



(in)human architecture



P5

Twan Goossens
Complex Projects Studio

Tutors:
Hrvoje Smidihen
Hubert van der Meel
Luc Willekens

(in)human architecture

Resource redistribution centre

2100

Amsterdam



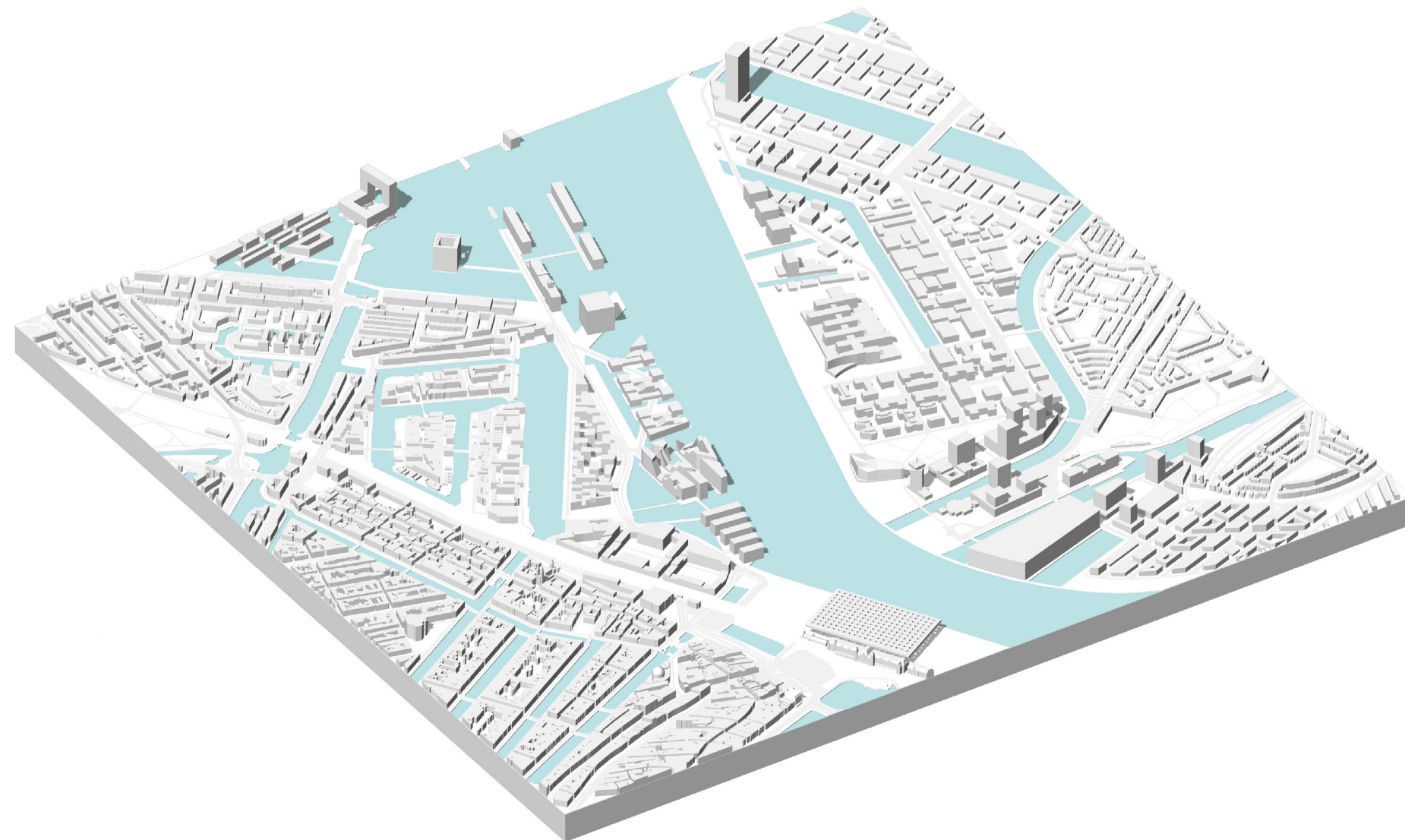
Introduction

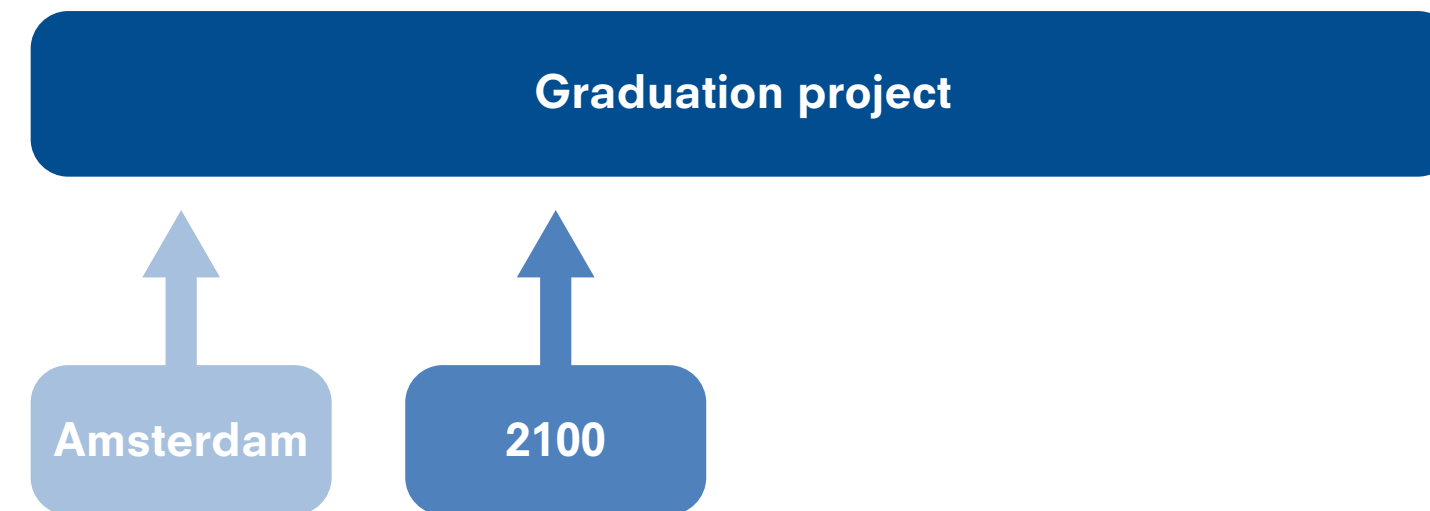
(in)human architecture

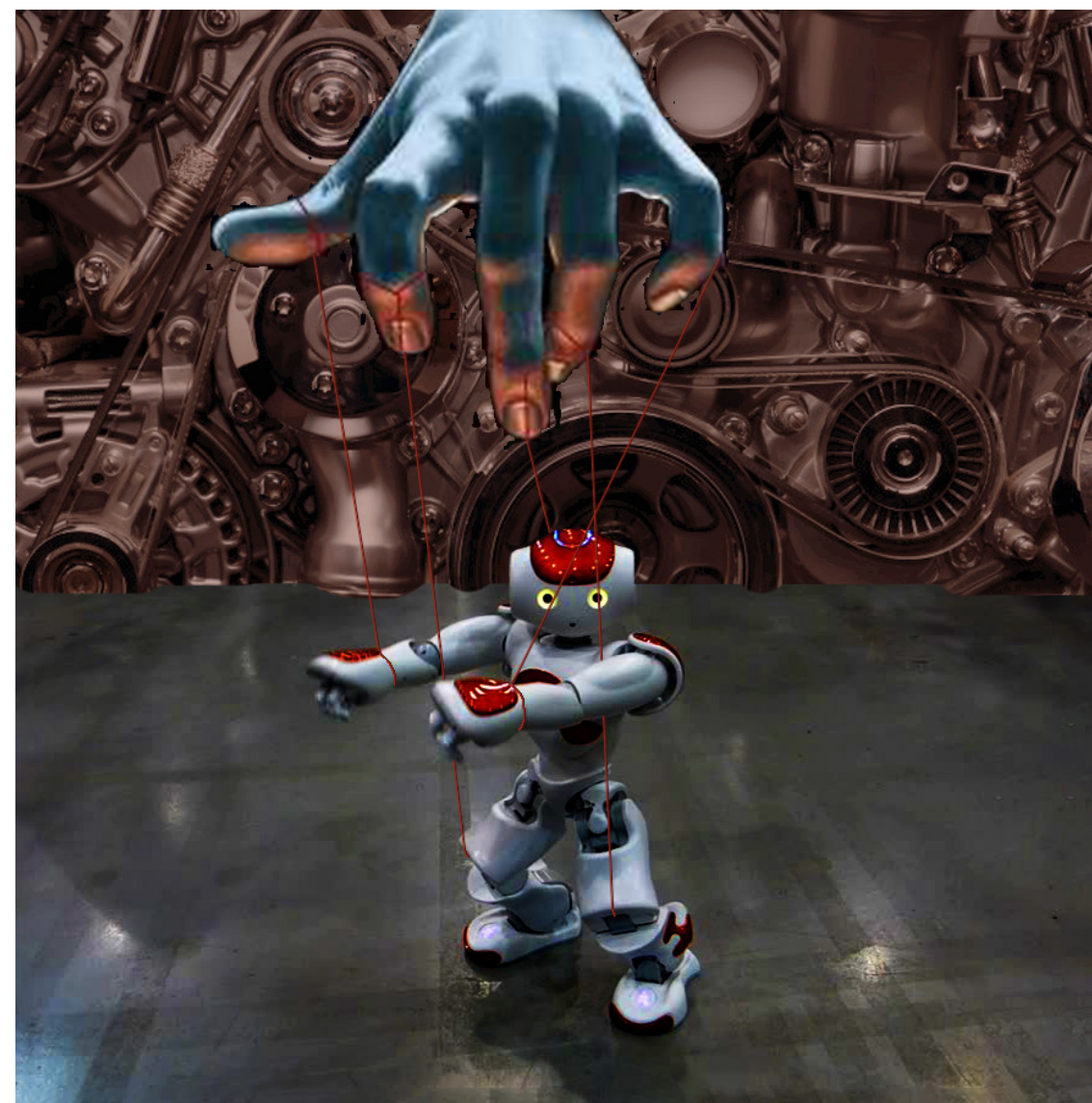
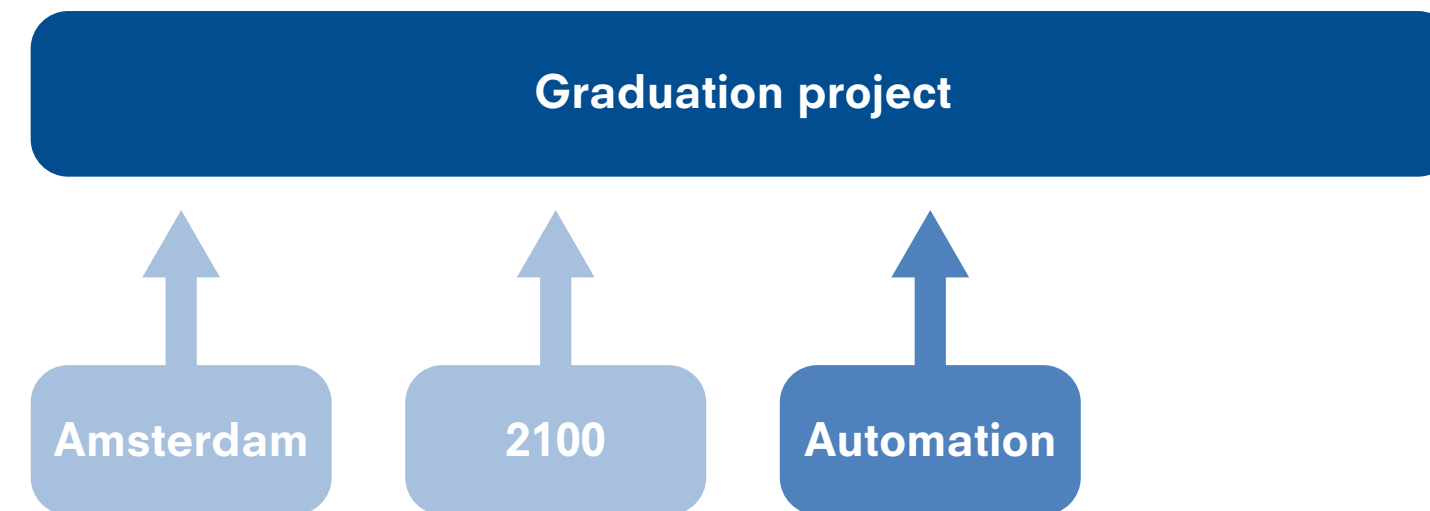


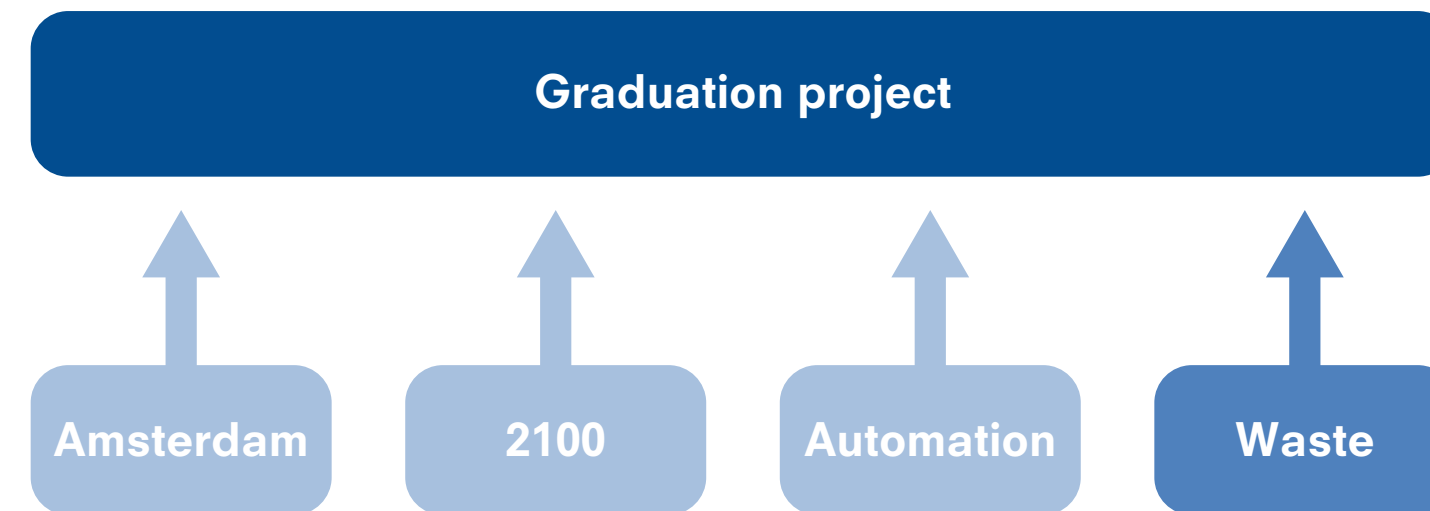
Graduation project

Amsterdam









Factory as a palace



Factory as a plague



Ideal workspace for humans

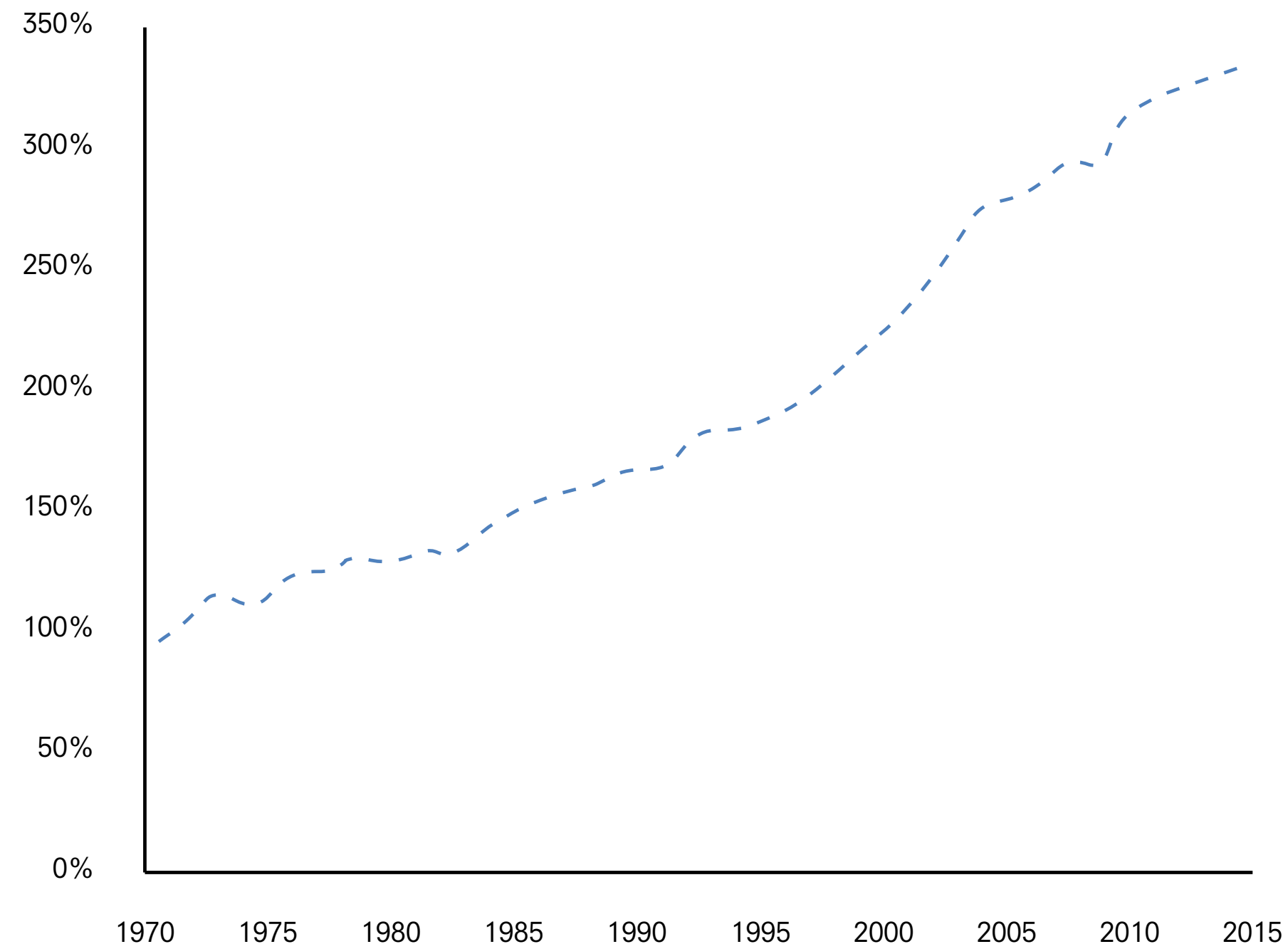


Which humans?



