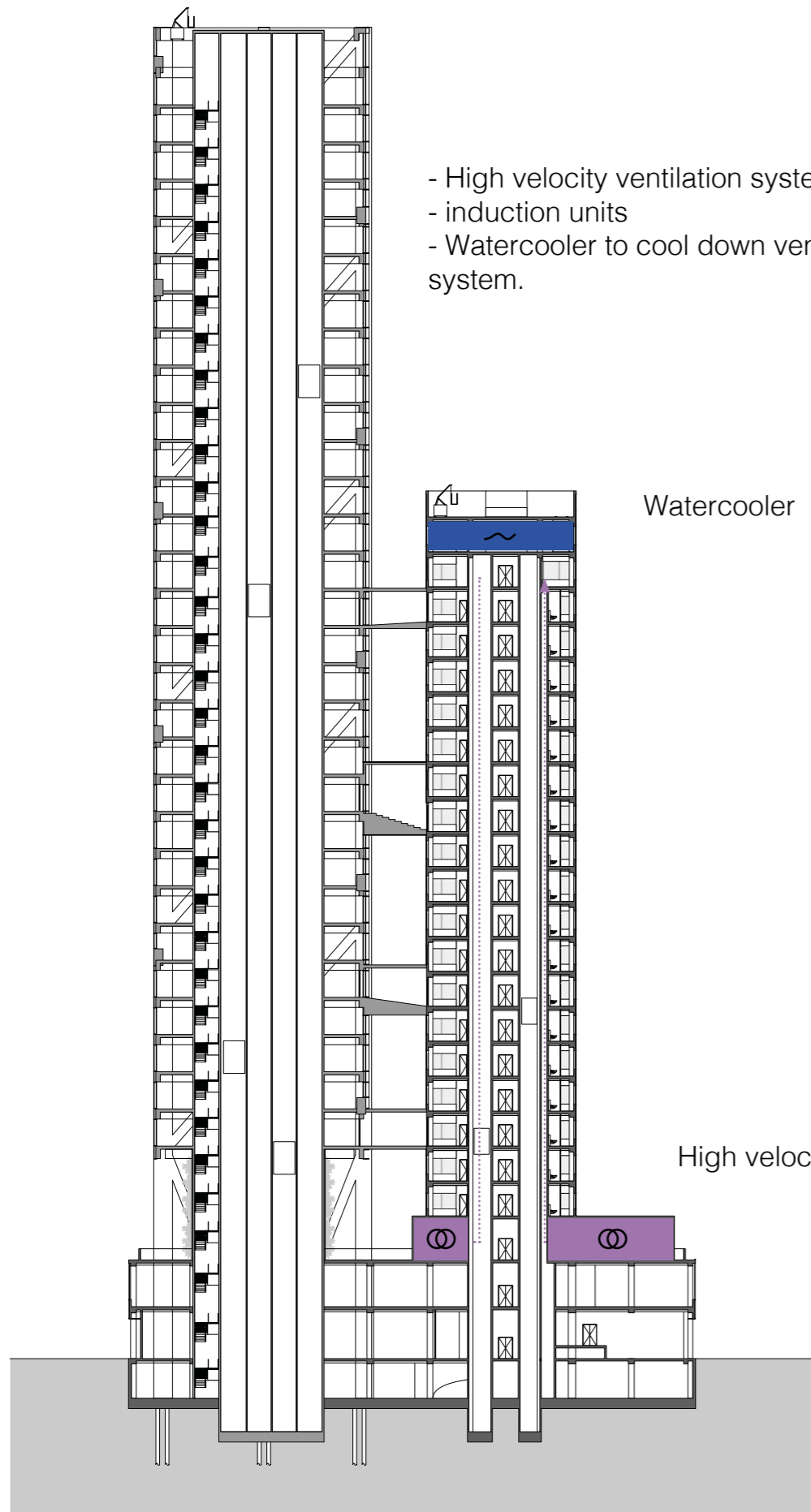


Integrated design



“Many companies’ corporate responsibility strategies require that the buildings they occupy achieve a high sustainability rating.” EY ULI

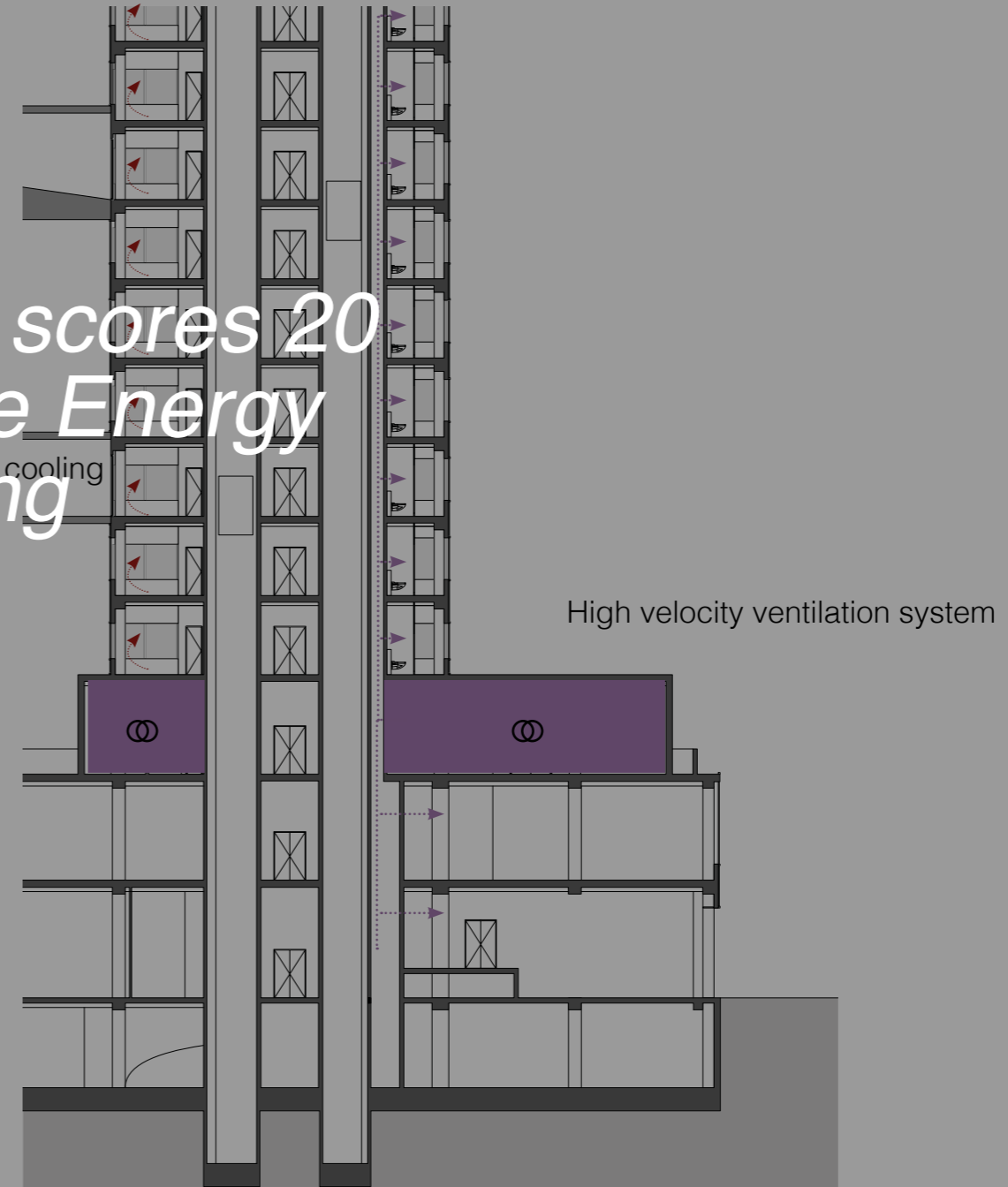
Climate scheme



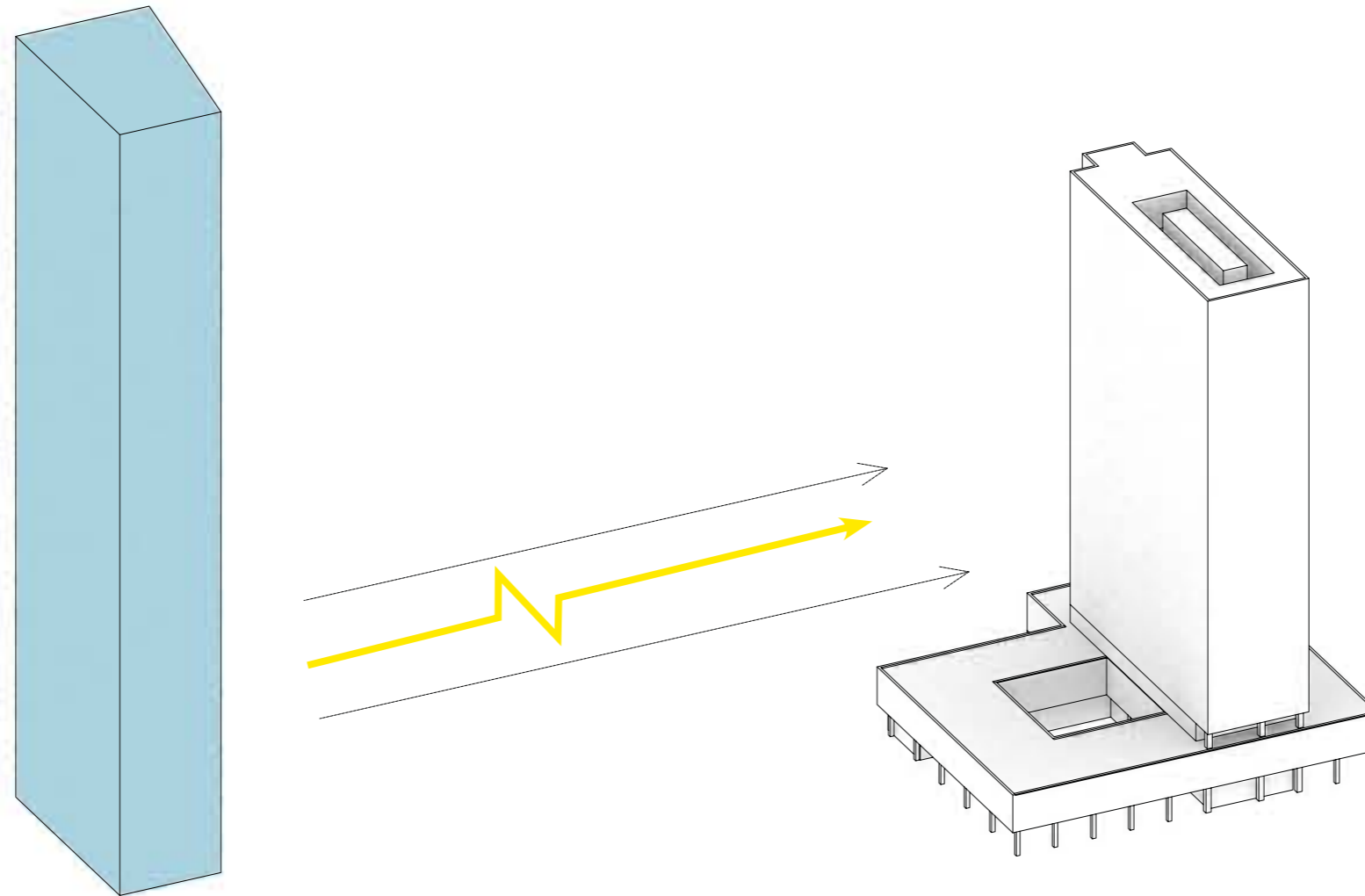
Climate scheme

- High velocity ventilation system
- induction units
- Watercooler to cool down ventilation system.

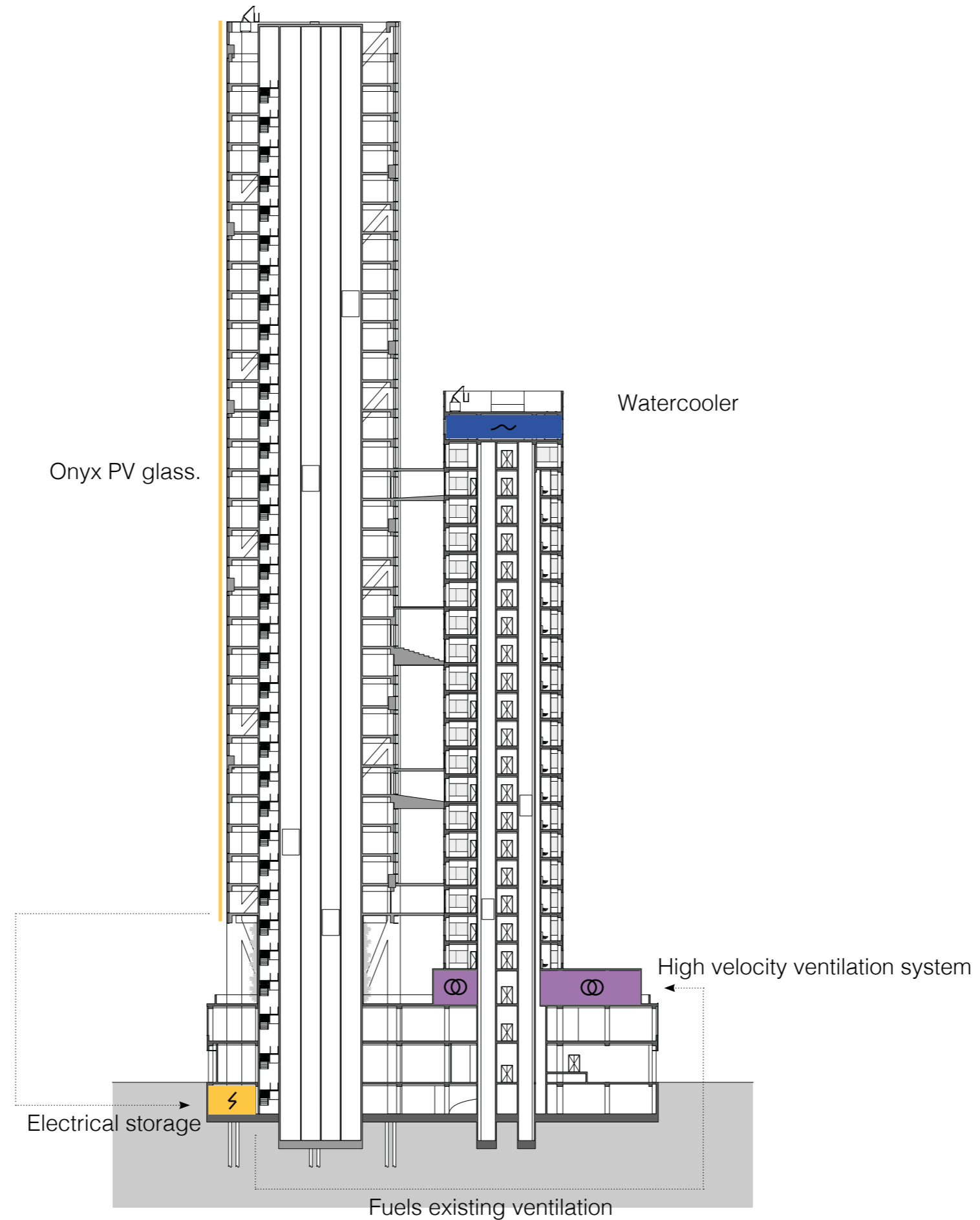
The Lever House scores 20 out of 100 on the Energy Star Rating

