LIVING WITH DATA

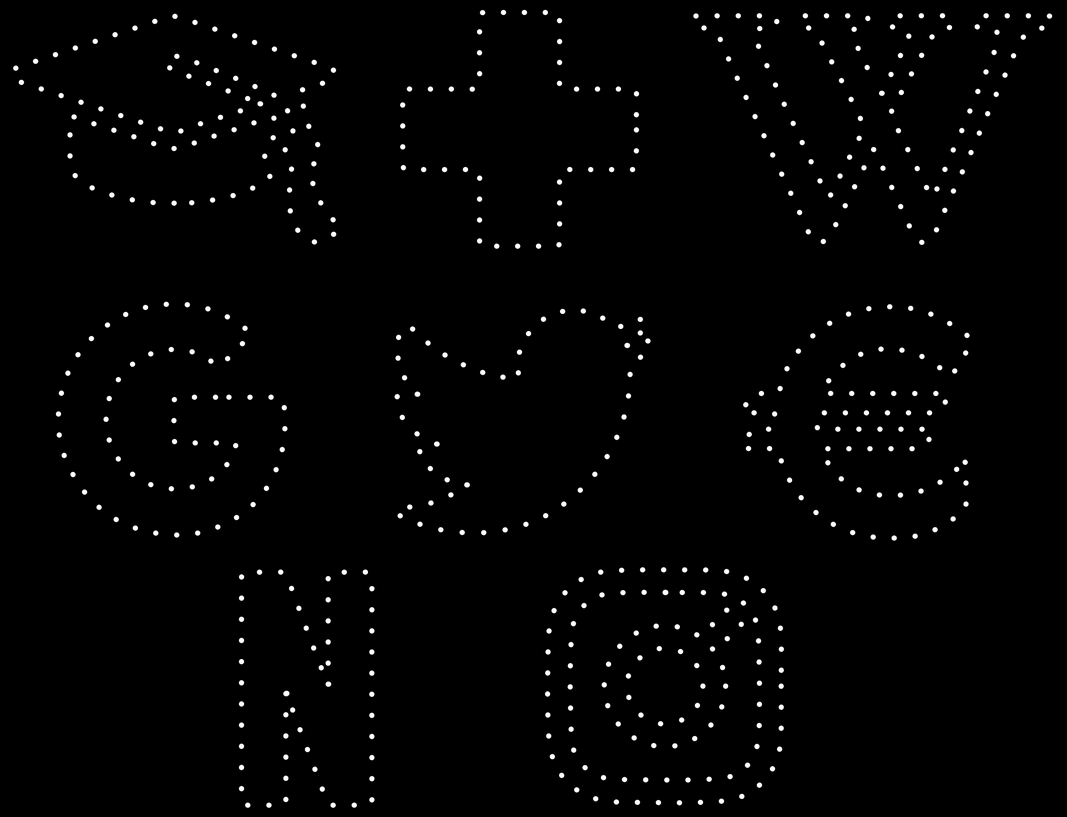
P5 Presentation 07/11/2023

Architectural Engineering (aE) graduation studio

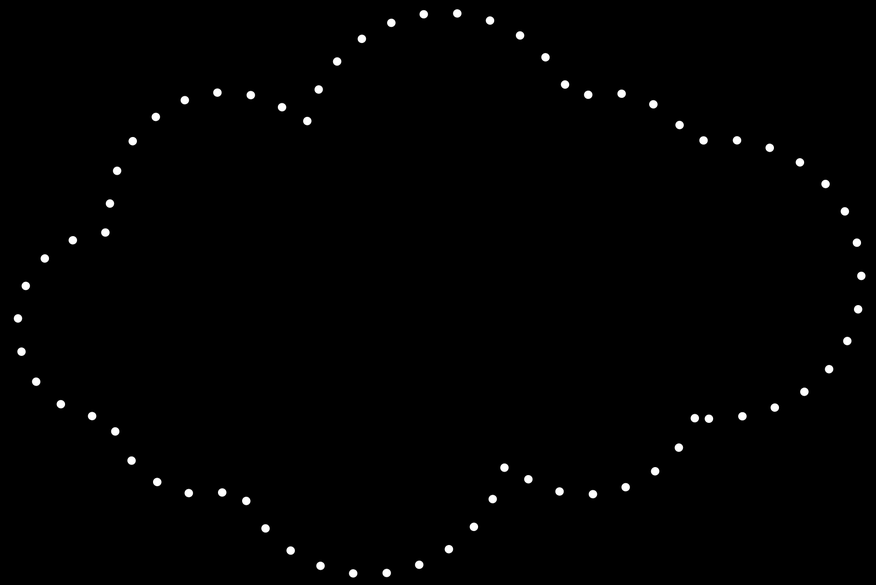
Student:	Yannick Bakker
Research Tutor:	Jos de Krieger
Design Tutor:	Roel van de Pas
Building Technology Tutor:	Ger Warries
Delegate:	Marco Lub

THE INTERNET HAS BECOME AN ESSENTIAL PART OF OUR SOCIETY.

WE USE IT TO IMPROVE OUR LIVES, FOR ENTERTAINMENT OR FOR WORK.



LIVING WITH DATA



ALL OF OUR DATA AND KNOWLEDGE, STORED AND PROCESSED HIGH IN THE CLOUD.

LIVING WITH DATA

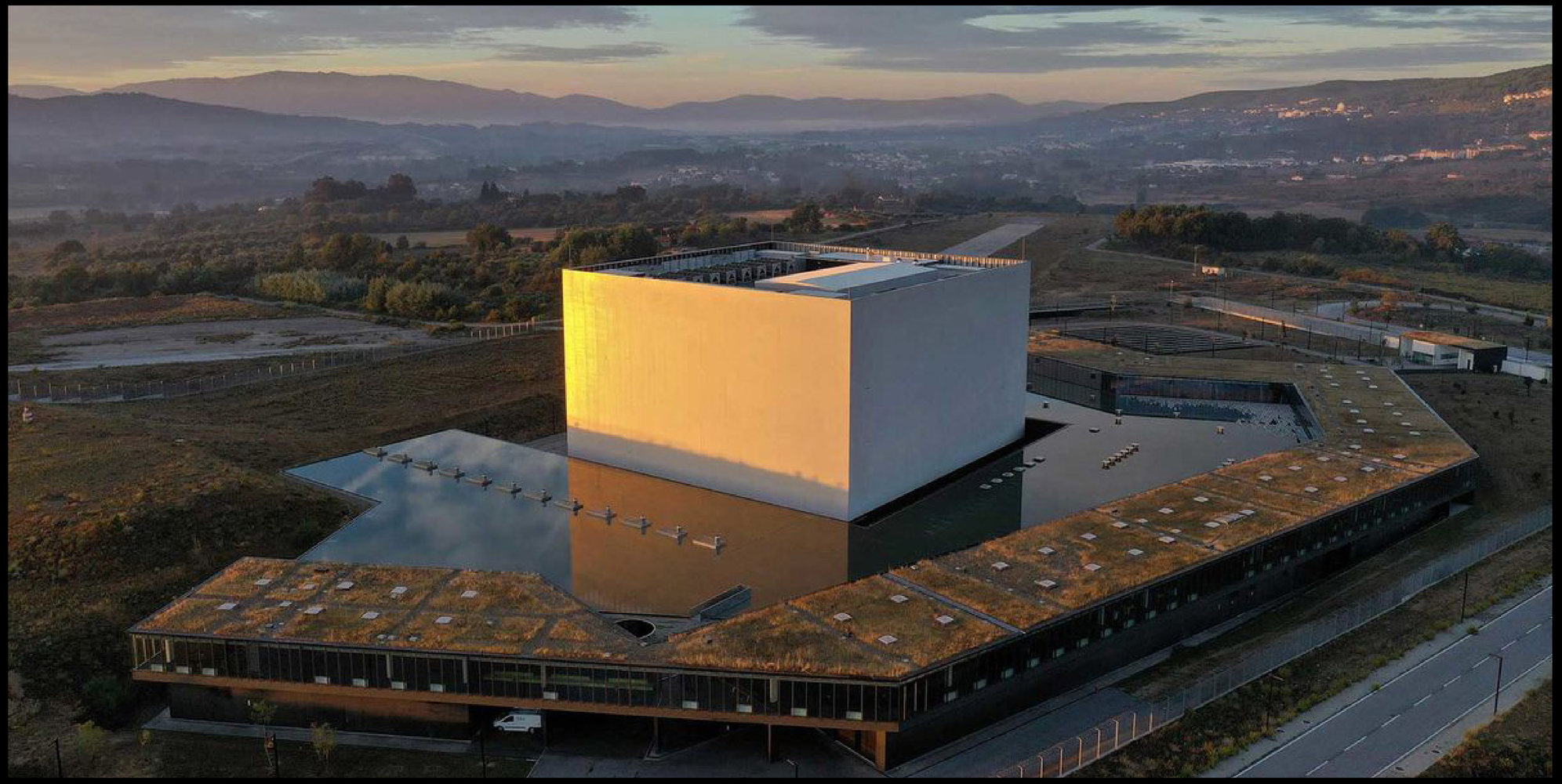
IN REALITY, THIS CLOUD IS BOUND TO THE SURFACE OF THE EARTH AND NOT THE ATMOSPHERE.

GOOGLE DATA CENTER @ EEMSHAVEN, THE NETHERLANDS



LIVING
WITH
DATA

ALTICE DATA CENTER @ COVILHÃ, PORTUGAL



CARRILHO DA GRAÇA

LIVING WITH DATA

EQUINIX AM3/AM4 @ AMSTERDAM, THE NETHERLANDS



BENTHEM CROUWEL

LIVING WITH DATA

VERIZON 375 STREET @ NEW YORK, USA

ROSE, BEATON & ROSE (1975)
UNKNOWN (RENOVATION 2016)

COMPETITION ENTRY @ SHENZHEN, CHINA

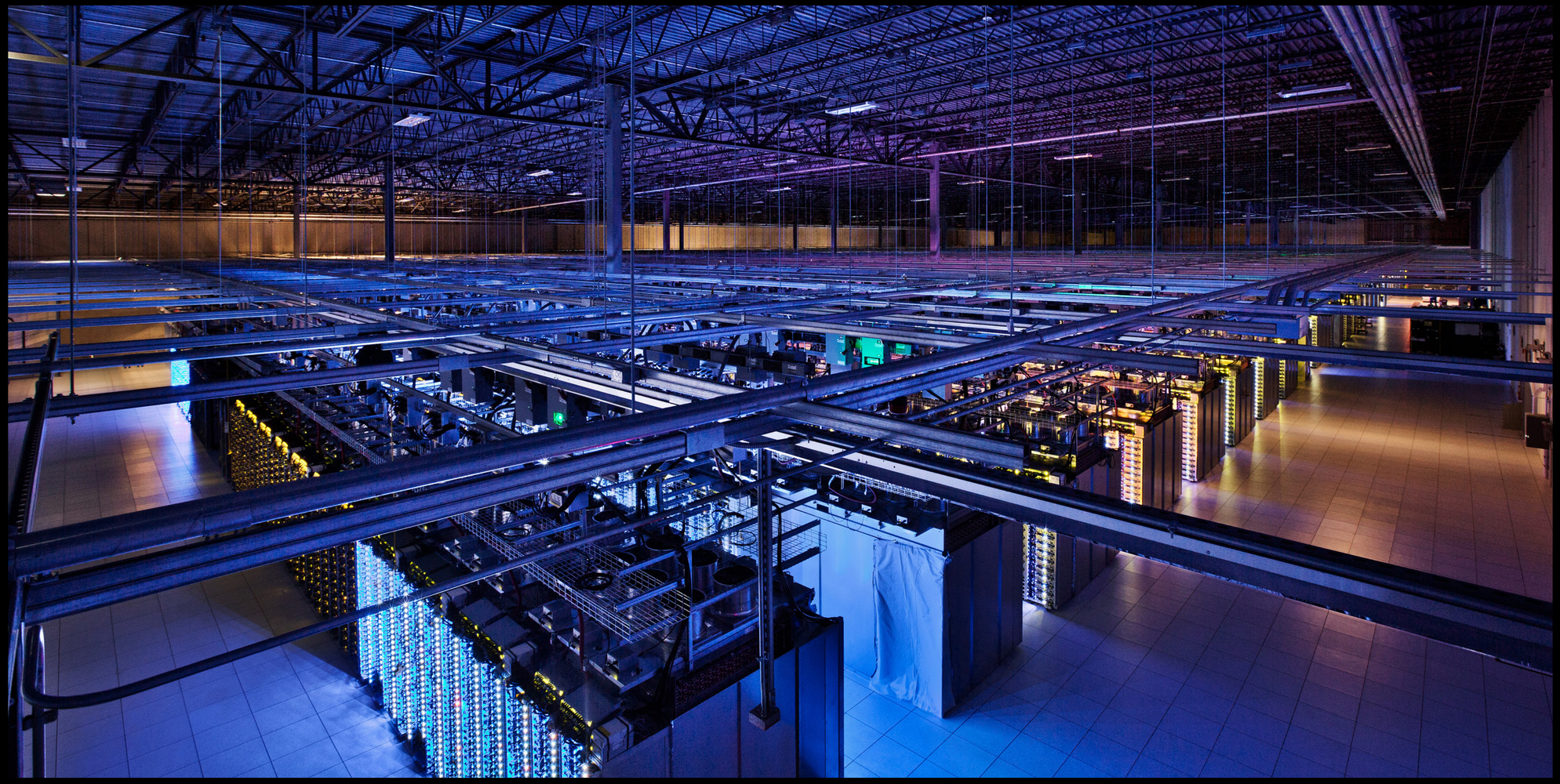
MECANOO

LIVING
WITH
DATA

DATA CENTERS ARE DESIGNED FOR MACHINES, NOT HUMANS. RARELY DOES A PERSON STEP INSIDE OF THESE FACILITIES.

LIVING
WITH
DATA

GOOGLE DATA CENTER @ COUNCIL BLUFFS, USA



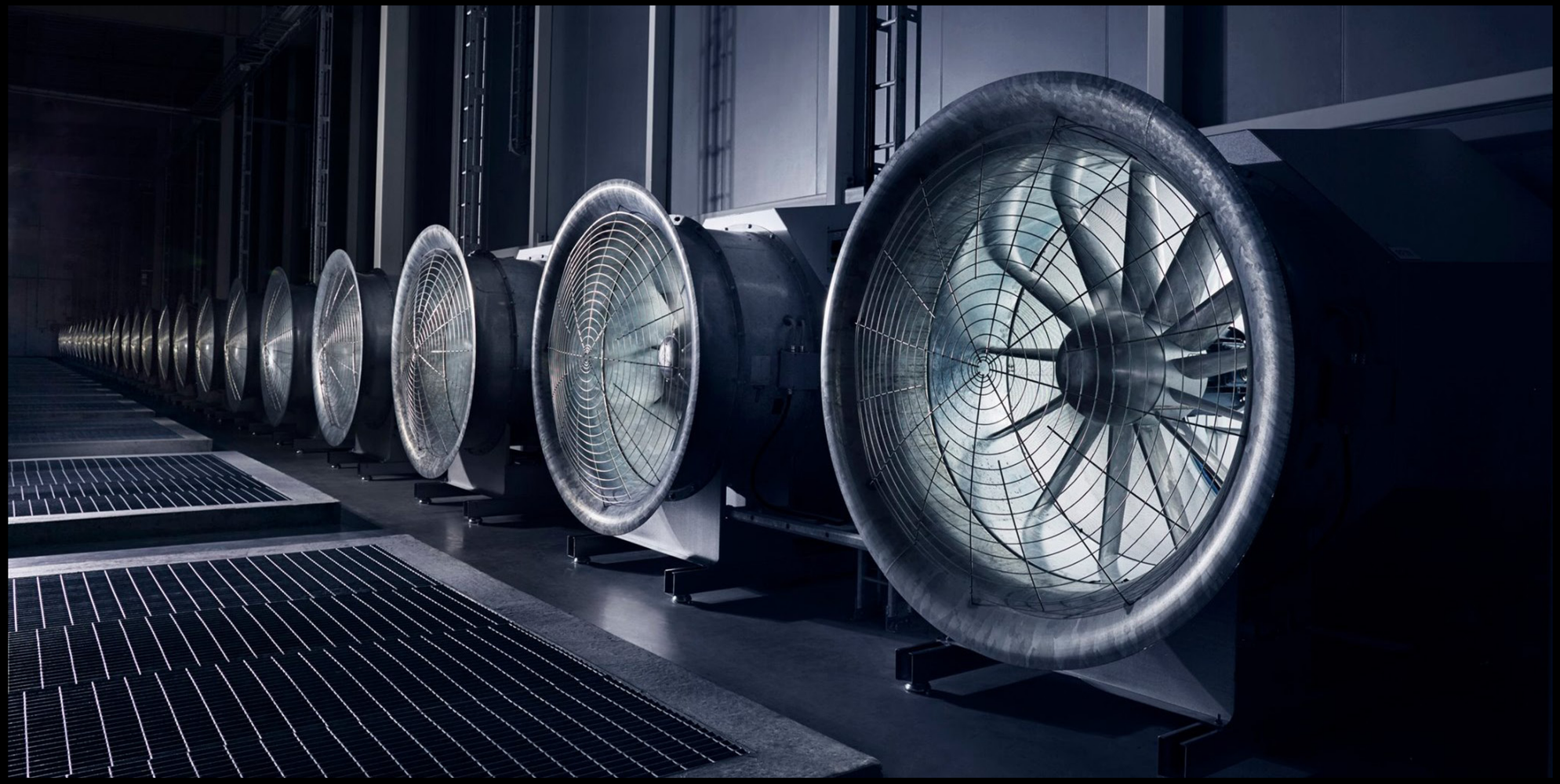
LIVING
WITH
DATA

META DATA CENTER @ LULEÅ, SWEDEN



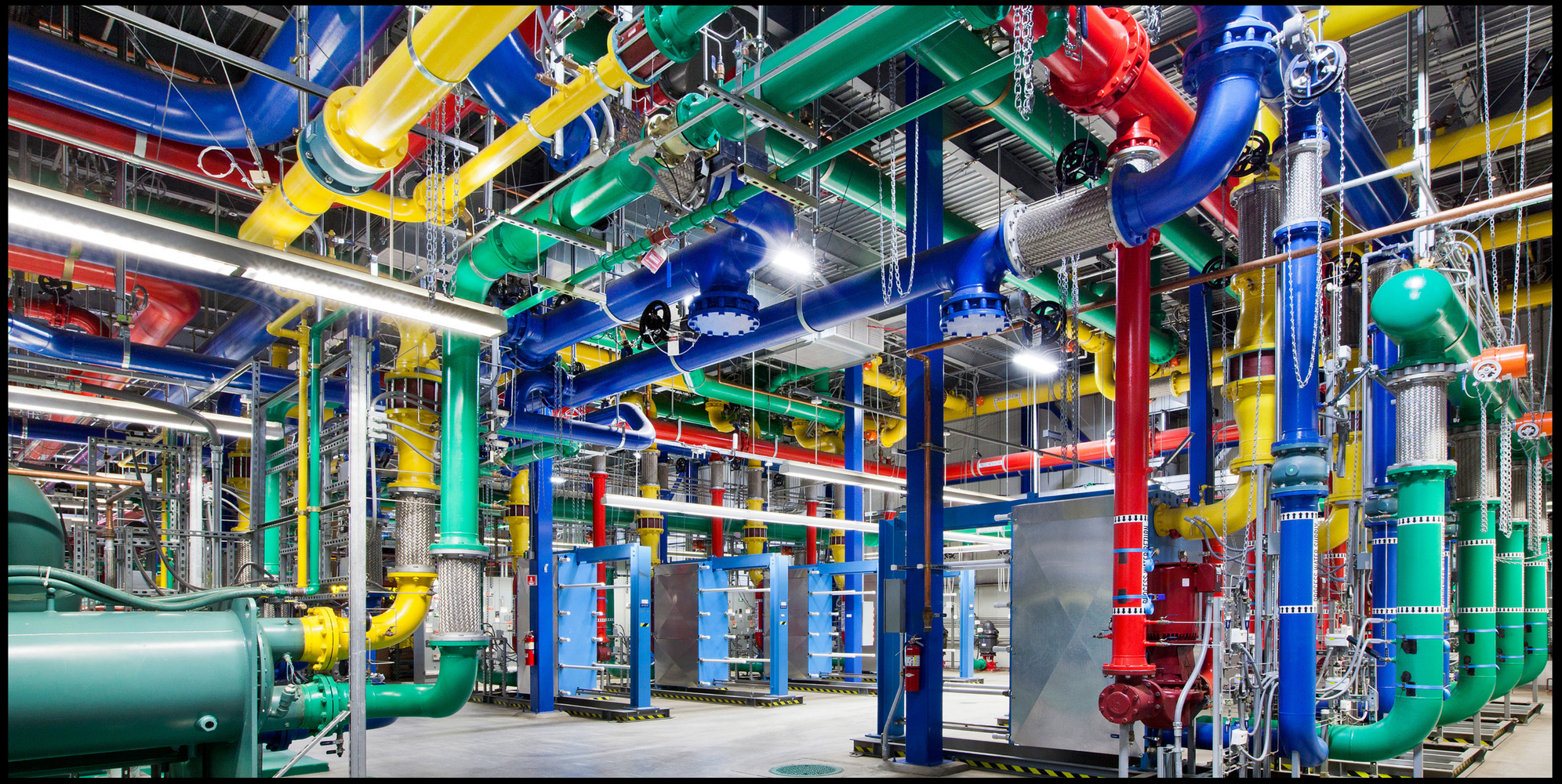
LIVING
WITH
DATA

META DATA CENTER @ LULEÅ, SWEDEN



LIVING
WITH
DATA

GOOGLE DATA CENTER @ THE DALLES, USA



LIVING
WITH
DATA

DATA CENTERS CONSUME VAST AMOUNTS OF RESOURCES IN PROCESSES WHICH ARE NOT DESIGNED WITH REUSE IN MIND.