A new revolution

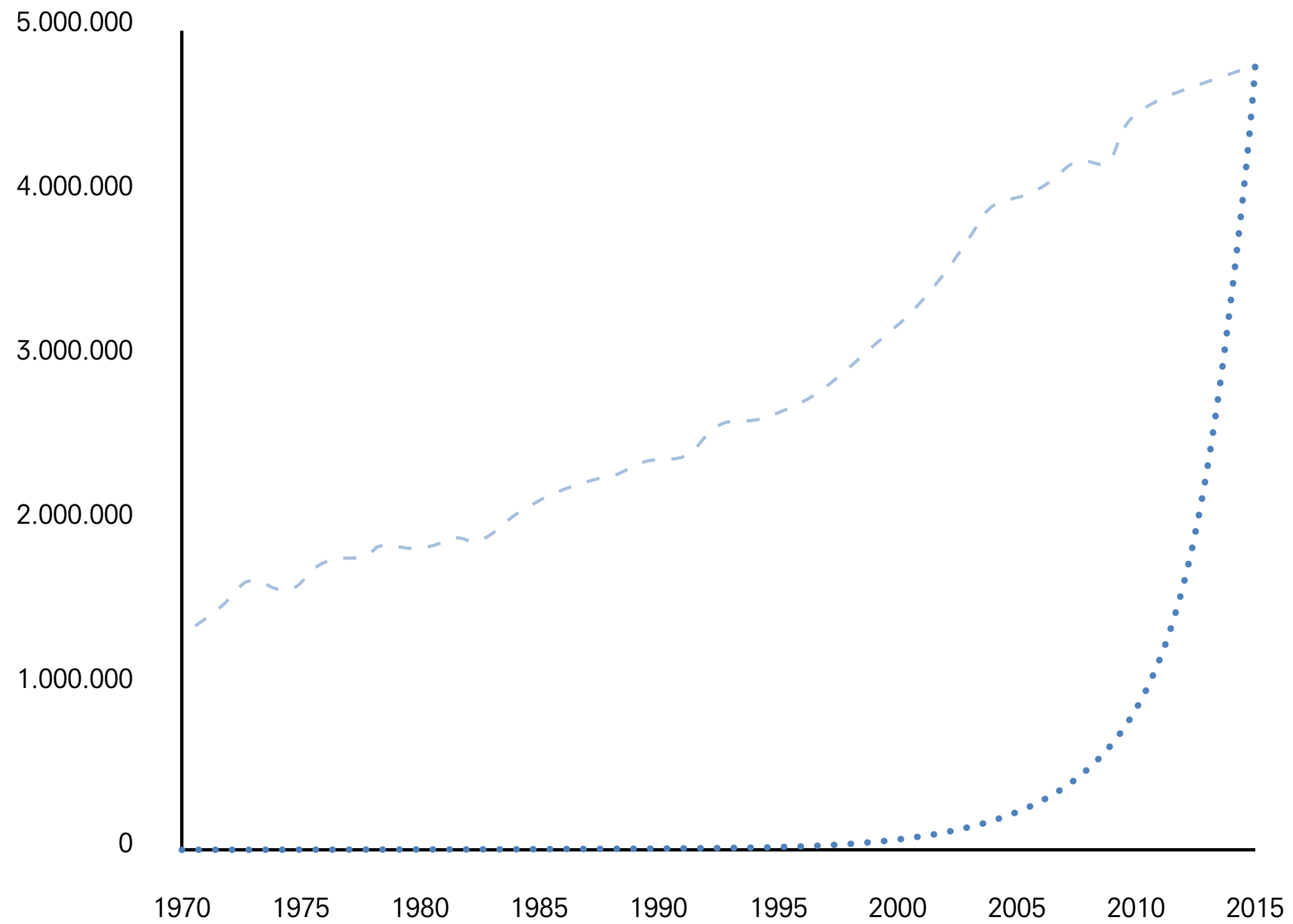
Growth of labor productivity
(USA, compared to 1945)



Source: <https://www.bloomberg.com/opinion/articles/2017-12-04/workers-get-nothing-when-they-produce-more-wrong>

A new revolution

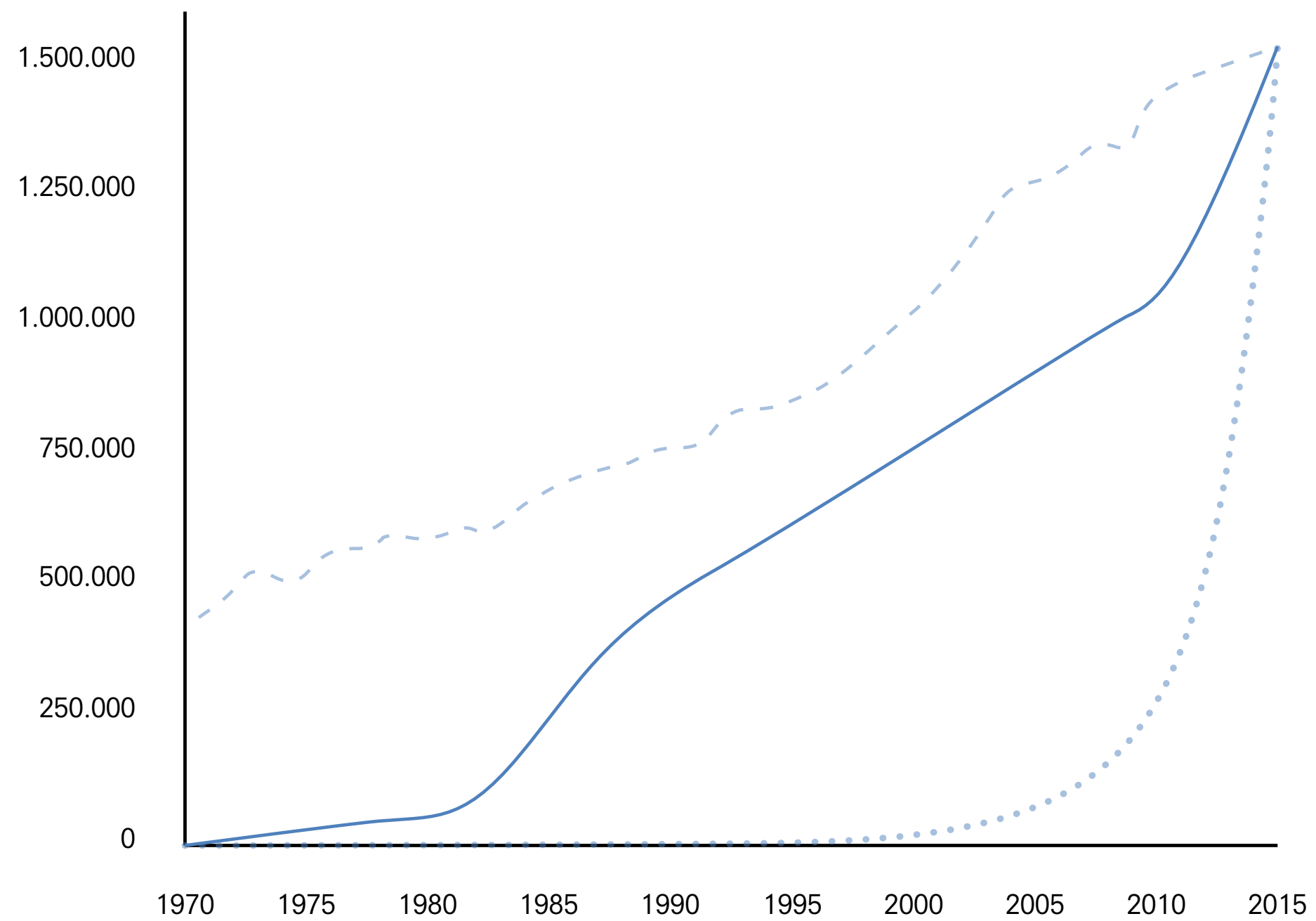
Moore's Law
(transistors in microprocessors)



Source: University of California, Berkeley (2017). The Beauty and Joy of Computing.

A new revolution

World total industrial robots



Source: BofA/ML, Bloomberg (2017). Global industrial Robots.

Taking over the mundane



Source: <https://www.digitaltrends.com/cool-tech/best-robot-lawnmowers/>

Disconnecting us from ancient processes



How far will this revolution go?



AI designed office (programmed by Autodesk)

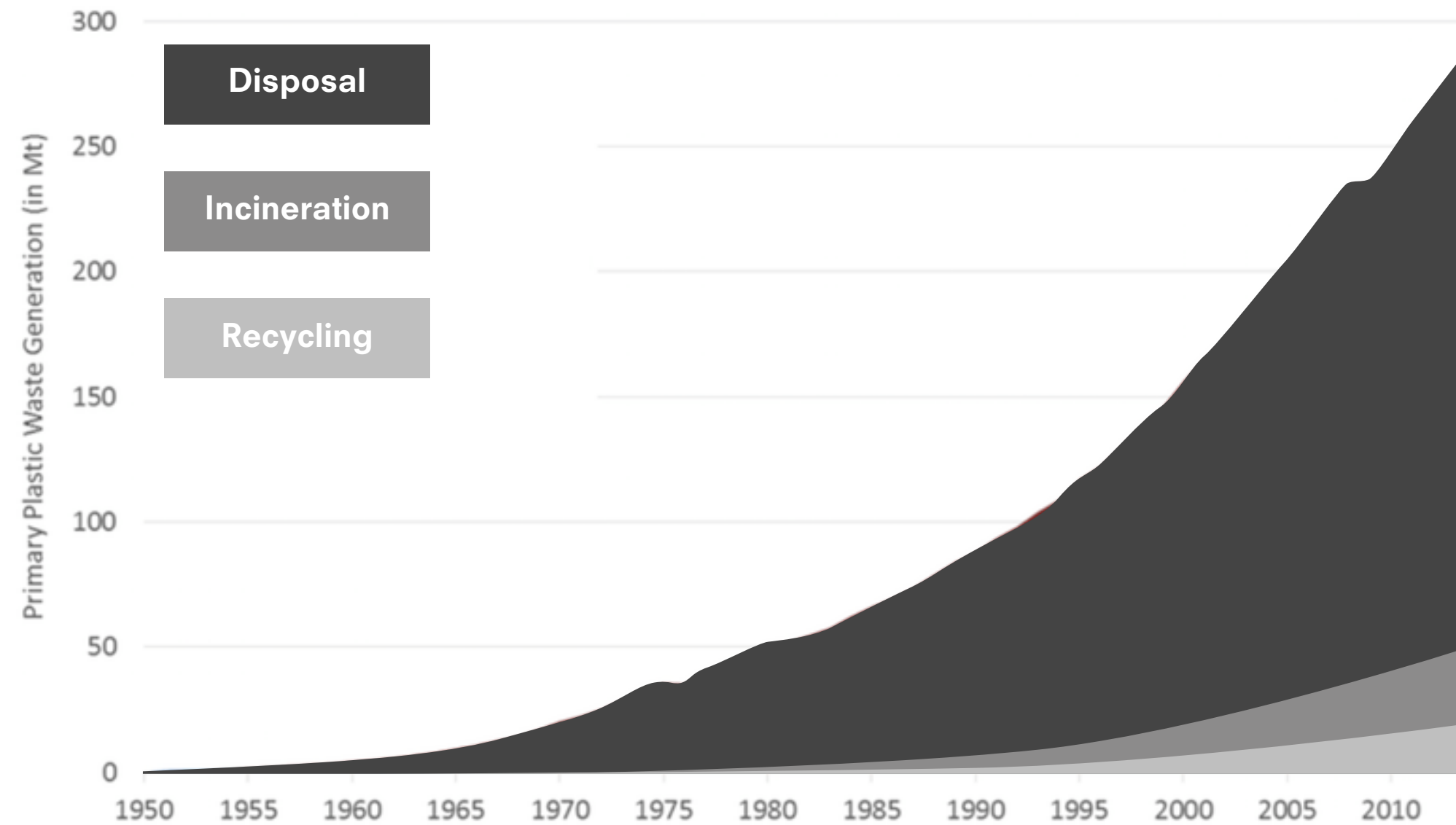
What connections remains between society and the processes that run it?



The answer is waste.



A fundamental change in how we treat waste is necessary



A fundamental change in how we treat waste is necessary



The circular economy as connection between man and machine



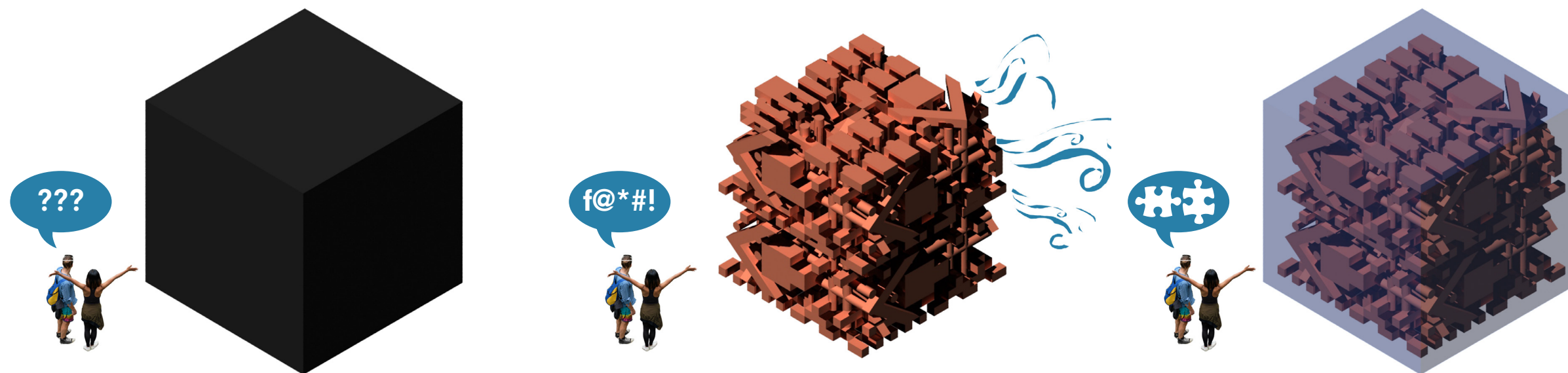
**As the gateway between these two worlds,
how are people confronted with the processing of waste?**



**How will waste treatment be incorporated in the urban fabric
of the city centre of Amsterdam in 2100?**

Research Question

Society is confronted with the automated processes running it through waste. How can this confrontation be designed?