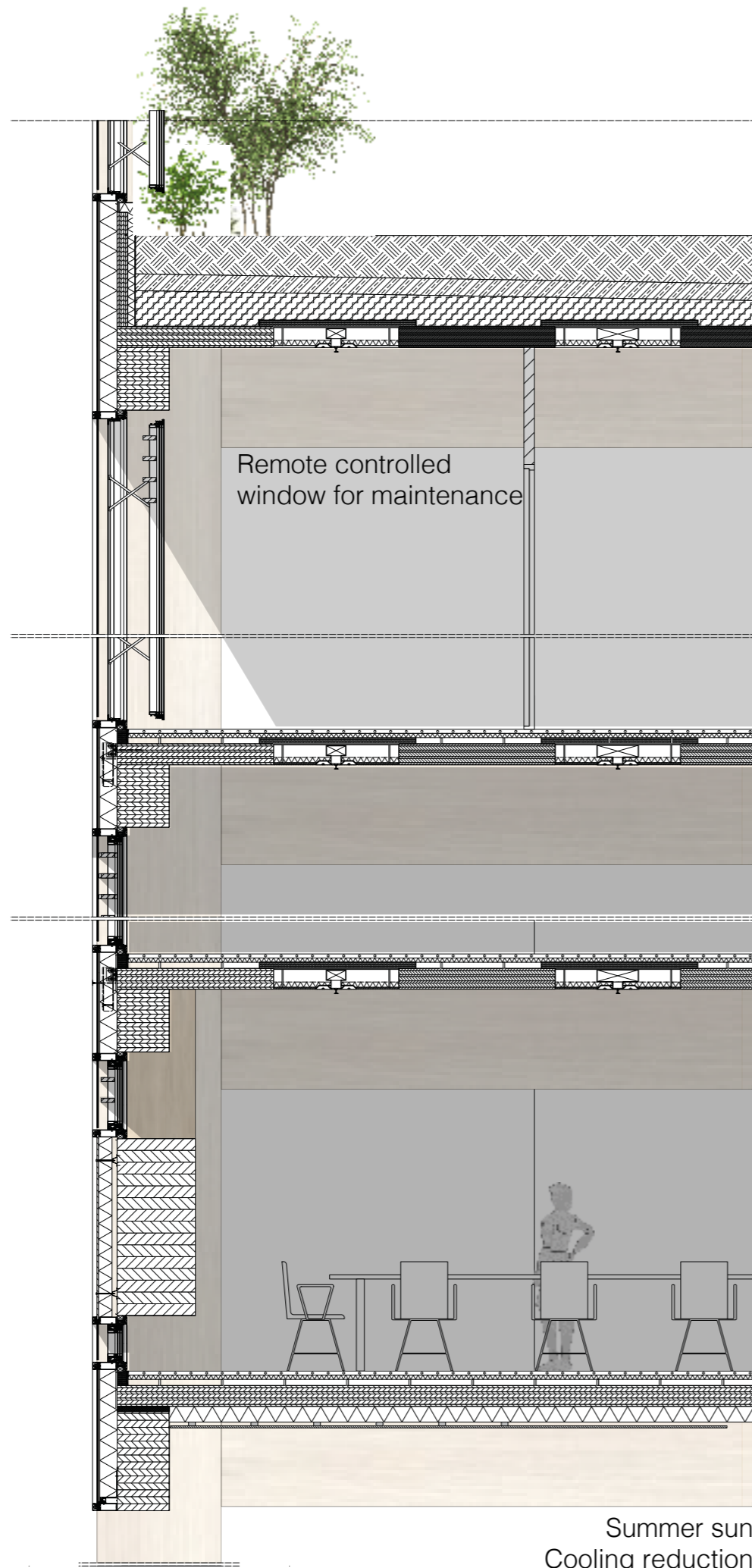
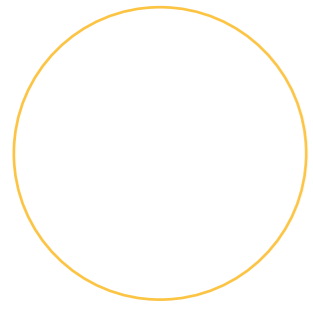


Introducing new energy



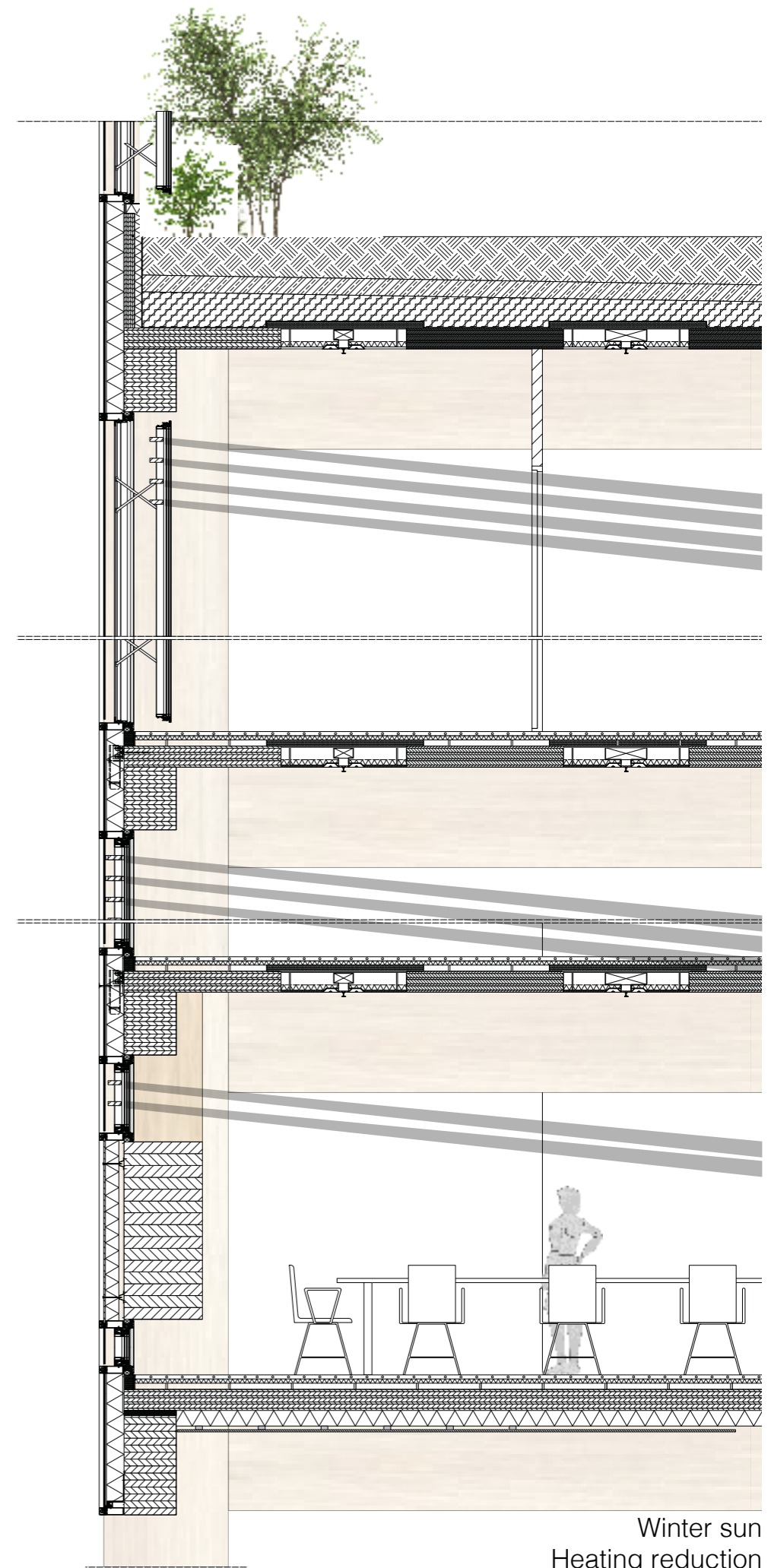
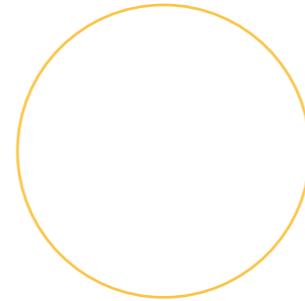
Introducing new energy