LIVING
WITH
DATA

DUTCH DATA CENTER ENERGY USE

FROM 1.6 BILLION KWH IN 2017

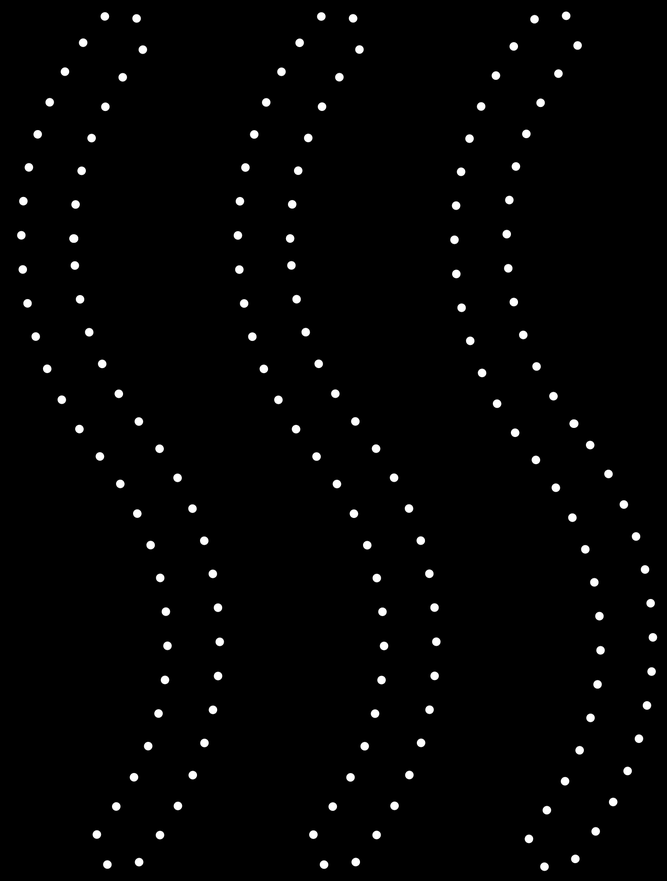
TO 3.2 BILLION KWH IN 2020

LIVING WITH DATA

THAT'S 2.8% OF THE TOTAL ENERGY CONSUMPTION OF THE NETHERLANDS.

AND EQUALS TO THE ENERGY CONSUMPTION OF 1.3 MILLION HOUSEHOLDS.

LIVING WITH DATA



MOST ELECTRICITY CONSUMED BY DATA CENTERS IS TURNED INTO HEAT.

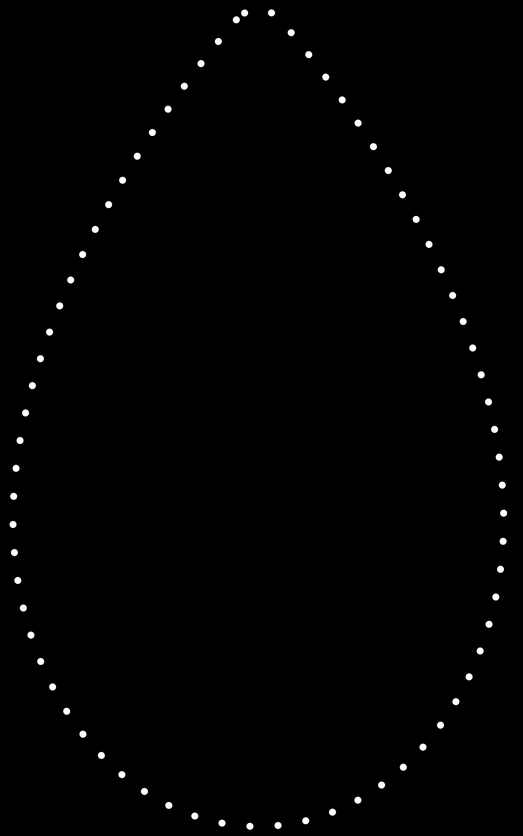
LIVING WITH DATA

ALMOST ALL OF THIS HEAT GOES TO **WASTE.**

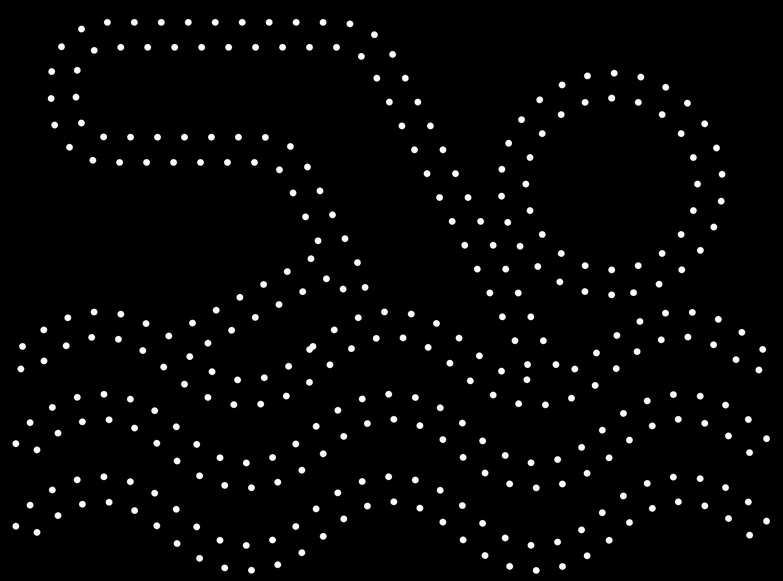
IF DUTCH DATA CENTERS WOULD MAKE THEIR WASTE HEAT ACCESIBLE WE COULD HEAT **1 MILLION HOMES.**

LIVING WITH DATA

DATA CENTERS USE A LOT OF WATER FOR BOTH COOLING AND HUMIDIFICATION.



LIVING WITH DATA



IN MOST CASES, THE QUALITY OF THIS WATER IS THAT OF **DRINKING WATER.**

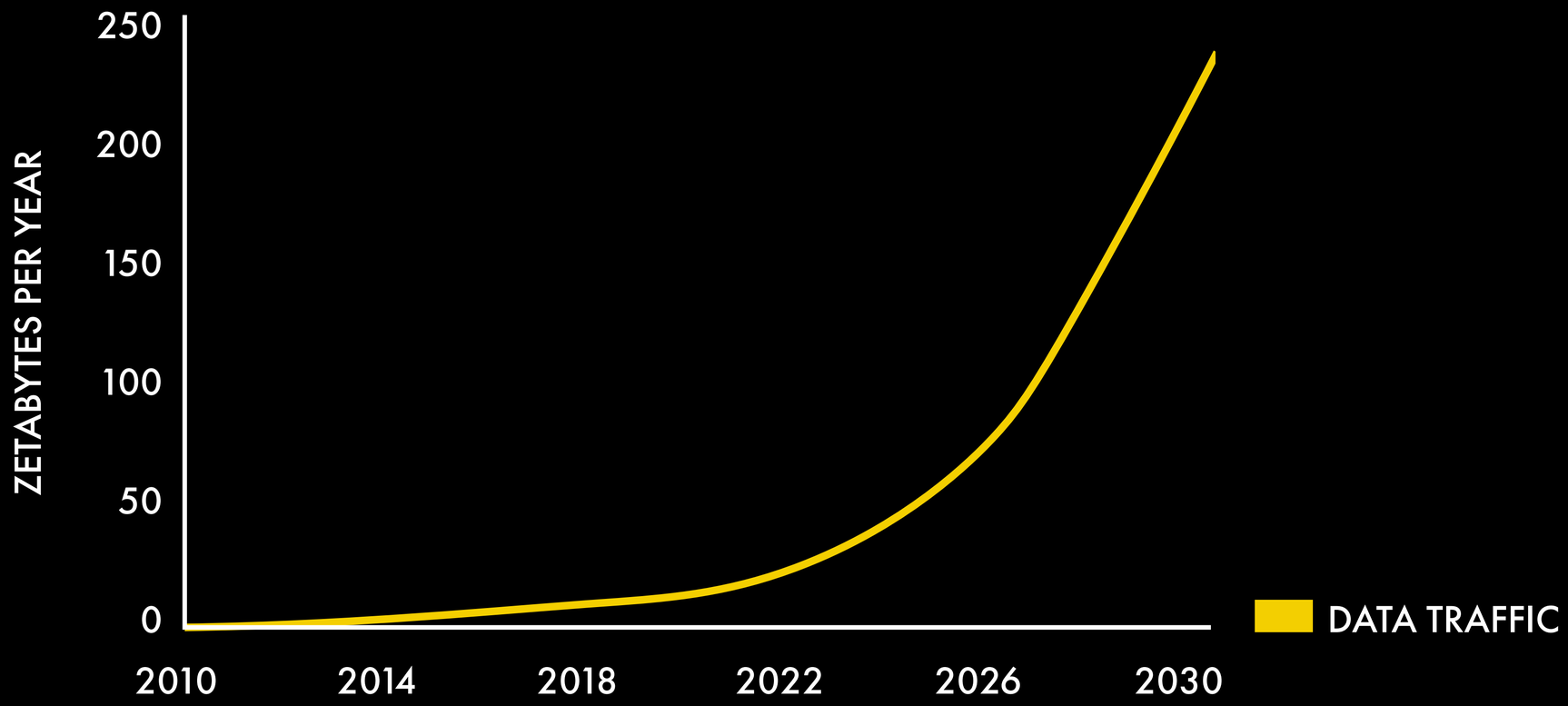
DUTCH DATA CENTERS CONSUME **1.000.000.000** LITERS OF WATER ANUALLY. THAT'S 400 OLYMPIC-SIZE SWIMMING POOLS.

LIVING WITH DATA

WORLDWIDE DATA TRAFFIC IS EXPECTED TO INCREASE BY MORE THAN 20 TIMES IN 2030 COMPARED TO 2020.

LIVING WITH DATA

WORLDWIDE DATA TRAFFIC



1 ZETABYTE = 1 TRILLION (1.000.000.000.000) GIGABYTES

LIVING WITH DATA

GROWTH OF DATA TRAFFIC WILL BE FASTER THAN ADVANCEMENTS IN DATA CENTER EFFICIENCY.

THERFORE IT IS UNDENIABLE THAT MORE DATA CENTERS WILL BE NEEDED TO RESPOND TO OUR FUTURE NEEDS AND DEMANDS.

LIVING WITH DATA

CAN WE CREATE A NEW BUILDING TYPOLOGY FOR DATA CENTERS, ONE THAT INTEGRATES WITH THE URBAN ENVIRONMENT?

LIVING
WITH
DATA

WHAT OPPORTUNITIES AND CHALLENGES AWAIT US IF WE EXPLORE A HIGH-DENSITY URBAN AREA AS THE LOCATION FOR A MIXED-USE DATA CENTER BUILDING?

LIVING WITH DATA



- 1. Amsterdam (605 MW)
- 2. London (559 MW)
- 3. Frankfurt (315 MW)
- 4. Paris (183 MW)

Based on data from 2019

1 MW is comparable to a 1000 houshold capacity

AMSTERDAM IS A LEADING DATA CENTER HUB IN EUROPE.

LIVING WITH DATA



Sluisbuurt

Data center areas:

Science Park

Haven/Haven-stad

Amstel III West

Schinkelkwartier

DATA CENTERS ARE UNCOMMON IN CITY CENTERS, THIS IS ALSO TRUE FOR AMSTERDAM.

LIVING WITH DATA

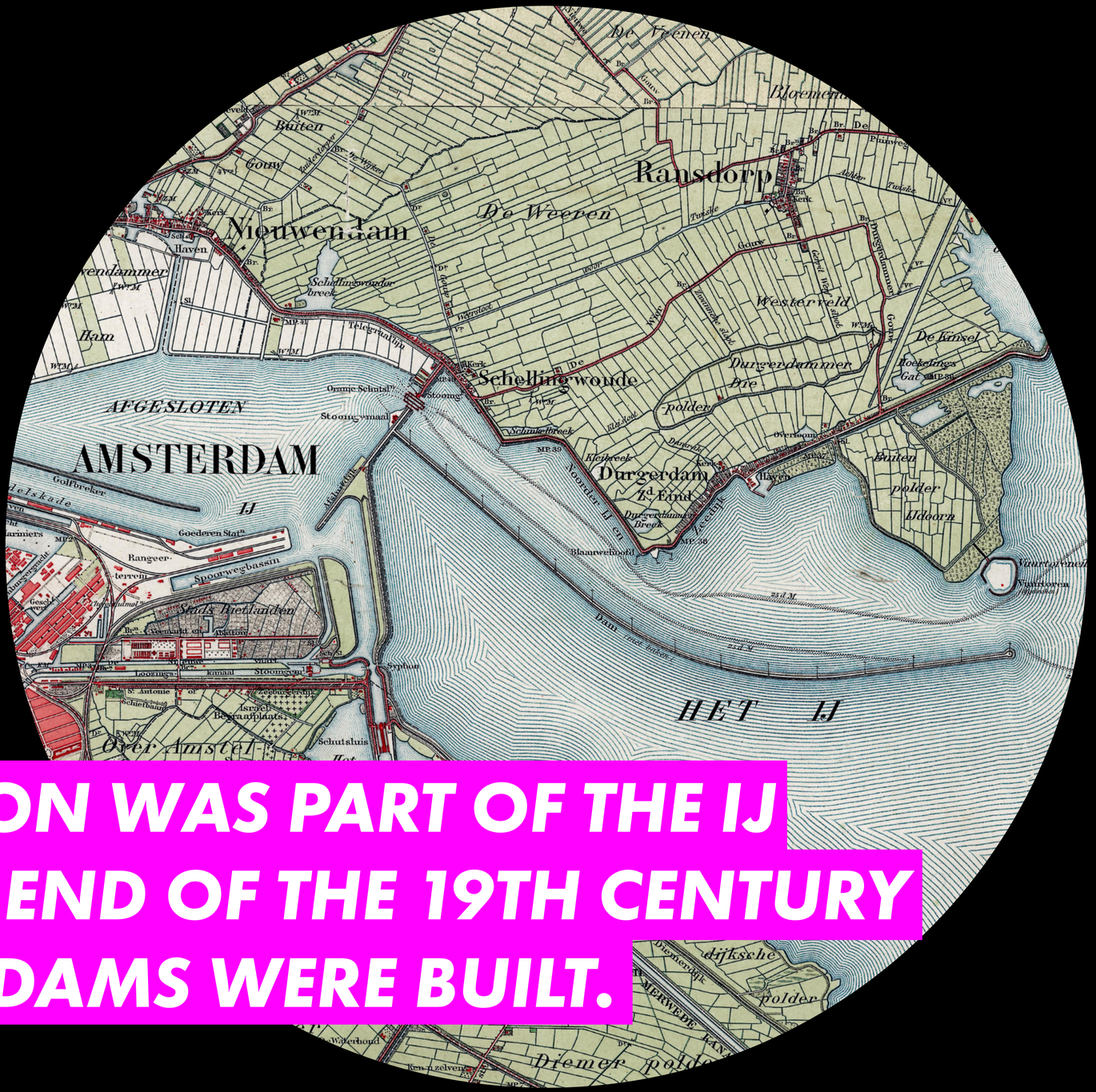
A LARGE ADDITION TO THE HOUSING STOCK WILL BE REALIZED IN THE FUTURE SLUISBUURT NEIGHBORHOOD.

LIVING WITH DATA



5.500 HOMES WILL BE REALIZED IN ADDITION TO 100.000 M2 OF MIXED-USE DEVELOPMENT.

LIVING
WITH
DATA



THE LOCATION WAS PART OF THE IJ BAY. AT THE END OF THE 19TH CENTURY DIKES AND DAMS WERE BUILT.

LIVING WITH DATA

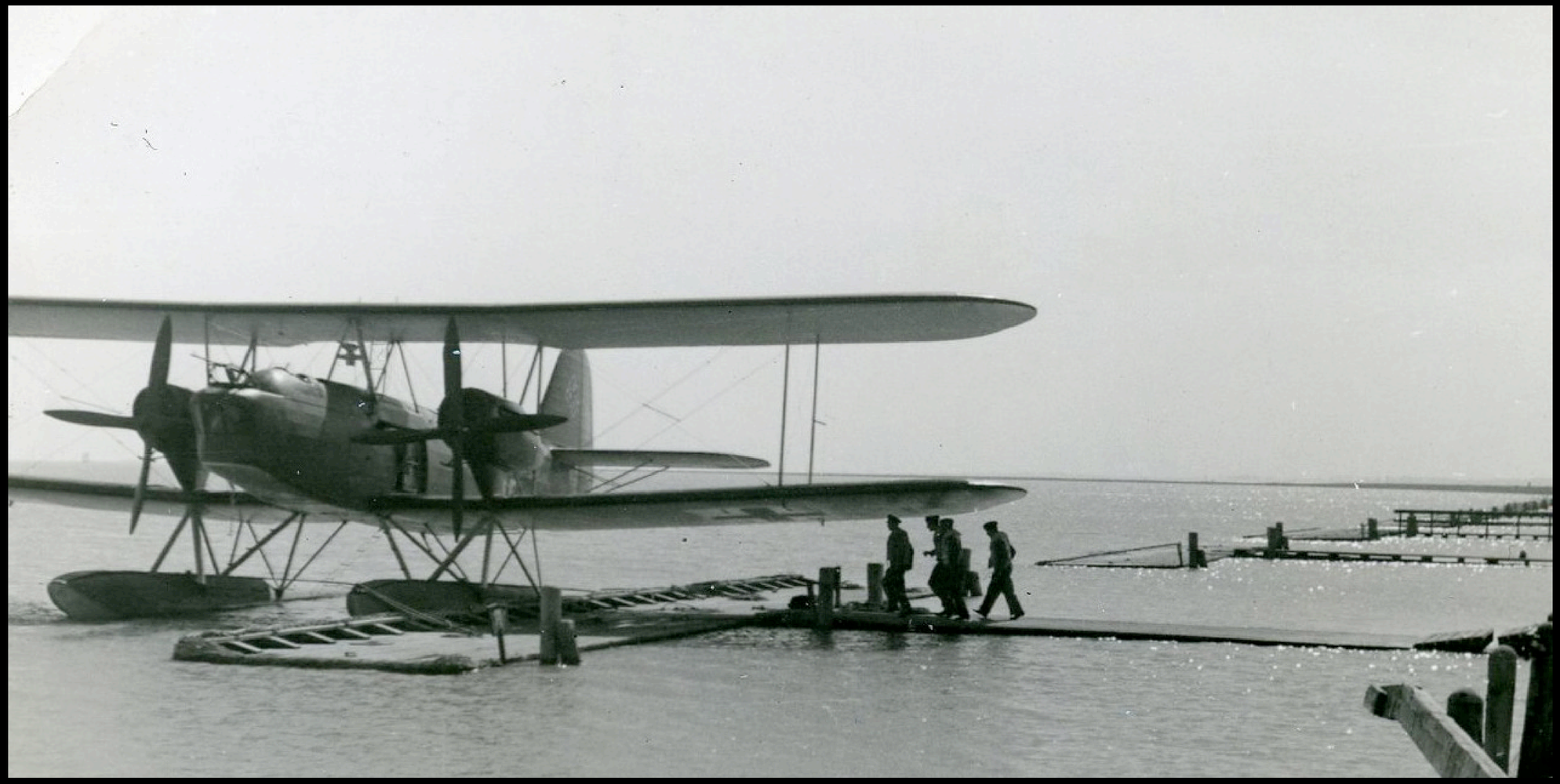


A FEW YEARS LATER, ZEEBURG ISLAND WAS CREATED AS A DEPOT FOR DREDGED MATERIAL.