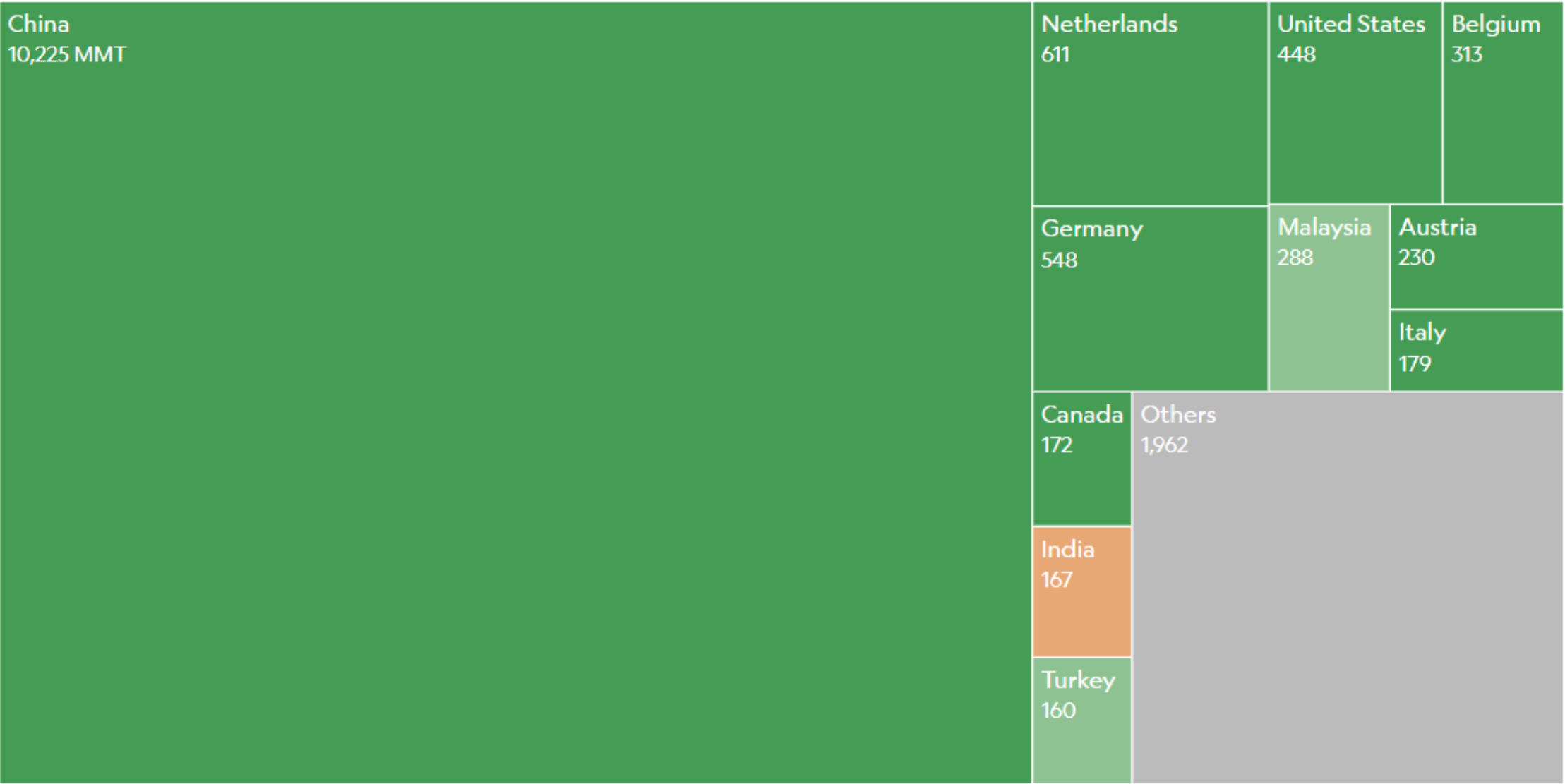


Location

(in)human architecture

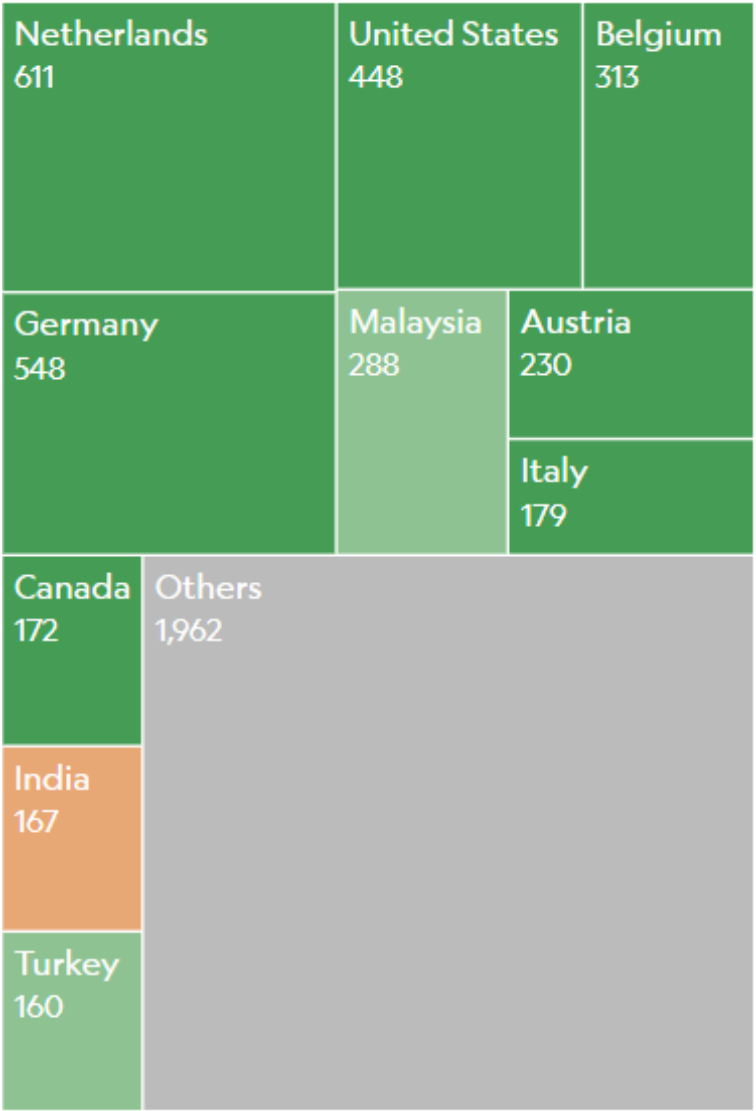


Global waste crisis



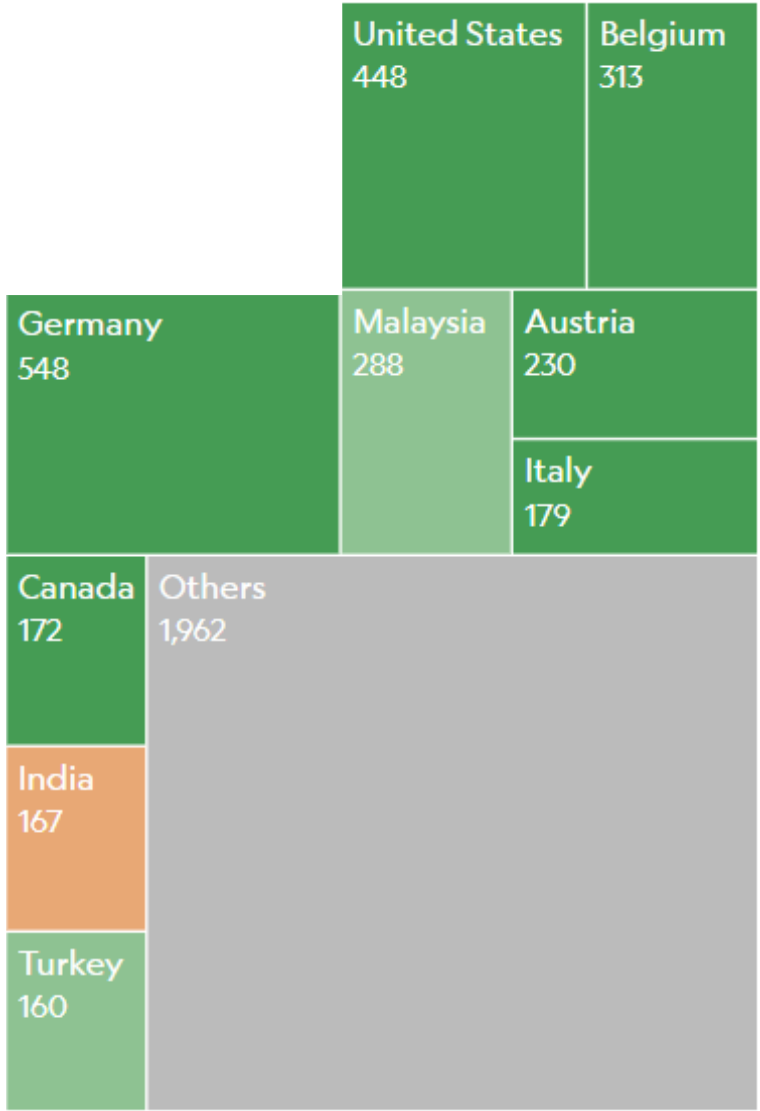
Plastic waste imports, 2016. Graph by Parker & Elliot, 2018

Global waste crisis



Plastic waste imports, 2016. Graph by Parker & Elliot, 2018

Global waste crisis



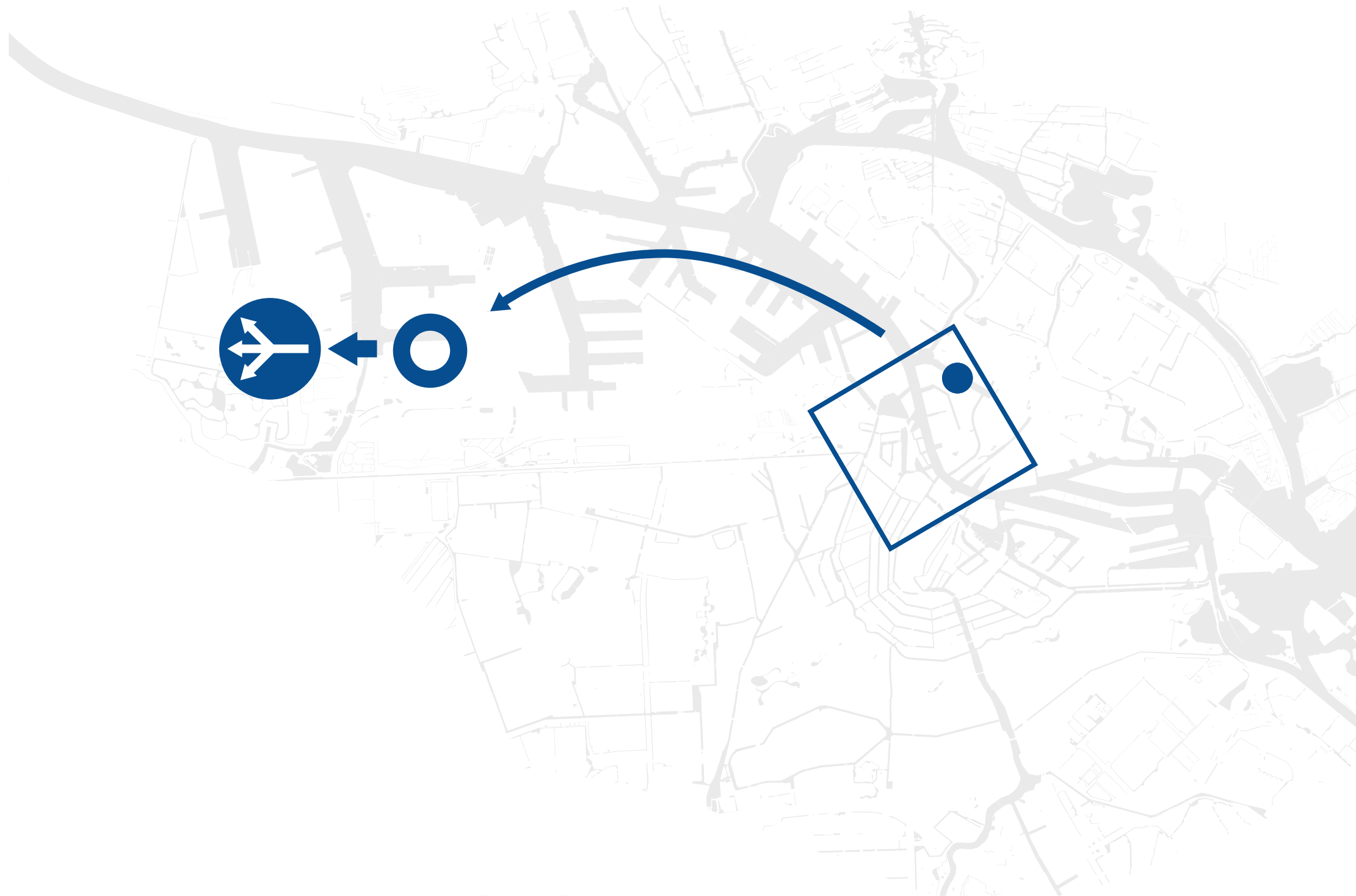
Plastic waste imports, 2016. Graph by Parker & Elliot, 2018

Dutch waste crisis

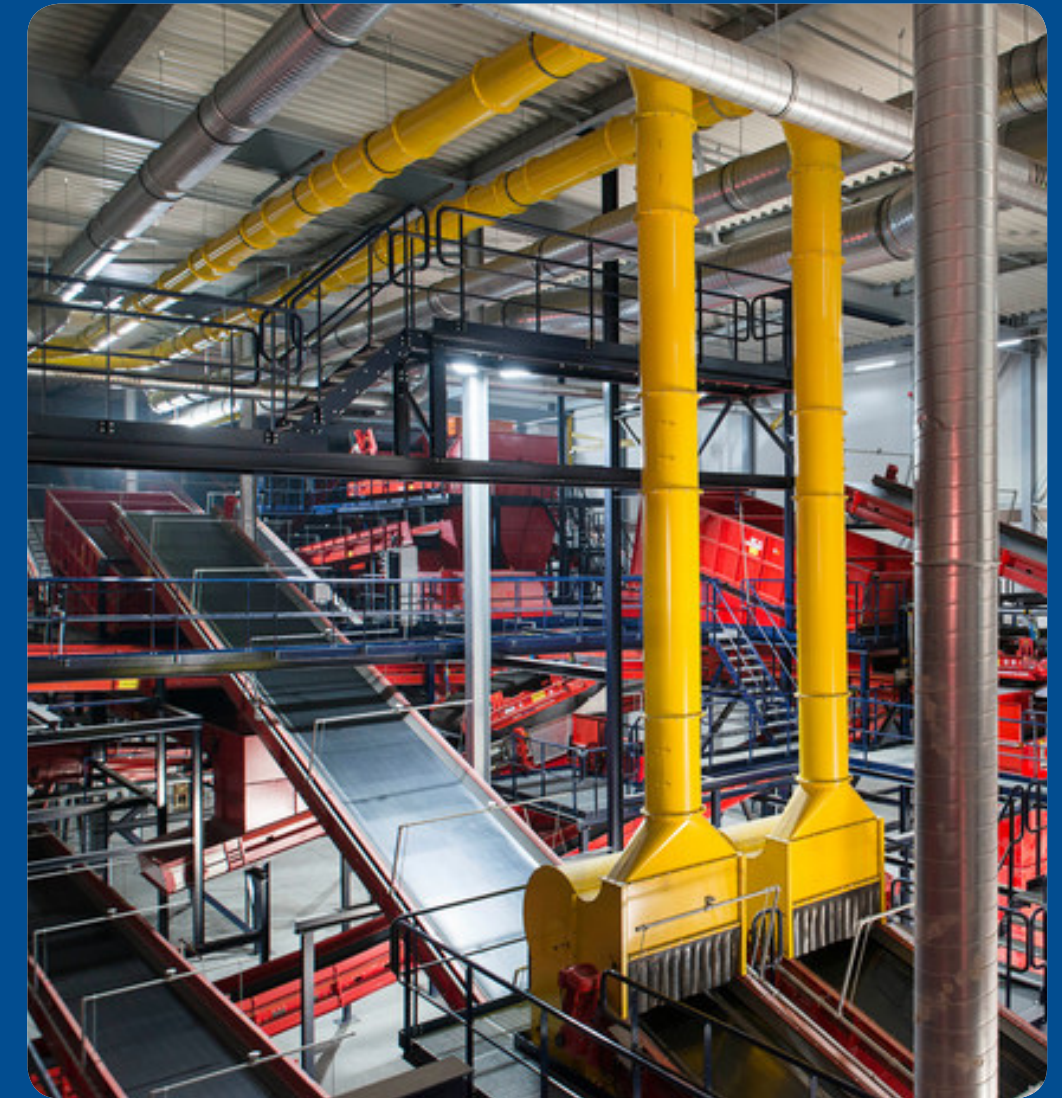


AEB is operating at 30% capacity: <https://www.parool.nl/english/no-one-is-willing-to-solve-amsterdam-s-waste-crisis~b83bf8f6/>