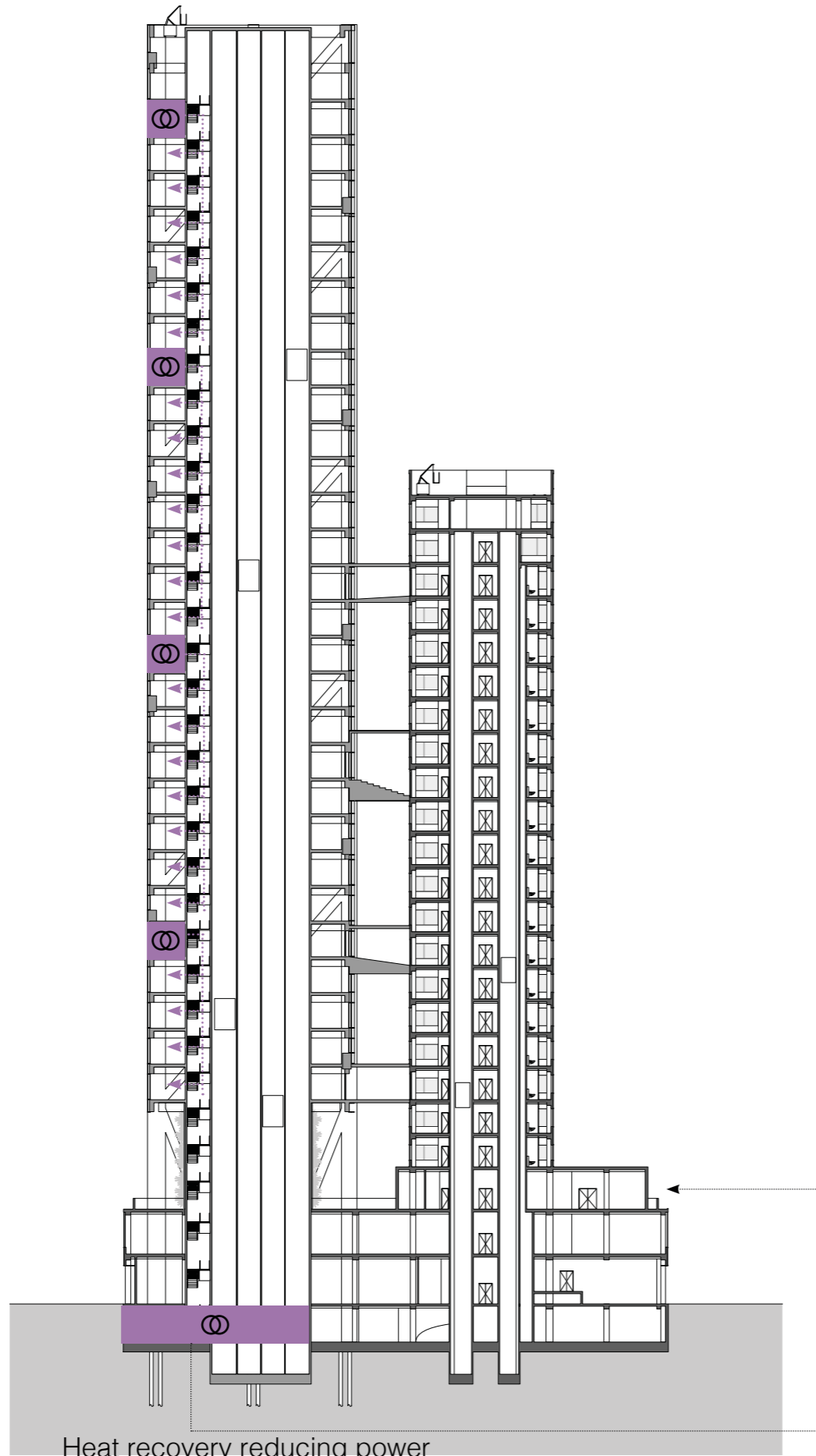
Summer sun
Cooling reduction

Onyx PV glass blocks
17% light transmittance
0.3% UV transmittance

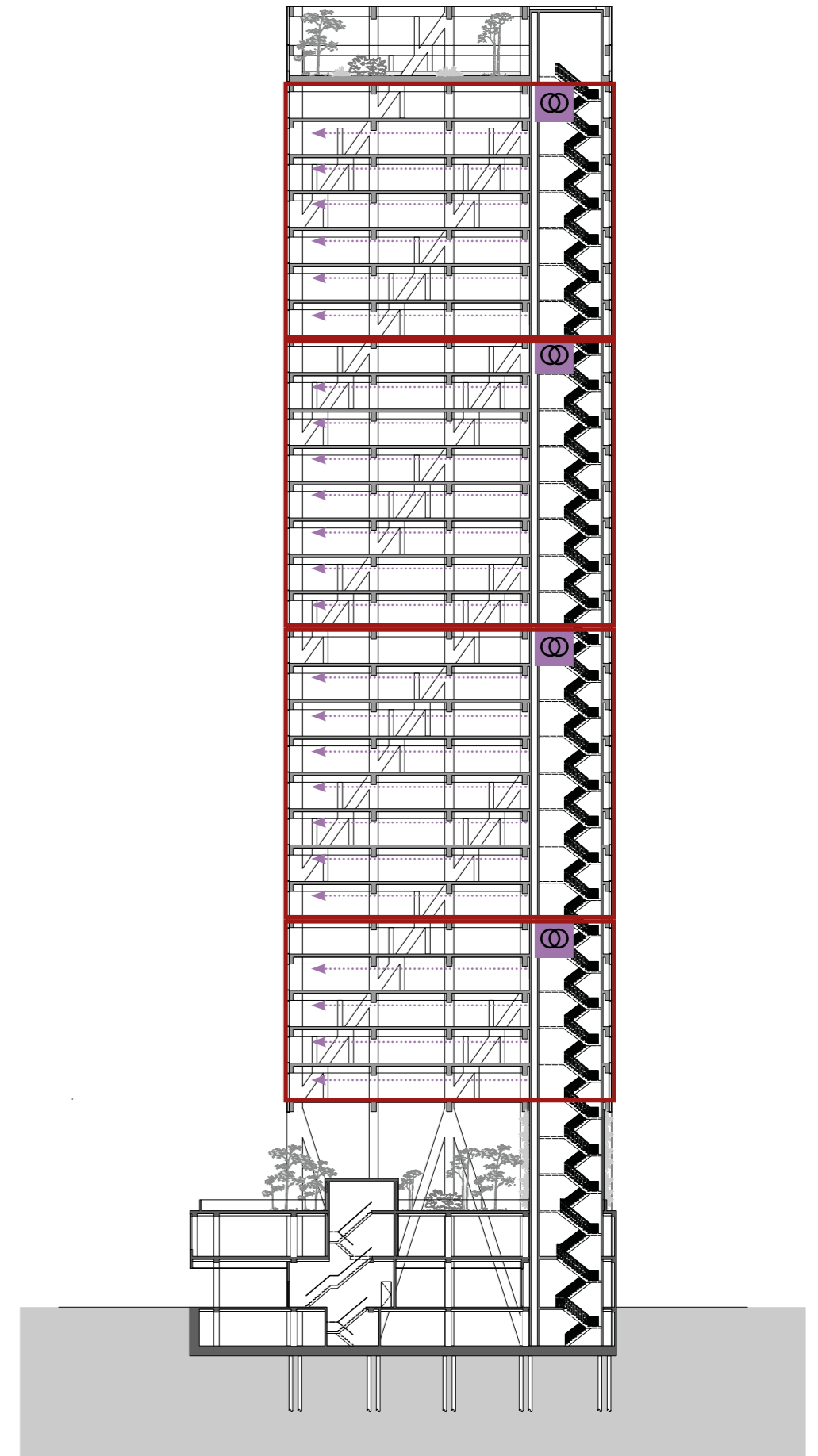


Winter sun
Heating reduction

Ventilation system, fire compartment

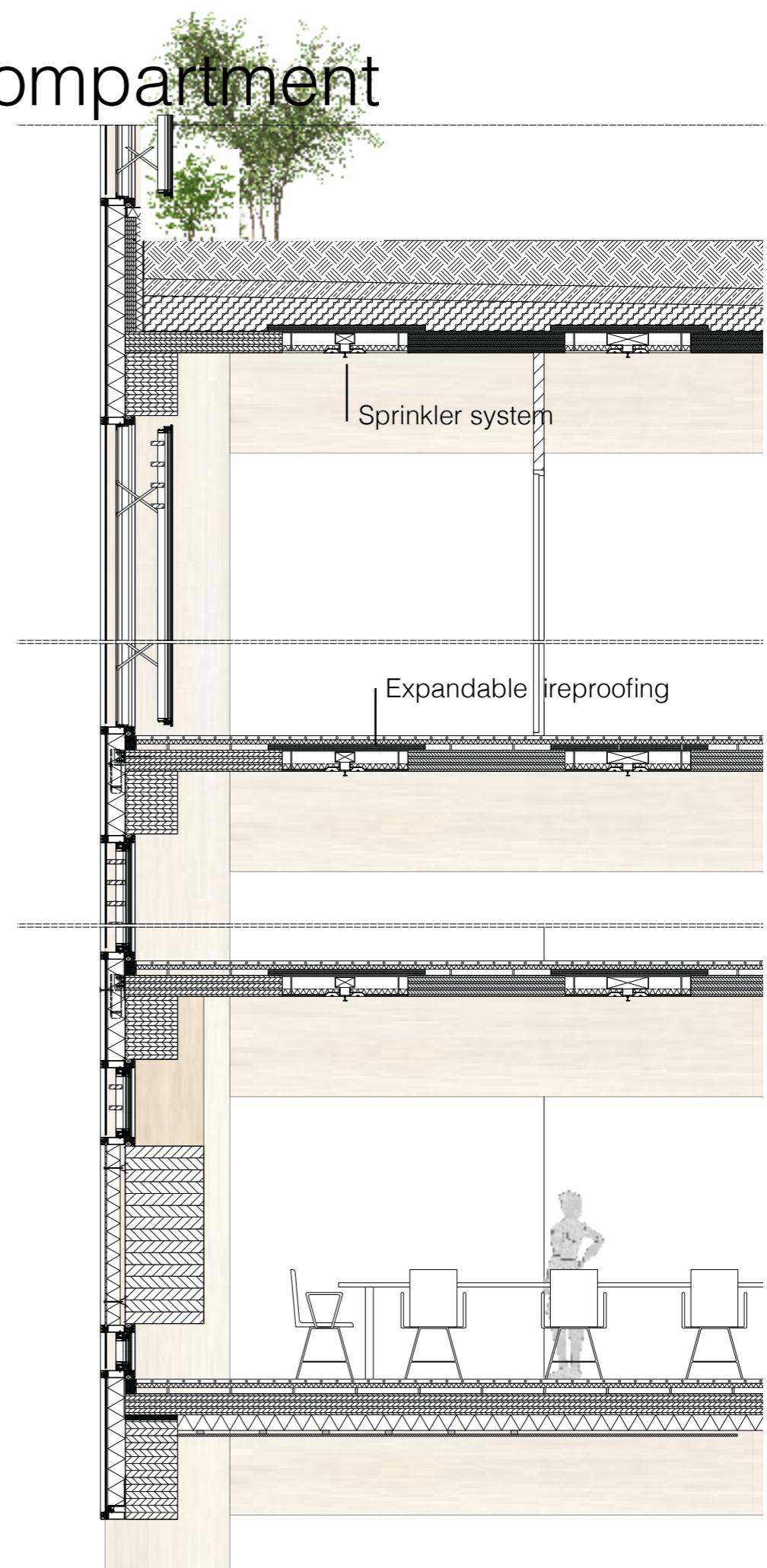
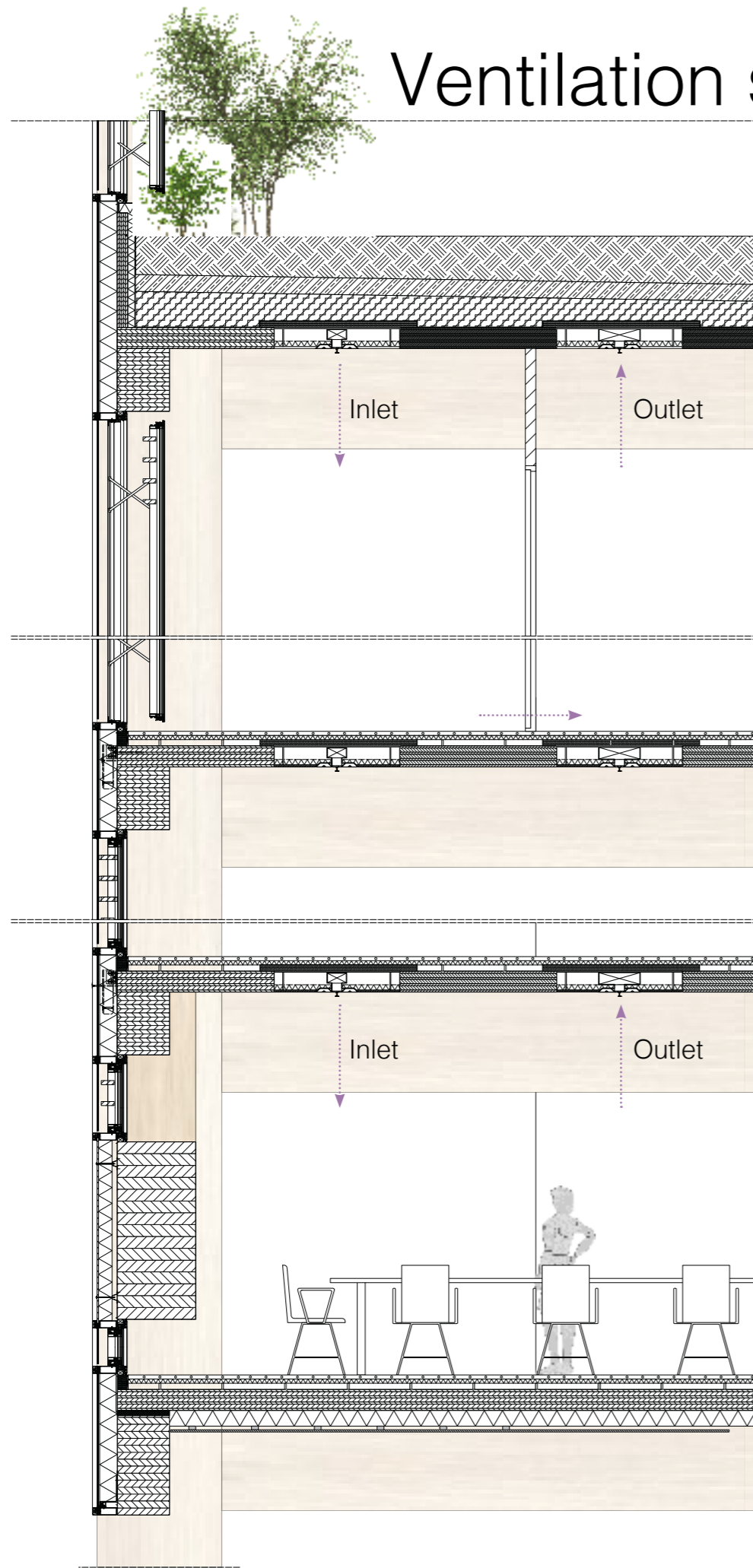