LIVING WITH DATA

IT BECAME A MILITARY TRAINING AREA IN THE 20TH CENTURY. THE GERMANS TOOK CONTROL OF THE ISLAND IN WW2.

LUFTWAFFE HE-59 AT ZEEBURG ISLAND, 1940



LIVING
WITH
DATA

AFTER THE WAR IT BECAME A MOSTLY INDUSTRIAL AREA ON THE FRINGES OF THE CITY.

PART OF THE ISLAND HAS ALREADY BEEN REDEVELOPPED. SLUISBUURT IS NEXT.

SLUISBUURT SCALE MODEL



BURTON HAMFELT

LIVING WITH DATA

SLUISBUURT ON 24-01-2023



LIVING
WITH
DATA

DATA CENTERS ARE INTROVERTED AND PRIVATE. BUILDINGS IN A CITY SHOULD ENRICH THE URBAN FABRIC AND BE FOR THE PEOPLE.

HOW TO SOLVE THIS CONFLICT?

LIVING
WITH
DATA

COMBINE IT WITH

OPEN & PUBLIC PLINTH

ELEVATED DATA CENTER

RESIDENTIAL TOWER

VERTICAL GREENHOUSE

HOW CAN DATA CENTER FLOWS BENEFIT THESE DIVERSE BUILDING PROGRAMS AND VICE VERSA?

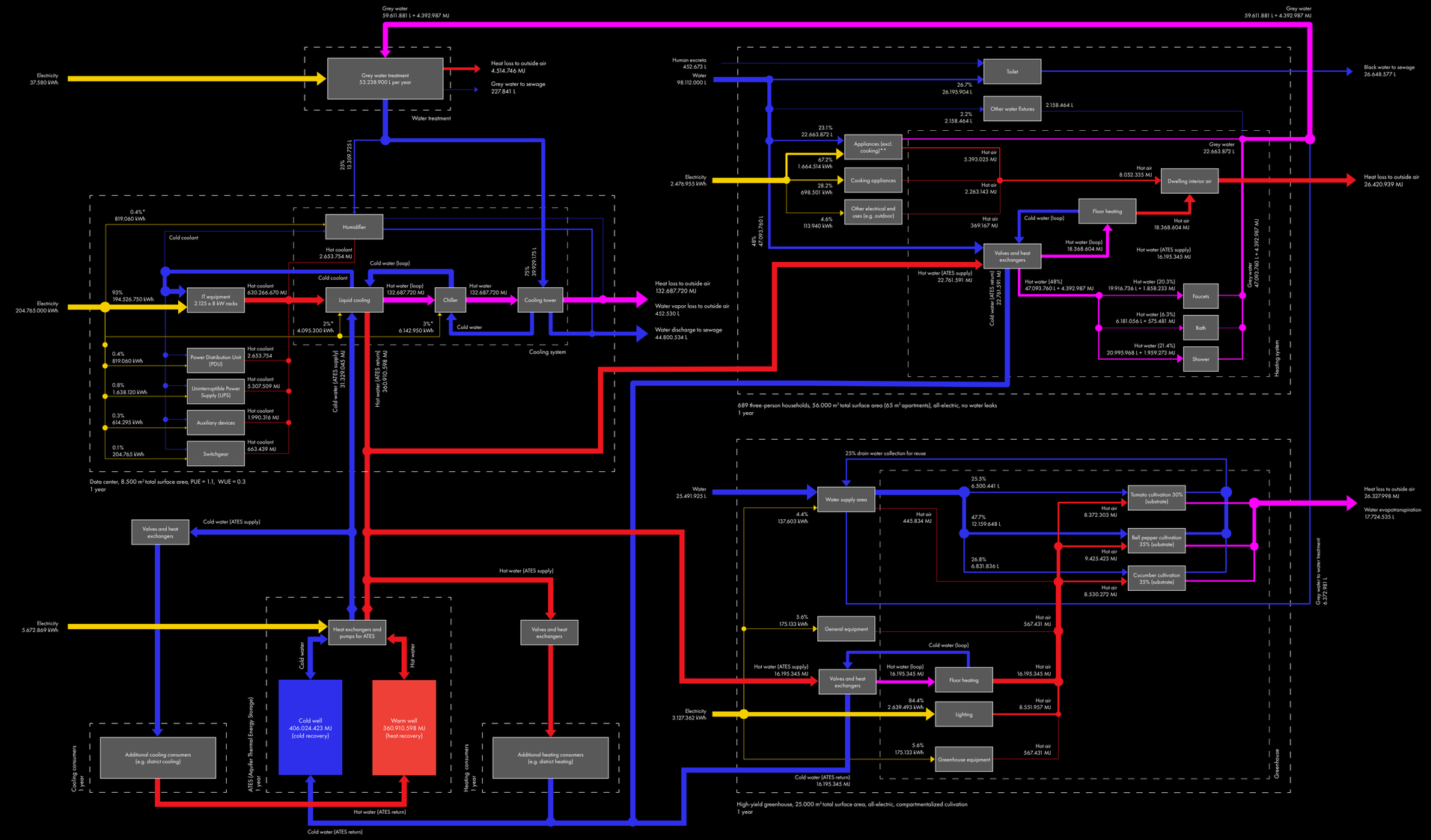
LIVING
WITH
DATA

ACHIEVING SYNERGY

10.000 M2 DATA CENTER CAN PROVIDE ENOUGH HEAT FOR HEATING OVER 1.200.000 M2 OF RESIDENTIAL PROGRAM OR 700.000 M2 GREENHOUSE PROGRAM PER YEAR.

75.000 M2 OF RESIDENTIAL PROGRAM OR 245.000 M2 OF GREENHOUSE PROGRAM PRODUCES ENOUGH GREY WATER TO SUPPLY 10.000 M2 DATA CENTER PROGRAM WITH WATER FOR A YEAR.

LIVING
WITH
DATA



MATERIAL FLOW ANALYSIS DIAGRAM FOR POSSIBLE STRATEGY CONSISTING OF 8.500 M2 DATA CENTER PROGRAM, 56.000 M2 RESIDENTIAL PROGRAM AND 25.000 M2 GREENHOUSE PROGRAM. OWN WORK.

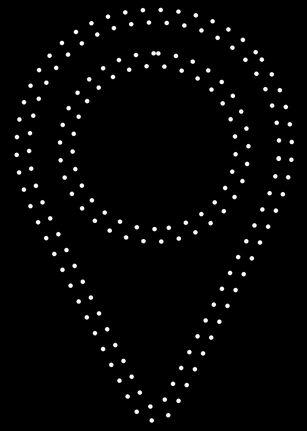
LIVING WITH DATA

Data center program			
Base scale factor:	*85%*		*calculates parameters from Appendix A*
Gross floor area:	8.500	m^2	
Number of racks:	2125	racks	
Heat output per year:	663.438.600	MJ	
Cooling demand per year:	36.857.700	MJ	based on Appendix F, 5% of total
Heat recovery factor (liquid cooling):	80%		Zimmermann et al., 2012
Yearly heat supply to ATES:	530.750.880	MJ	
Water usage per year:	53.238.900	L	
Residential program			
Base scale factor:	*560%*		*calculates parameters from Appendix B*
Gross floor area:	56.000	m^2	
Number of apartments:	689	units	
Yearly heat demand:	22.761.591	MJ	
Grey water output per year:	47.093.760	L	based on Appendix G, 48% of total program
Greenhouse program			
Base scale factor:	*250%*		*calculates parameters from Appendix C*
Gross floor area:	25.000	m^2	
Total yearly yield:	1.467.313	kg	30% tomatoes, 35% bell peppers & 35% cucumbers
Total yearly heat demand:	16.195.345	MJ	
Grey water output per year:	6.372.981	L	based on Appendix H, 25% of total
Aquifer Thermal Energy Storage (ATES)			
Yearly heat supply to ATES:	530.750.880	MJ	
ATES heat recovery factor:	80%		Kleyböcker & Bloemendal, 2020
Yearly heat recovery:	424.600.704	MJ	
ATES cold recovery factor:	90%		
Yearly cold recovery:	477.675.792	MJ	Kleyböcker & Bloemendal, 2020
Yearly electricity required for ATES system:	3.264.001	kWh	80% energy savings (Beernink et al., 2019)
of which data center share	*2.047.650*	*kWh*	*based on Appendix F, 5% of total program*
of which residential share	*316.609*	*kWh*	*based on Appendix G, 39% of total program*
of which greenhouse share	*899.741*	*kWh*	*based on Appendix H*
Cooling / heating synergy			positive balance indicates a surplus, negative a deficiency
Heat balance	385.643.767	MJ	heat recovery minus residential & greenhouse heat demand
Cold balance	440.818.092	MJ	cold recovery minus data center cooling demand
Water synergy			positive balance indicates a surplus, negative a deficiency
Water balance	227.841	L	(residential + greenhouse water demand) - data center water demand
Yearly water treatment (grey water):	53.238.900	L	required for water to be used in data center
Electricity demand			
Water treatment electricity required:	0,6	kWh/m^3	Hamza et al., 2022
Yearly electricity for water treatment:	37.580	kWh	grey water treatment for data center use
Total yearly electricity demand:	210.404.991	kWh	data center (incl. water treatment) + residential + greenhouse

CALCULATIONS SHOWING POSSIBLE ROGRAM STRATEGY. CONSISTING OF 8.500 M2 DATA CENTER PROGRAM, 56.000 M2 RESIDENTIAL PROGRAM AND 25.000 M2 GREENHOUSE PROGRAM. OWN WORK.

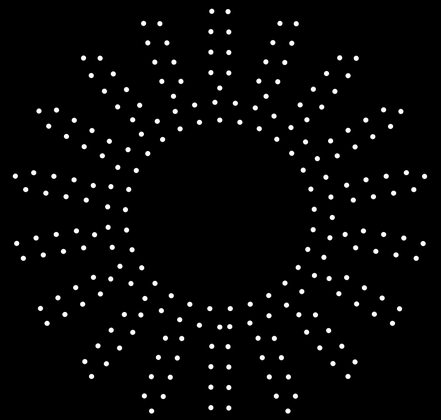
LIVING WITH DATA

SITE REQUIREMENTS



PRESENCE

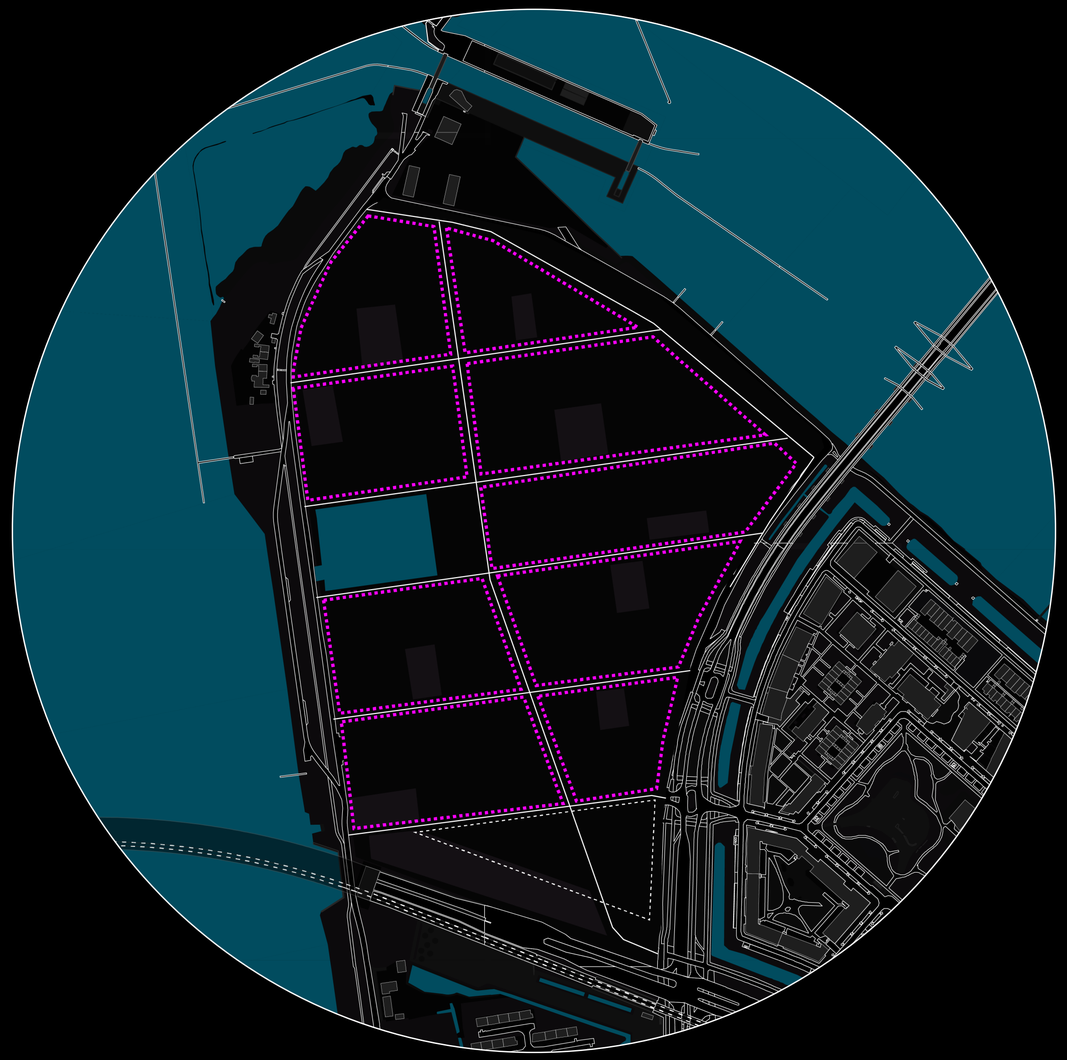
THE MORE EXPOSED THE SITE IS THE BETTER AS IT INCREASES THE CHALLENGE FOR INTEGRATION.

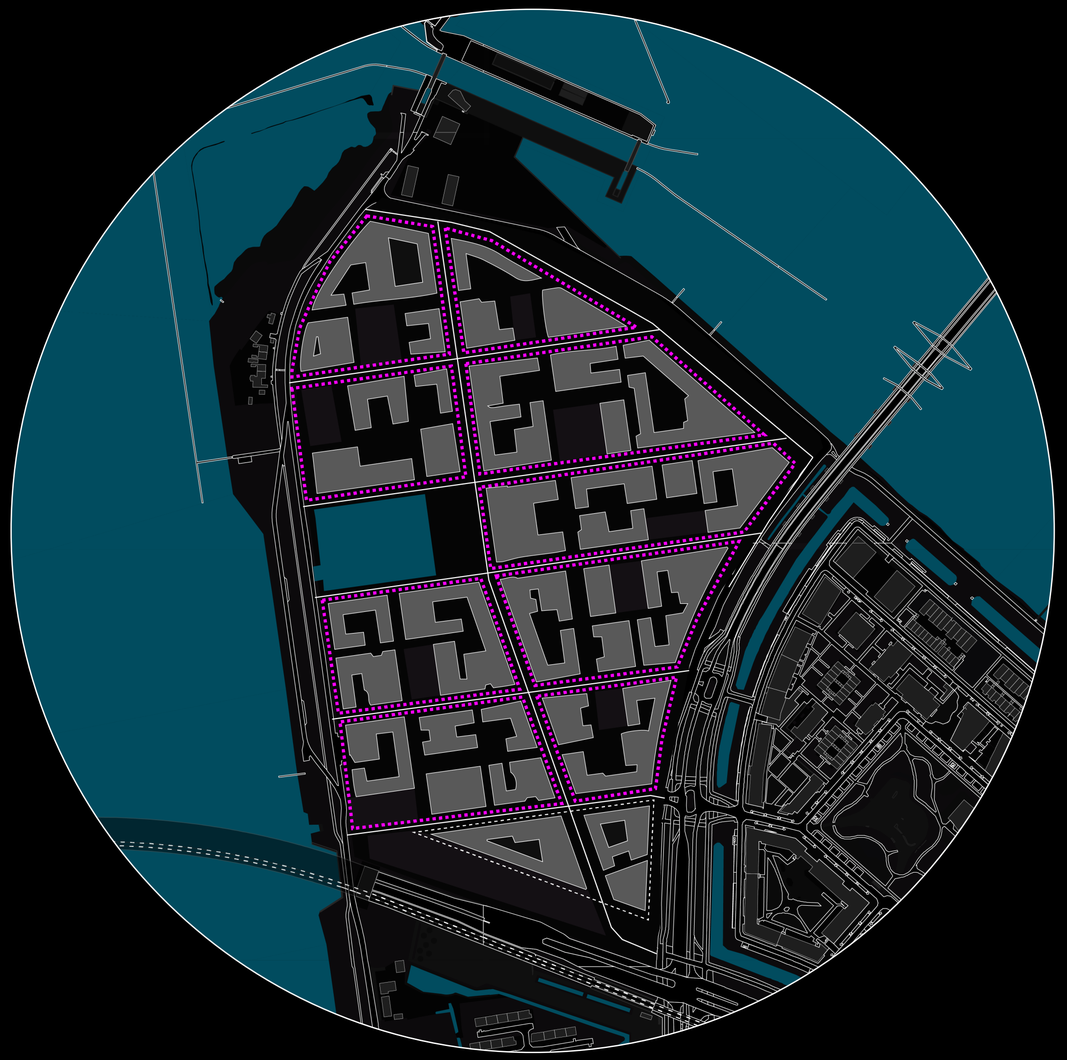


SUNLIGHT

BOTH THE RESIDENTIAL AND GREENHOUSE PROGRAM BENEFIT FROM SUNLIGHT EXPOSURE.

LIVING WITH DATA





LEFT: THE 10 DIFFERENT CLUSTERS DEFINED IN THE SLUISBUURT MASTERPLAN.
RIGHT: BUILDING FOOTPRINTS DEFINED IN THE SLUISBUURT MASTERPLAN.

LIVING WITH DATA





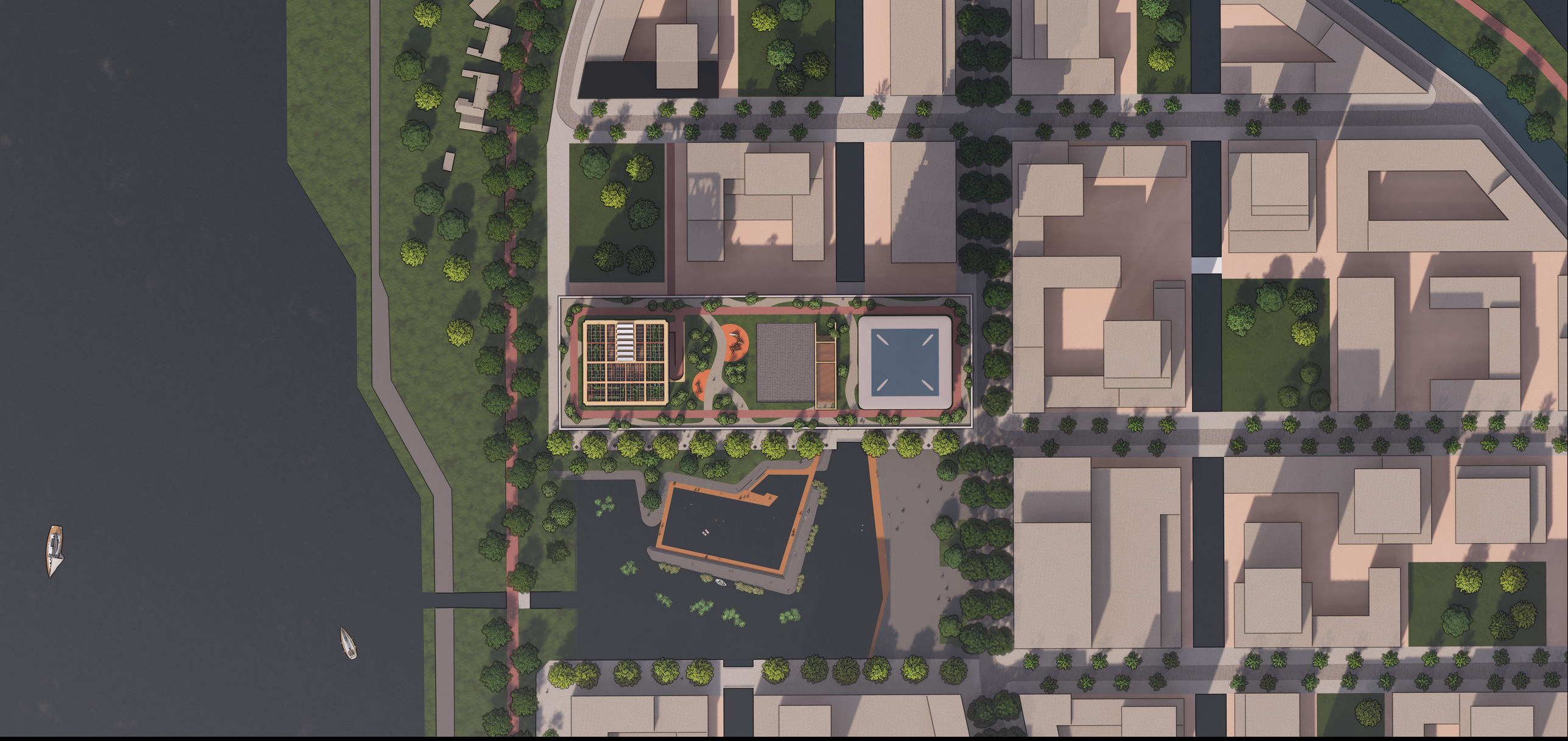
LEFT: DESIGNATED AREAS FOR HIGH RISE.
RIGHT: SELECTED LOCATION FOR DESIGN, WHICH THE MUNICIPALITY DEFINES AS PART OF CLUSTER 10.