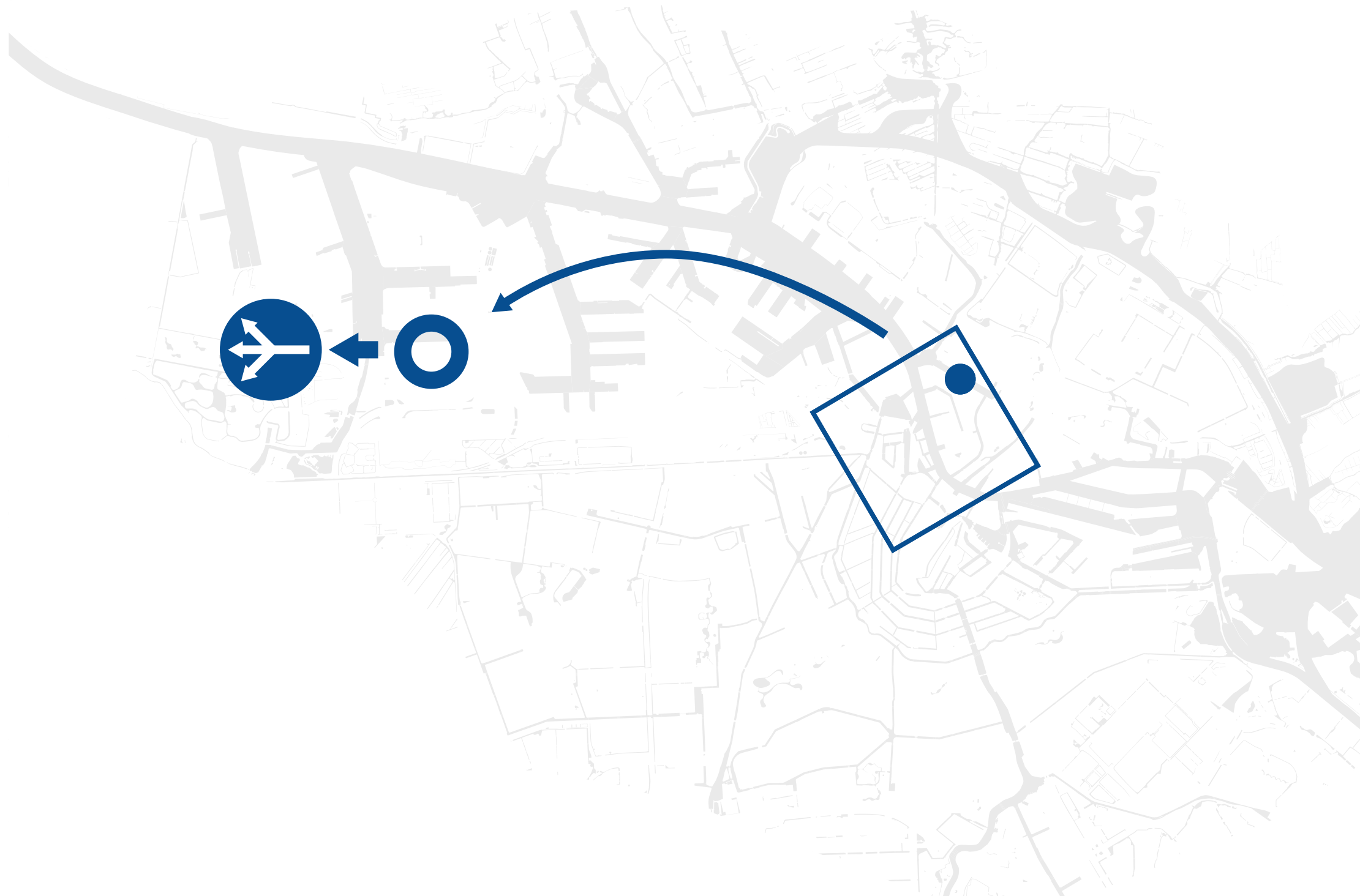
Dutch waste crisis



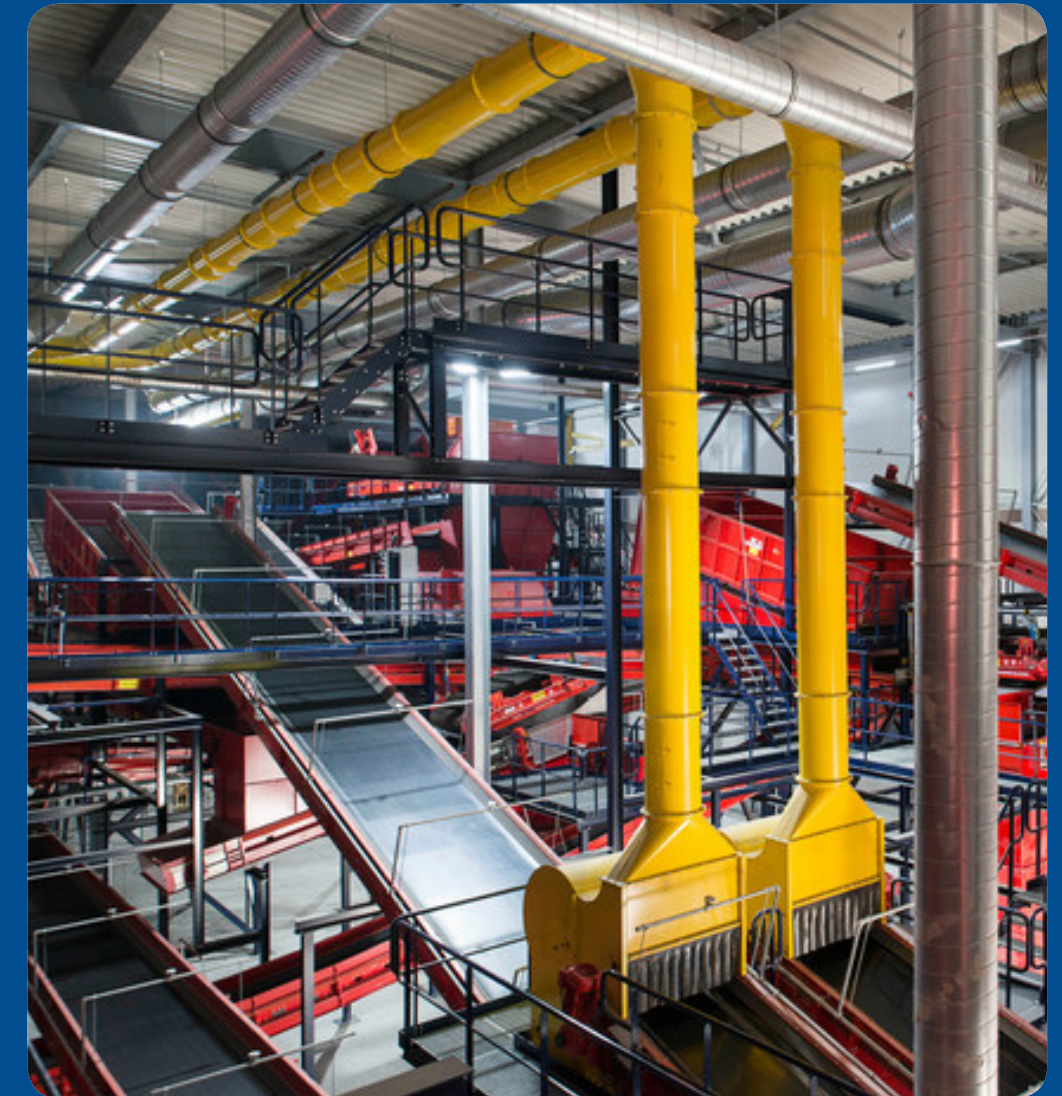
Centralised facility Sorting



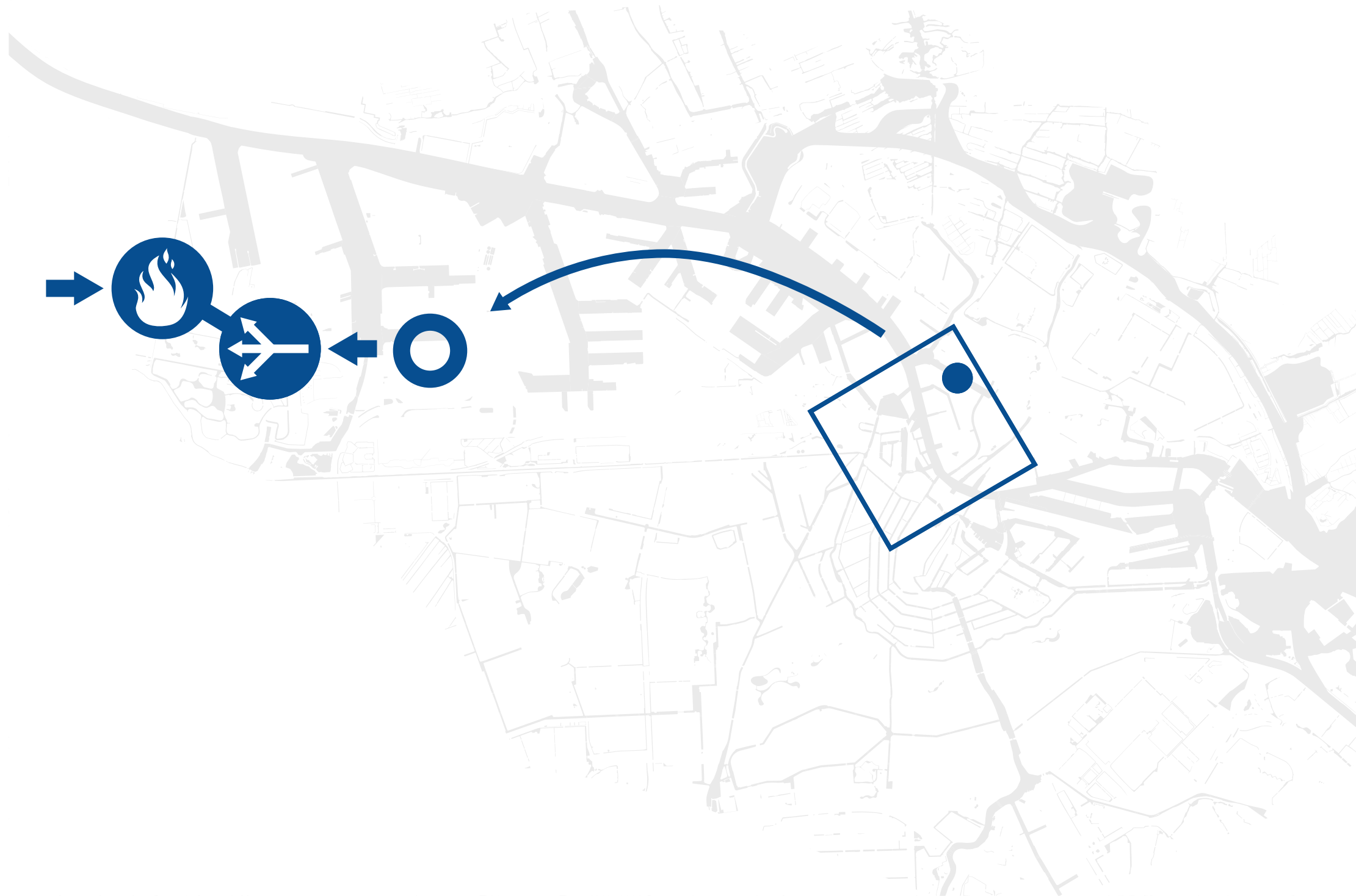
Dutch waste crisis



Centralised facility Sorting



Dutch waste crisis



**Centralised facility
Incinerating**



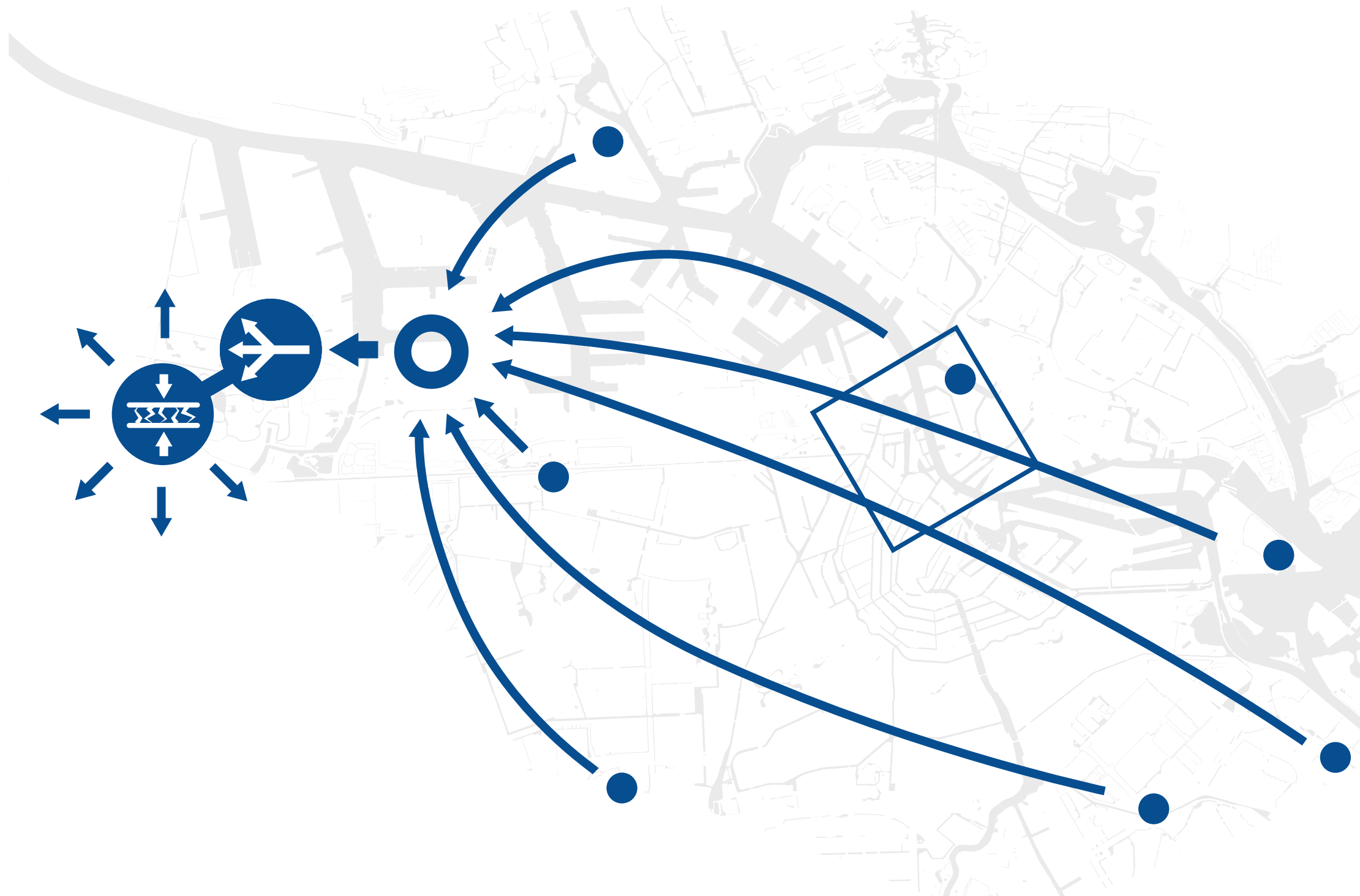
Dutch waste crisis



**More regional
recycling**



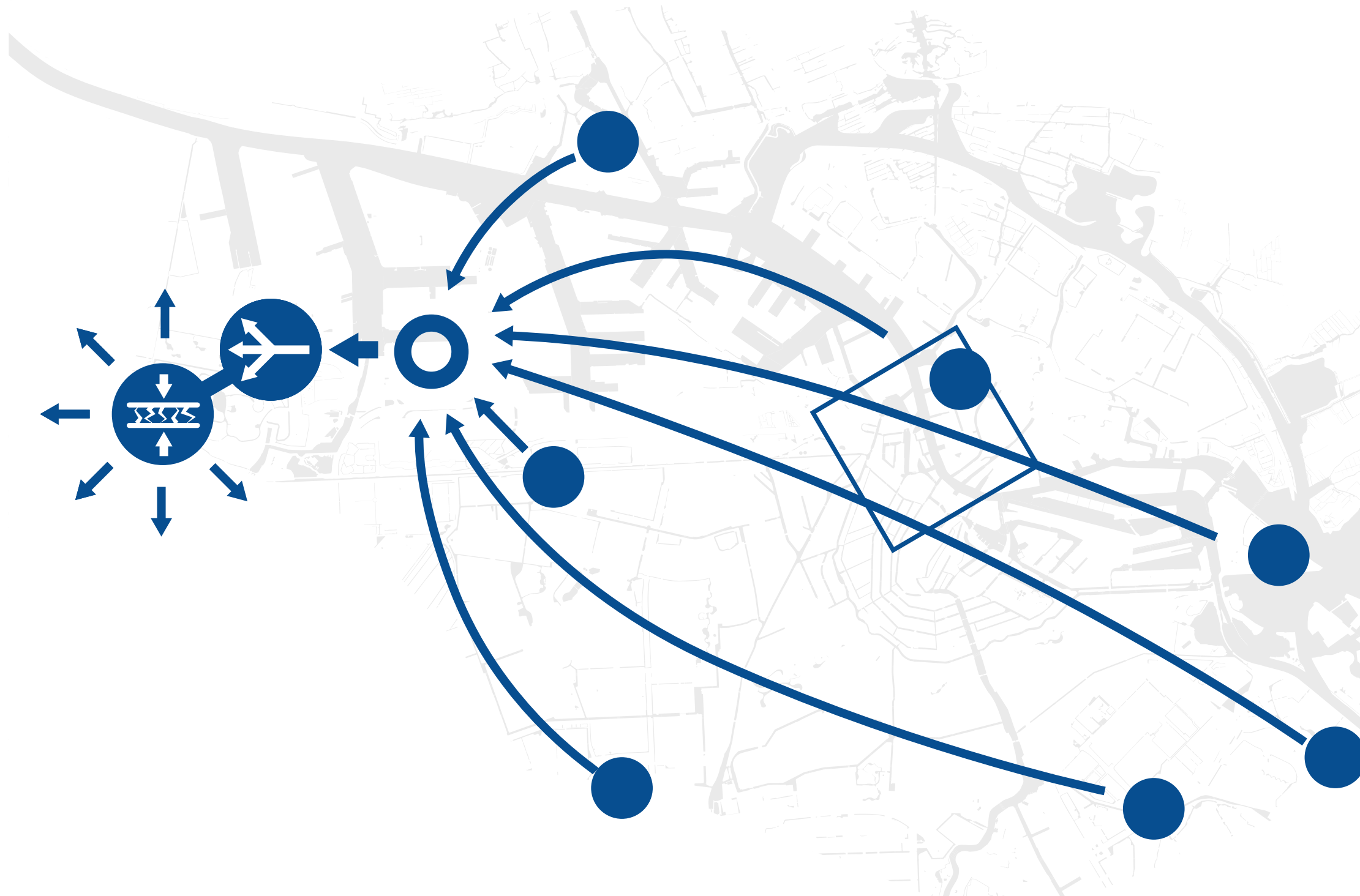
Dutch waste crisis



Congestion problems



Dutch waste crisis

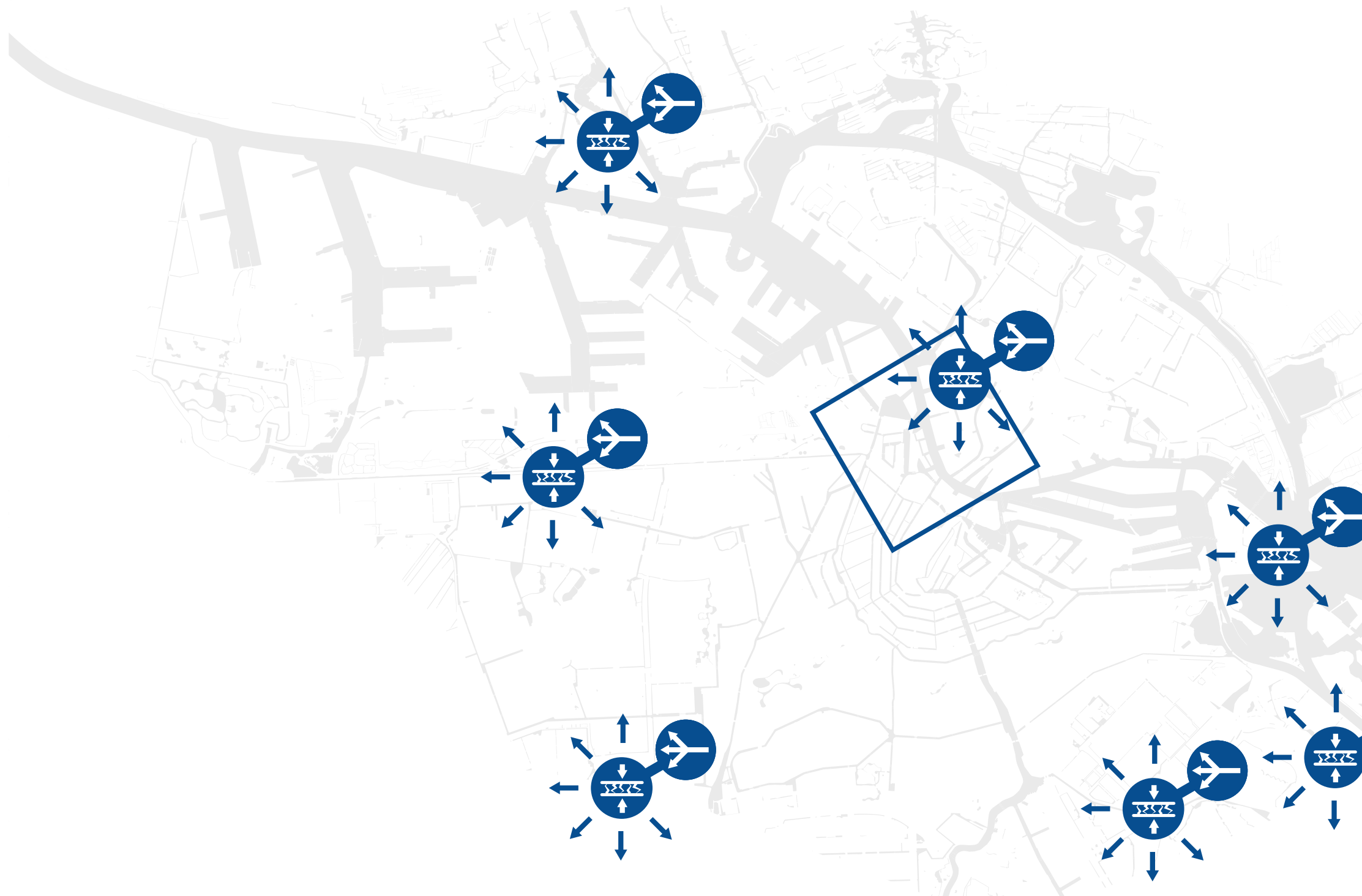


**Population growth:
more capacity needed**

Total population in Amsterdam 2100
1.571.994

2100
2090
2080
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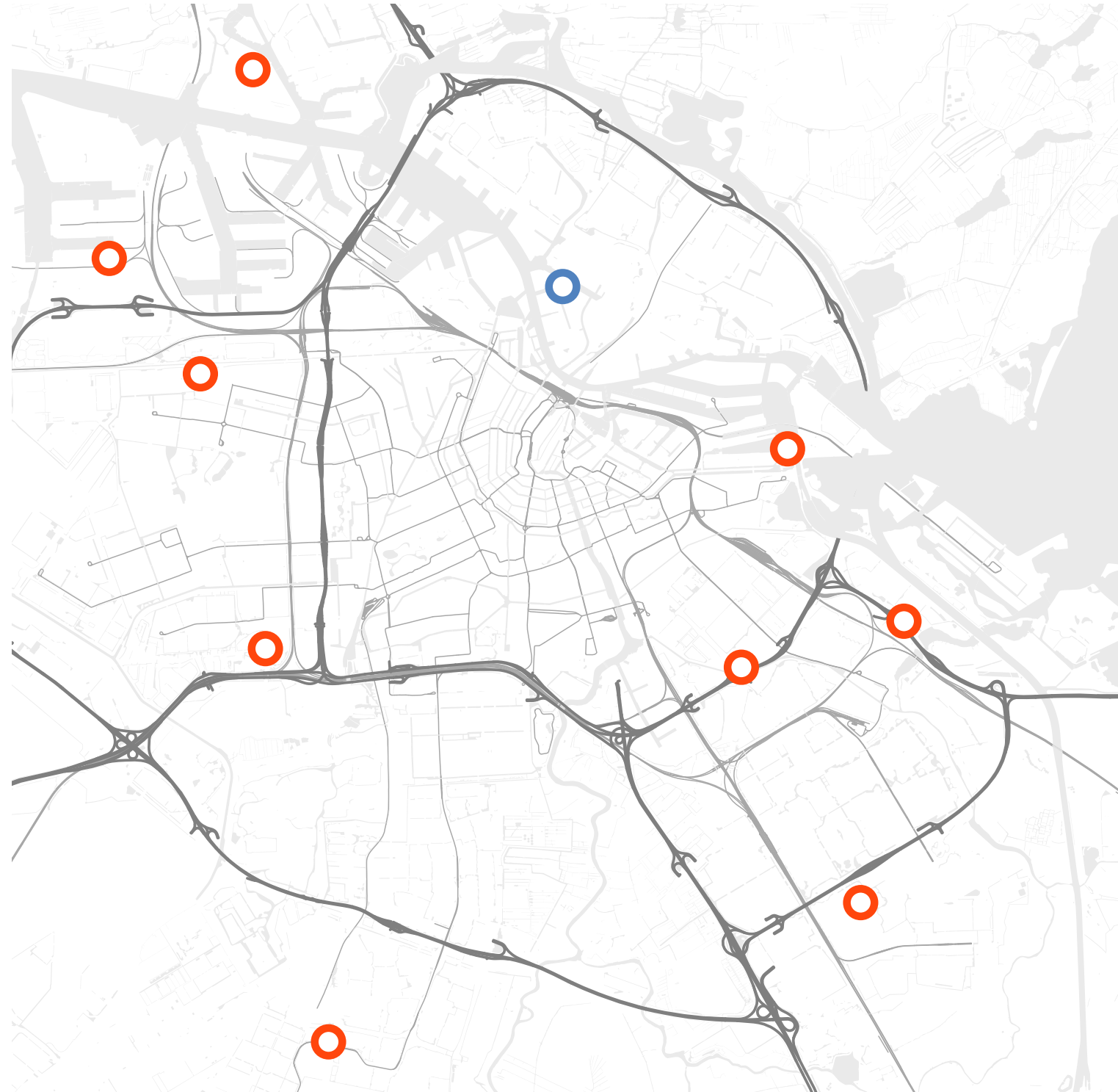
Dutch waste crisis



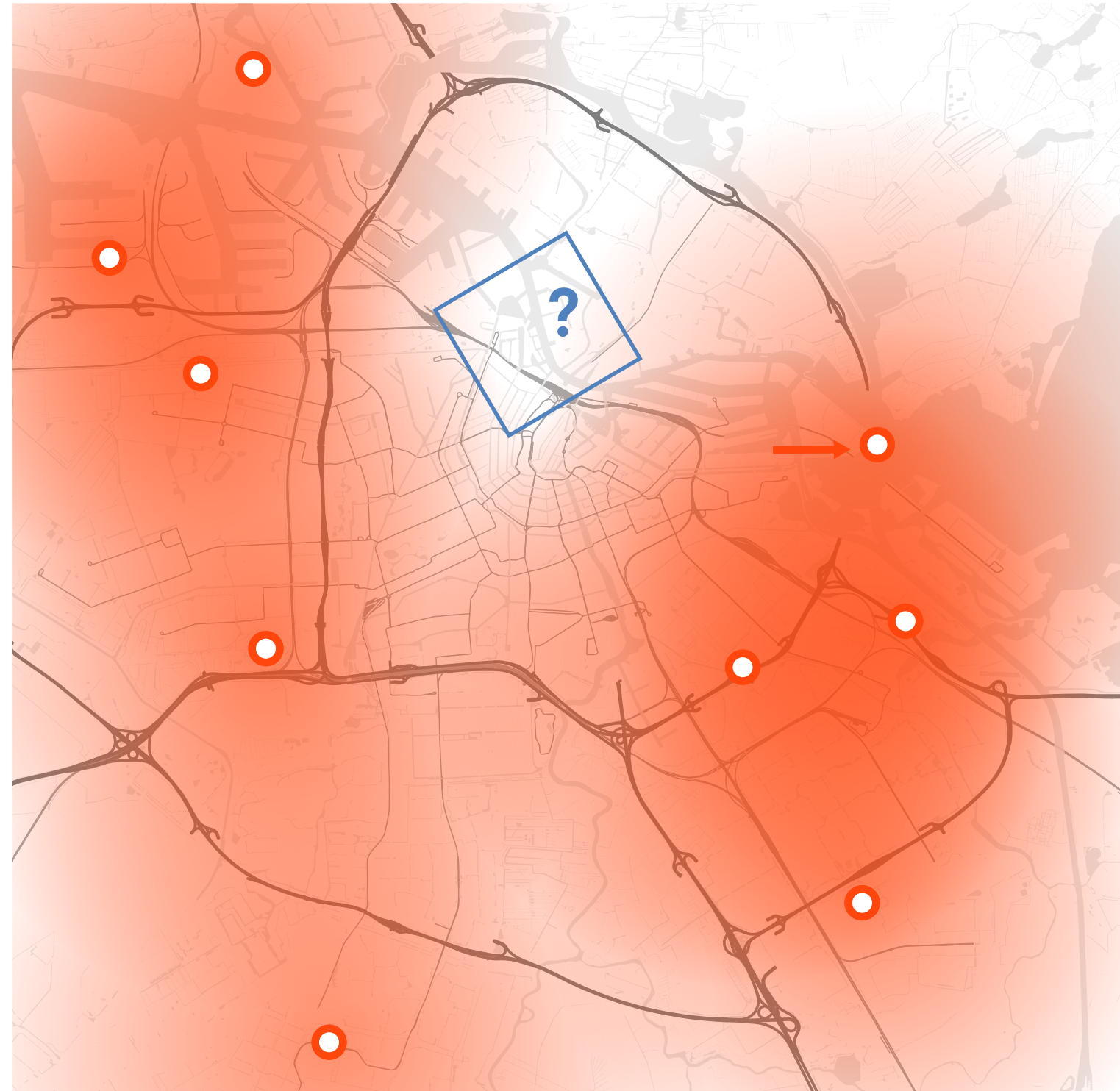
**Recycling hubs
upgraded**



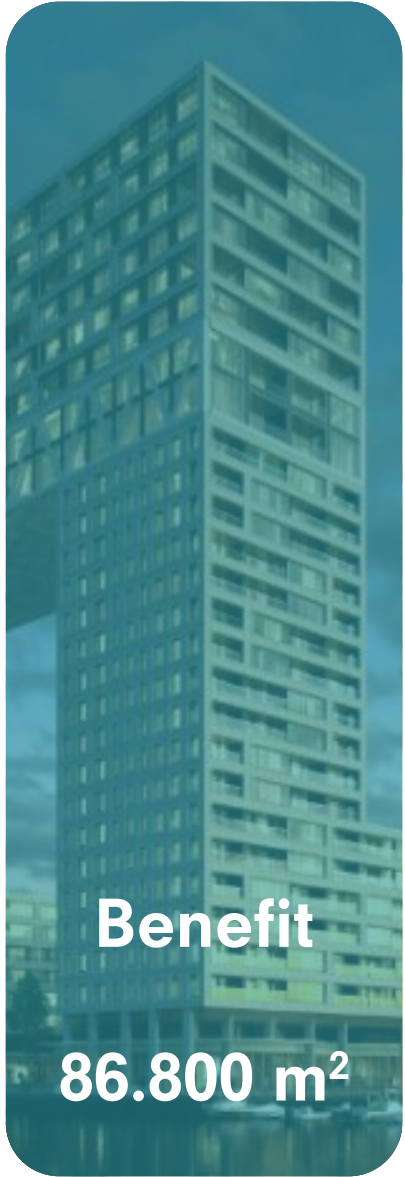
Existing recycling hubs