Heat recovery reducing power

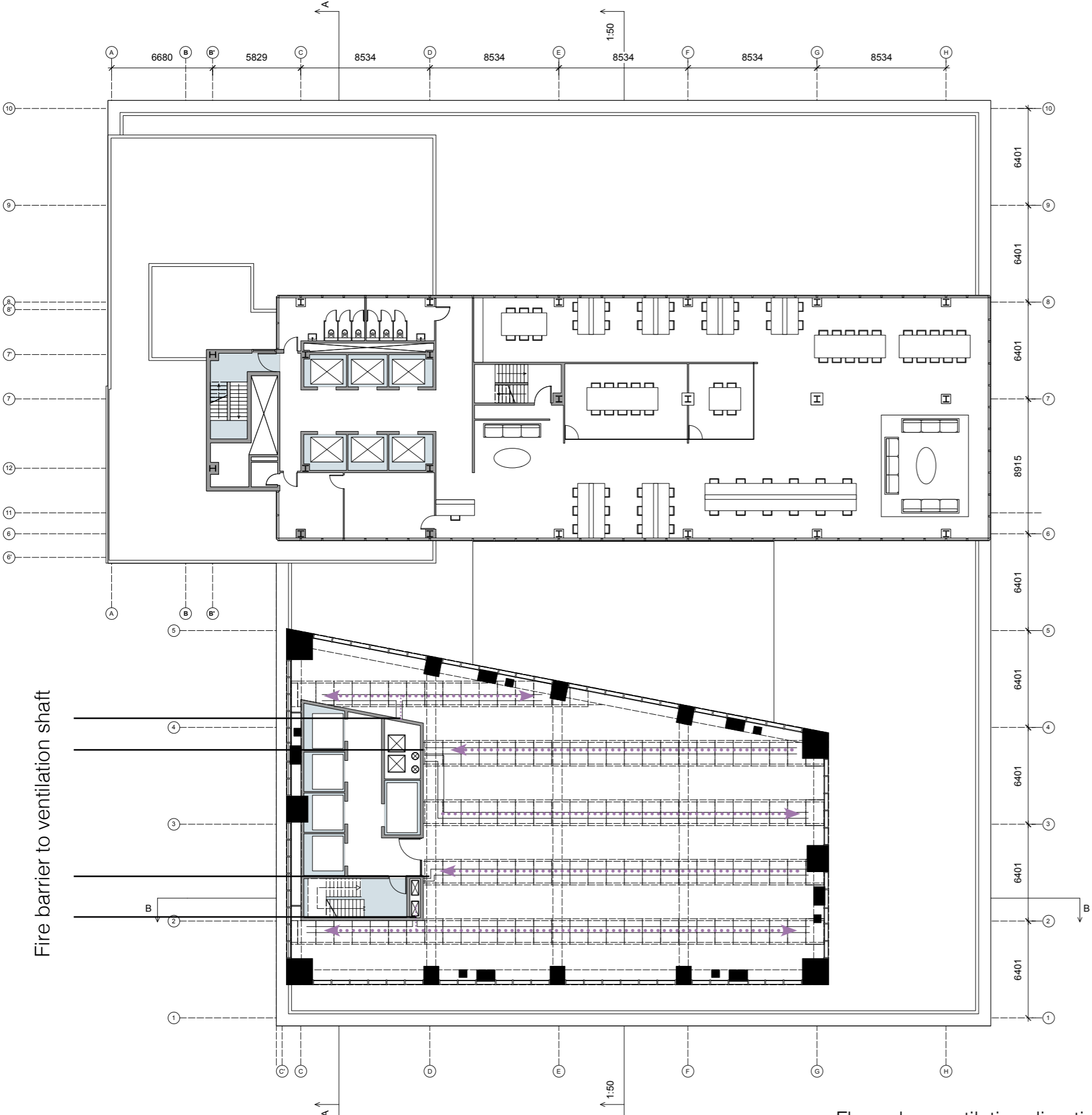


Divided ventilation systems for fire compartments

Ventilation system, fire compartment



Ventilation system, fire compartment



Ventilation shaft: 1.37 m²
 Ventilation Kanal: 0,0194 m²

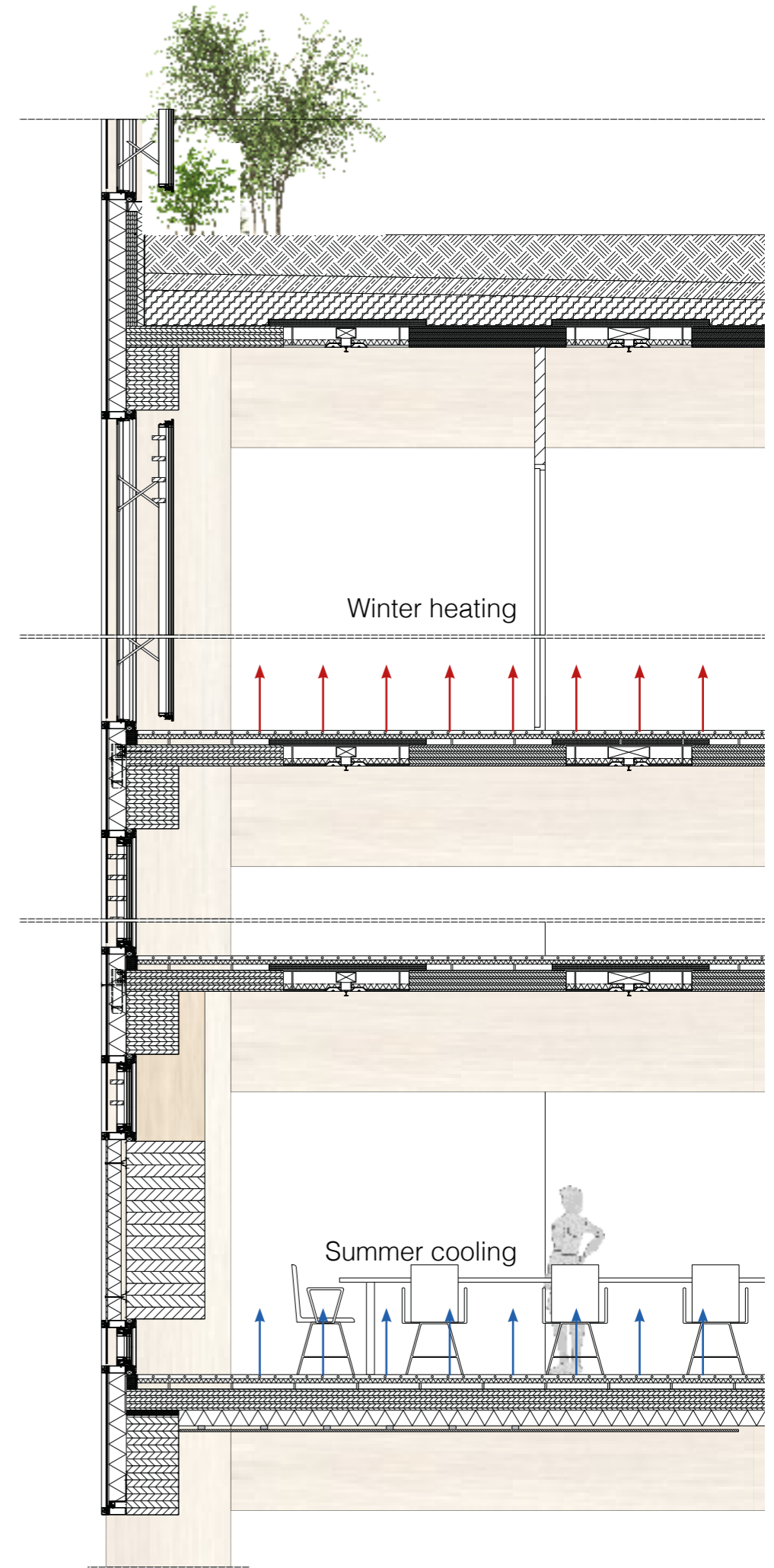
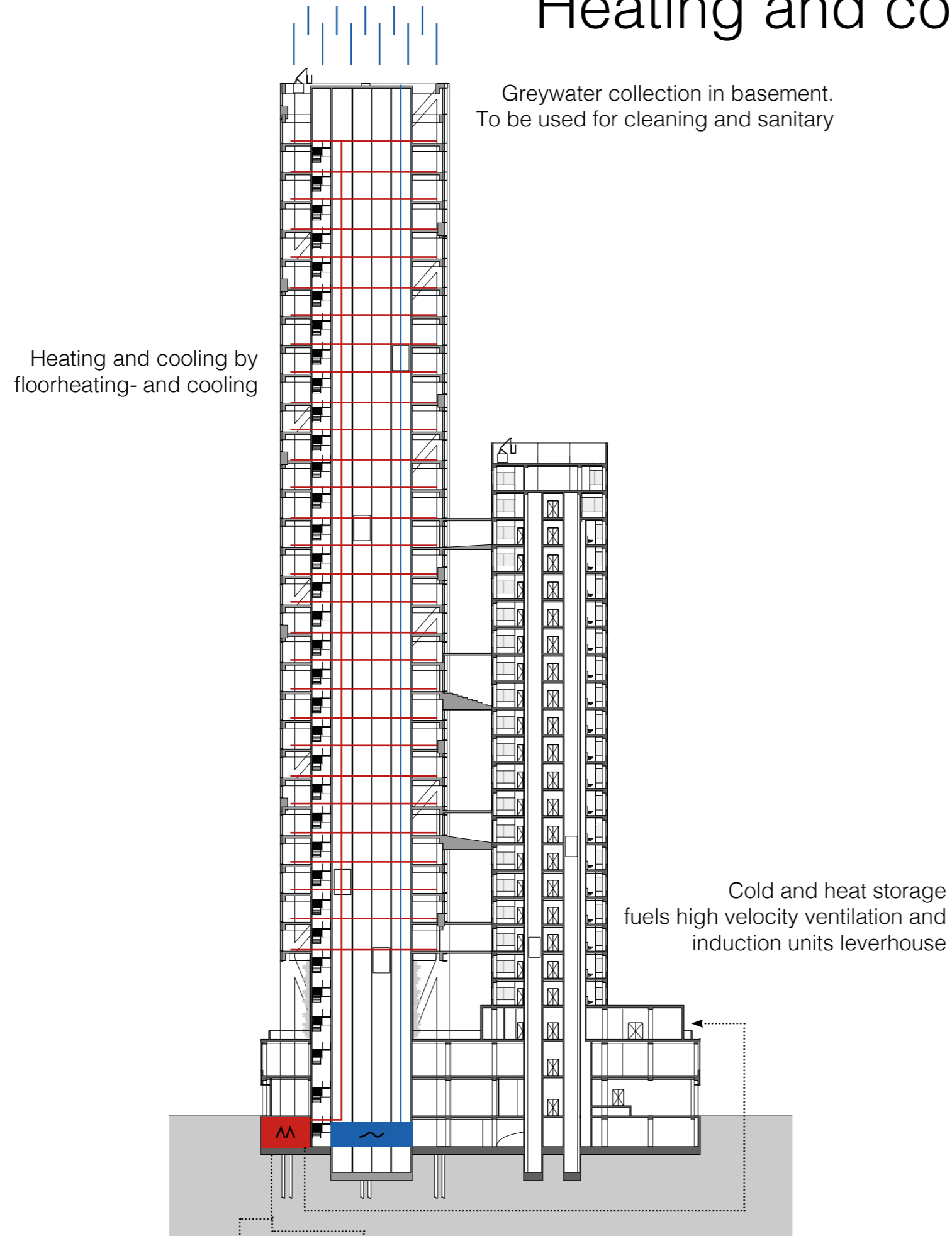
Main ventilation: 25 m³/p/h
 Main ventilation speed: 10 m/s
 Secondary ventilation speed: 5m/s
 Tertiary ventilation speed: 3m/s
 Interior surface = 556,5 m² * 28 = 15582
 People: 8 m²/p = 15582/ 8 = 1947,75
 A ventilation = ventilation amount / ventilation speed.

A Main shaft = 1947,75 * 25 = 48693,75 m³/h = 13,52 m³/s
 A Main shaft = 13,5 m³/s / 10 m/s = 1,35m²

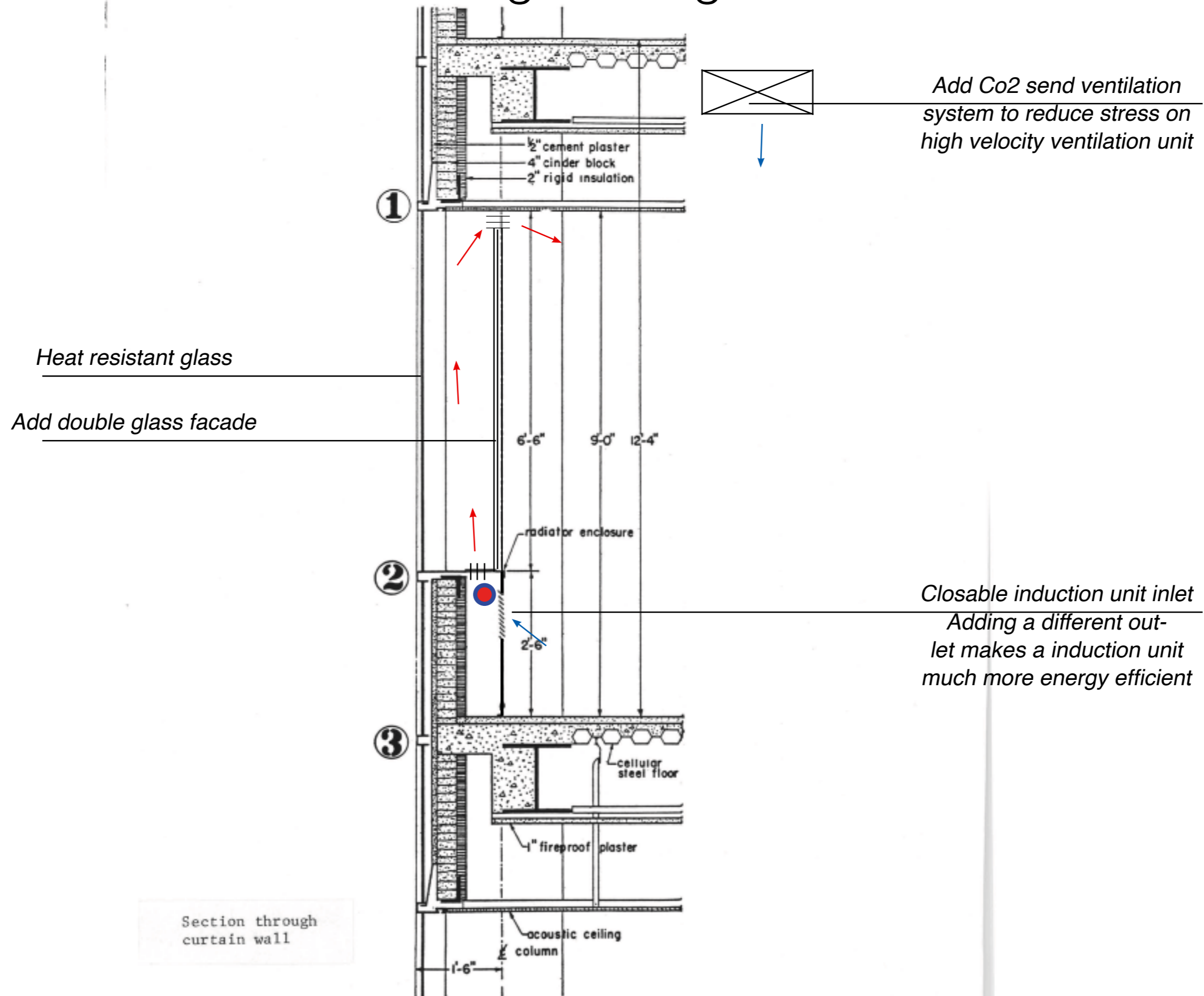
Secondary ventilation = 70 x 25 = 1750 m³/h = 0,486 m³/s
 A secondary ventilation = 0,486 m³/s / 5 m/s = 0,097 m²
 Dimension secondary ventilation supply = 0,097 m² / 5 = 0,0194 m²
 Dimension secondary ventilation supply = 140mm x 140mm

Dimension secondary ventilation discharge: 0,097 m² / 2 = 0,0485 m²
 Dimension secondary ventilation discharge = 220 x 220

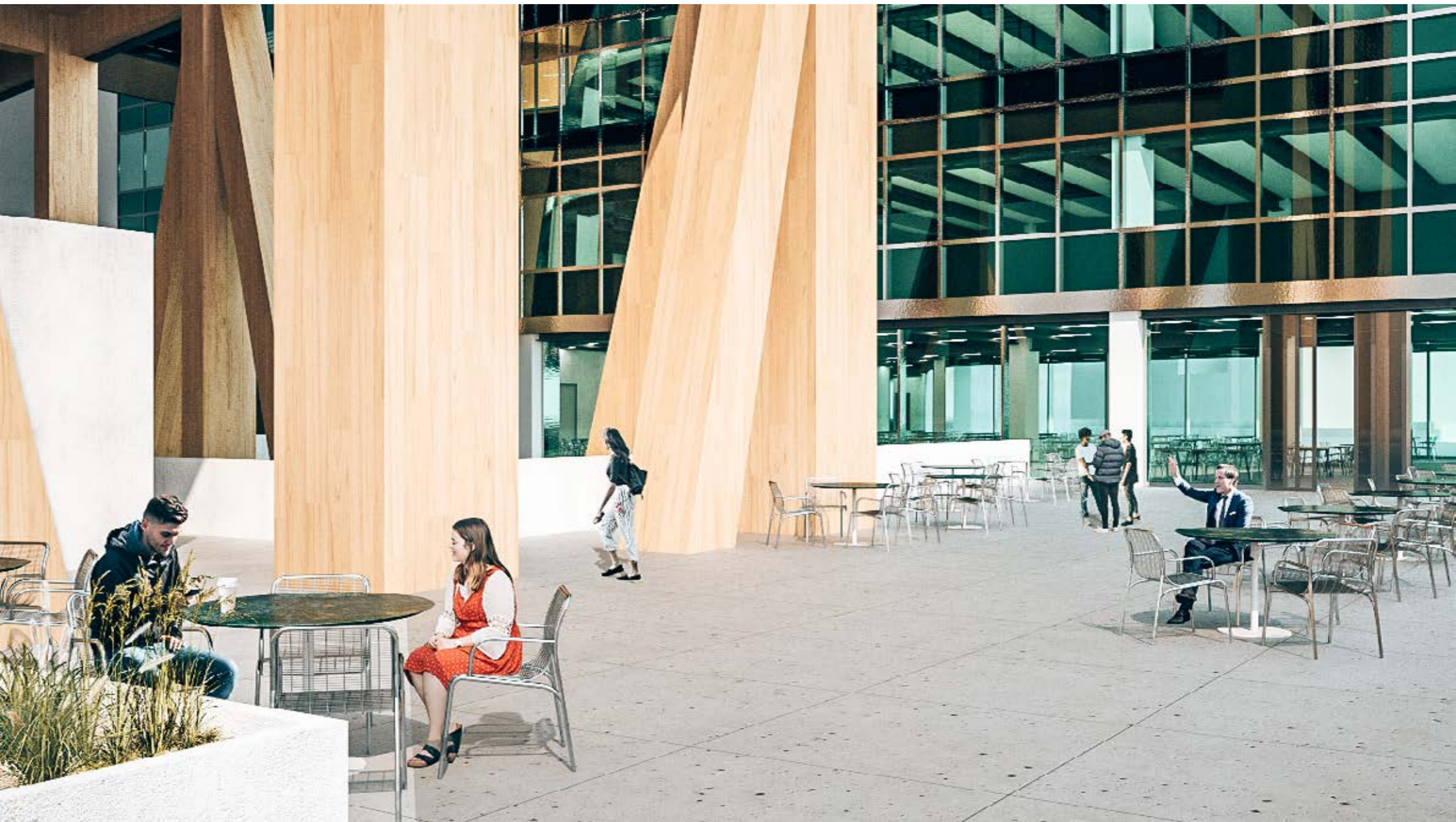
Heating and cooling



Enhancing existing climate



A wooden construction



A new trend

Mjøstårnet - 18 storey timber building completed

Global stability of high-rise timber buildings

Carsten Hein, Lisa Kaluzni, Brian Twohig, Wen Shao Chang

Construction Materials

Briefing: Super tall timber – Oakwood Tower
Foster and Ramage

ice | proceedings

Proceedings of the Institution of Civil Engineers

<http://dx.doi.org/10.1680/jcoma.16.00034>

Paper 1600034

Received 21/06/2016

Accepted 23/07/2016

Keywords: buildings, structures & design/materials technology/
timber structures

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ice
Institution of Civil Engineers

publishing

Briefing: Super tall timber – Oakwood Tower

Staying close to SOM

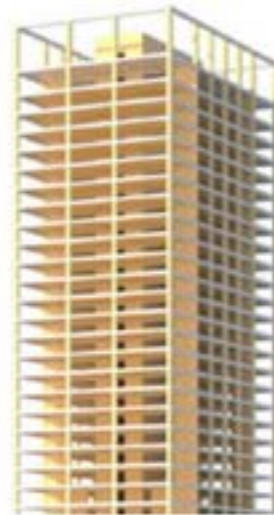
SOM

RESEARCH



Timber Tower Research Project

ONGOING RESEARCH SINCE 2013



INITIAL RESEARCH REPORT (MAY 2013)

The goal of the Timber Tower Research Project was to develop a structural system for tall buildings that uses mass timber as the main structural material and minimizes the embodied carbon footprint of the building. The research was applied to a prototypical building based on an existing concrete benchmark for comparison. The concrete benchmark building is the Dewitt-Chestnut Apartments, a 395-foot-tall, 42-story building in Chicago designed by SOM and built in 1965.