LIVING WITH DATA



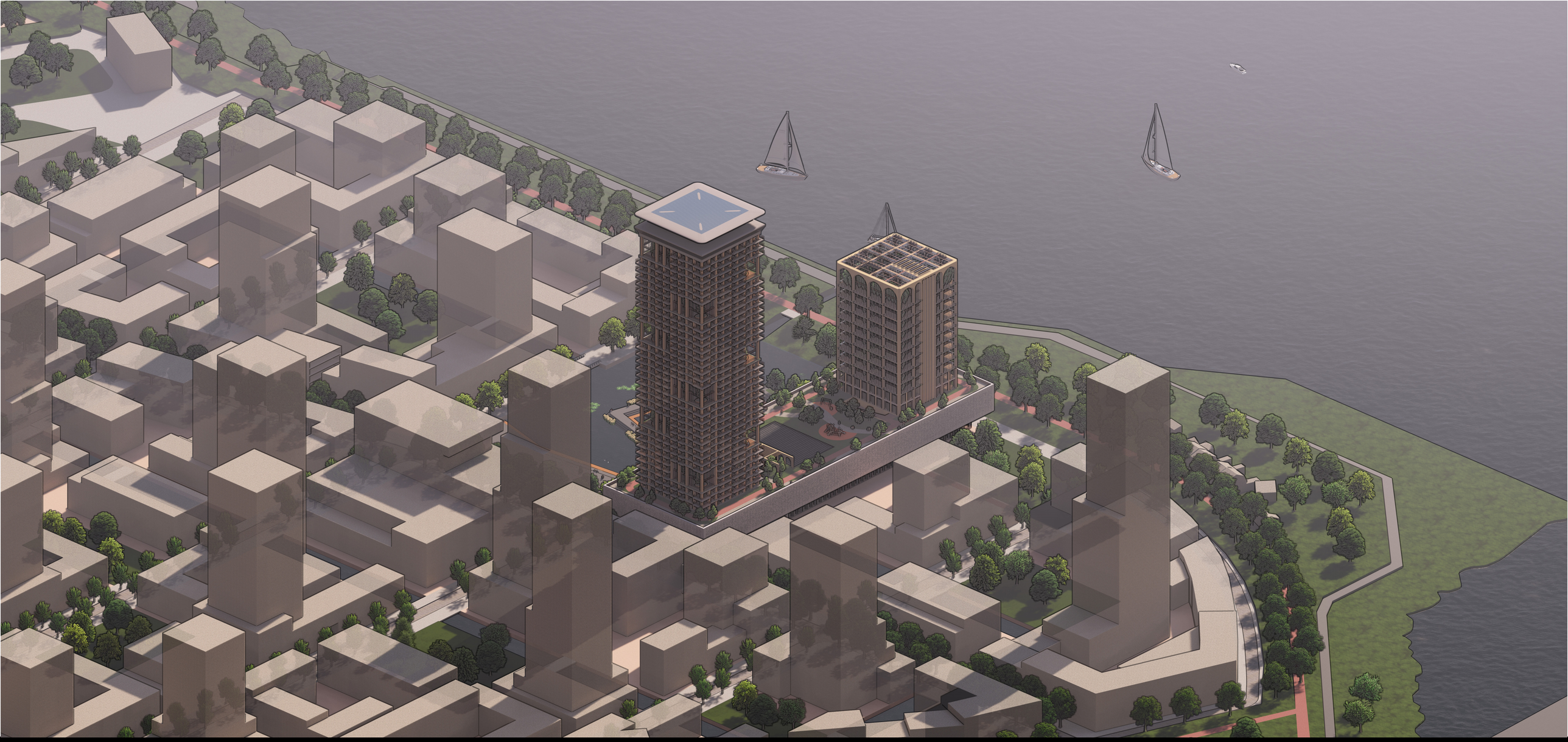
BIRD'S-EYE VIEW OF THE PROJECT. SHOWING THE PUBLIC PLINTH, WITH AN ELEVATED DATA CENTER ABOVE IT. THE TOWER ON THE LEFT IS THE VERTICAL GREENHOUSE, WHILE THE TOWER ON THE RIGHT IS RESIDENTIAL. BETWEEN BOTH OF THEM IS A PUBILCLY ACCESSIBLE ROOF GARDEN.

LIVING WITH DATA



MASTERPLAN OF SLUISBUURT, WITH THE MIXED-USE DATA CENTER BUILDING IN THE CENTER. LARGE, OPEN BLOCKS DEFINE THE URBAN VOLUMES. THROUGHOUT THE NEIGHBOURHOOD CANALS FLOW FREELY.

LIVING WITH DATA



BIRD'S EYE PERSPECTIVE FROM THE OPPOSITE SIDE. KEY WAS TO HAVE THE DESIGN OF THE DATA CENTER LAND RESPECTFULLY IN THE HIGH-DENSITY URBAN ENVIRONMENT.

LIVING WITH DATA

KEY FACTS

5.000 M2 PUBLIC PLINTH

15.000 M2 DATA CENTER

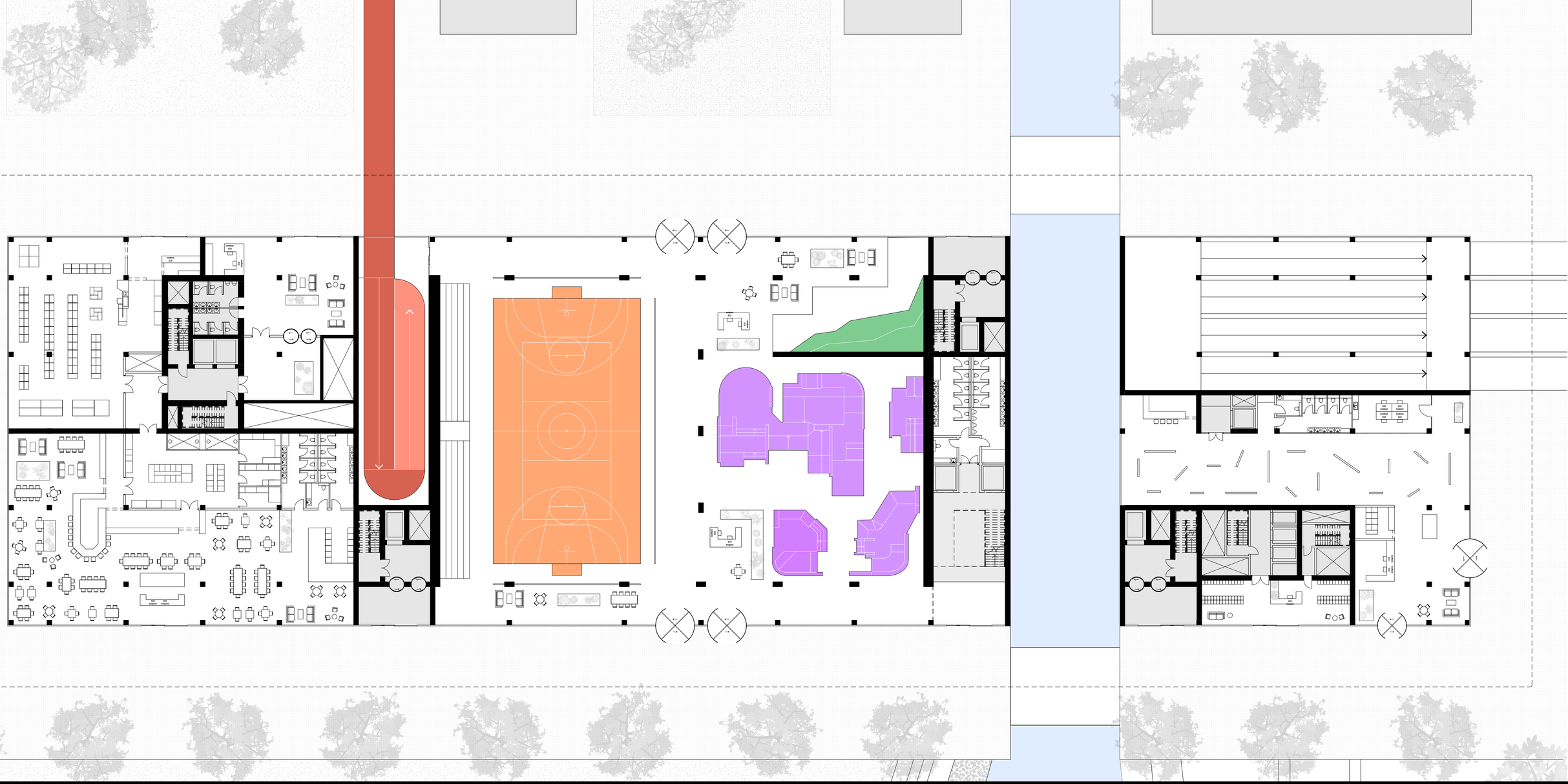
35.000 M2 HOUSING

10.000 M2 GREENHOUSE



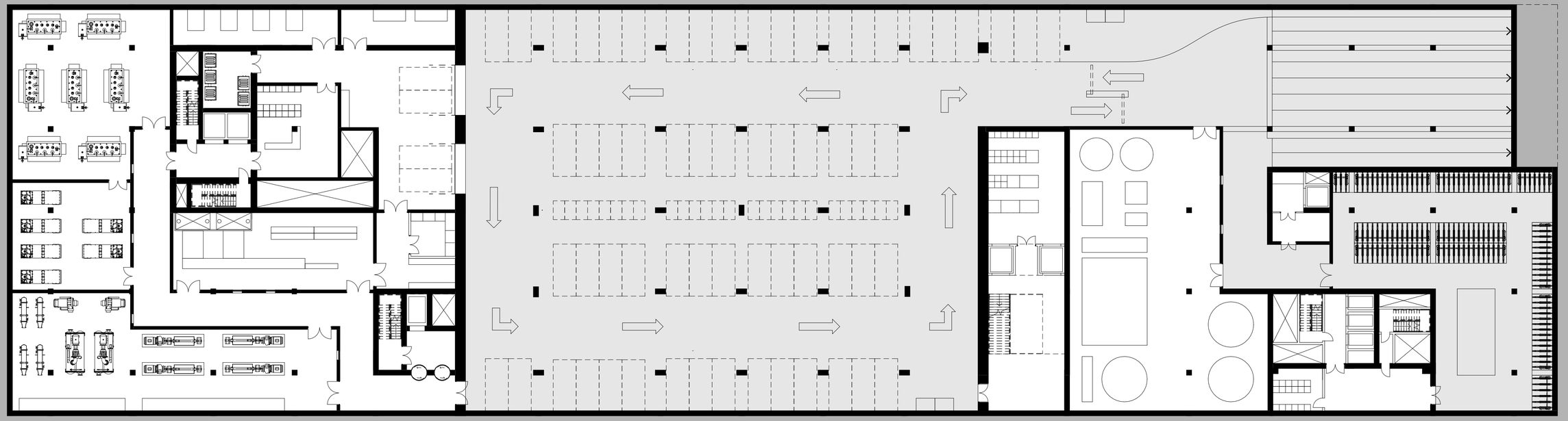
PERSPECTIVE FROM THE EDGE OF THE POOL. THE PROJECT CAN BE DIVIDED INTO TWO DIFFERENT WORLDS: DYNAMIC PLINTH AND IMPOSING DATA CENTER, WHILE THE ROOF GARDEN AND BOTH TOWERS FORM A CALM AND SHELTERED ENVIRONMENT IN THE MIDDLE OF THE CITY.

LIVING WITH DATA



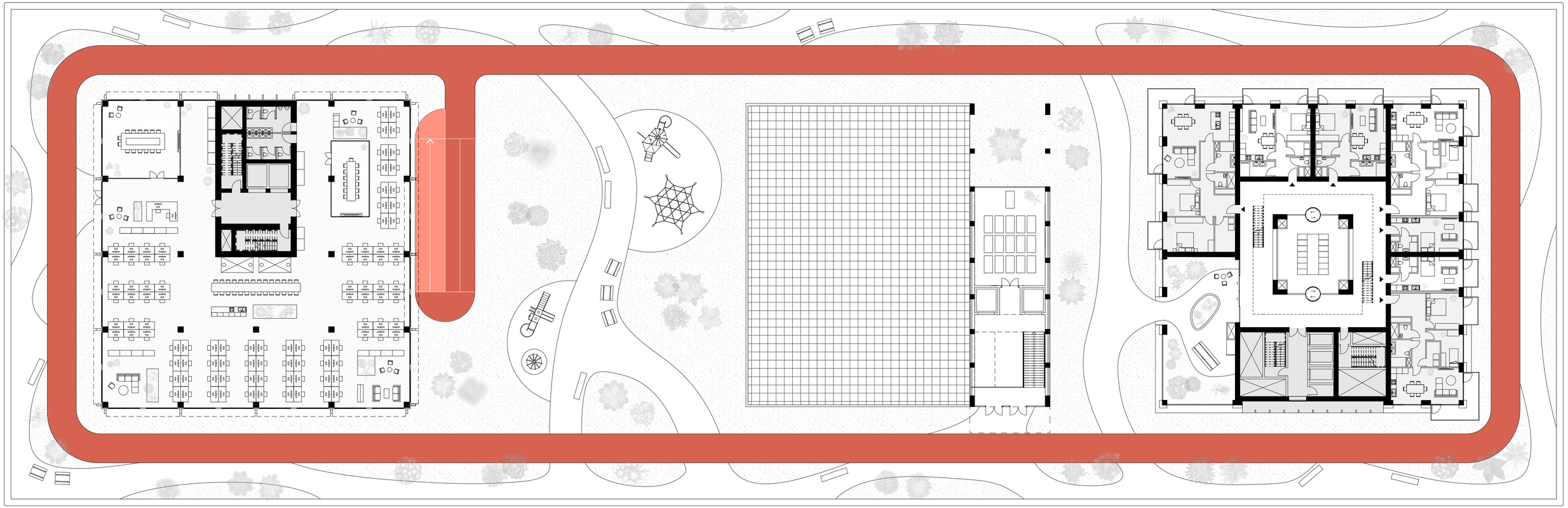
GROUND FLOOR PLAN SHOWING THE SPORTS CENTER, CULTURAL CENTER , TOWER ENTRANCES AND GREENHOUSE RESTAURANT.

LIVING WITH DATA



BASEMENT FLOOR PLAN SHOWING THE MOBILITY HUB (CARS AND SCOOTERS) AS WELL AS THE MECHANICAL ROOMS FOR THE DATA CENTER.

LIVING WITH DATA



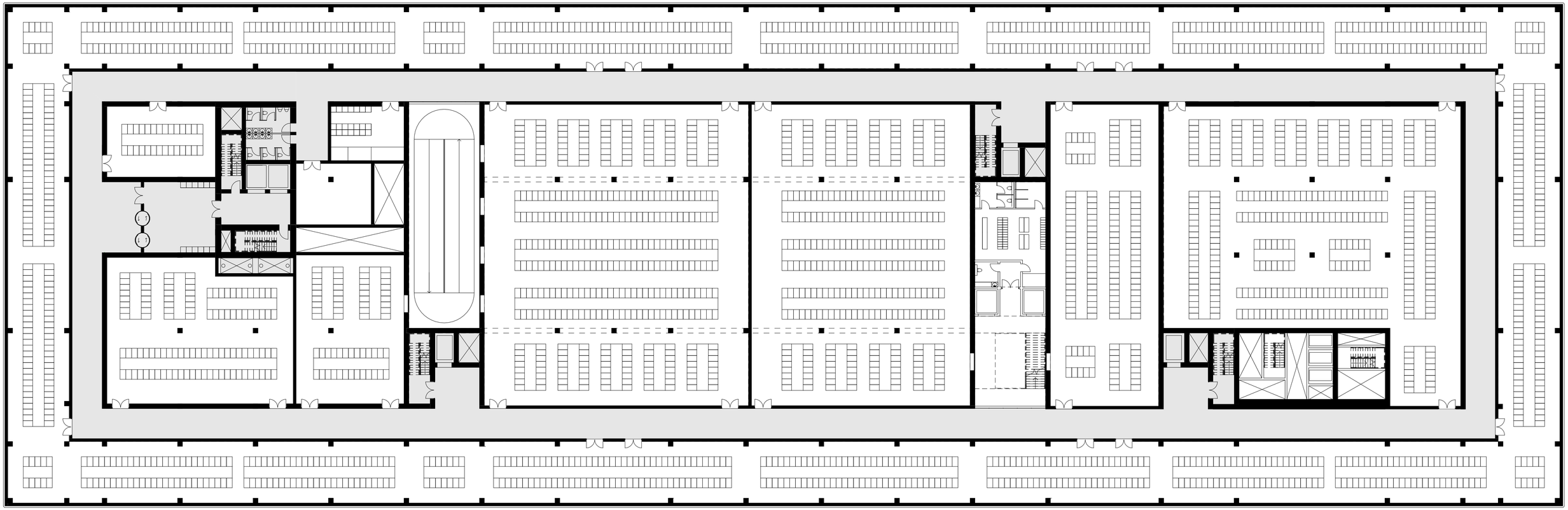
ROOF GARDEN FLOOR PLAN SHOWING THE RUNNING TRACK, ROOFTOP PAVILLION AND GROUND FLOOR PLANS OF THE TOWERS.