Recycling hub coverage



Space savings created with additional collection hub



Population of service area:
280.000

Households:
180.000

Space per household required
for waste disposal:
1.2m²

Space with automated vacuum
local waste collection system
0.7m²

Space required for facility

Advances in climate control



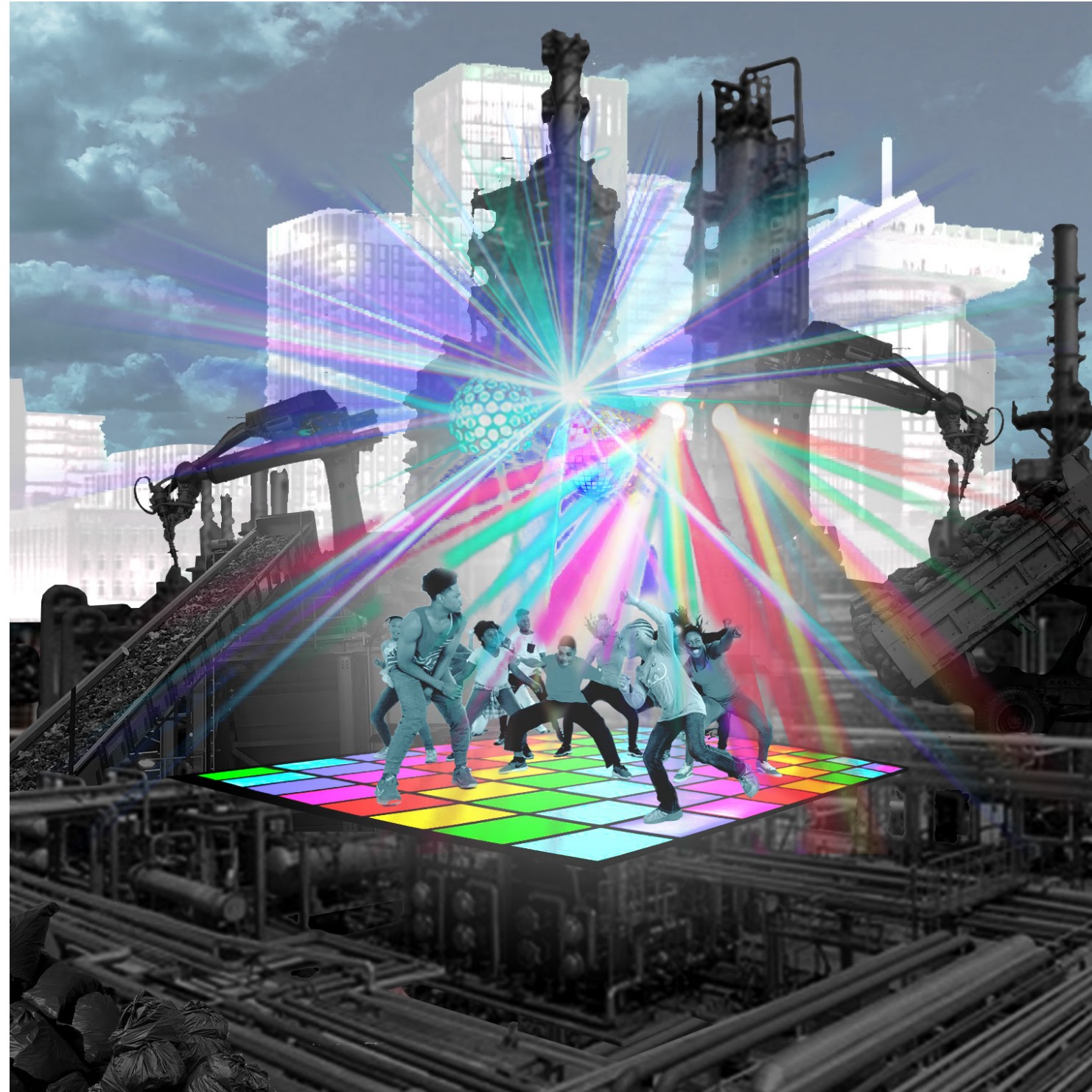
Closed off & automated systems



Efficient space-use



New waste collection hub is needed downtown!



Situation in 2100



Areas most in demand



Public land



Redevelopment with AVAC waste disposal



Access to underground pod system



Accessible for small cargo ships



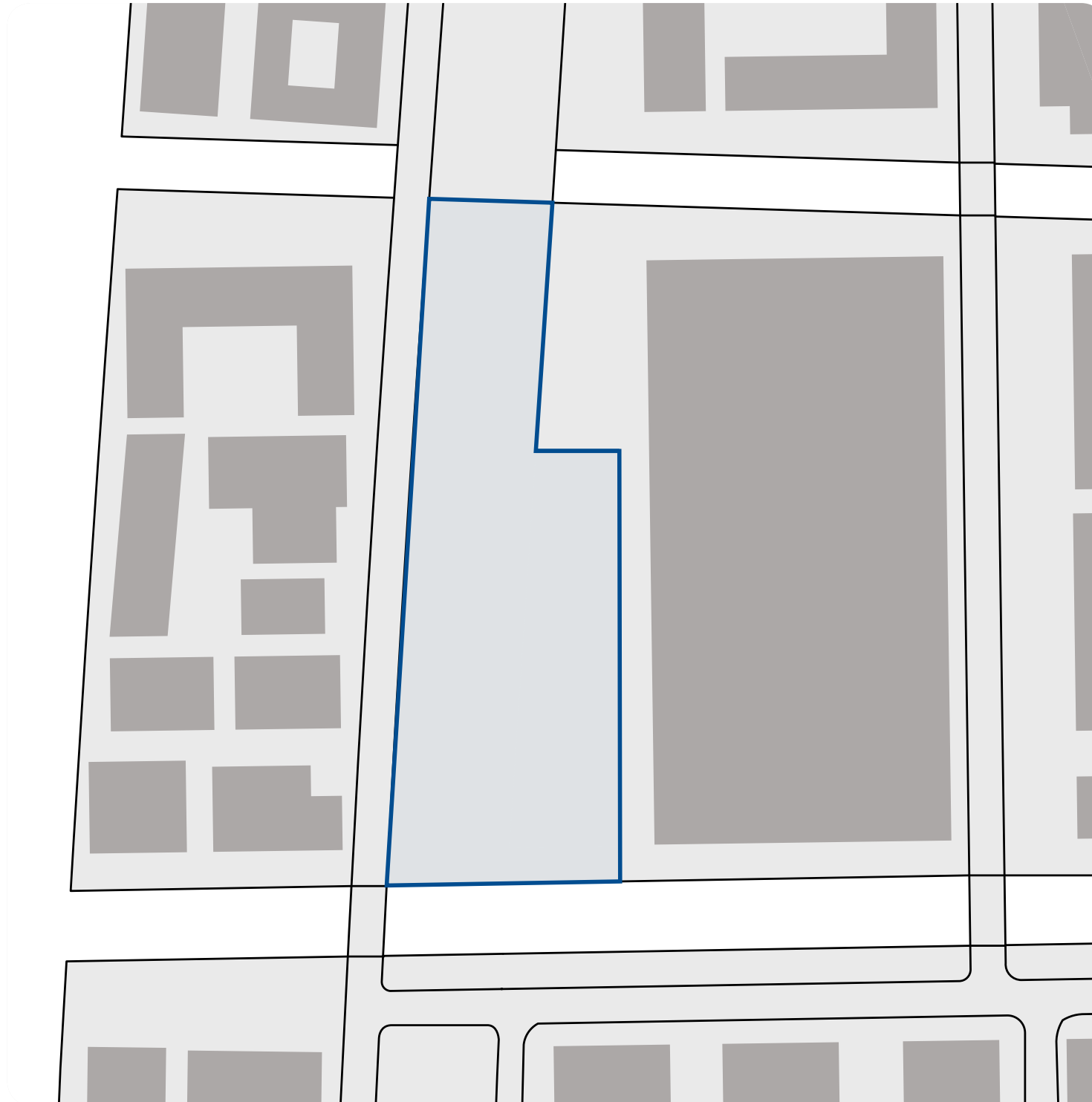
Suitability after overlay



Suitability after overlay



Transport requirements



No above-ground road
entrance to facility

Transport requirements



Mooring bollards required
Movable cranes required

Maximal ship dimensions:

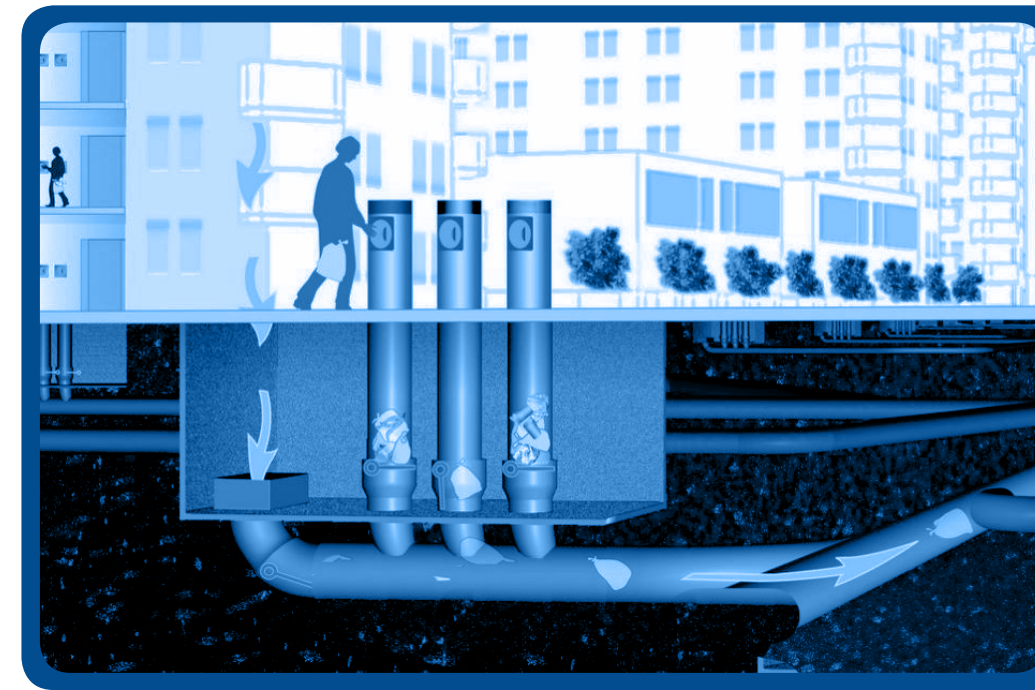
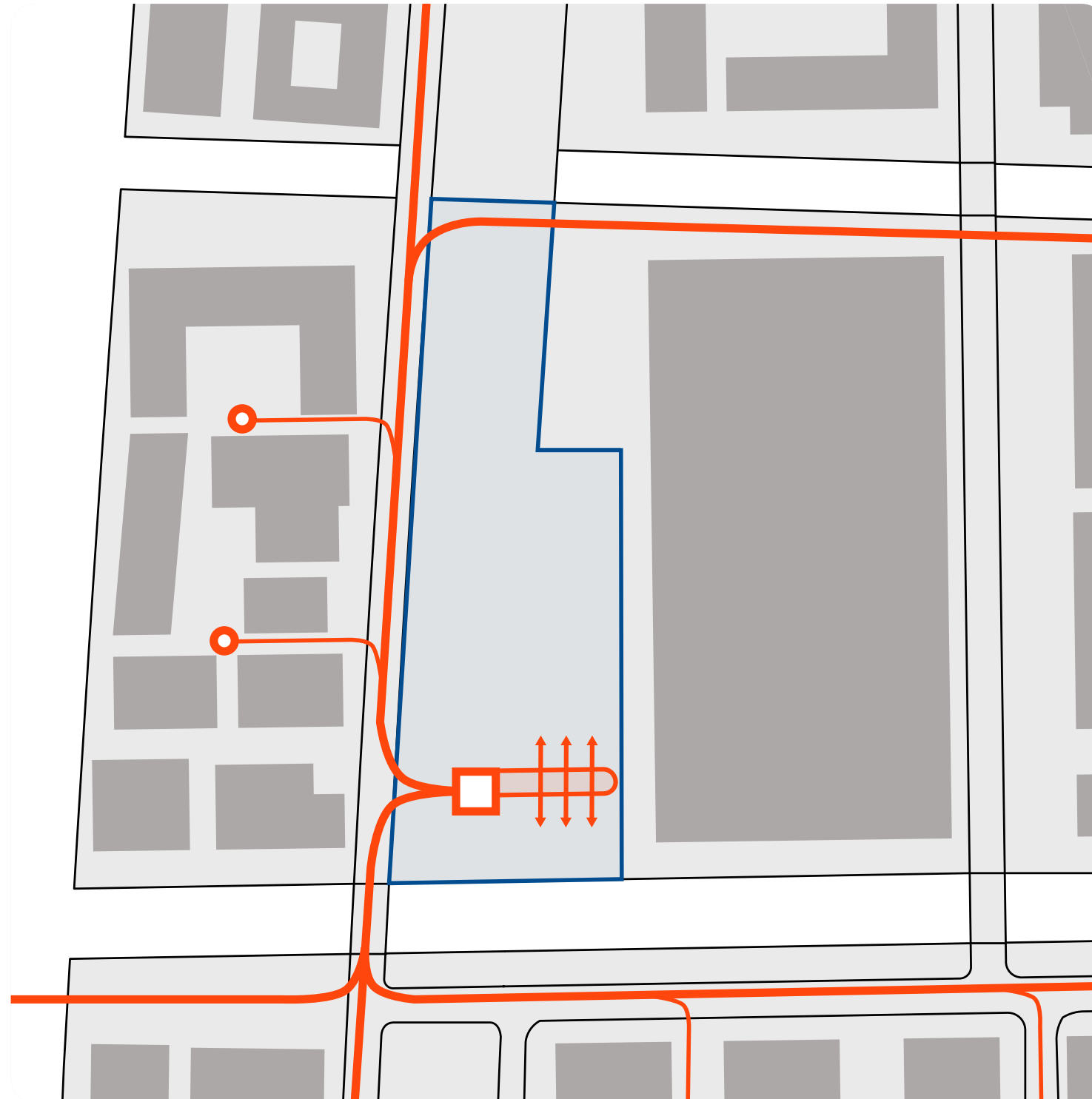
depth 2,50m

width 7,00m

length 32m

Southern bridges can open

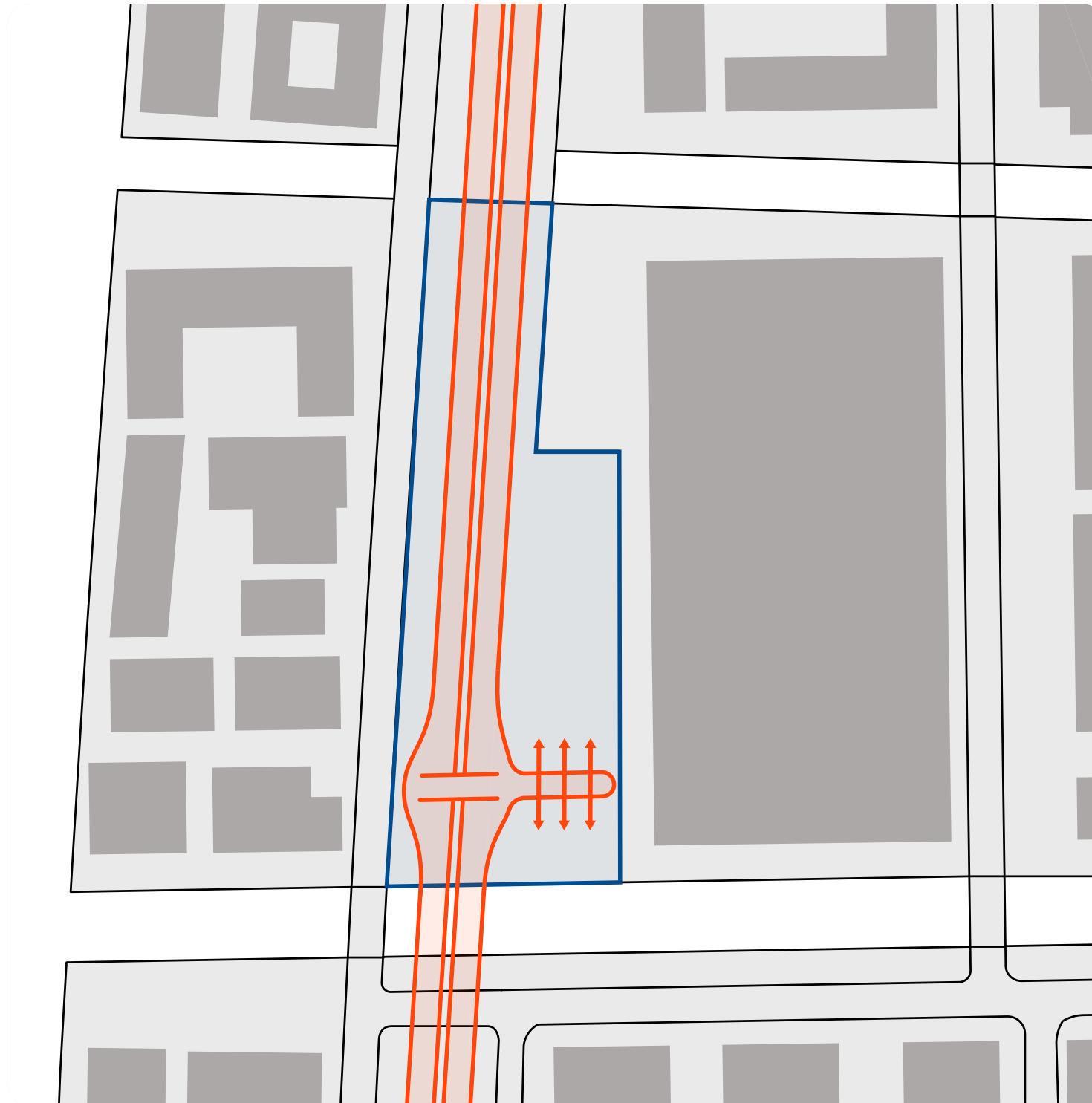
Transport requirements



Facility includes:
vacuum blower, airlocks and collec-
tion bays

Underground pneumatic pipes
Diameter 500mm
Length 1000m

Transport requirements



Facility includes:
Collection bays
Temporary parking
Maintenance hub

Vehicle width 2,66m
Tunnel diameter at least 4,00m

Vehicles are stored outside the city.

Transport requirements



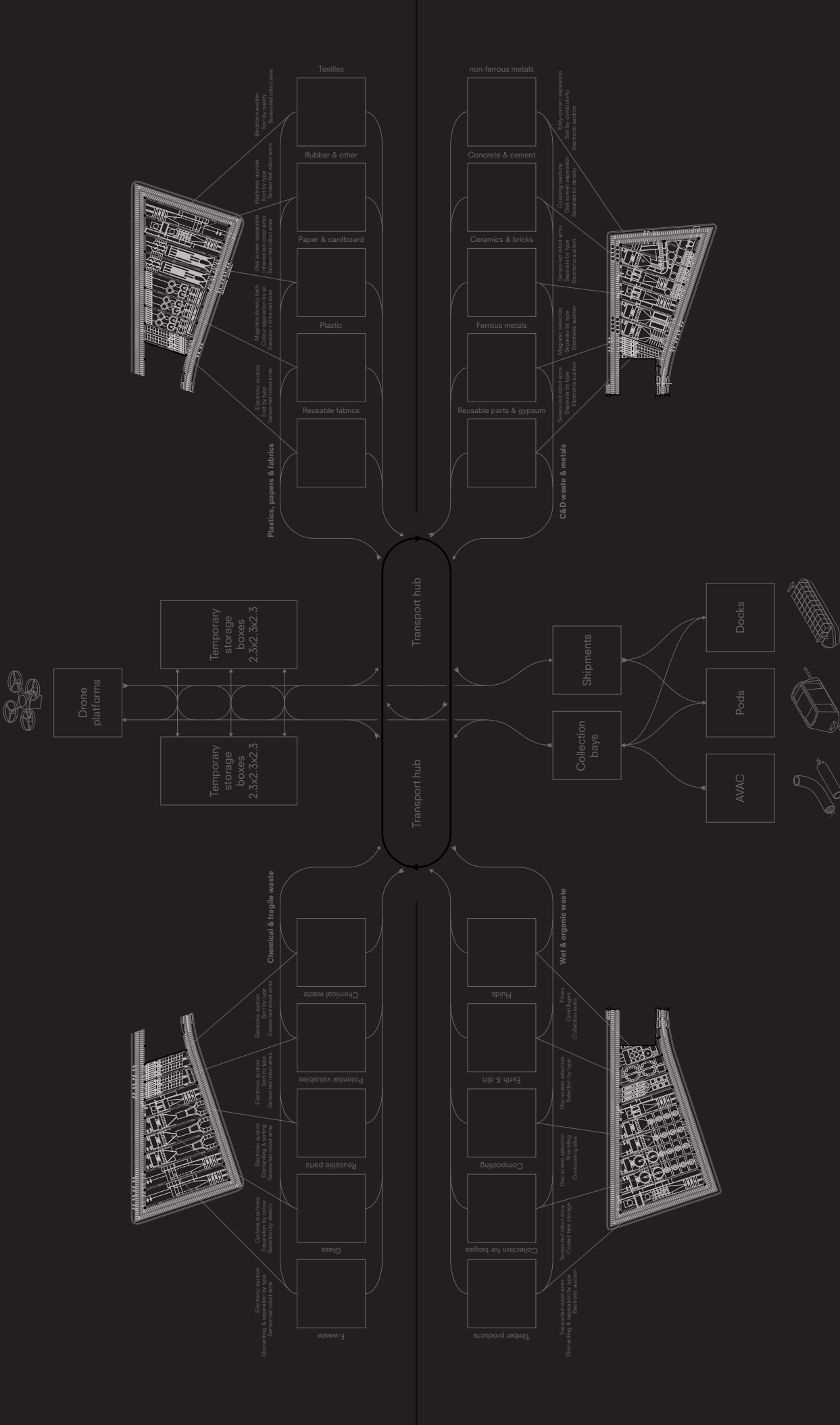
Facility includes:
Collection bays
Temporary parking
Maintenance hub

Drone flying routes stay clear of residential areas.