SOM's solution to the tall wooden building problem is the Concrete Jointed Timber Frame. This system relies primarily on mass timber for the main structural elements, with supplementary reinforced concrete at the connecting joints. This system plays to the strengths of both materials. The result is an efficient structure that could compete with reinforced concrete and steel while reducing the carbon footprint by 60 percent to 75 percent.

SOM believes that the proposed system is technically feasible from the standpoint of structural engineering, architecture, interior layouts, and building services. Additional research and physical testing is necessary to verify the performance of the

structural system. SOM has also developed the system with consideration to constructability, cost, and fire protection. Expert reviews and physical testing related to fire-safety are also required before this system can be fully implemented in the market. Lastly, the design community must continue to work creatively with forward-thinking municipalities, and code officials using the latest in fire engineering and performance-based design, to make timber buildings a viable alternative for more sustainable tall buildings.

[Download Initial Report](#)

[Download System Report](#)

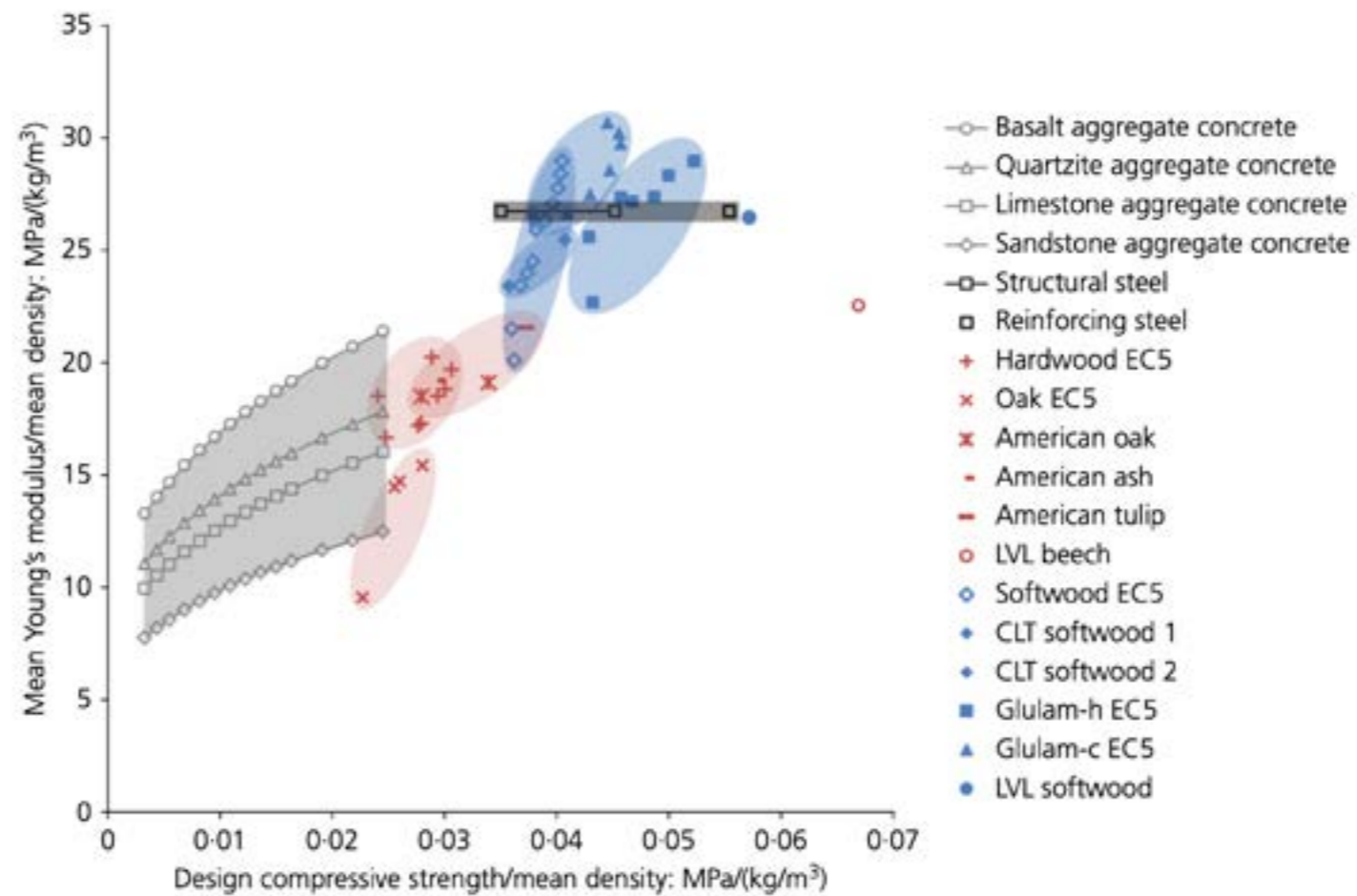
[Download OSU Testing Report](#)

[Download AISC System Report](#)

Strength Softwood Glulam

Steel has a compression strength of 550 n/mm²

Glulam has an average compression strength of 35,6 n/mm²



Foster, R. (2016). Briefing: super tall timber - Oakwood tower. Geraadpleegd van https://www.researchgate.net/publication/306028081_Briefing_Super_tall_timber_-_Oakwood_Tower

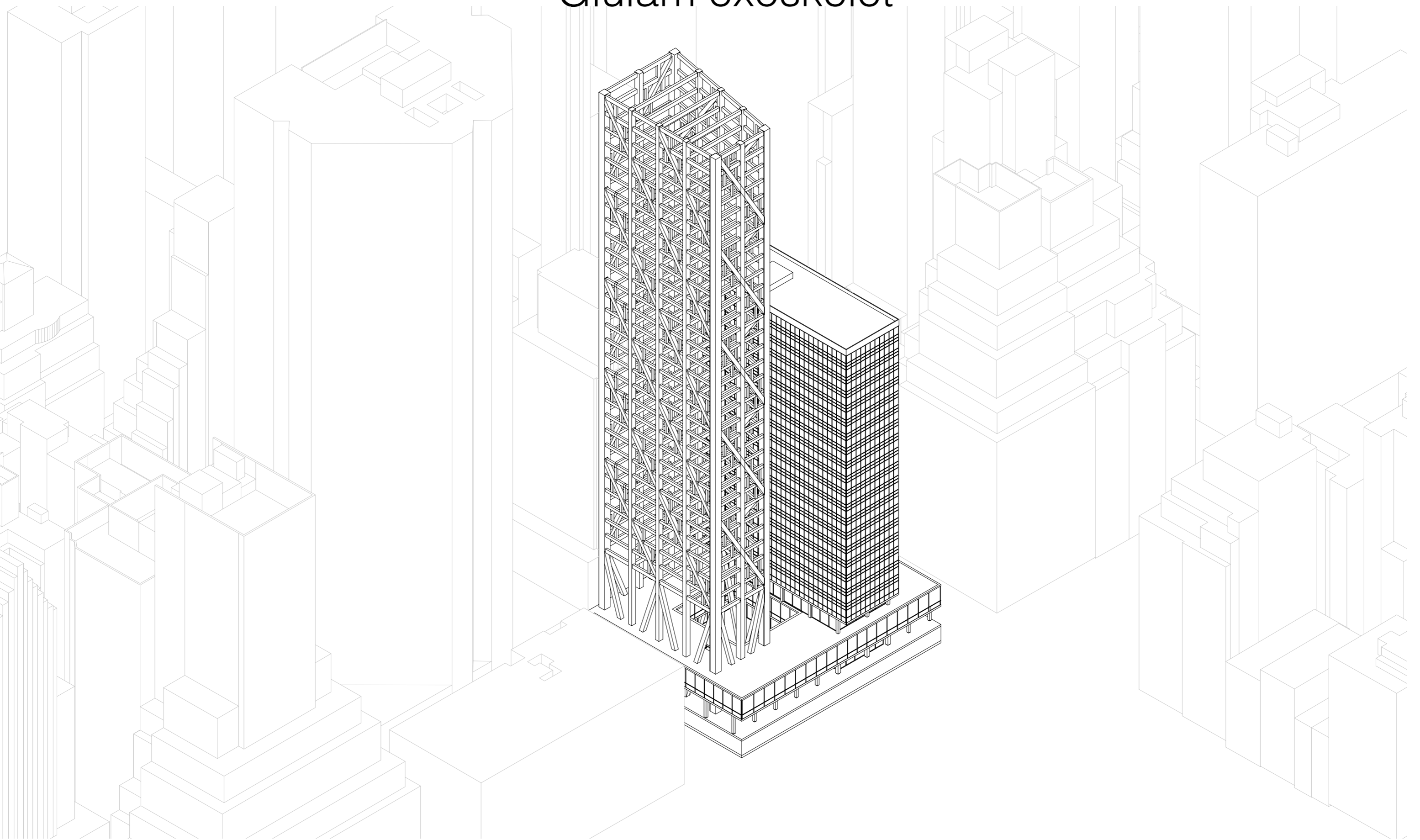
*Available in the state New York: 8.454.176.640 square meter board of softwood.
Largest amount of softwood is Spruce. Perfect for Glulam.*

*The amount grows with 47.380.550,4 square meter board a year.
Only 13.935.456 square meter board is harvested*

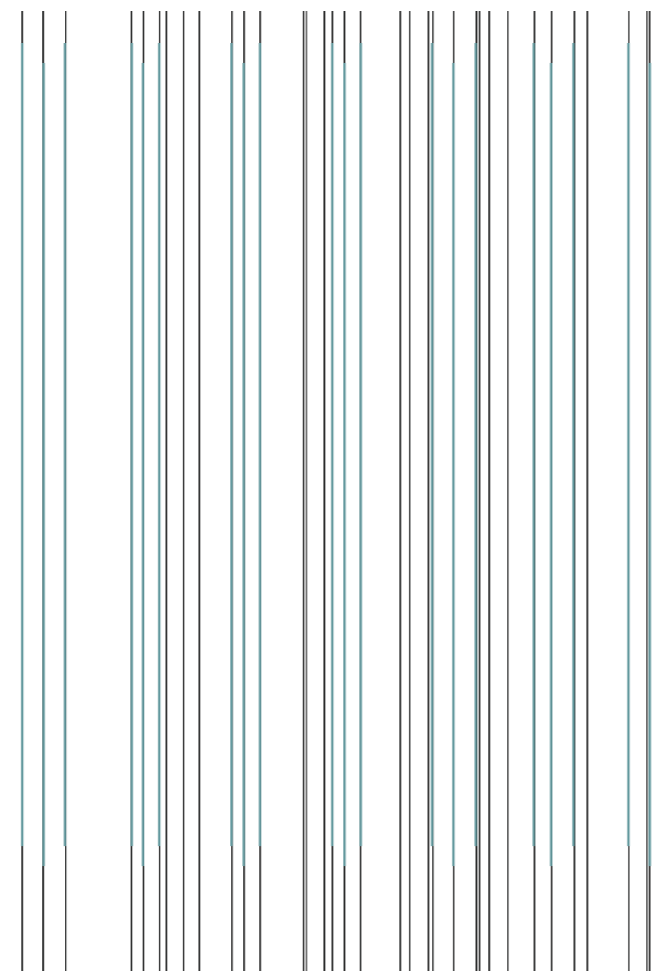
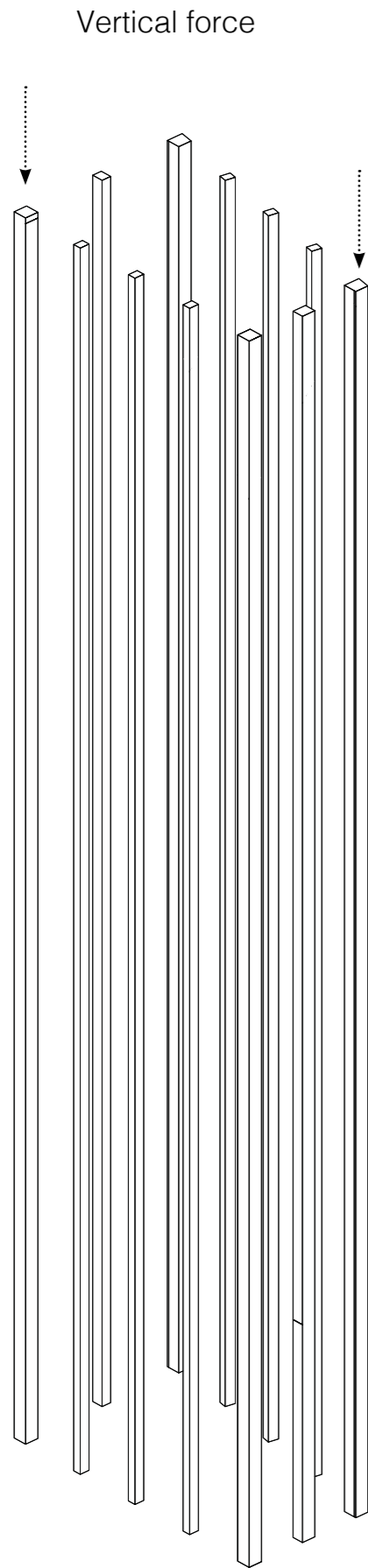
A perfect source for the new addition

Sloane Crawford, State Forest Industry Specialist. (z.d.). Softwood timber utilization opportunity. Geraadpleegd op 3 april 2020, van <https://woodproducts.ny.gov/system/files/documents/2018/07/softwood-prospectus.pdf>