LIVING WITH DATA



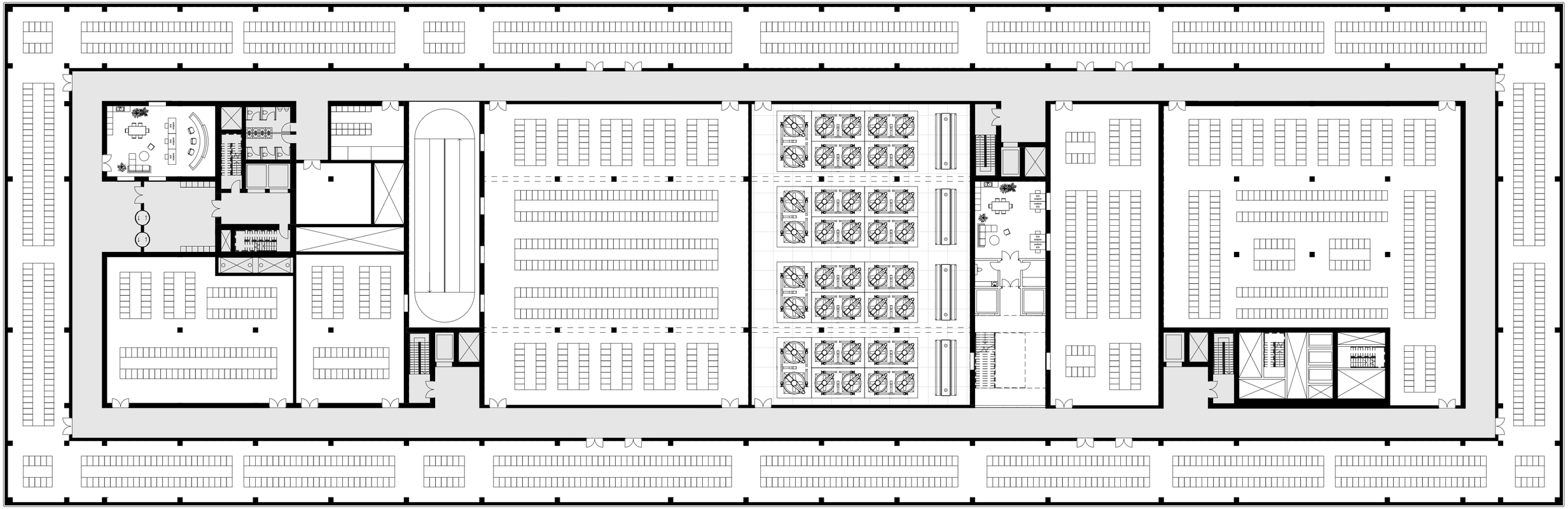
PERSPECTIVE FROM ROOF GARDEN. THE GAP BETWEEN BOTH TOWERS ALLOWS SUNLIGHT TO REACH DEEP INTO THE NEIGHBOURHOOD.

LIVING WITH DATA



DATA CENTER FLOOR PLAN SHOWING SERVER SPACES AS WELL AS THE INTERSECTING PUBLIC ROUTING TO THE ROOFTOP WHICH PROVIDES VIEWS INTO THE ATA CENTER.

LIVING WITH DATA



DATA CENTER FLOOR PLAN SHOWING SERVER SPACES, CONTROL ROOM AS WELL AS THE COOLING TOWER AREA WHICH IS EXPOSED TO THE ROOF GARDEN.

LIVING WITH DATA

DATA CENTER PRODUCES ENOUGH HEAT TO SUPPLY THE WHOLE SLUISBUURT, AROUND 6.000 HOMES.

THERE IS CAPACITY TO HEAT AN ADDITIONAL 3.000 HOMES. THIS HEAT CAPACITY CAN ALSO BE USED FOR HOUSING IN THE SURROUNDING AREA OF DIFFERENT HEAT-DEMANDING FUNCTIONS WITHIN THE SLUISBUURT.

LIVING WITH DATA

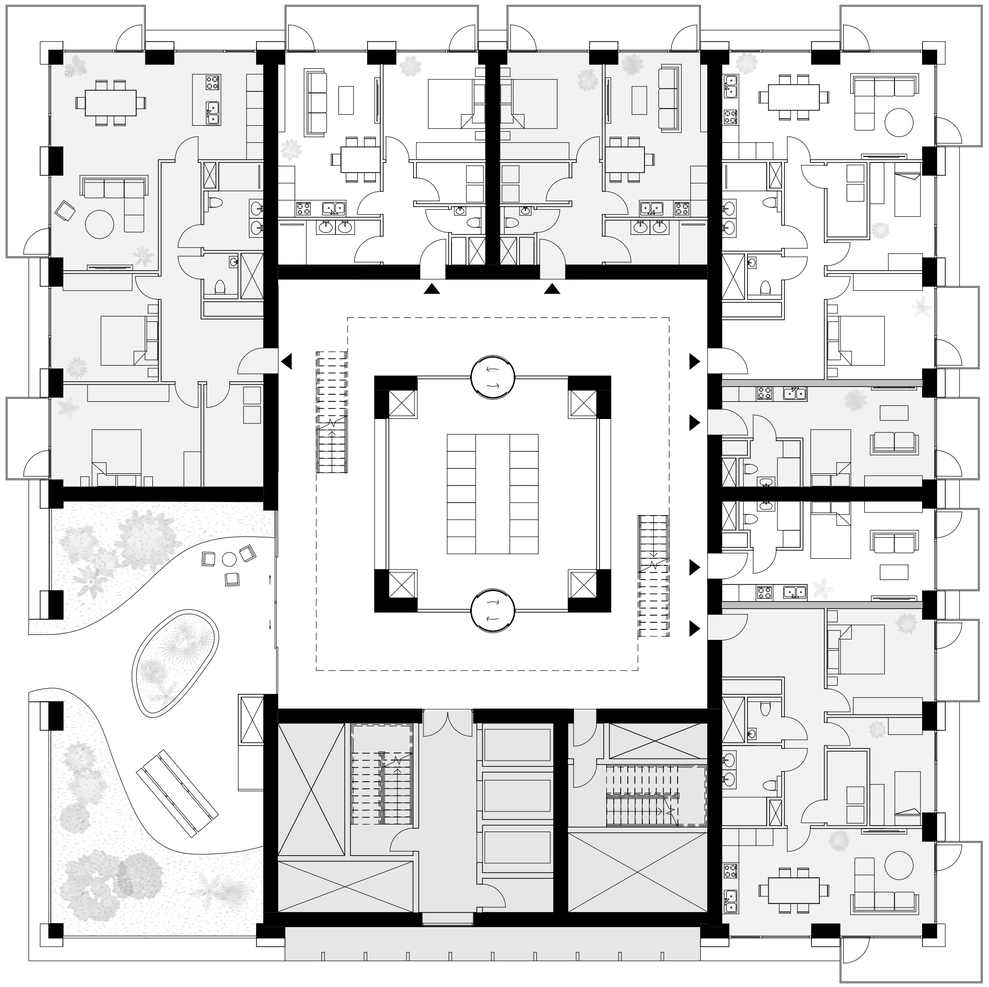
RESIDENTIAL AND GREENHOUSE PROGRAM PROVIDE ENOUGH GREY WATER TO SUPPLY THE DATA CENTER WITH 33% OF IT'S WATER DEMAND PER YEAR.

GREY WATER FROM THE RESIDENTIAL AND GREENHOUSE REQUIRES WATER TREATMENT, WHICH IS HOUSED IN THE BASEMENT, BEFORE IT CAN BE USED.

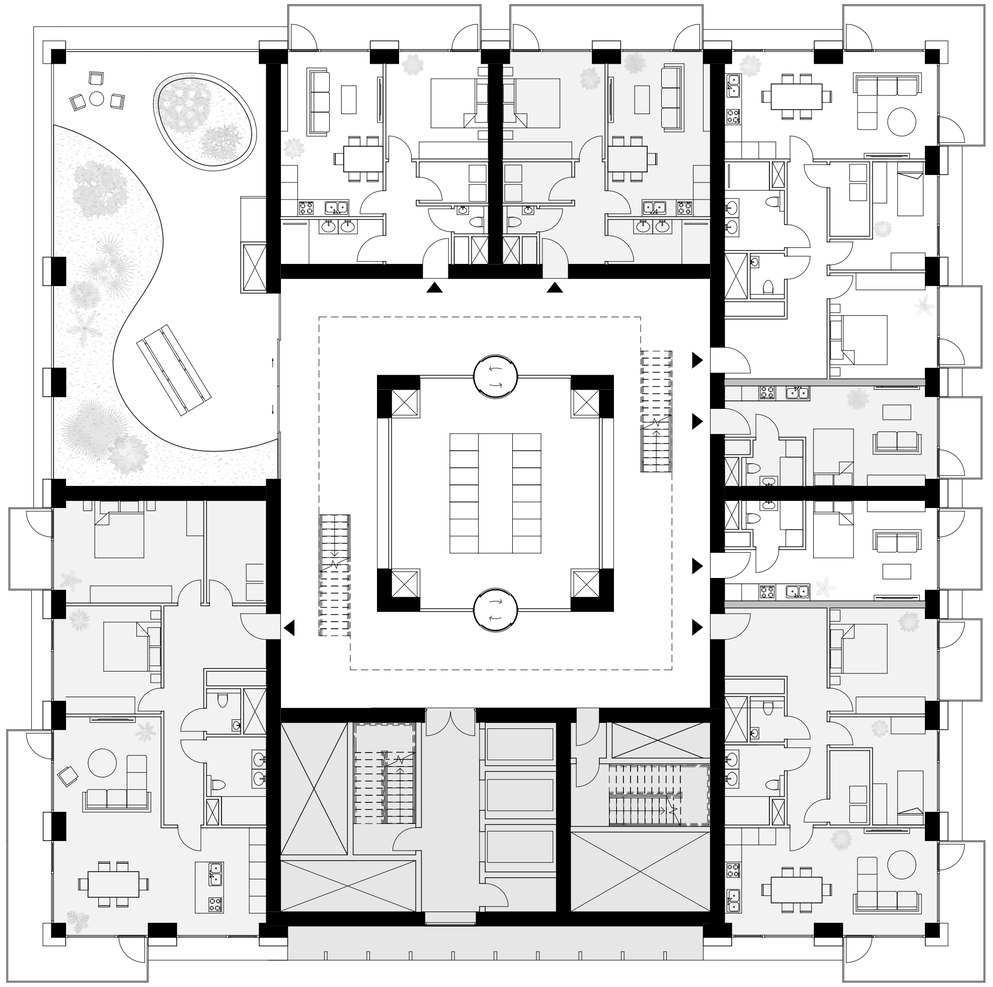
BY CONNECTING 1.600 ADDITIONAL APARTMENTS TO THE TREATMENT 100% OF THE DATA CENTER WATER DEMAND CAN BE SATISFIED.

LIVING WITH DATA

RESIDENTIAL TOWER 1ST FLOOR



RESIDENTIAL TOWER FLOOR 4



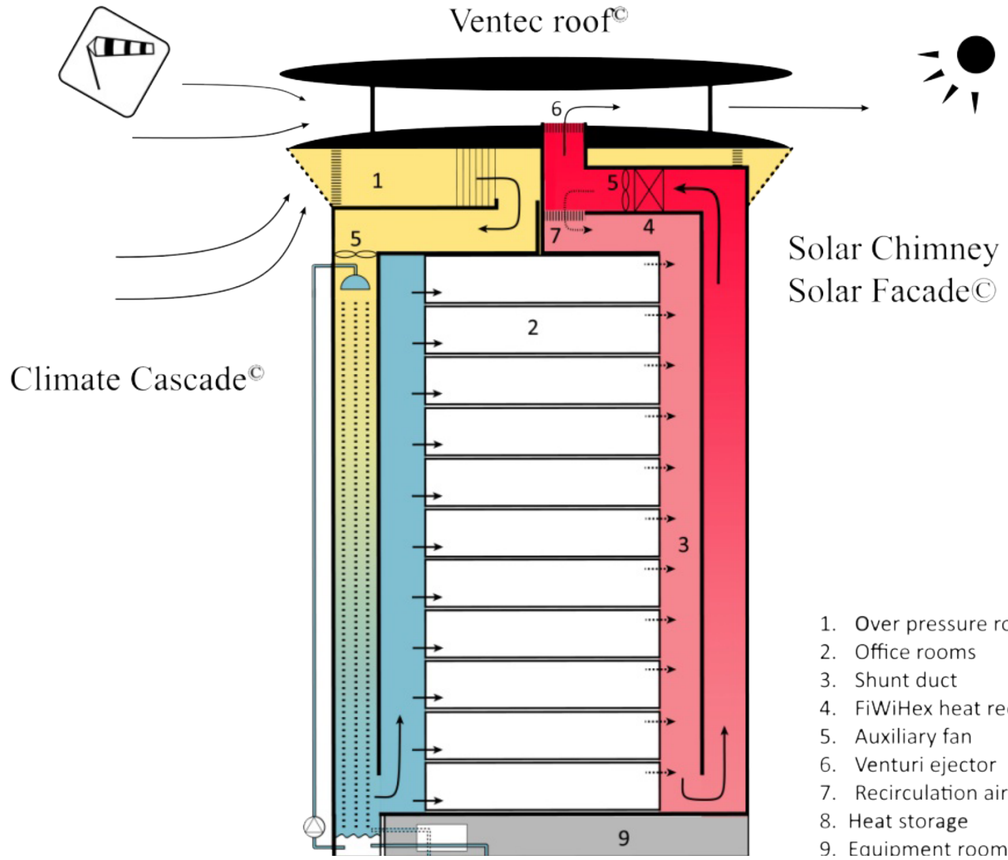
FLOOR PLANS OF THE RESIDENTIAL TOWERS, SHOWING THE VARIOUS APARTMENT LAYOUTS, THE DATA CORE, COMMUNAL INDOOR & OUTDOOR AREAS AND THE EARTH WIND AND FIRE SYSTEM (EWF).

LIVING WITH DATA

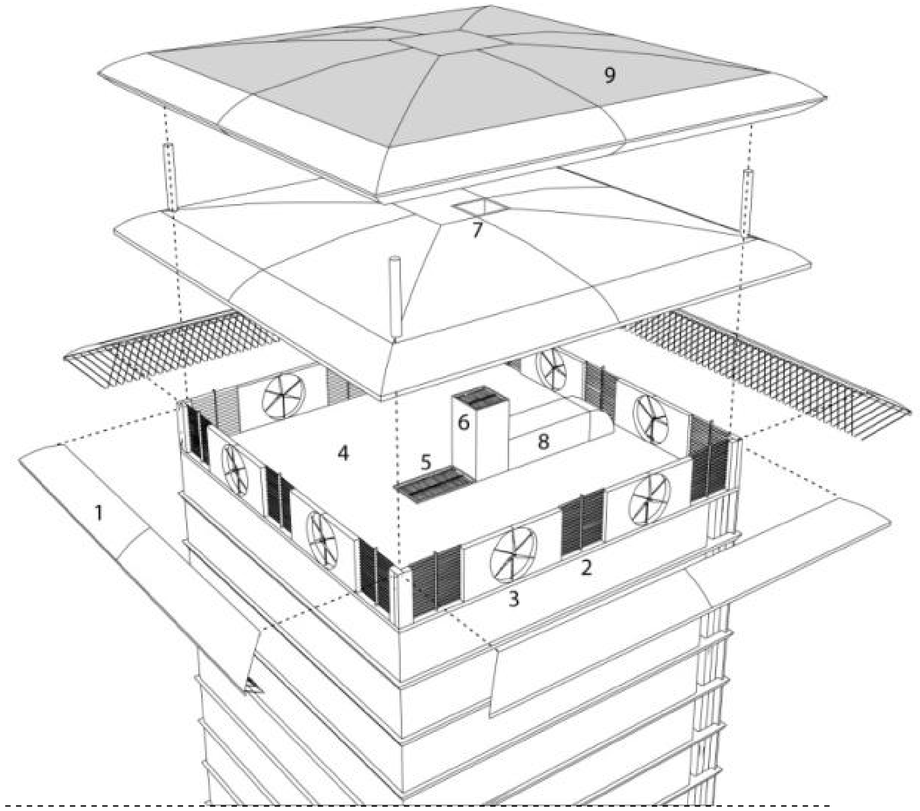


THE HEIGH CEILINGS OF THE COMMUNAL OUTDOOR ALLOW FOR ELEVATED GARDENS AND SUNLIGHT TO REACH DEEP INTO THE BUILDING.

LIVING WITH DATA



1. Over pressure room
2. Office rooms
3. Shunt duct
4. FiWiHex heat recovery
5. Auxiliary fan
6. Venturi ejector
7. Recirculation air damper
8. Heat storage
9. Equipment room



1. Roof projection
2. Air dampers
3. Wind turbines
4. Over pressure room
5. Entry Climate Cascade©
6. Exhaust to Venturi
7. Venturi ejector
8. FiWiHeX heat recovery
9. Thin Photovoltaic Foil

EARTH WIND AND FIRE CONCEPT BY BEN BRONSEMA. BRONSEMA, B. (2013). EARTH, WIND & FIRE–NATURAL AIR CONDITIONING (DOCTORAL DISSERTATION, PHD THESIS. DELFT UNIVERSITY OF TECHNOLOGY).

THE CURVED SOLAR FOIL COVERED VENTEC ROOF (900 M2) HANDLES AIR INTAKE ON THE WINDWARD SIDE OF THE BUILDING. IT MAKES USE OF THE VENTURI-EFFECT, MEANING THAT PASSING WINDS WILL CREATE AN UNDER PRESSURE THAT WILL EXTRACT USED AIR FROM THE BUILDING. THE CLIMATE CASCADE IS A SHAFT WHERE WATER OF 13 DEGREES CELSIUS FALLS DOWN, WHICH PULLS INCOMING AIR DOWNWARDS. IN THE SUMMER, THE HOT AIR IS COOLED. IN THE WINTER, COLD AIR IS WARMED UP. THE SOLAR CHIMNEY ON THE SOUTH FACADE HARVESTS SOLAR HEAT TO CREATE AN UPWARD DRAFT TO DRAW OUT THE AIR. IT ALSO CONTAINS 1.500 M2 OF SOLAR PANELS.

LIVING WITH DATA



PERSPECTIVE FROM THE COMMUNAL INDOOR AREA IN THE RESIDENTIAL TOWER. ON THE LEFT, VIEWS WILL BE POSSIBLE INTO THE DATA CORE. IN THE DISTANCE THE COMMUNAL OUTDOOR SPACE CAN BE SEEN.

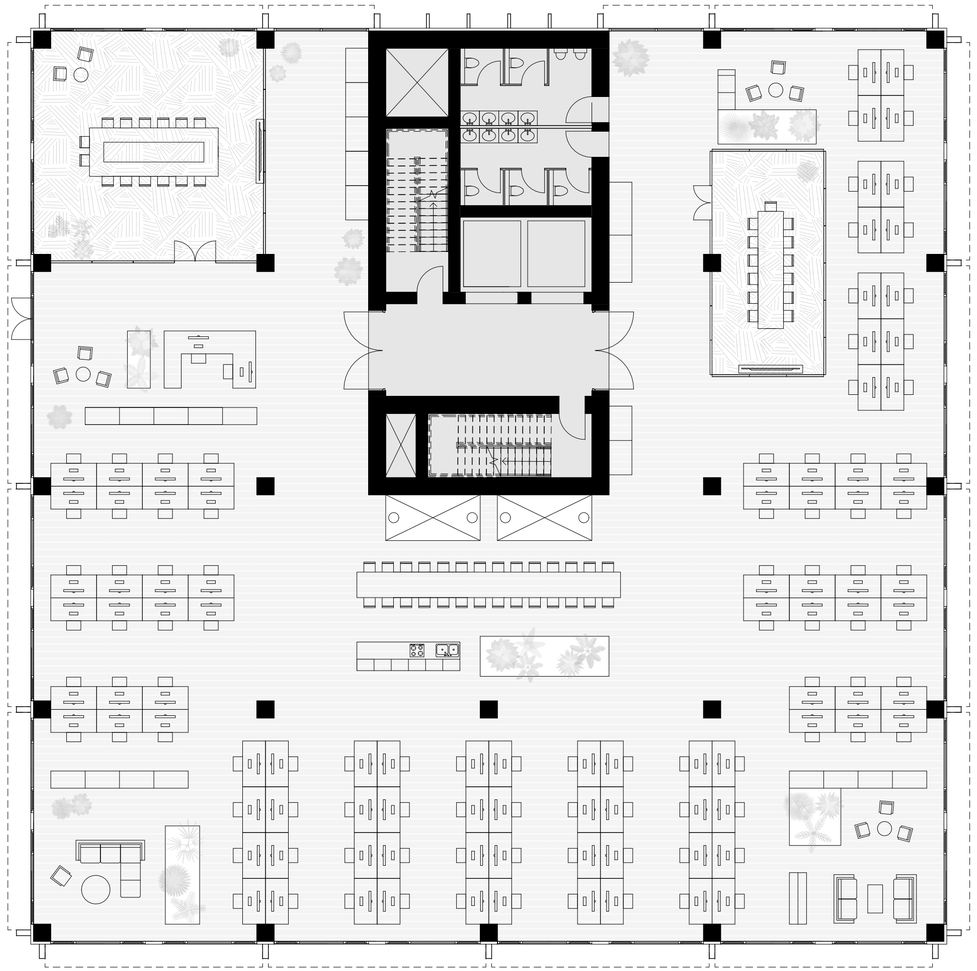
LIVING WITH DATA



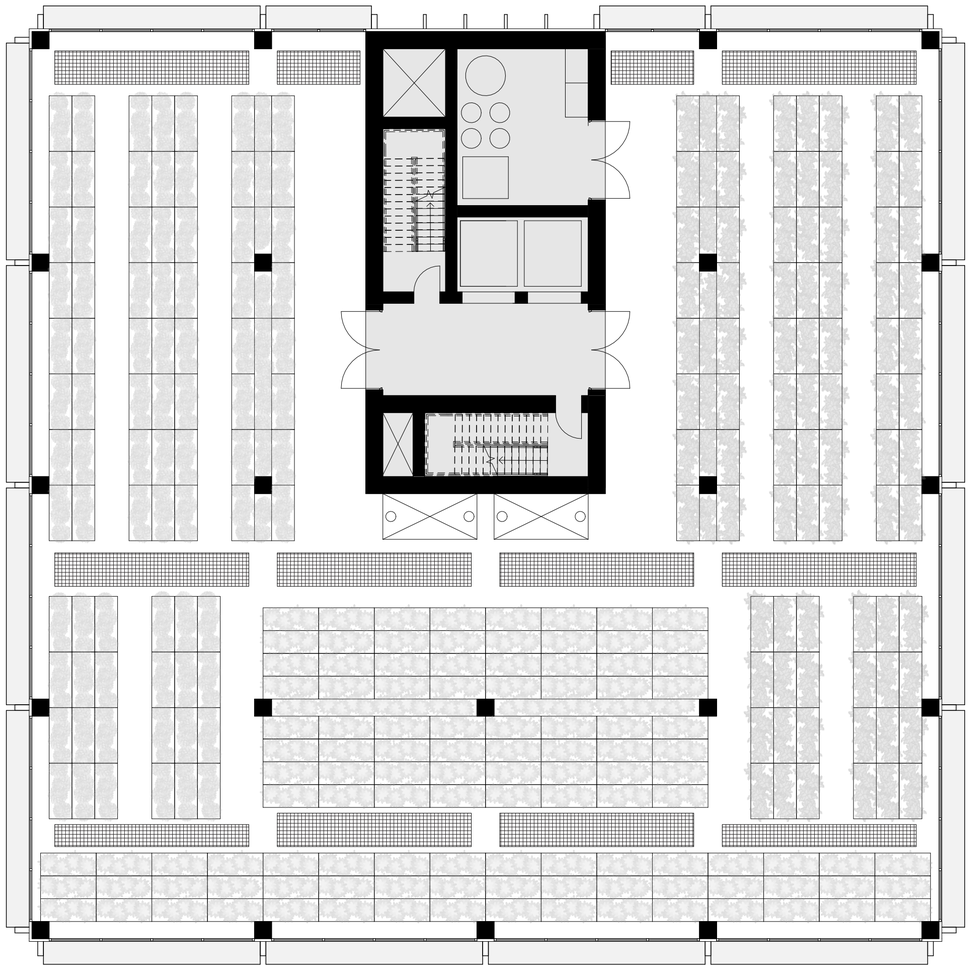
PERSPECTIVE FROM THE COMMUNAL OUTDOOR AREA IN THE RESIDENTIAL TOWER. THE SPACE SERVES TO CREATE A SENSE OF COMMUNITY WITHIN THE TOWER. BOTH IN SUMMER AND IN WINTER RESIDENTS CAN USE THIS OUTDOOR LIVING ROOM.