Drones enter facility at
15 meters or higher

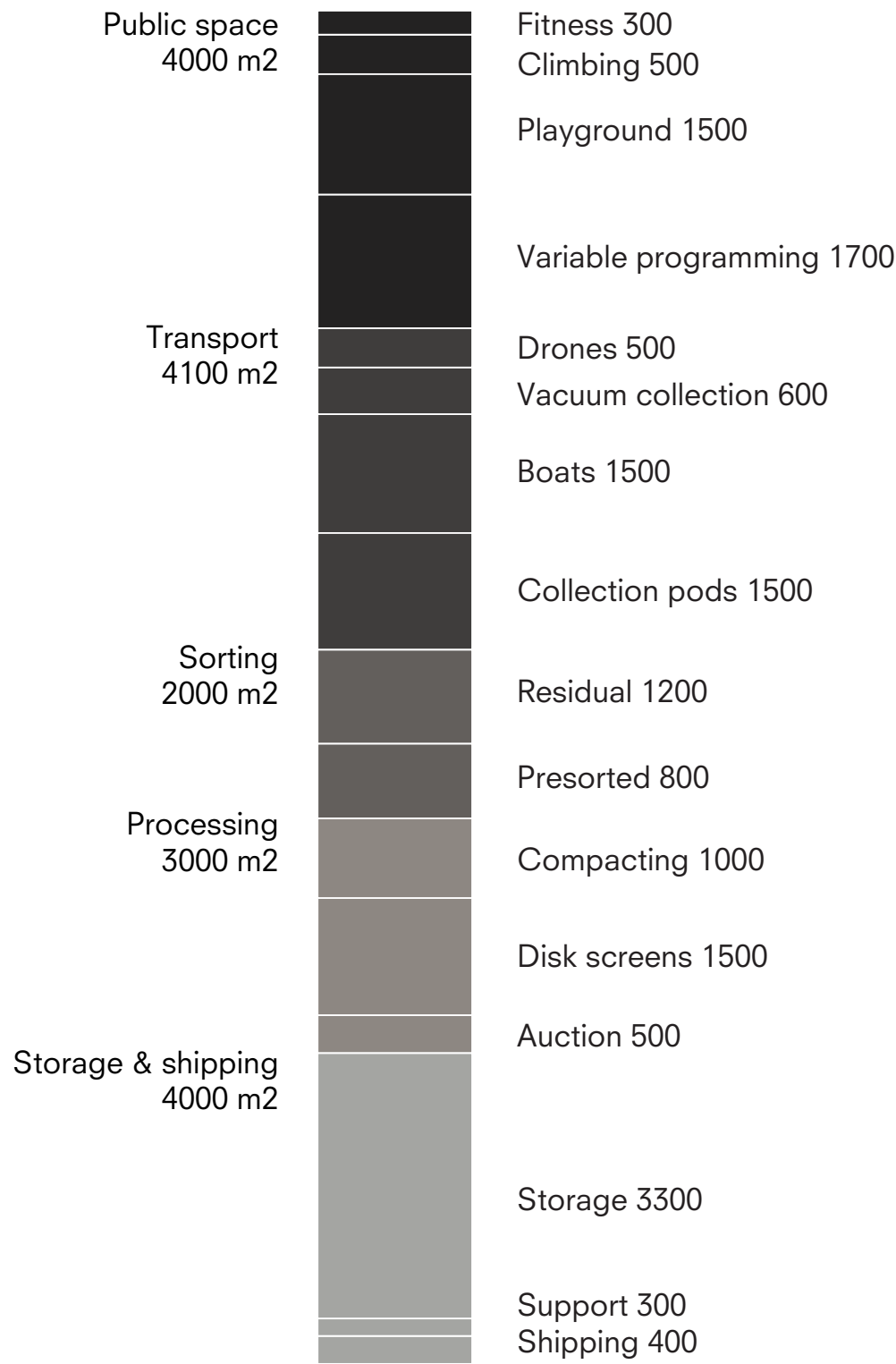
Building Requirements

(in)human architecture

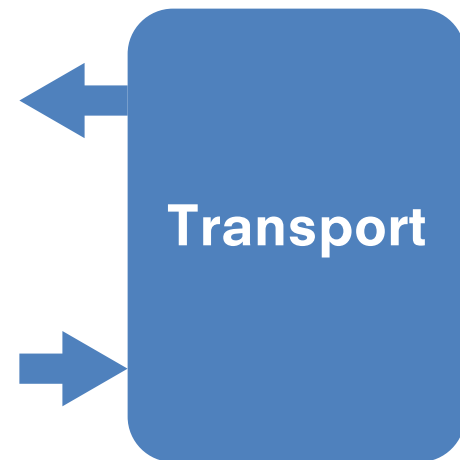


Basic layout

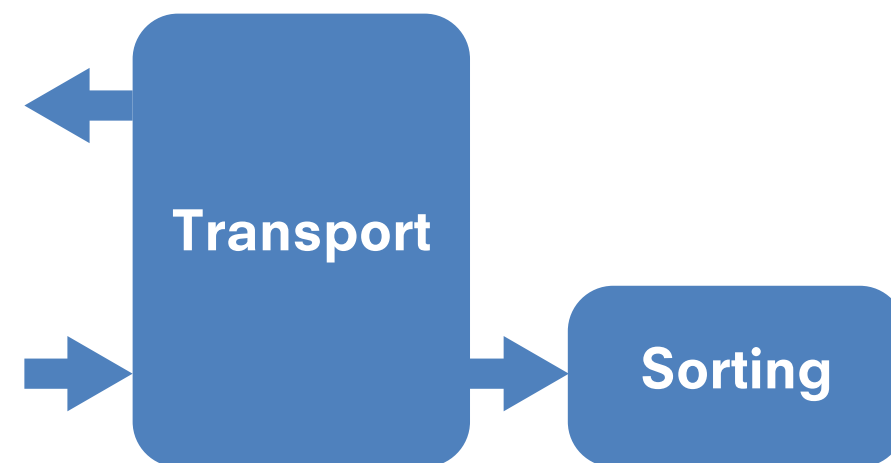
Total floor area
17.100 m2



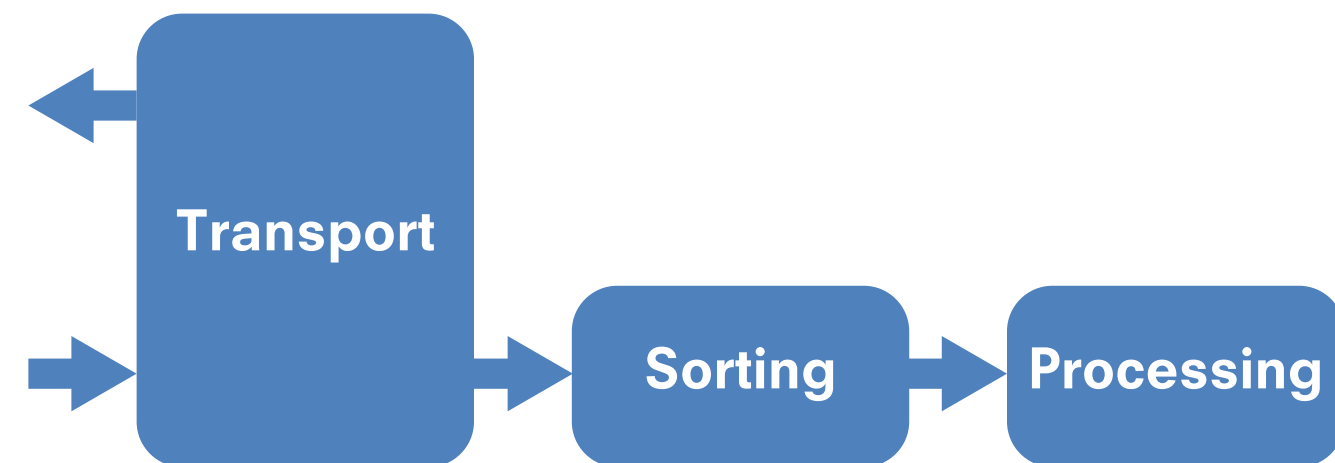
Basic layout



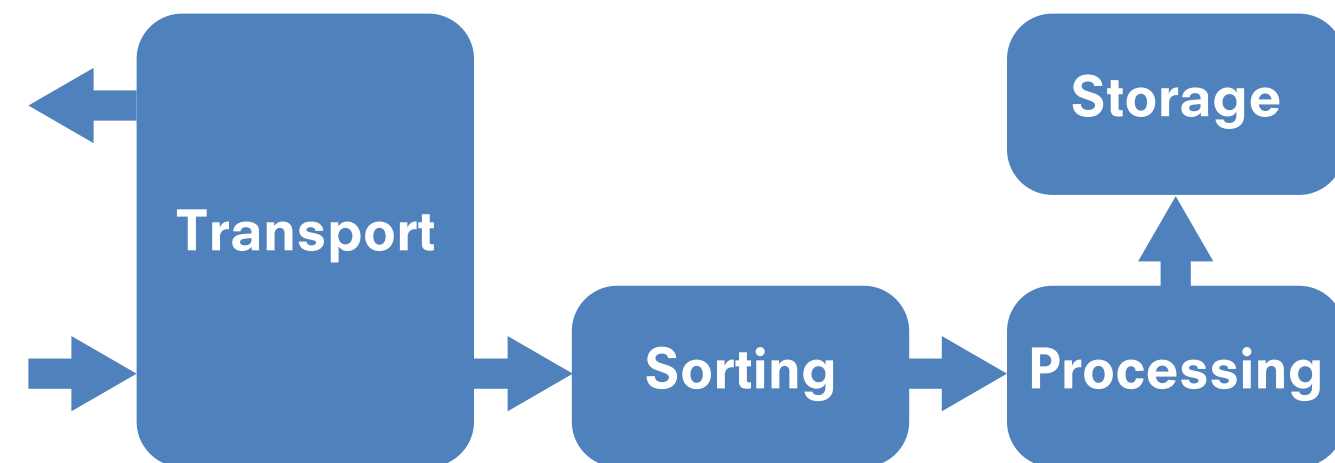
Basic layout



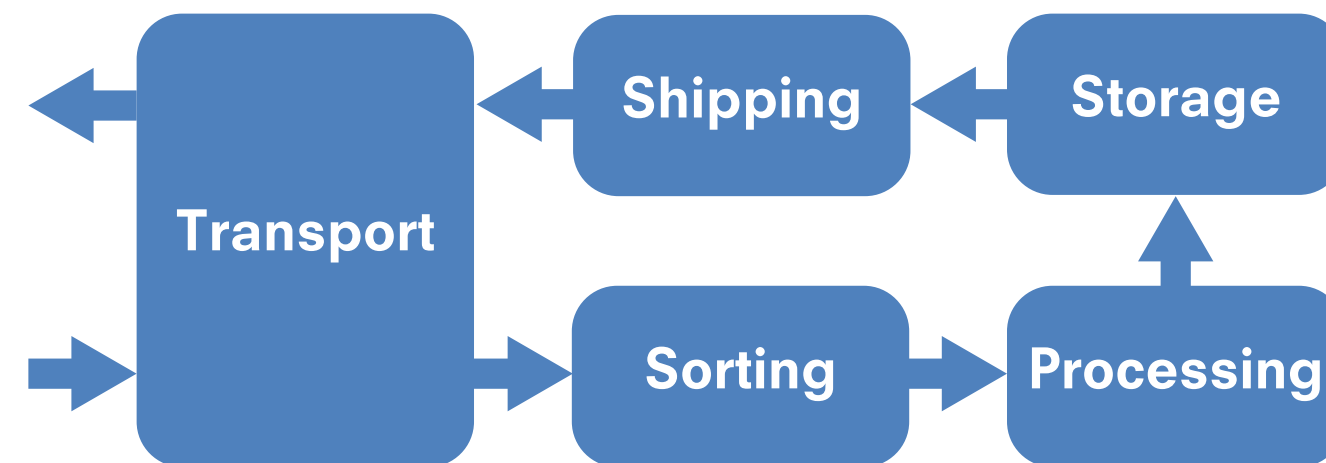
Basic layout



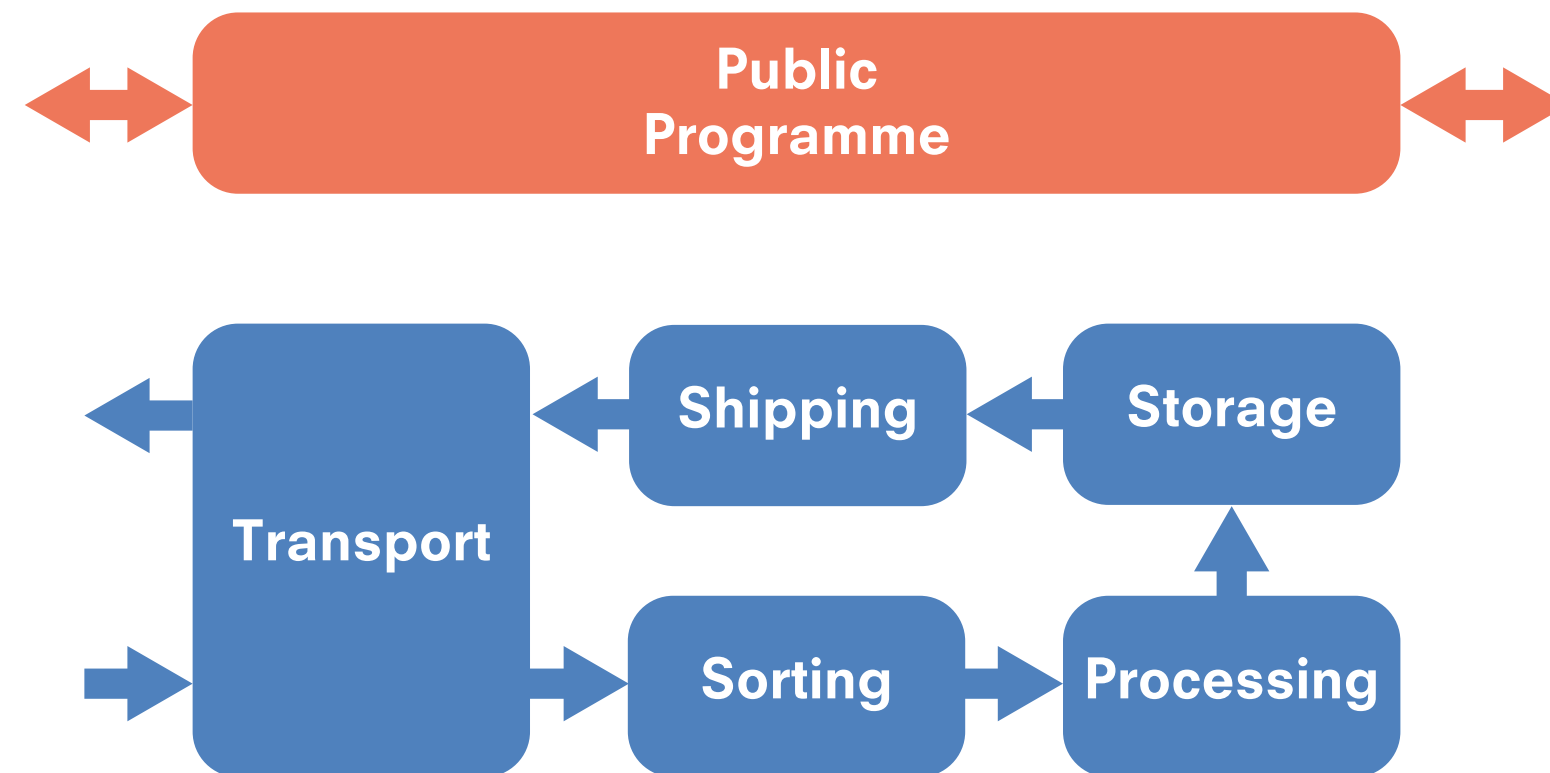
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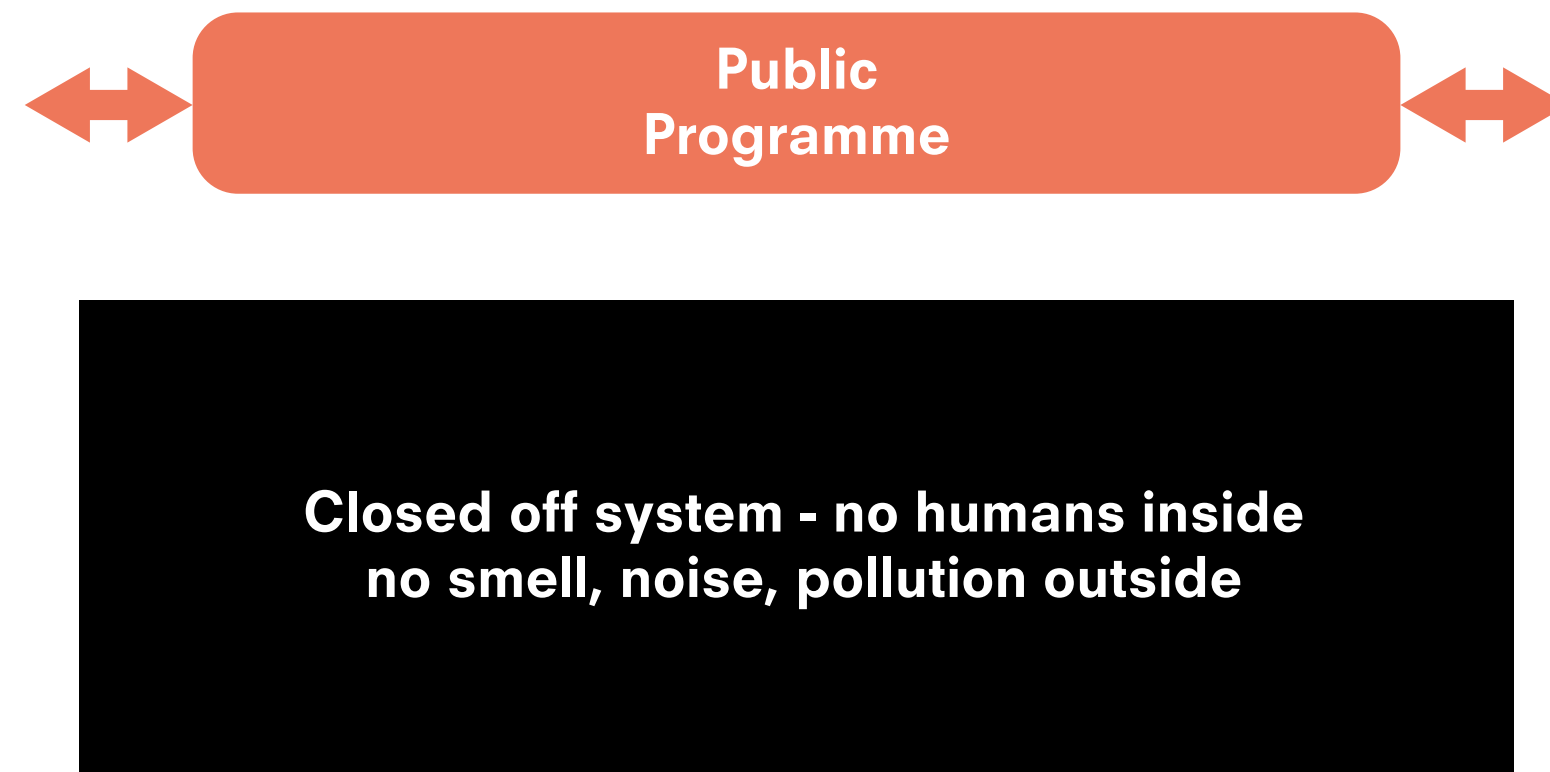
Basic layout