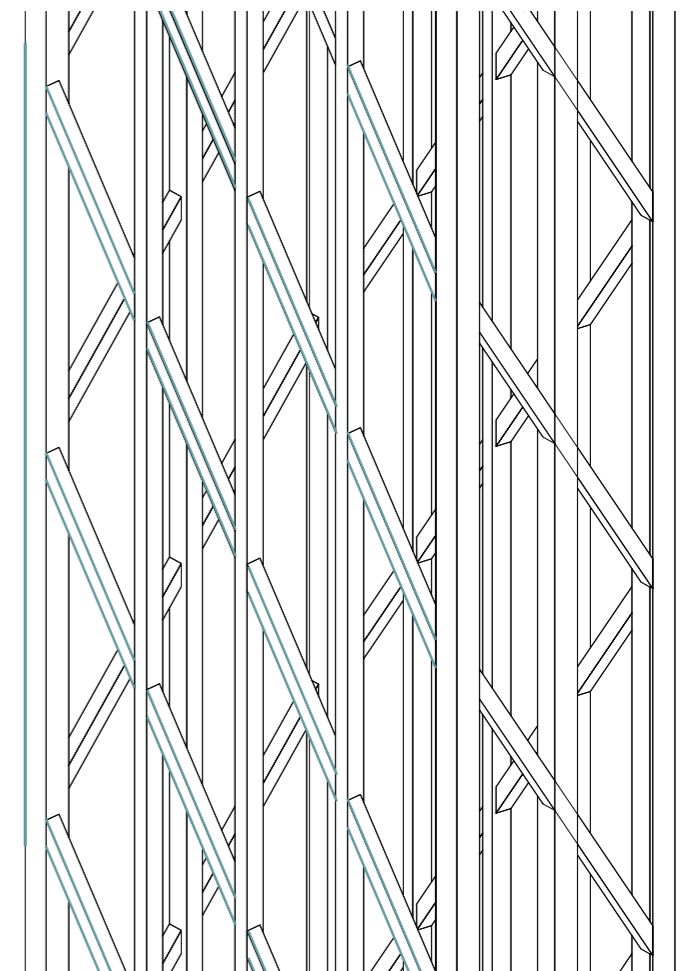
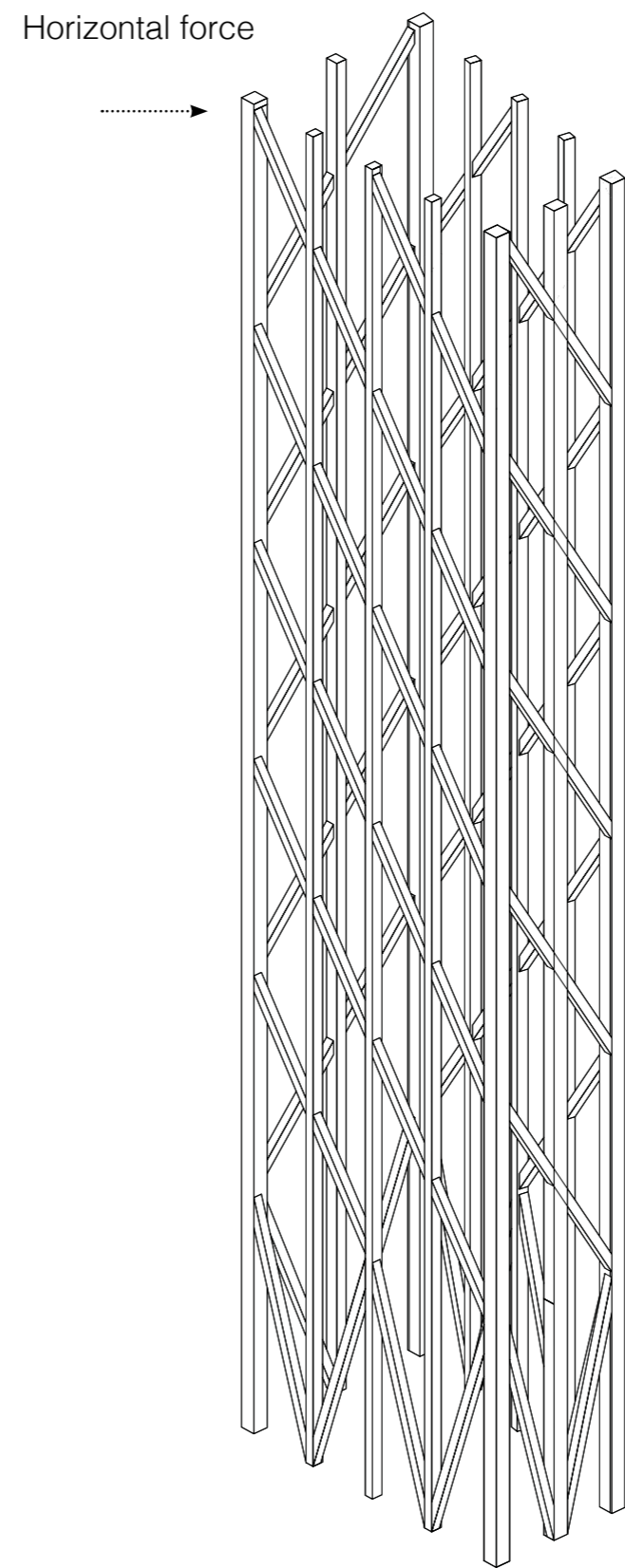
Glulam exoskelet



Glulam exoskeleton

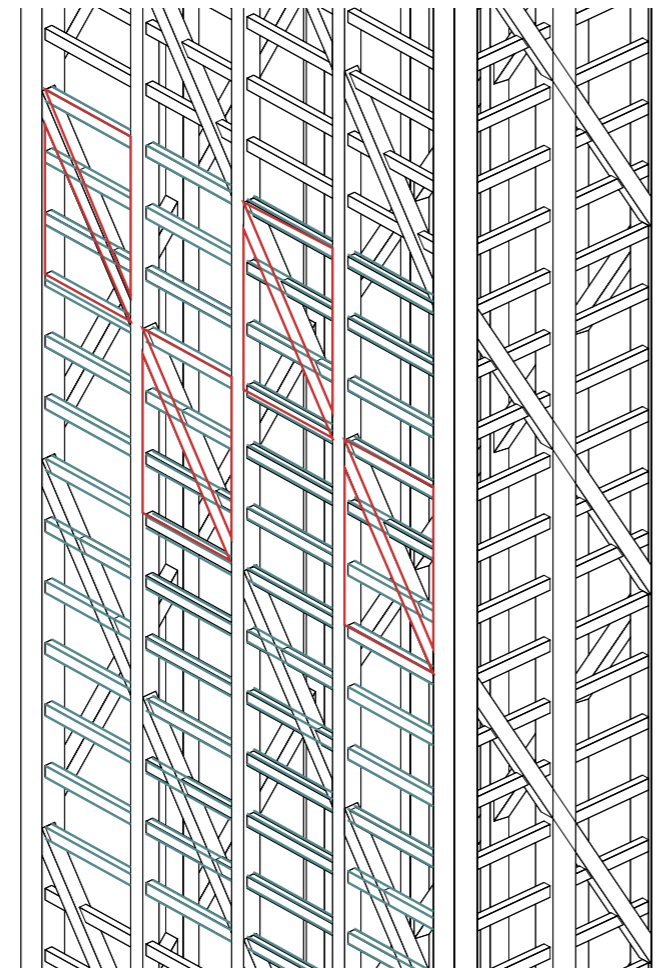
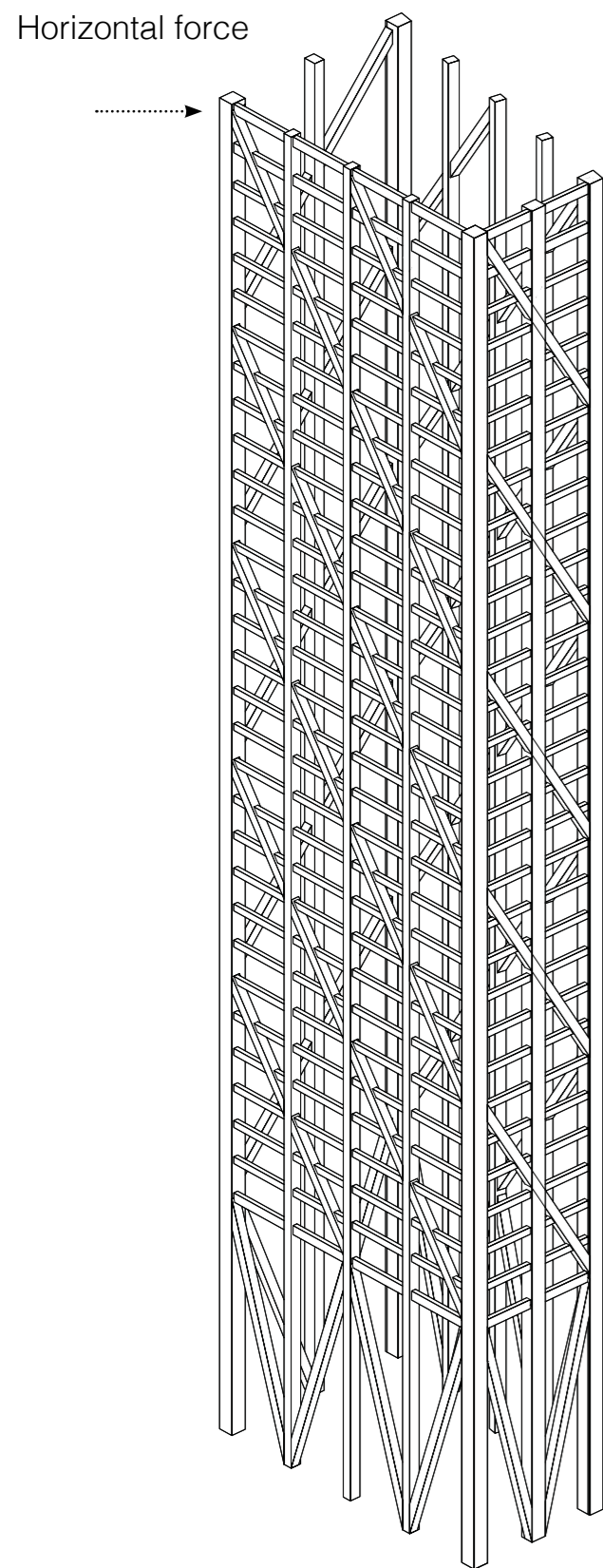


Gravitational load

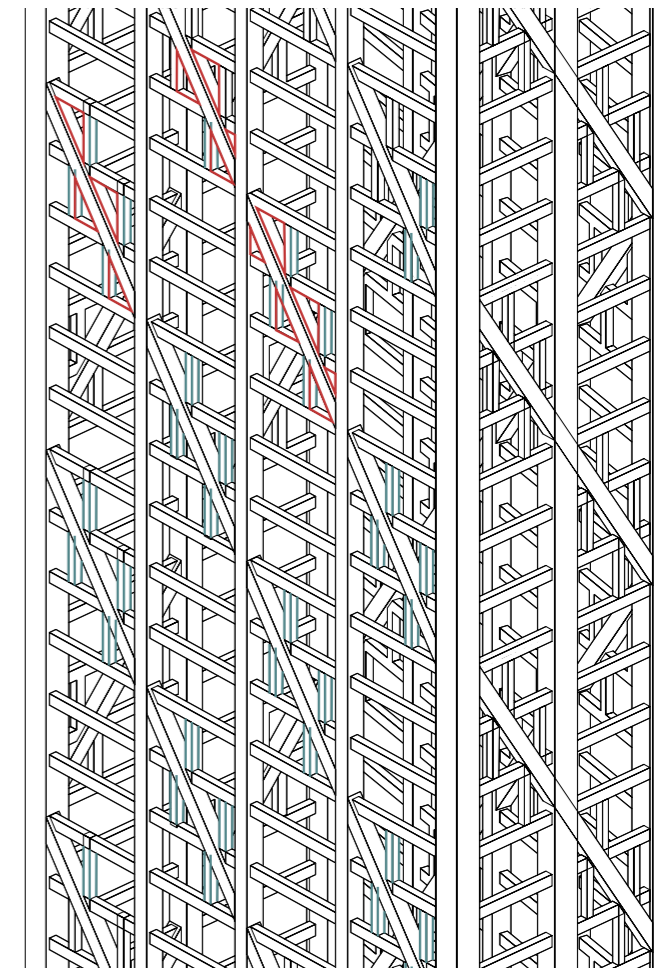
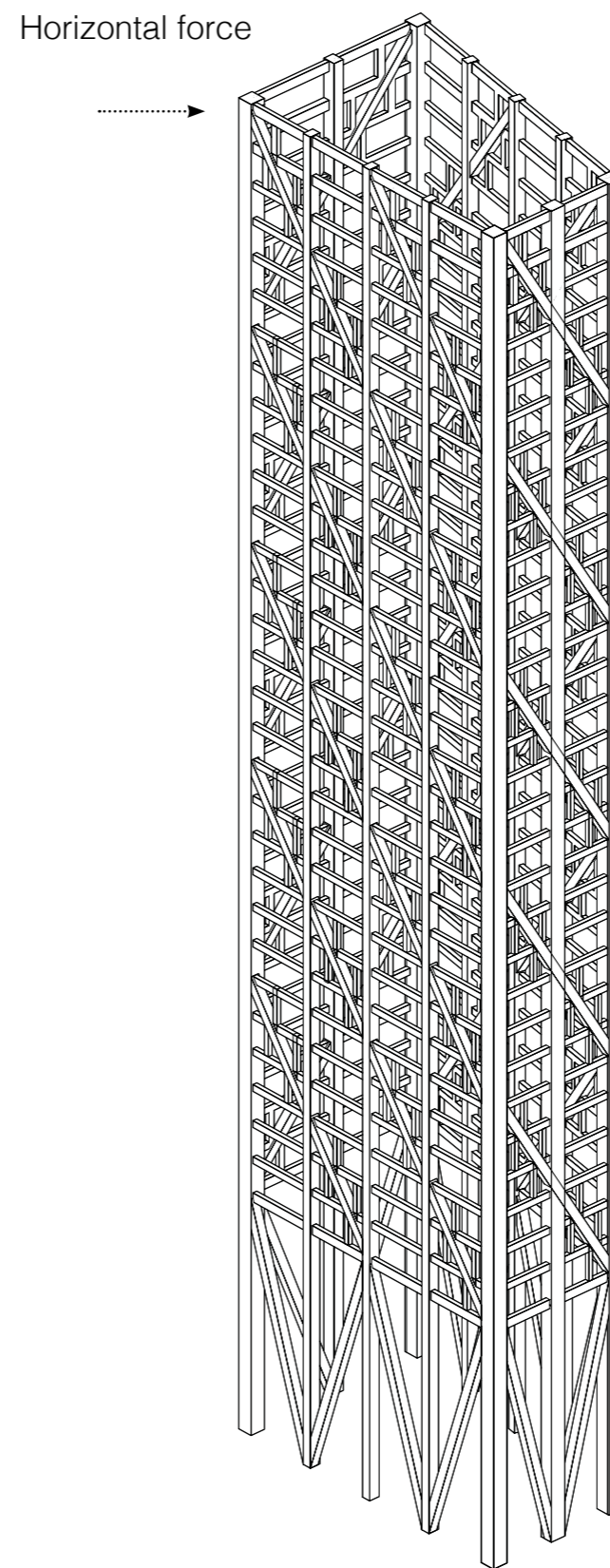