LIVING
WITH
DATA

GREENHOUSE 1ST & 2ND FLOOR

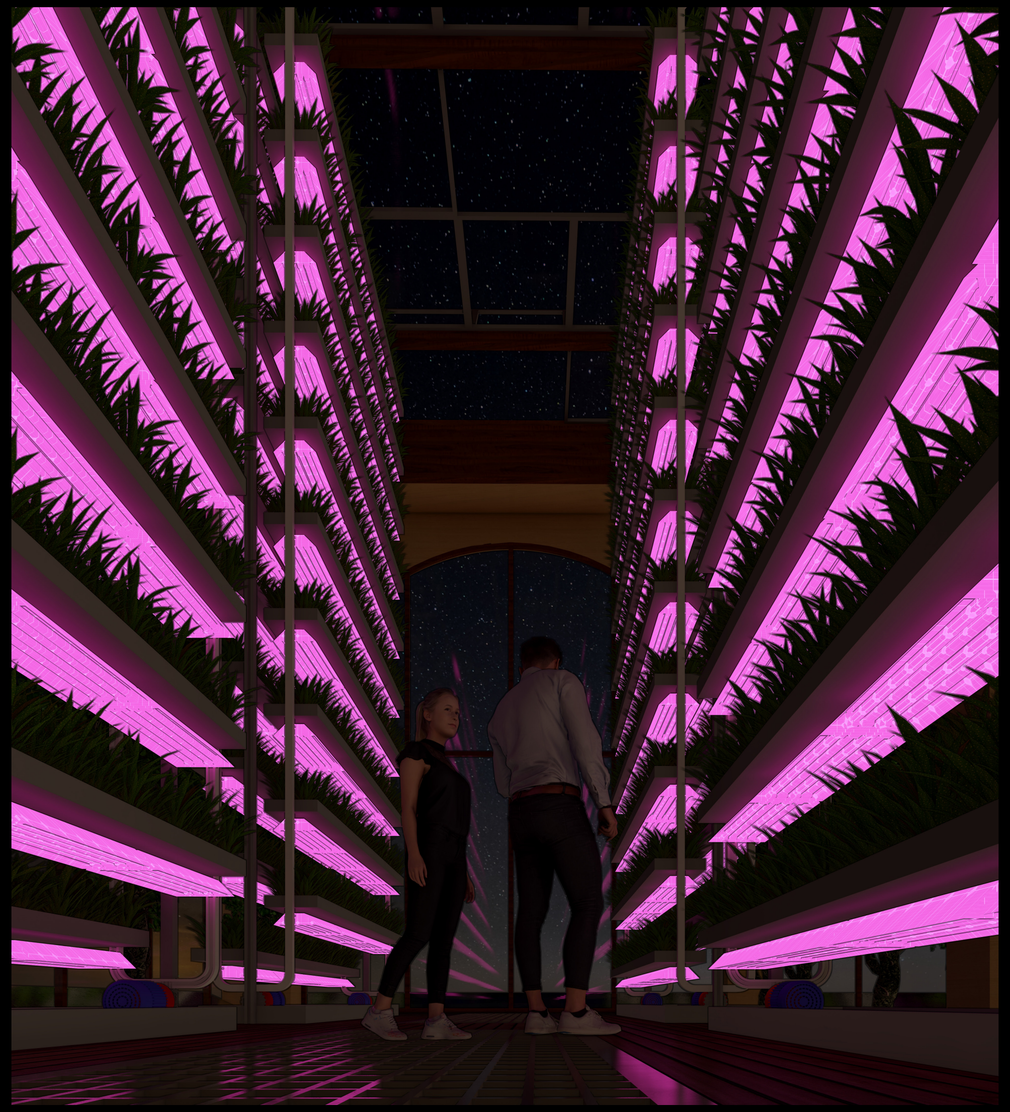


GREENHOUSE FLOOR 3-11



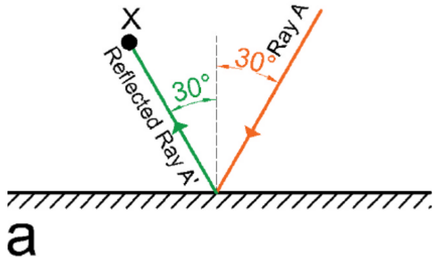
GREENHOUSE FLOOR PLANS WITH OFFICES ON THE FIRST TWO FLOORS. CROPS ARE HARVESTED BY ROBOTS AND TRANSPORTED ALONG THE CONVEYOR LIFTS. SUNLIGHT IS REFLECTED DEEP INTO THE BUILDING BY REFLECTORS. UPWARDS VENTILATION IS POSSIBLE THROUGH GRATED FLOORS.

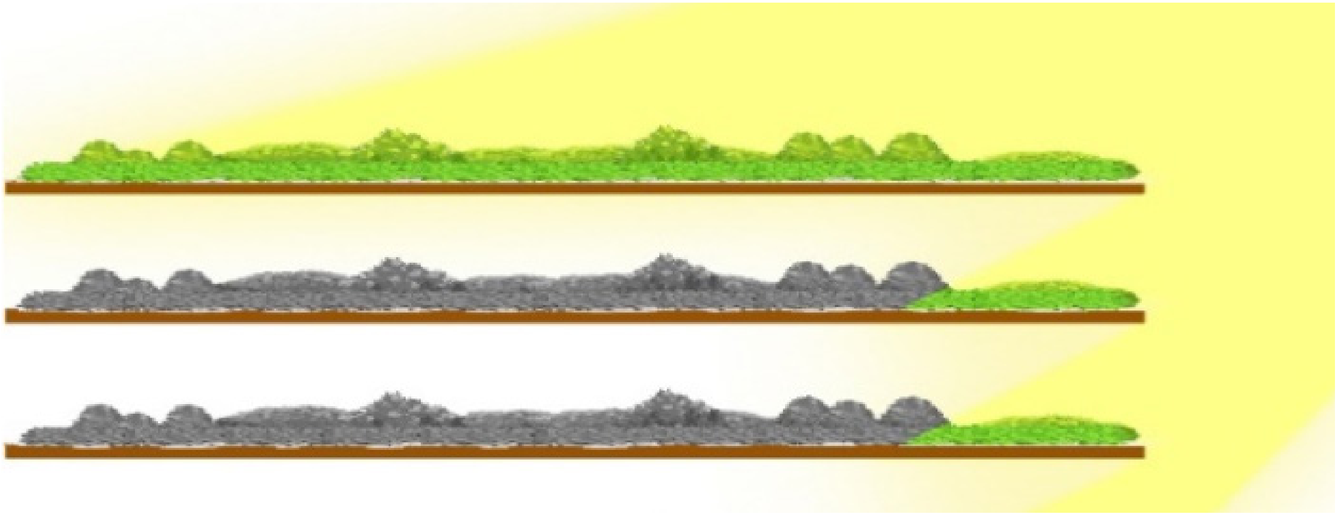
LIVING WITH DATA

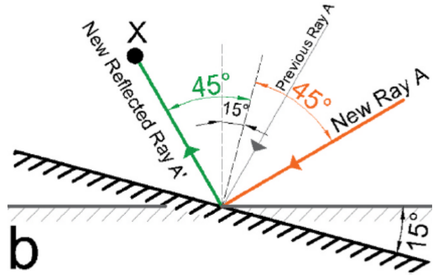


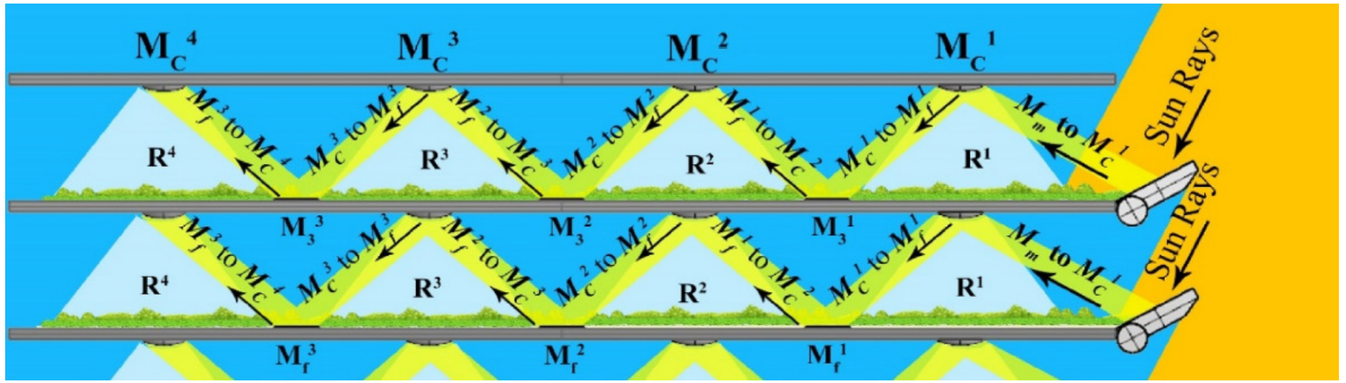
THE GREENHOUSE RELIES ON SUNLIGHT DURING THE DAY, WHILE ARTIFICIAL LIGHTING ALLOWS CROPS TO CONTINUE GROWING DURING THE NIGHT.

LIVING WITH DATA









CHOUBCHILANGROUDI, A., & ZAREI, A. (2022). INVESTIGATION THE EFFECTIVENESS OF LIGHT REFLECTORS IN TRANSMITTING SUNLIGHT INTO THE VERTICAL FARM DEPTH TO REDUCE ELECTRICITY CONSUMPTION. CLEANER ENGINEERING AND TECHNOLOGY, 7, 100421.

THE LIGHT REFLECTORS ON THE FACADE AND DIFFUSER PANELS ALLOW THE SUNLIGHT TO BE SENT DEEPER INTO THE GREENHOUSE FLOOR DEPTH.

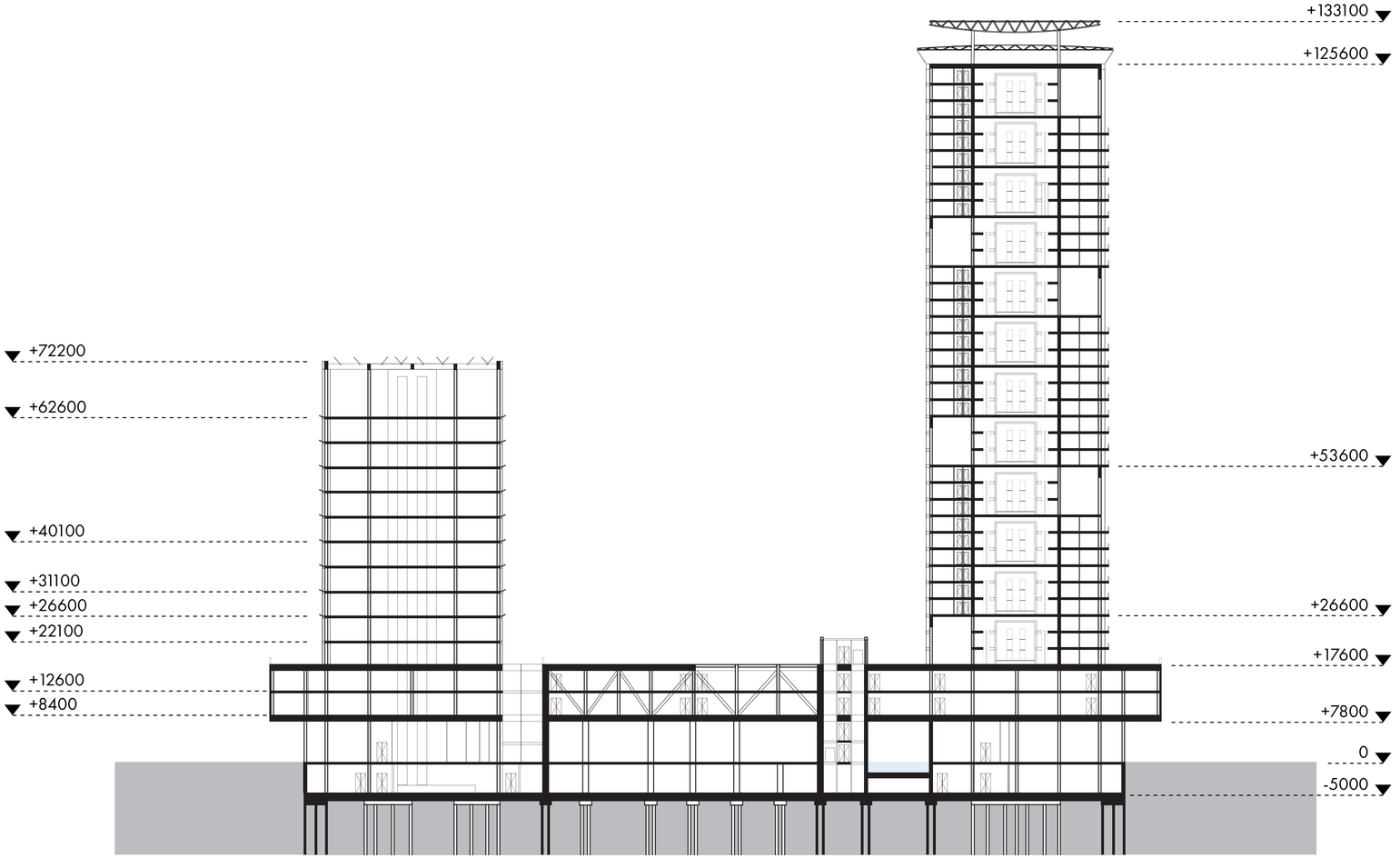
LIVING WITH DATA

THE GREENHOUSE PRODUCES 550.000 KG OF VEGETABLES PER YEAR. THIS PROVIDES 5.000 PEOPLE WITH VEGETABLES FOR A YEAR.

BASED ON 300 GRAMS OF VEGETABLES PER PERSON PER DAY .

LIVING WITH DATA

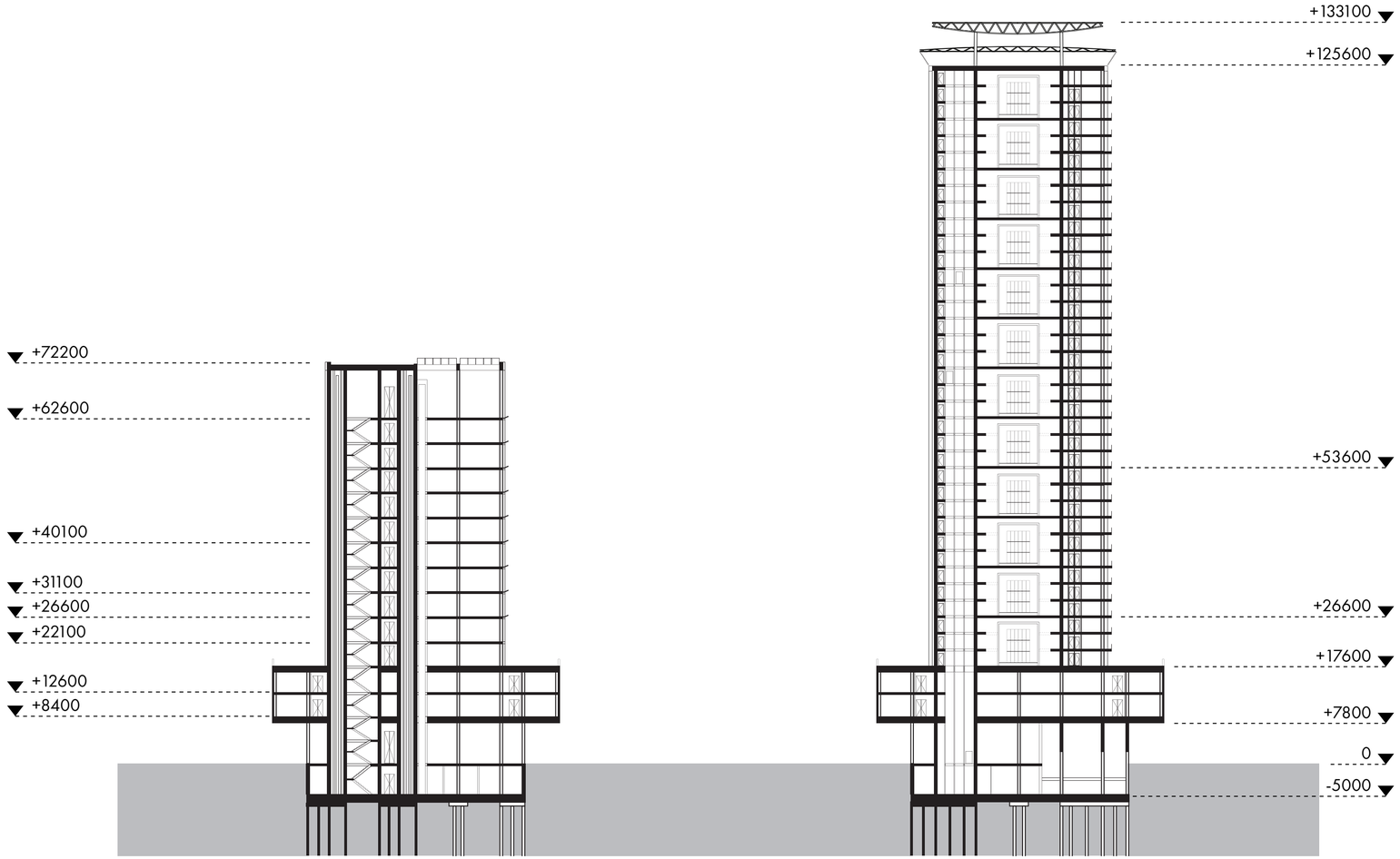
SECTION A-A



SECTION SHOWING TALL FLOOR HEIGHT OF THE PLINTH TO ACCOMODATE THE FUNCTIONS. THE TRUSS MAKES THE LARGE FLOOR SPANS POSSSIBLE. BASEMENT IS DIVIDED IN TWO CONNECTED SECTIONS TO ALLOW THE (50 CM DEEP) CANAL TO FLOW ABOVE IT.