Lateral load

Glulam exoskelet

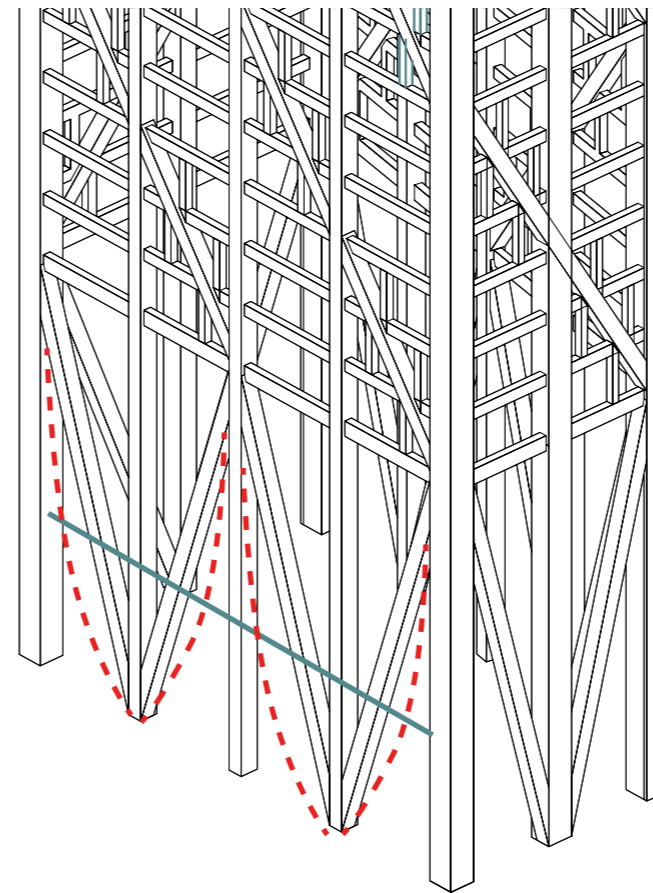
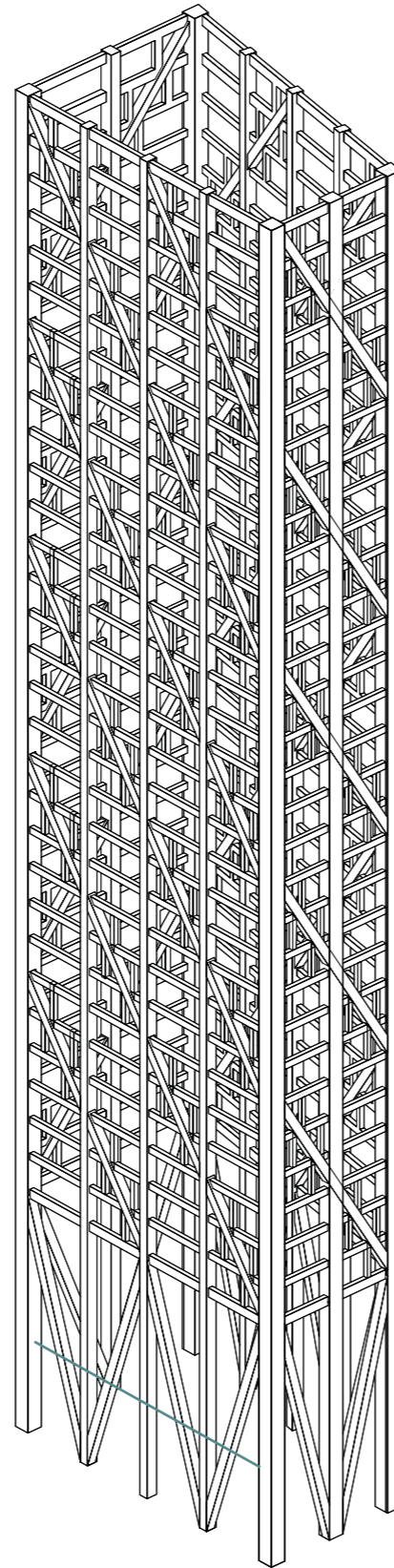


Triangle for Lateral load

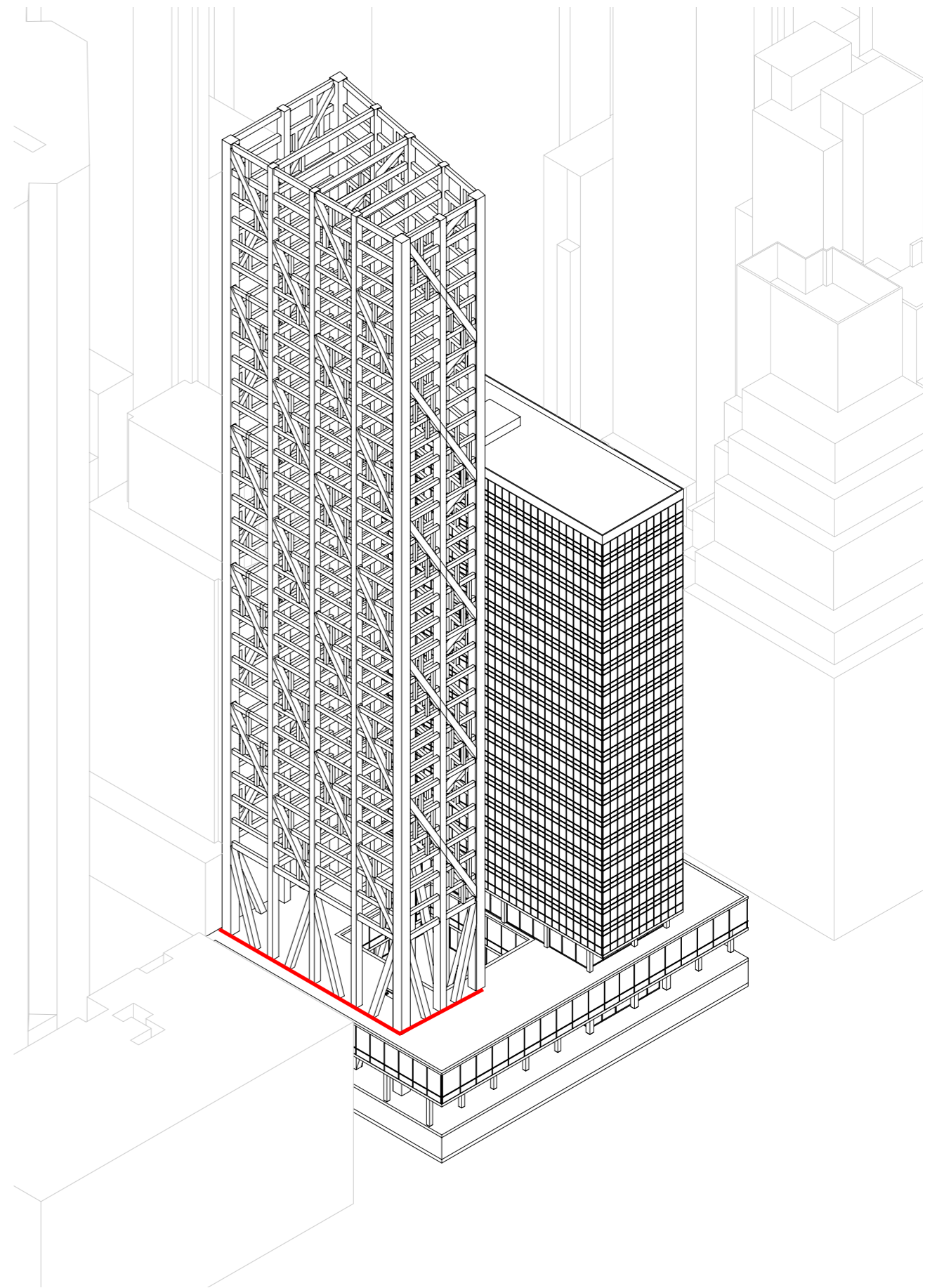
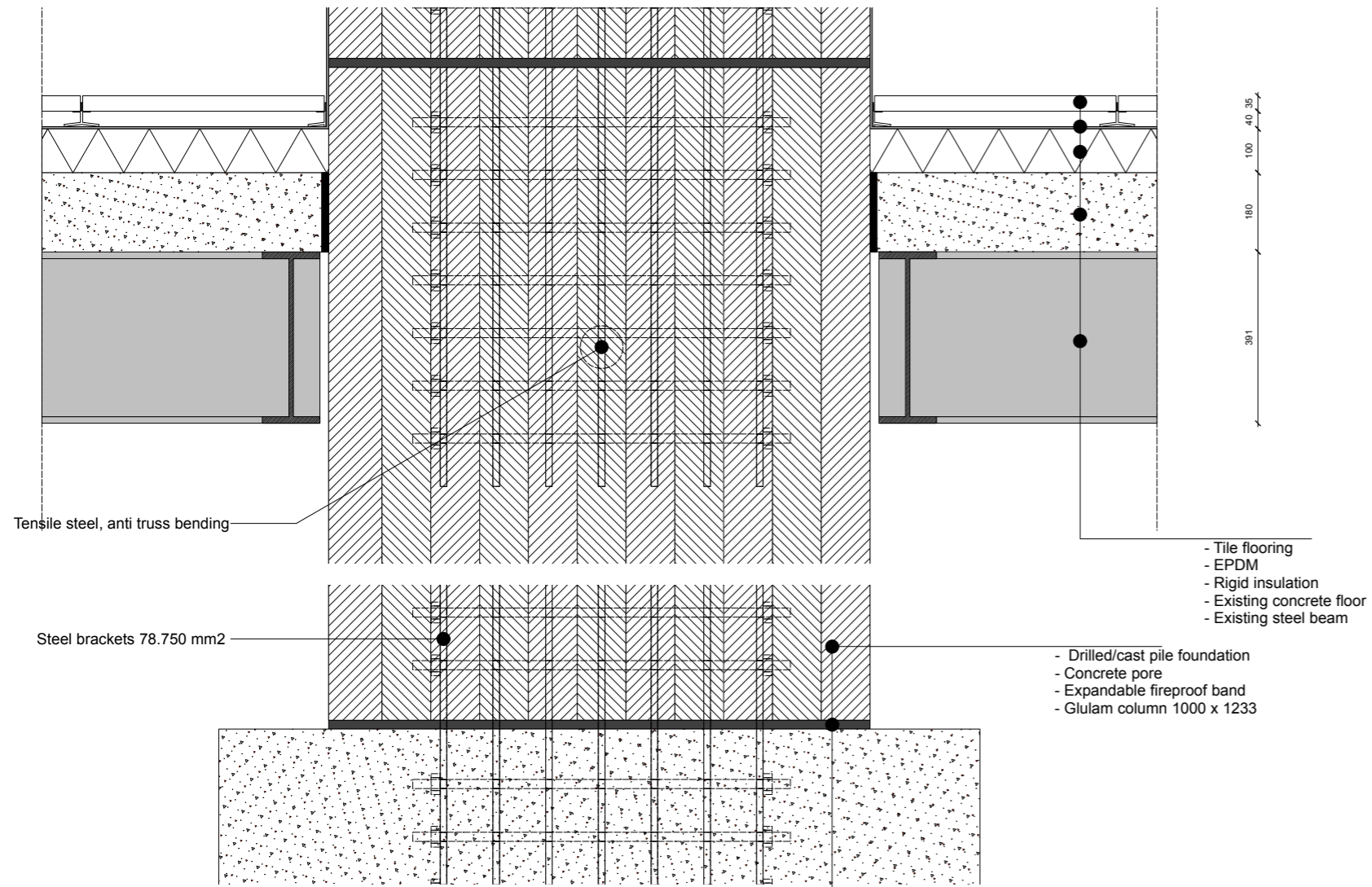