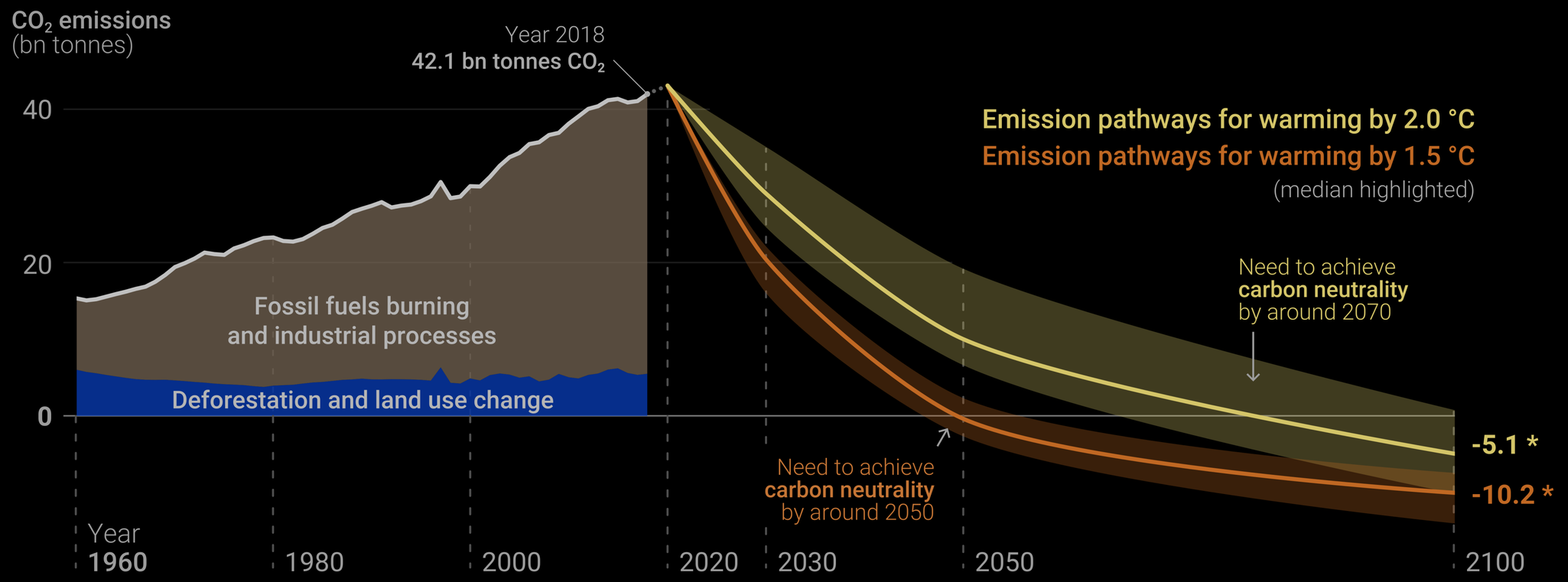
LIVING WITH DATA

SECTION B-B AND -CC



SECTION OF THE GREENHOUSE WITH TALL CEILING HEIGHTS AND FACADE REFLECTORS FOR DAYLIGHT EXPOSURE. SECTION OF THE RESIDENTIAL TOWER SHOWS THE GALLERY CIRCULATION IN WHICH 3 FLOORS (7 APARTMENTS PER FLOOR) FORM A COMMUNITY WITH A CENTRAL DATA CORE.

LIVING WITH DATA

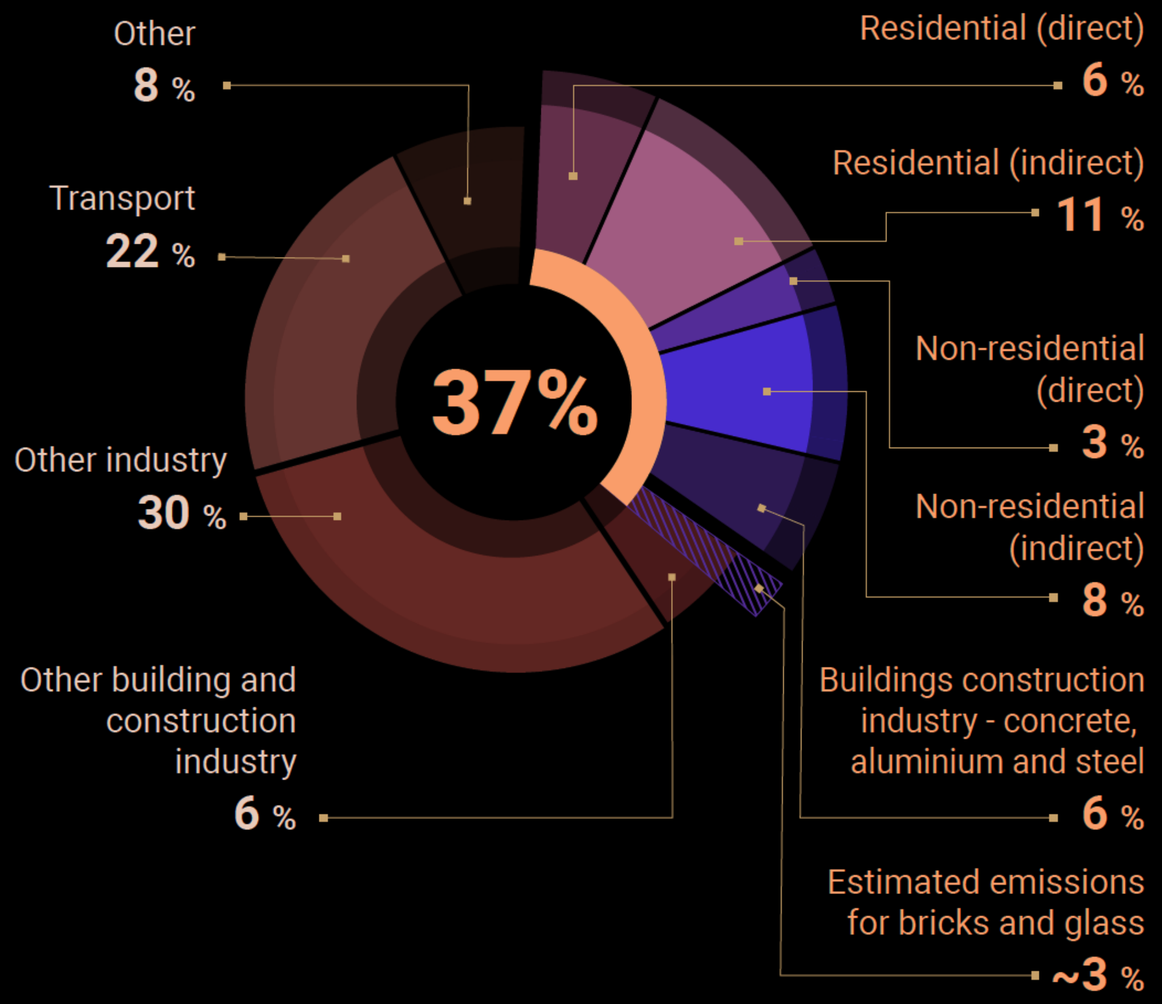


* **Negative emissions values** indicate that carbon capture technologies capture more atmospheric carbon than produced by human activity.

EMISSION PATHWAYS TOWARDS PARIS AGREEMENT. INFOGRAPHIC BY FAKTA O KLIMATU, LICENCED UNDER CC BY 4.0.

UNITED NATIONS ENVIRONMENT PROGRAMME (2022). 2022 GLOBAL STATUS REPORT FOR BUILDINGS AND CONSTRUCTION: TOWARDS A ZERO-EMISSION, EFFICIENT AND RESILIENT BUILDINGS AND CONSTRUCTION SECTOR.

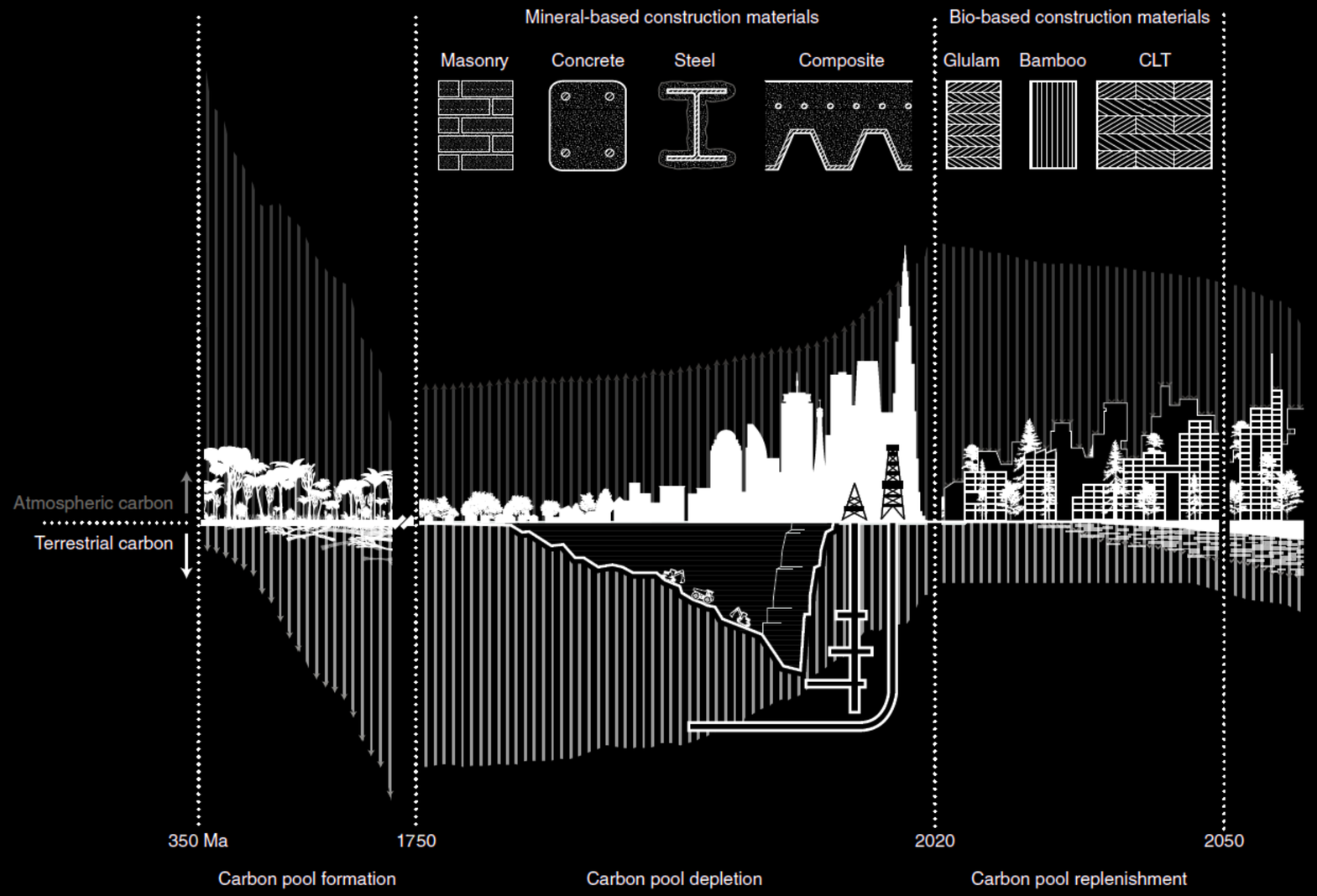
LIVING WITH DATA



CO_2 EMISSIONS IN BUILDINGS SECTOR ACCOUNT FOR ALMOST 40% OF THE TOTAL GLOBAL ENERGY AND PROCESS EMISSIONS.

UNITED NATIONS ENVIRONMENT PROGRAMME (2022). 2022 GLOBAL STATUS REPORT FOR BUILDINGS AND CONSTRUCTION: TOWARDS A ZERO-EMISSION, EFFICIENT AND RESILIENT BUILDINGS AND CONSTRUCTION SECTOR.

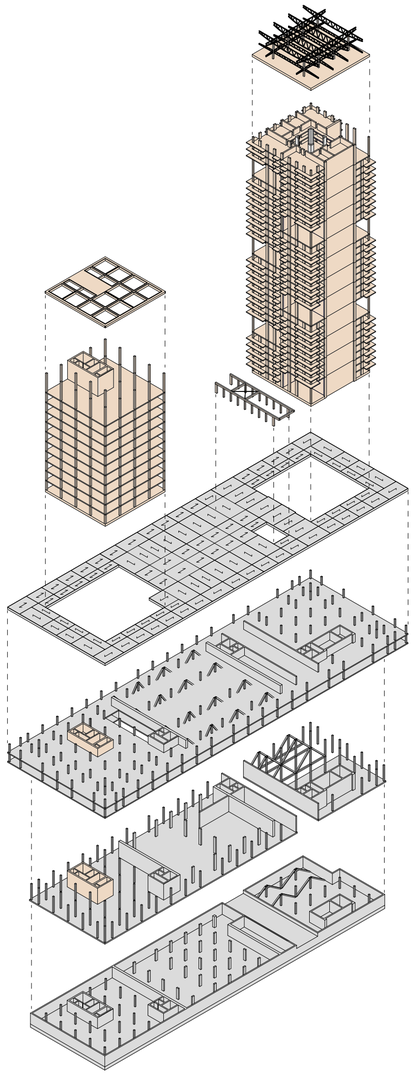
LIVING WITH DATA

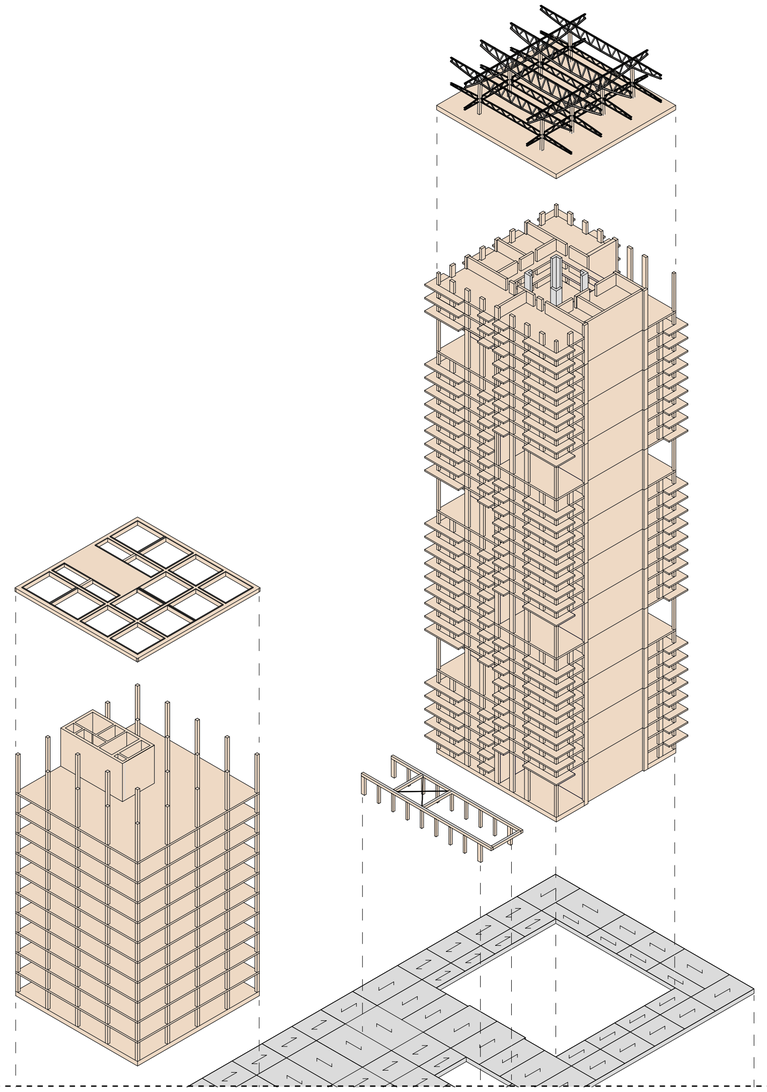


PROCESSES RESPONSIBLE FOR FORMATION, DEPLETION AND POTENTIAL REPLENISHMENT OF LAND CARBON POOL AND CHANGES IN ATMOSPHERIC CO_2 CONCENTRATIONS OVER TIME.

CHURKINA, G., ORGANSCHI, A., REYER, C. P. O., RUFF, A., VINKE, K., LIU, Z., RECK, B. K., GRAEDEL, T. E., & SCHELLNHUBER, H. J. (2020). BUILDINGS AS A GLOBAL CARBON SINK. IN NATURE SUSTAINABILITY (VOL. 3, ISSUE 4, PP. 269–276). SPRINGER SCIENCE AND BUSINESS MEDIA LLC.

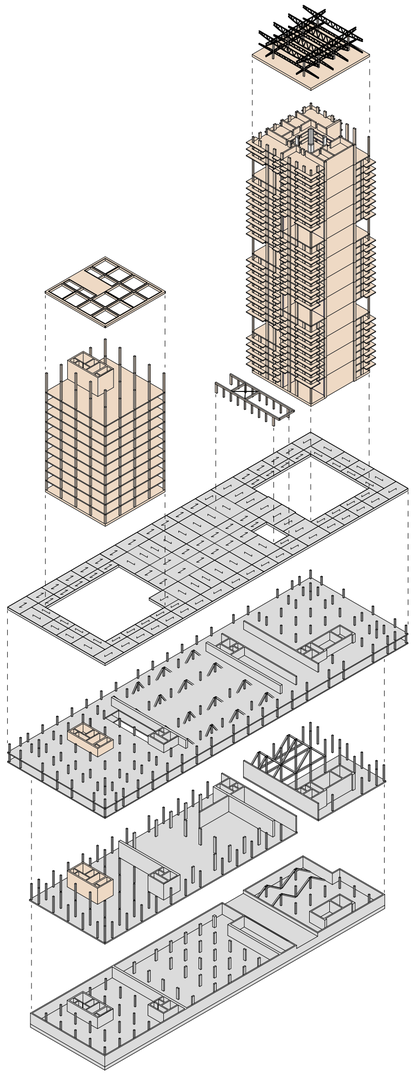
LIVING WITH DATA

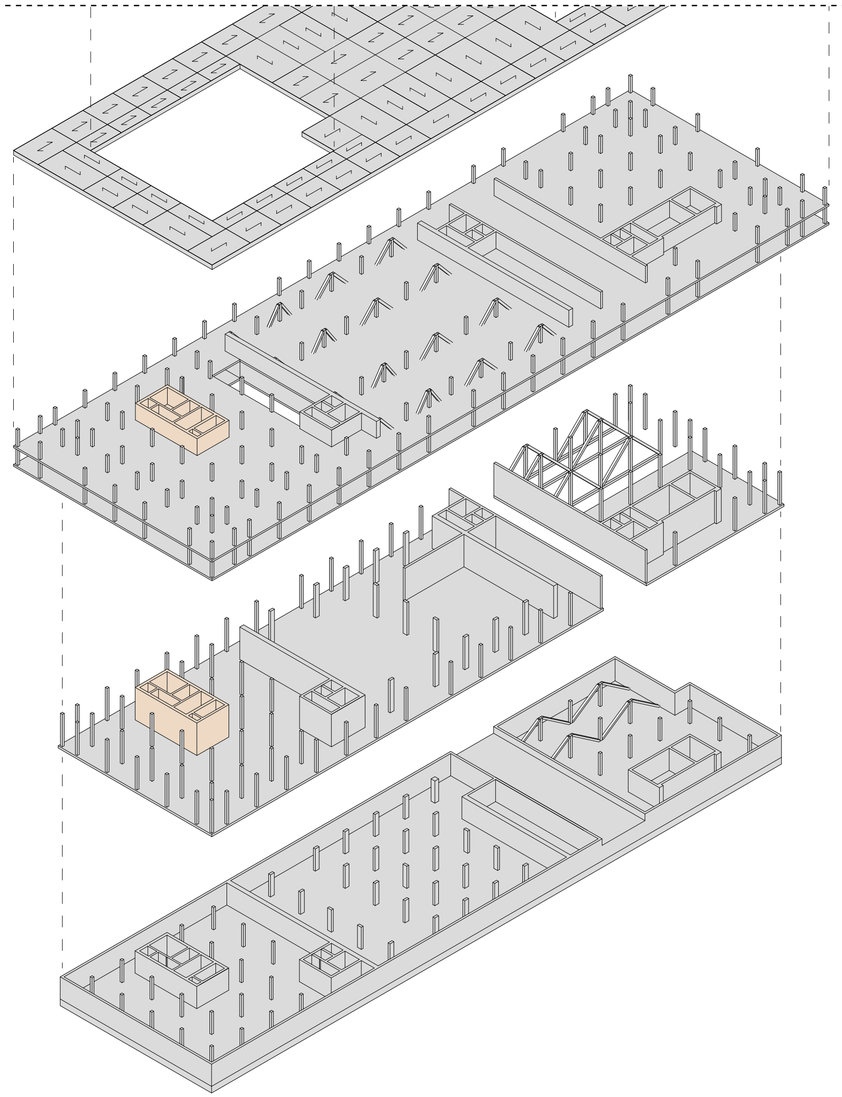




EXPLODED ISOMETRIC LOAD BEARING STRUCTURE. BOTH TOWERS ARE HIGH-RISE TIMBER STRUCTURES WHICH TRANSFER THEIR LOADS ONTO A STEEL AND CONCRETE PODIUM, THROUGH THE BASEMENT ONTO PILING. THE LIGHTWEIGHT VENTEC ROOF (EWF) IS SUPPORTED BY A GLUED LAMINATED TRUSS (GLULAM).

LIVING WITH DATA





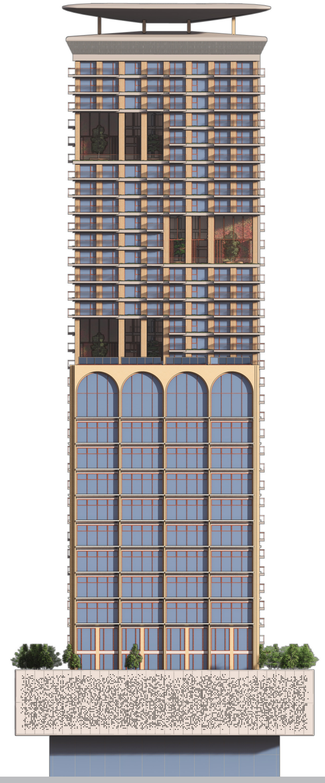
EXPLODED ISOMETRIC LOAD BEARING STRUCTURE. A STEEL TRUSS THAT SPANS TWO FLOORS IS INTRODUCED TO ACHIEVE THE LARGE SPANS THAT ARE REQUIRED TO KEEP THE SPORTS CENTER FREE OF COLUMNS. THE OUTER PERIMETER OF THE DATA CENTER CANTILEVERS 5.8 M OVER THE PUBLIC SPACE BY SPANNING THE FLOORS BETWEEN PROTRUDING STEEL BEAMS.

LIVING WITH DATA

SOUTH FACADE



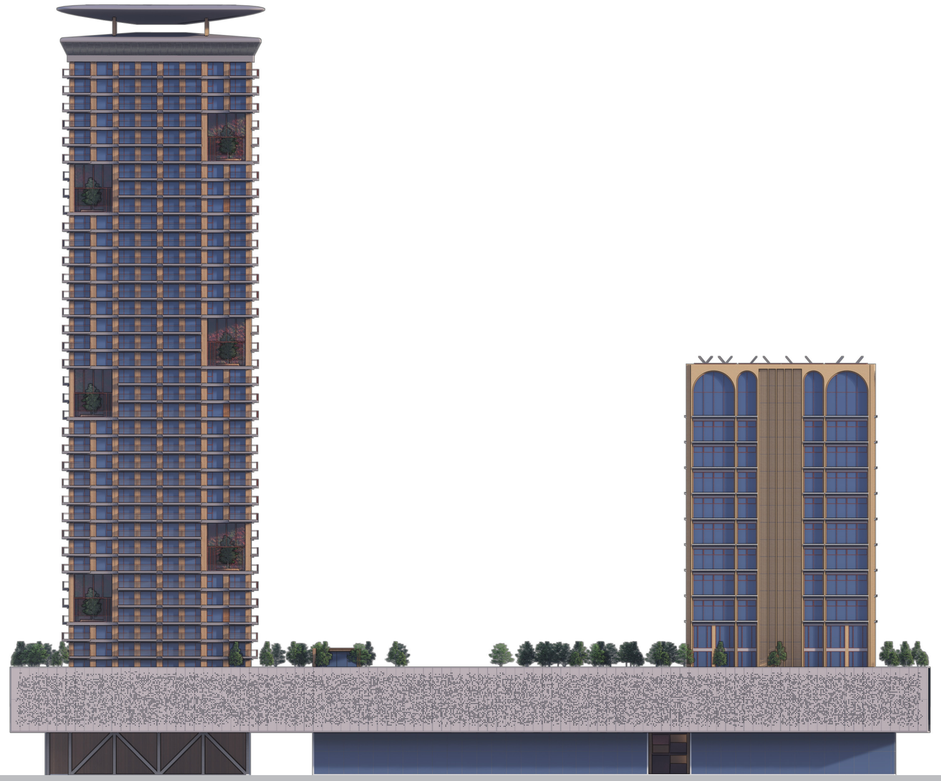
WEST FACADE



FACADES OF THE ENSEMBLE. THE PLINTH CONSISTS OF A CURTAIN WALL SYSTEM. THE DATA CENTER IS MATERIALISED WITH LIGHTWEIGHT PERFORATED FIBER CEMENT PANELS (CONSISTING OF WATER, PORTLANDCEMENT, CELLULOSE AND MINERALS).

LIVING WITH DATA

NORTH FACADE



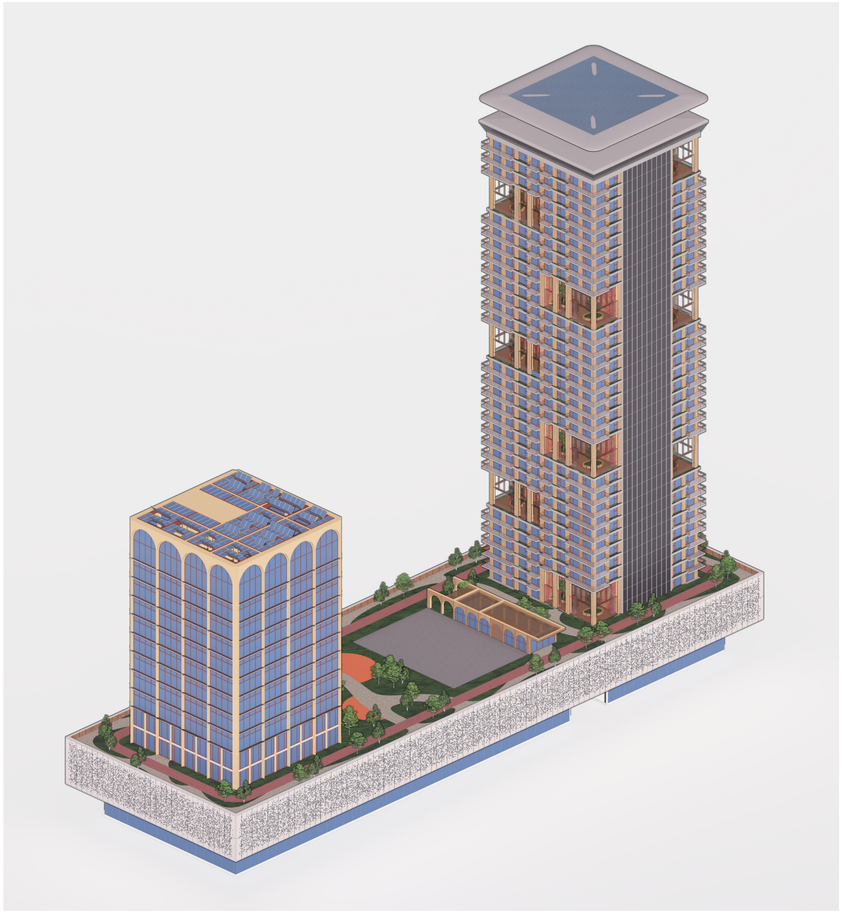
EAST FACADE



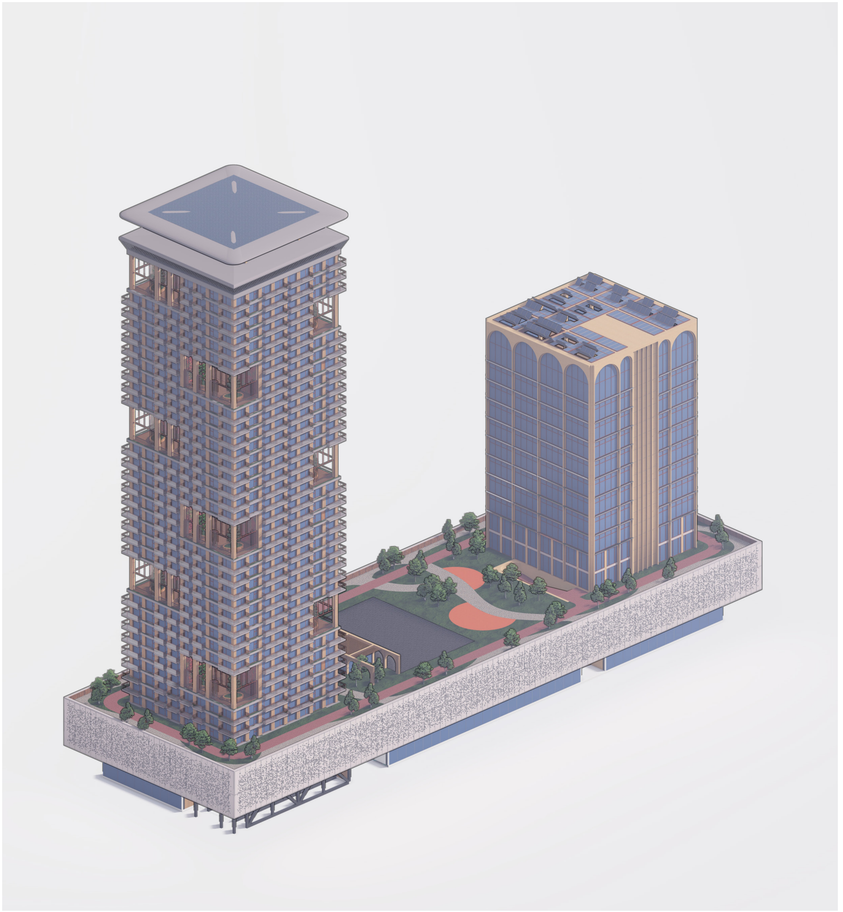
FACADES OF THE ENSEMBLE. THE TOWERS ARE STRUCTURALLY MADE OF TIMBER, WHICH IS ALSO REFLECTED IN THE WOODEN SLATS AND PANELS THAT ARE USED.

LIVING WITH DATA

AXONOMETRIC VIEW

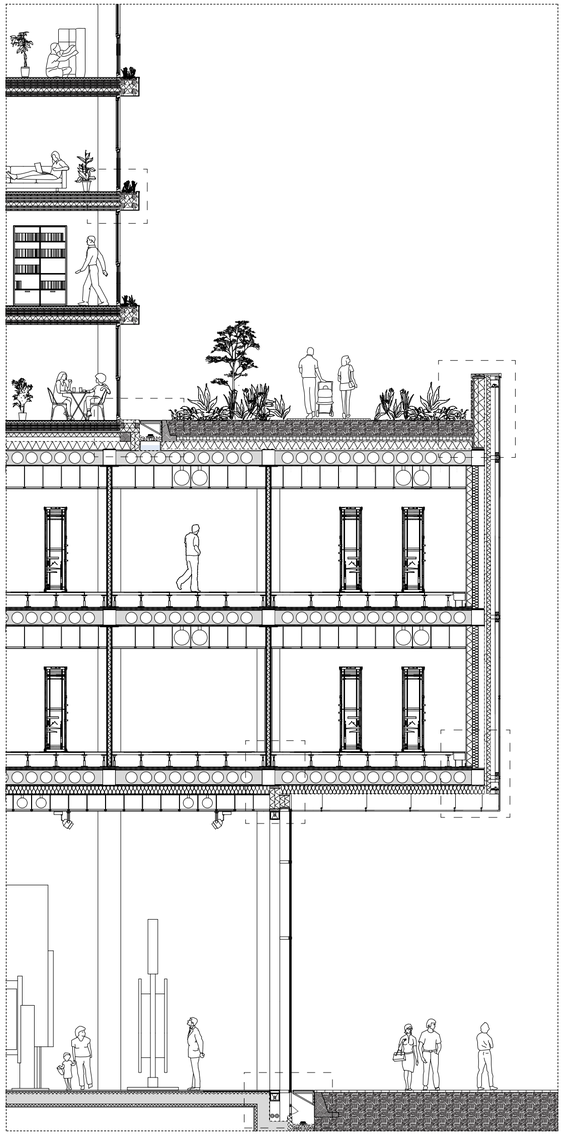


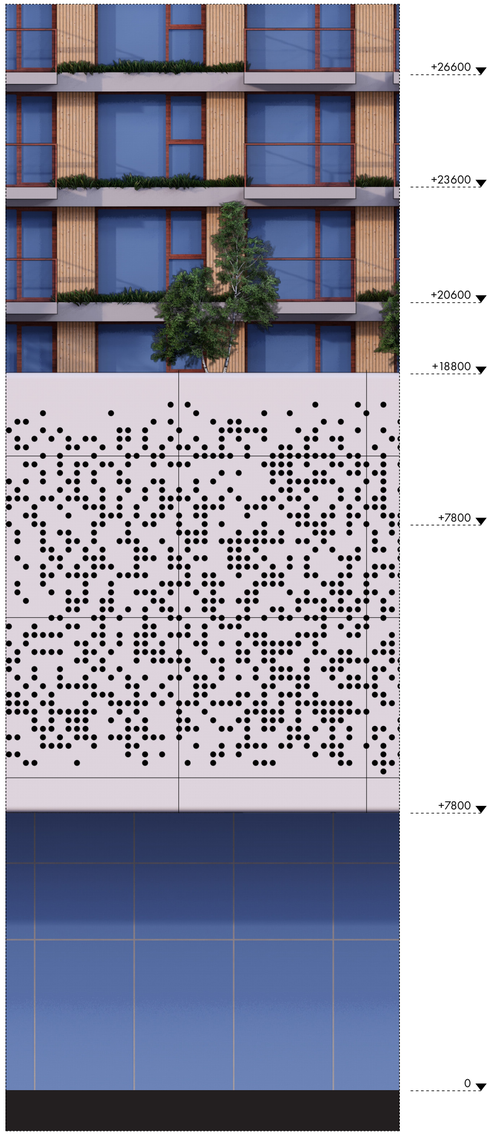
AXONOMETRIC VIEW

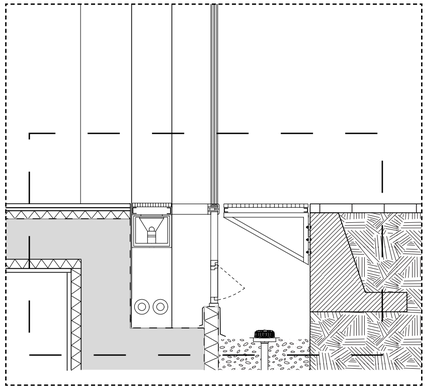


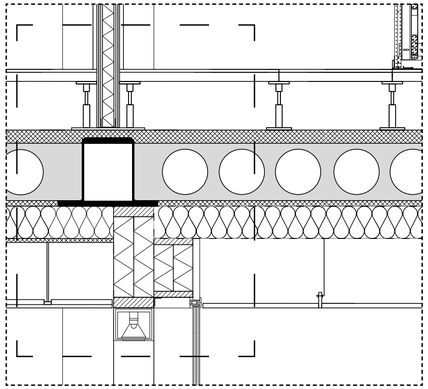
AXONOMETRIC VIEWS OF THE PROJECT. LOWER TO THE GROUND ARE THE DYNAMIC PLINTH AND IMPOSING DATA CENTER. IN CONTRAST, THE ROOF GARDEN AND BOTH TOWERS CREATE A CALM AND SHELTERED ENVIRONMENT IN THE MIDDLE OF THE CITY.

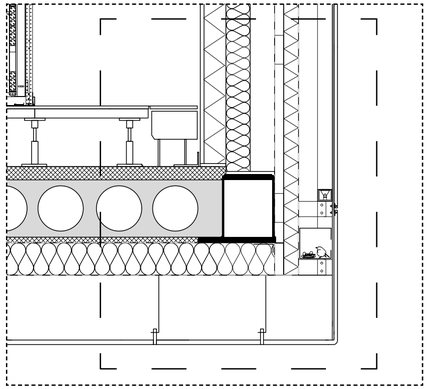
LIVING WITH DATA

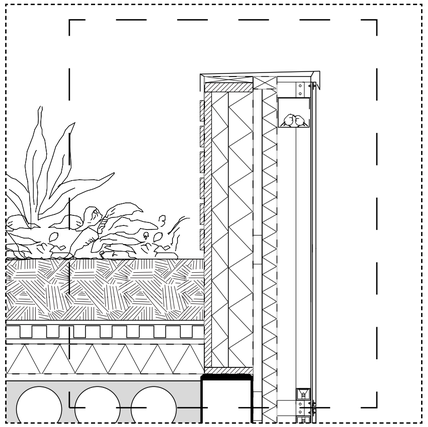


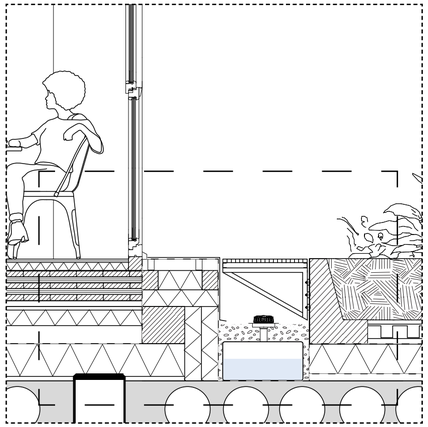


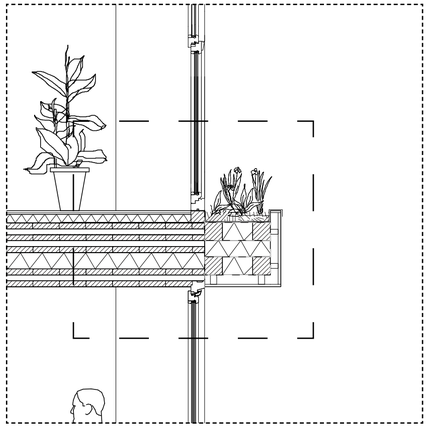


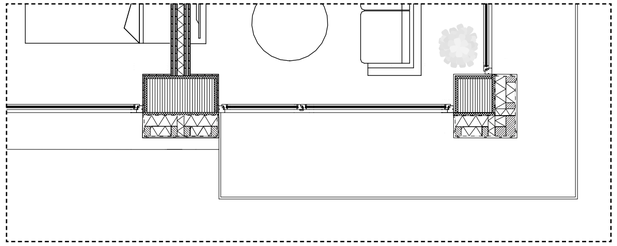


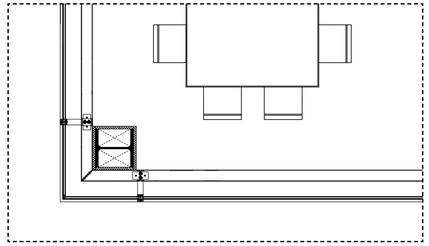












SEE POSTERS FOR MORE INFORMATION.

CONSTRUCTION DETAILS FOR THE CULTURAL CENTER, DATA CENTER, ROOF GARDEN AND RESIDENTIAL TOWER. VERTICAL SECTION AND FACADE FRAGMENT SHOW THE ELEMENTS TOGETHER. HIGHLIGHTED VERTICAL DETAILS AND HORIZONTAL DETAILS PROVIDE ADDITIONAL INFORMATION.

LIVING WITH DATA


LIVING
WITH
DATA

THANK YOU.

LIVING WITH DATA