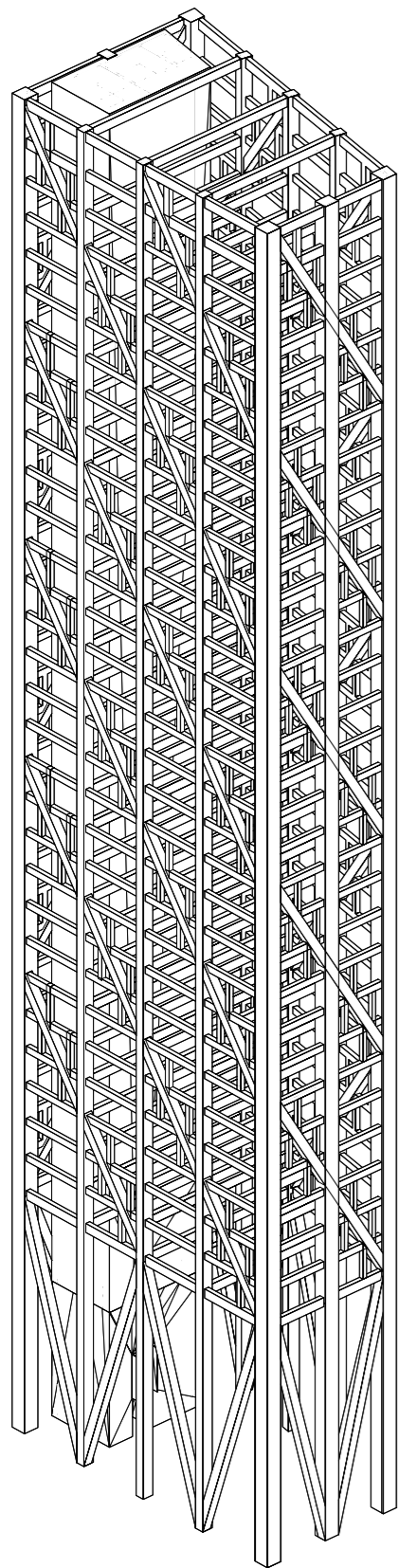
Triangle for Lateral load

Glulam exoskelet

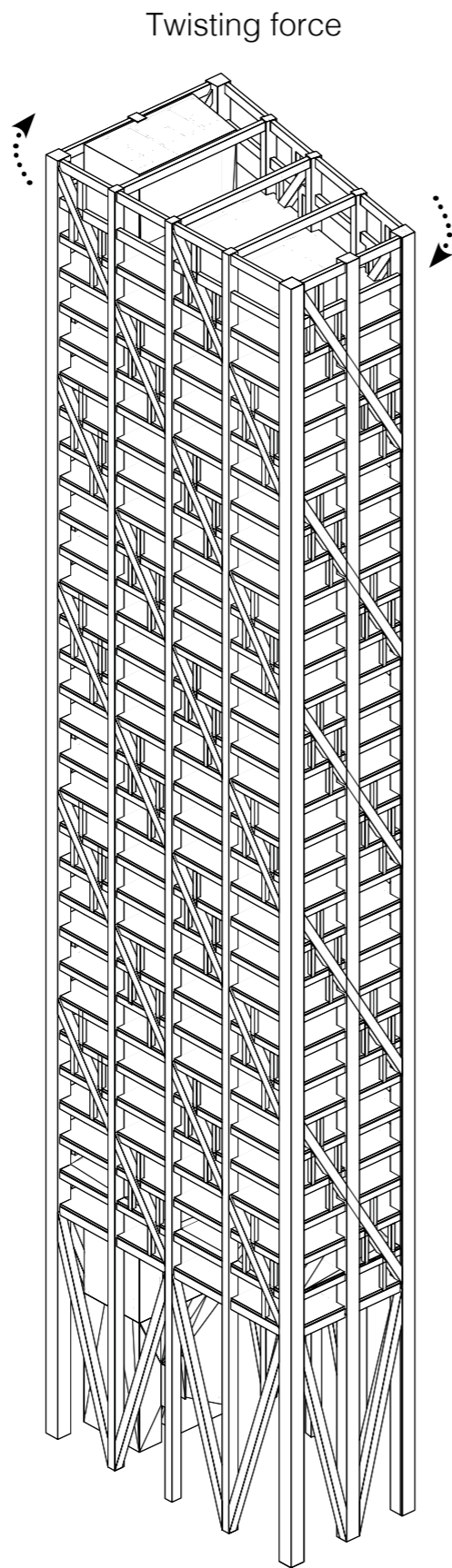


Bending support



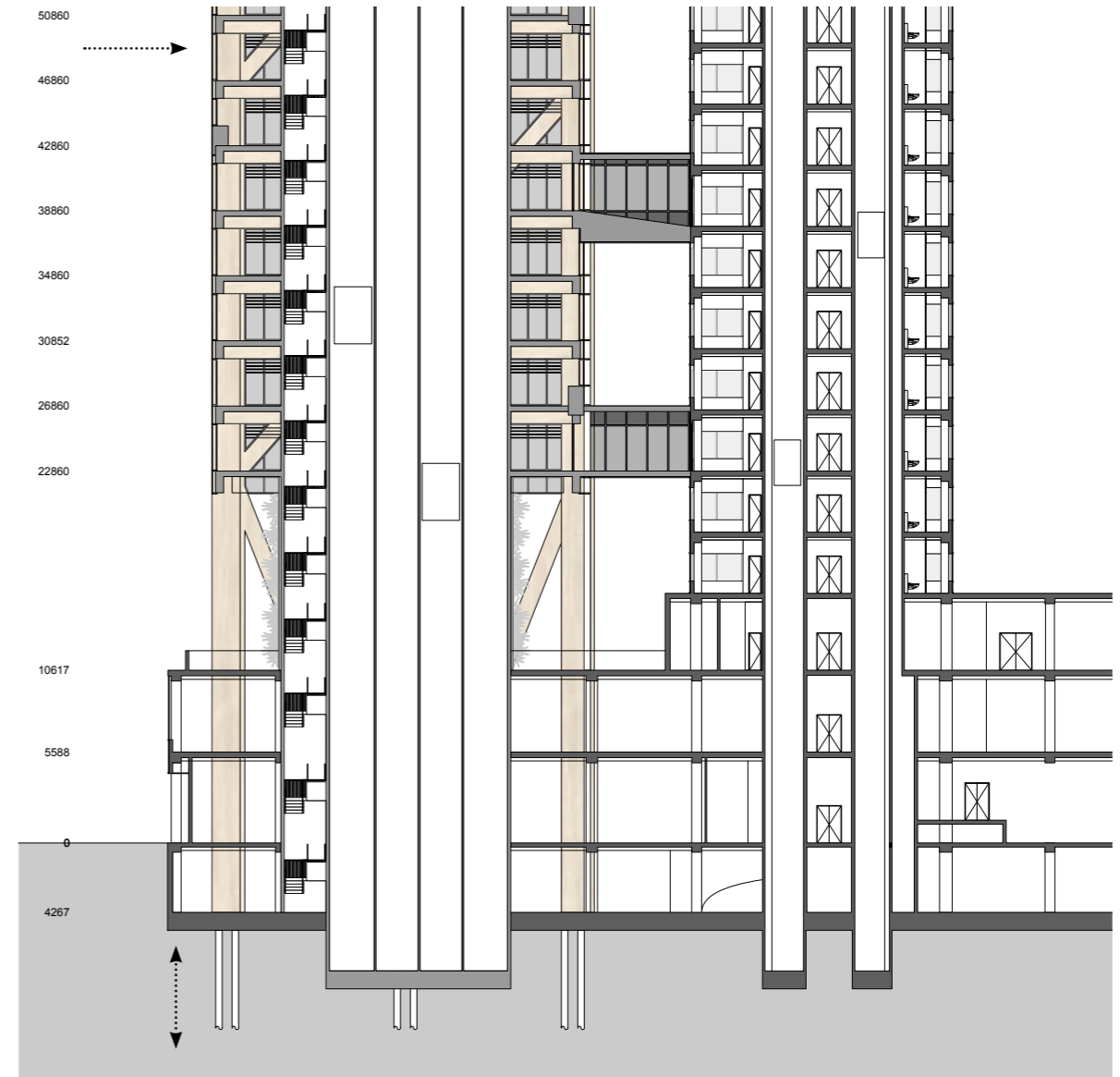


CLT core



Clt flooring against twisting

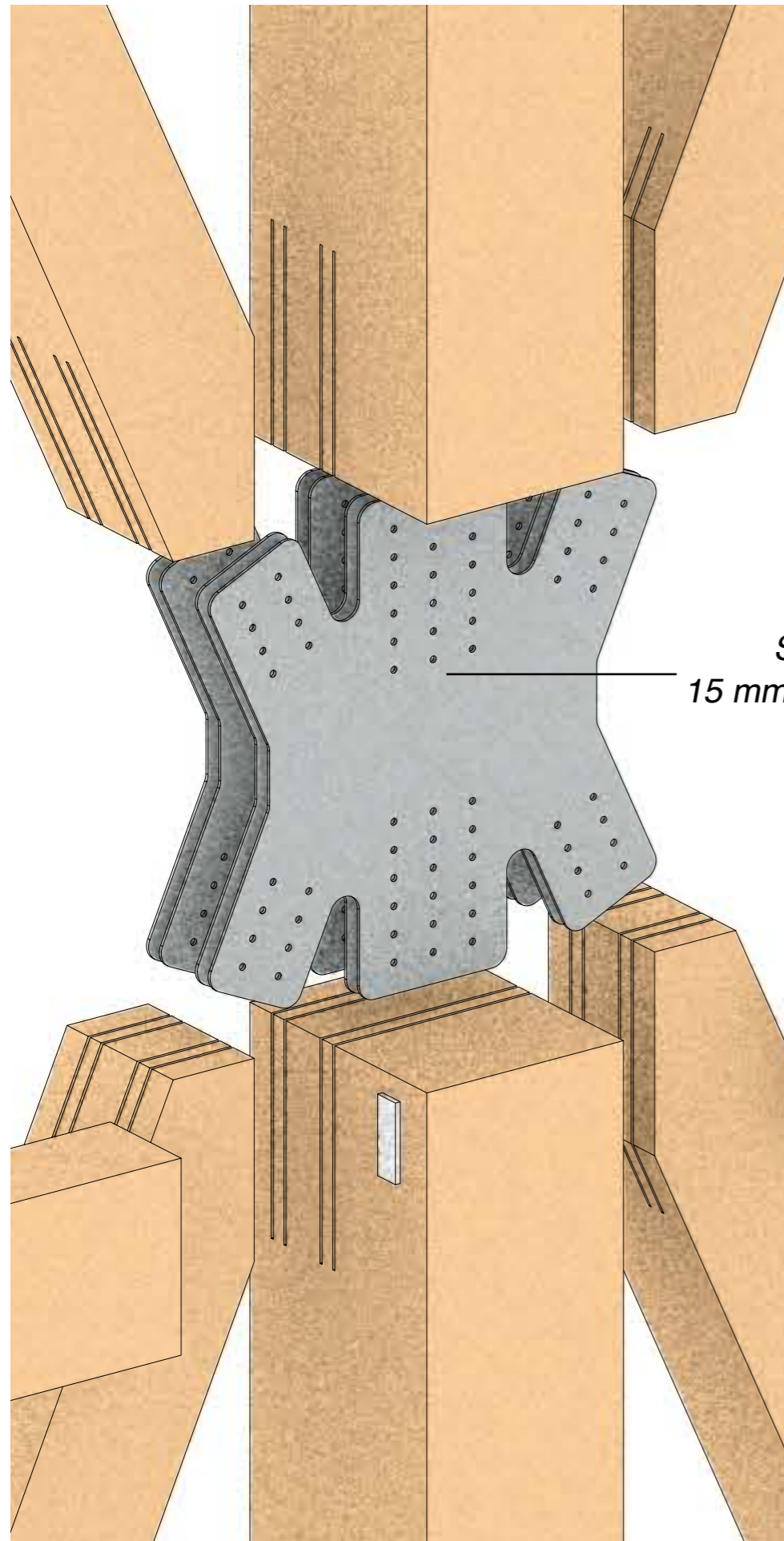
Horizontal force



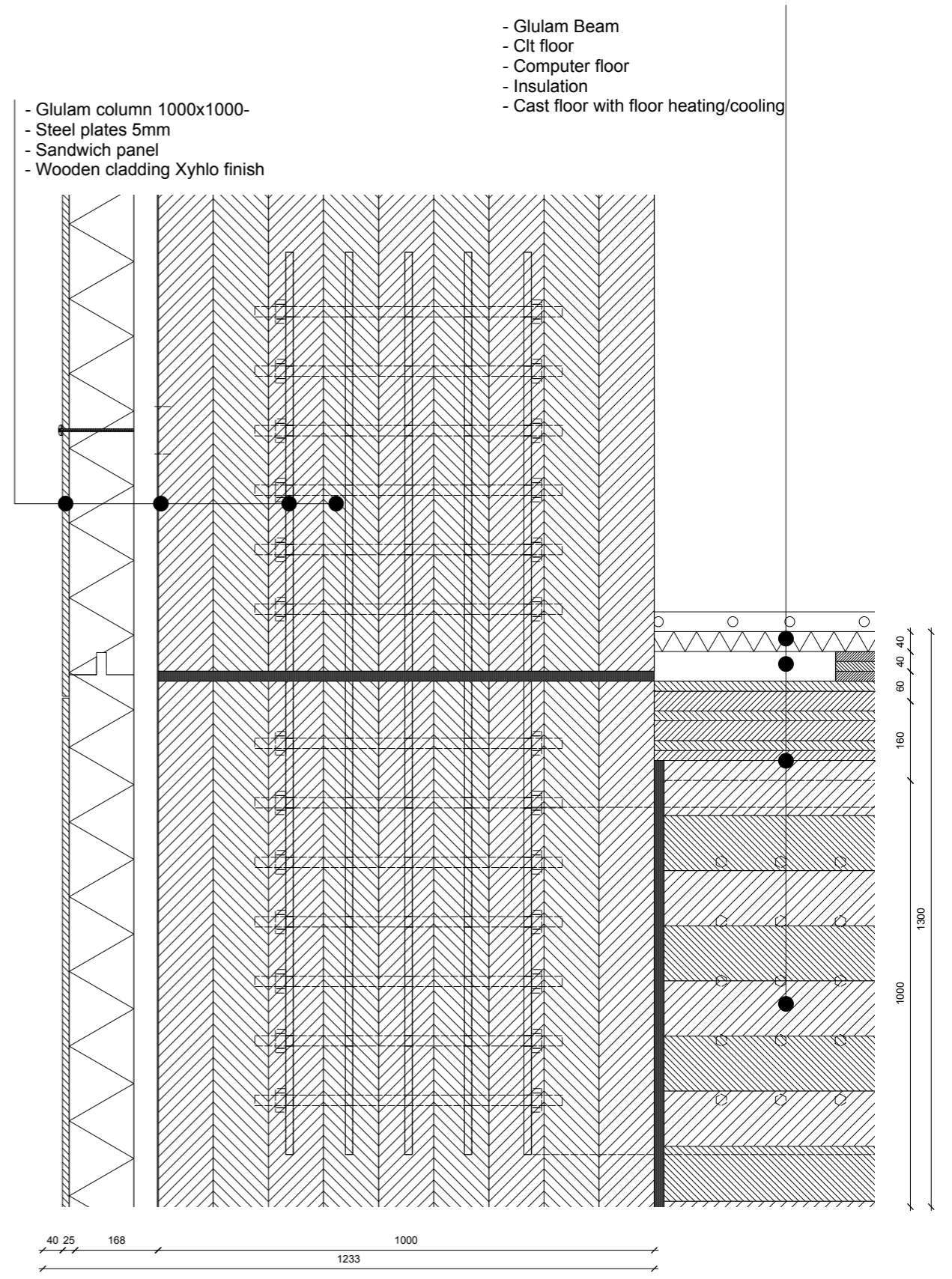
Poured foundation piles under-
neath new tower.

Gravitational and tensile stress

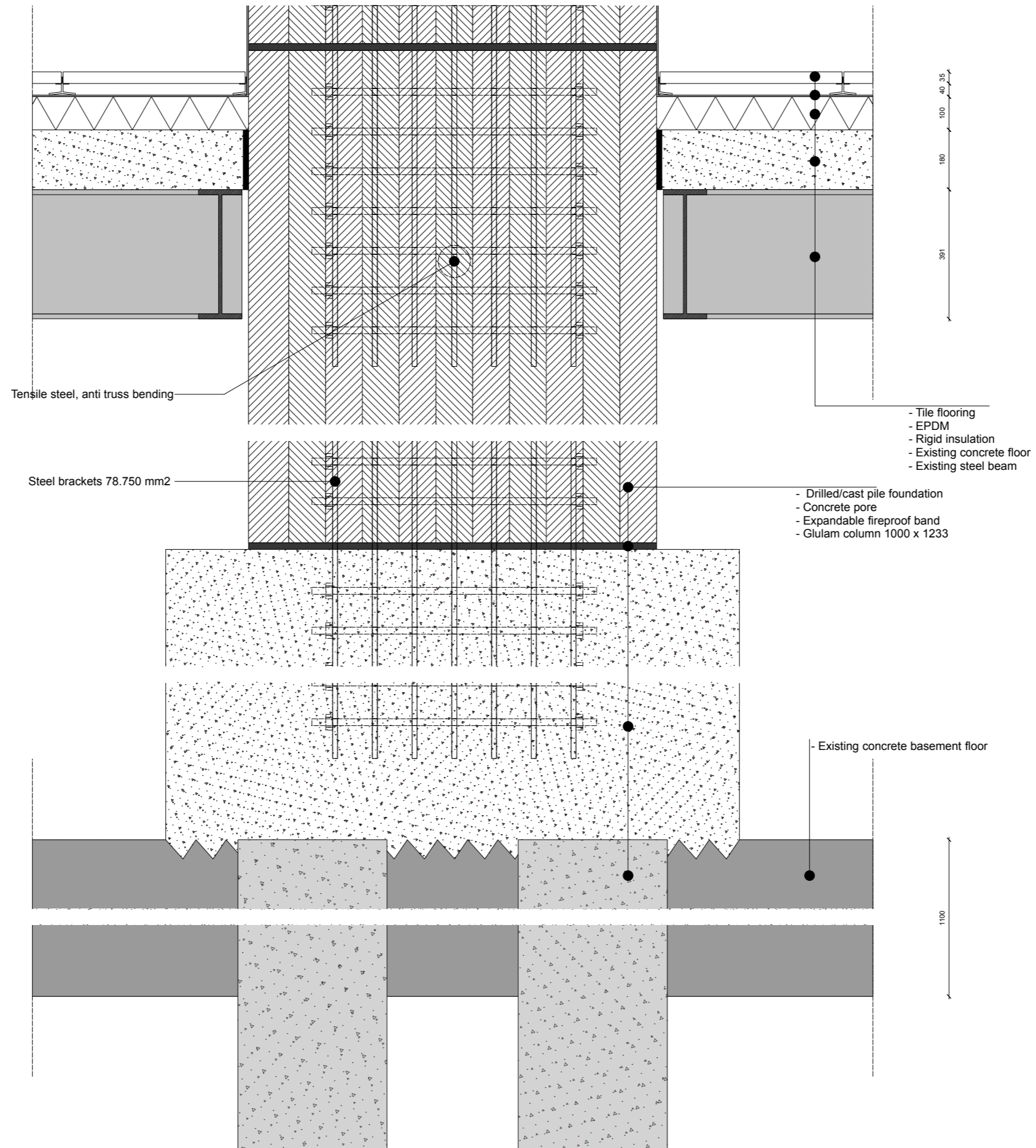
Transferring forces



Steel plates
15 mm thick x 750 wide



Connecting to the existing



Durability as a precedent



Intervention Concept Checkt

New Volume with Leas-able office space (enhance profits, prevent becoming commodity space)

Utilize FAR bonuses (respecting well known volume lever house)

Respect Landmark characteristics

Integrate changing work labour force

Create exchange between old and new

Integrated durability within new volume

Project environmental intervention to surroundings

Thank you!