Basic layout



Basic layout



Confront society with waste processes



Attract people with public programme



Combined with monumental/iconic architecture



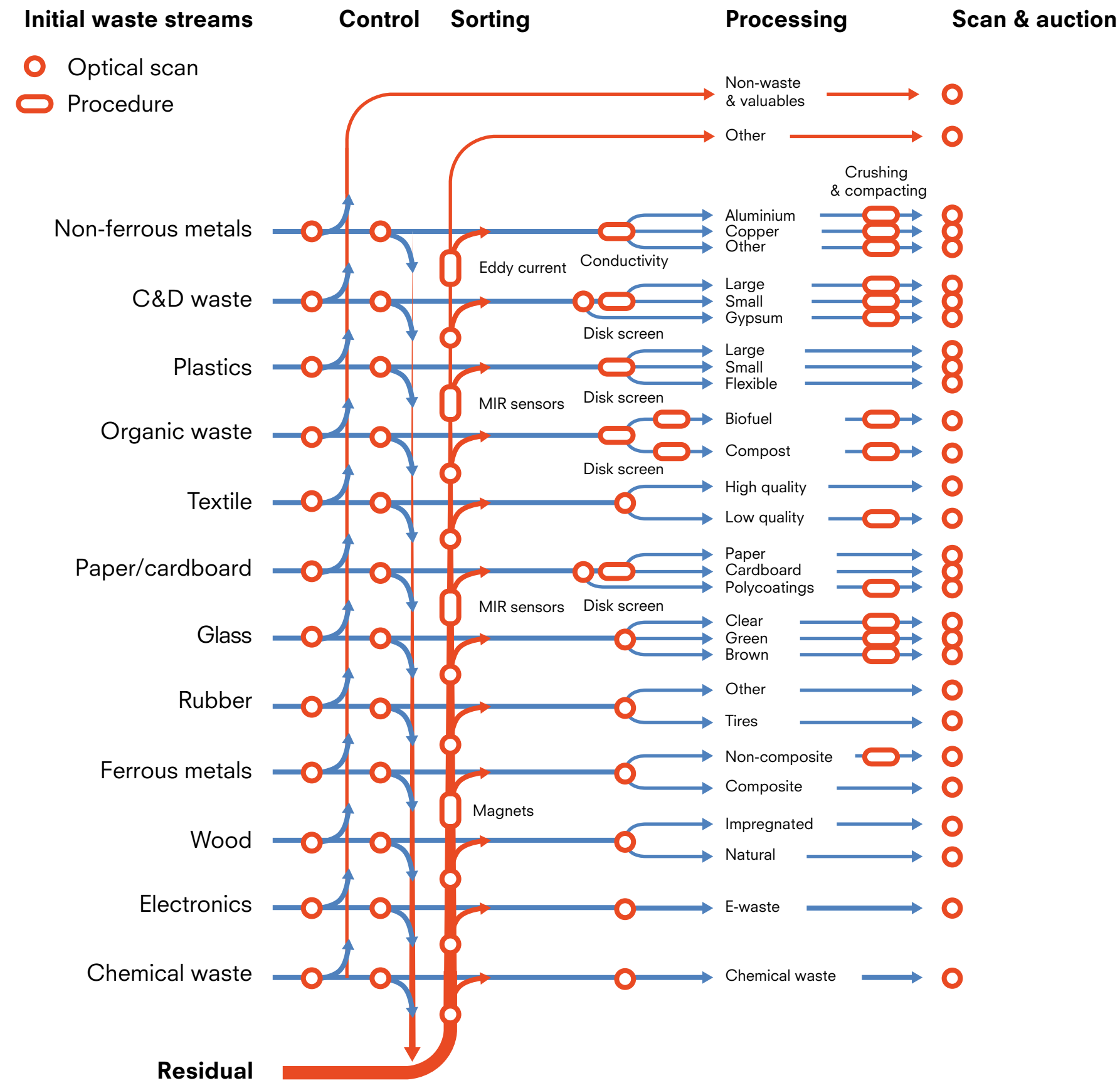
New playgrounds & sport facilities required



Public Program references



Sorting & processing requirements



Sorting & processing requirements

Conveyor belt



Compactor



Disc screen separation

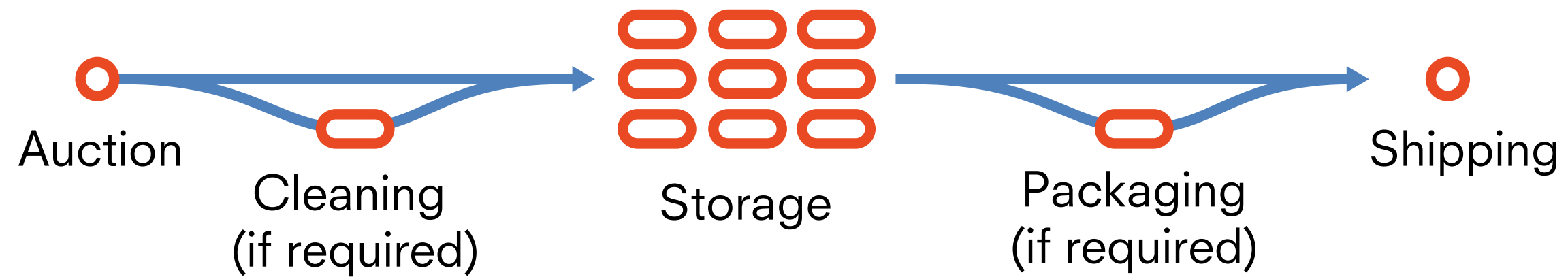


Eddy current & magnet separation



Storage & shipping requirements

48h-storage
9.000m³ capacity



Automated storage



Vertical stacking

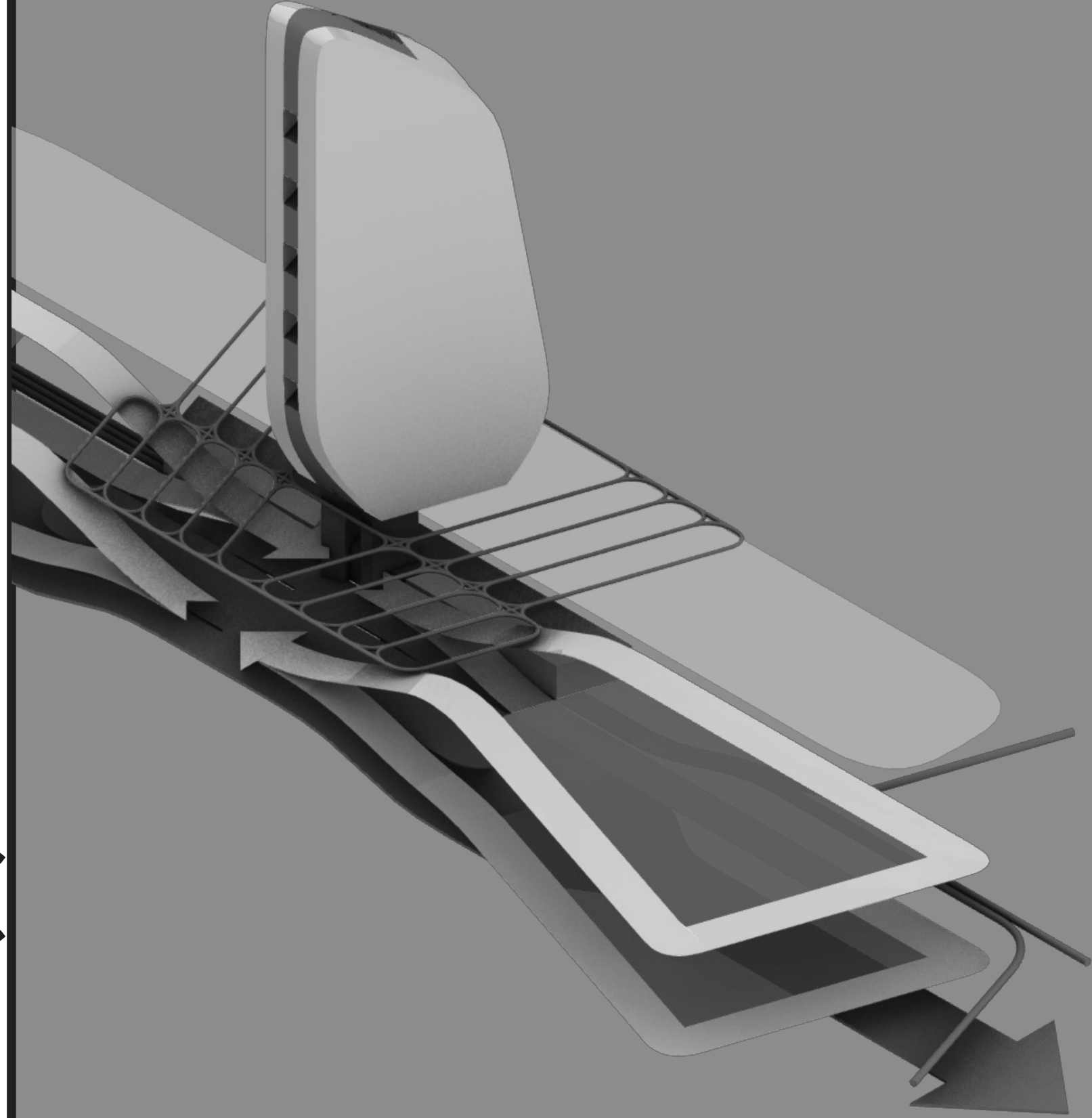


Processed waste is auctioned

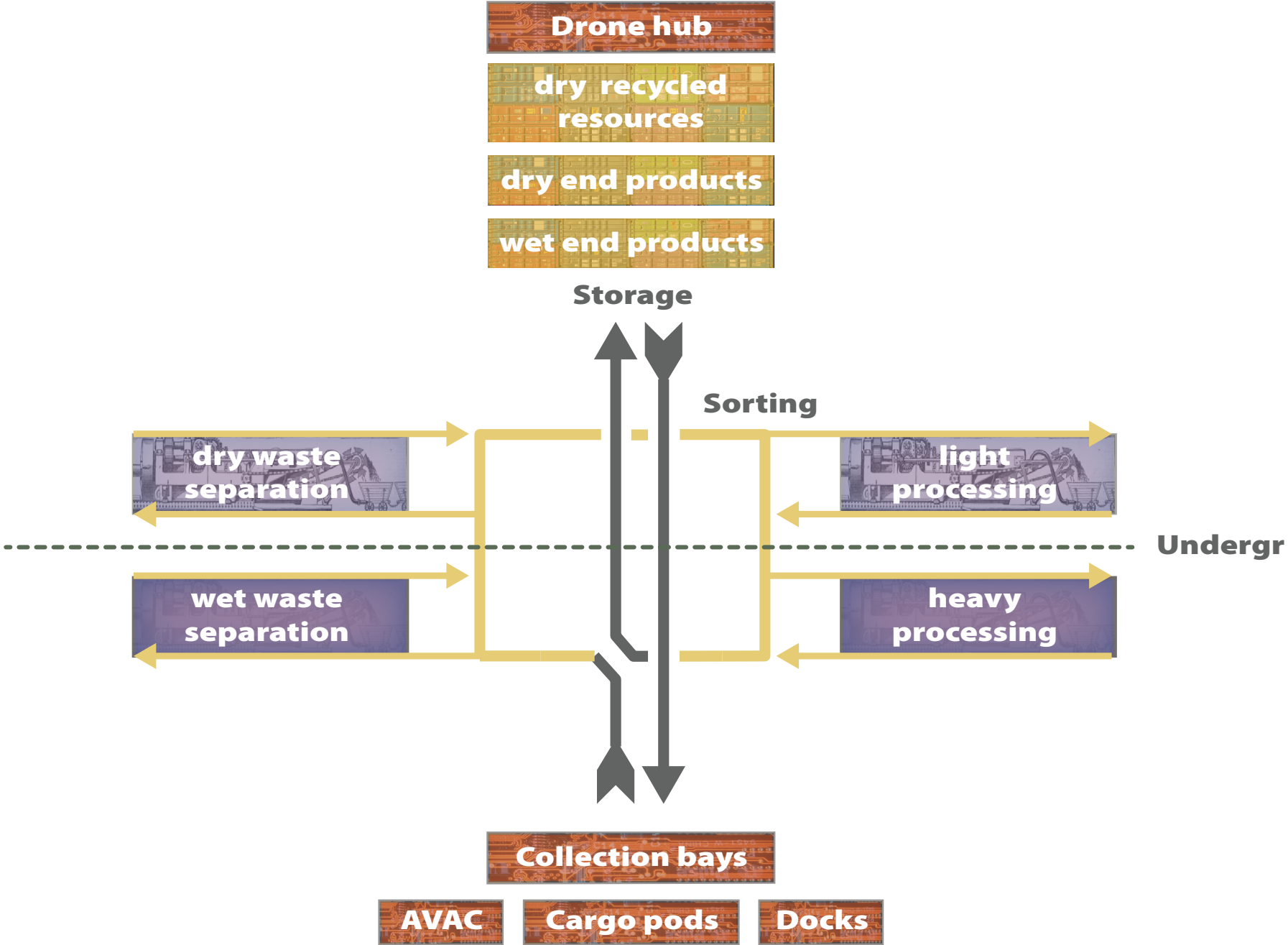


Design Concept

(in)human architecture



Organisation



Organisation - section



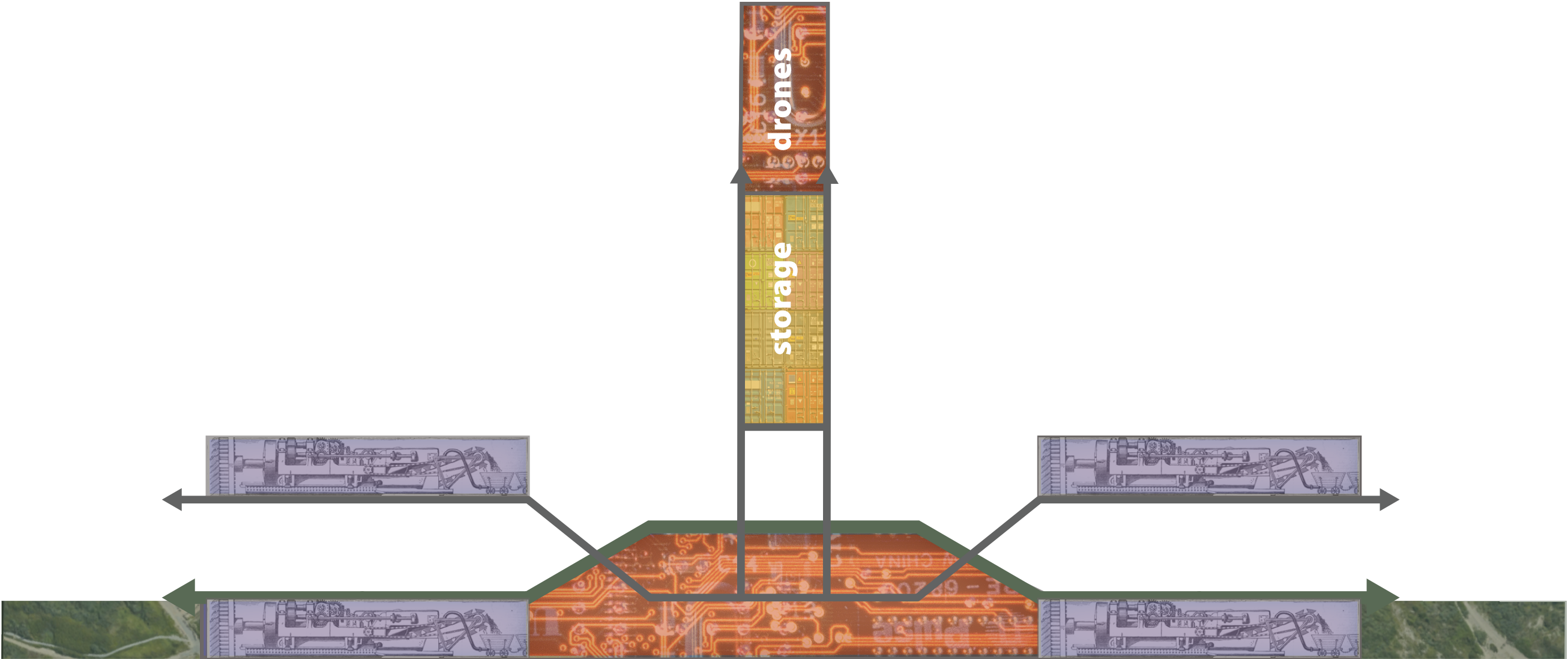
Organisation - section



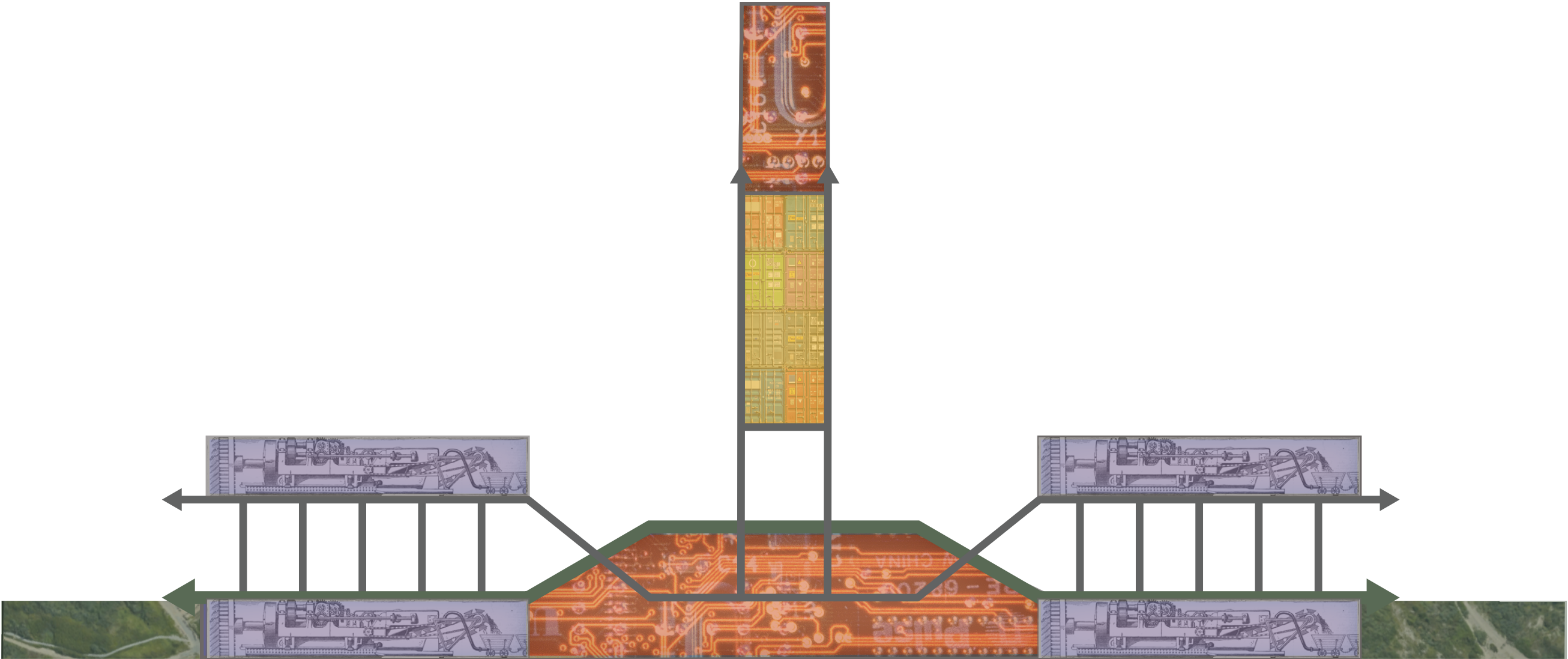
Organisation - section



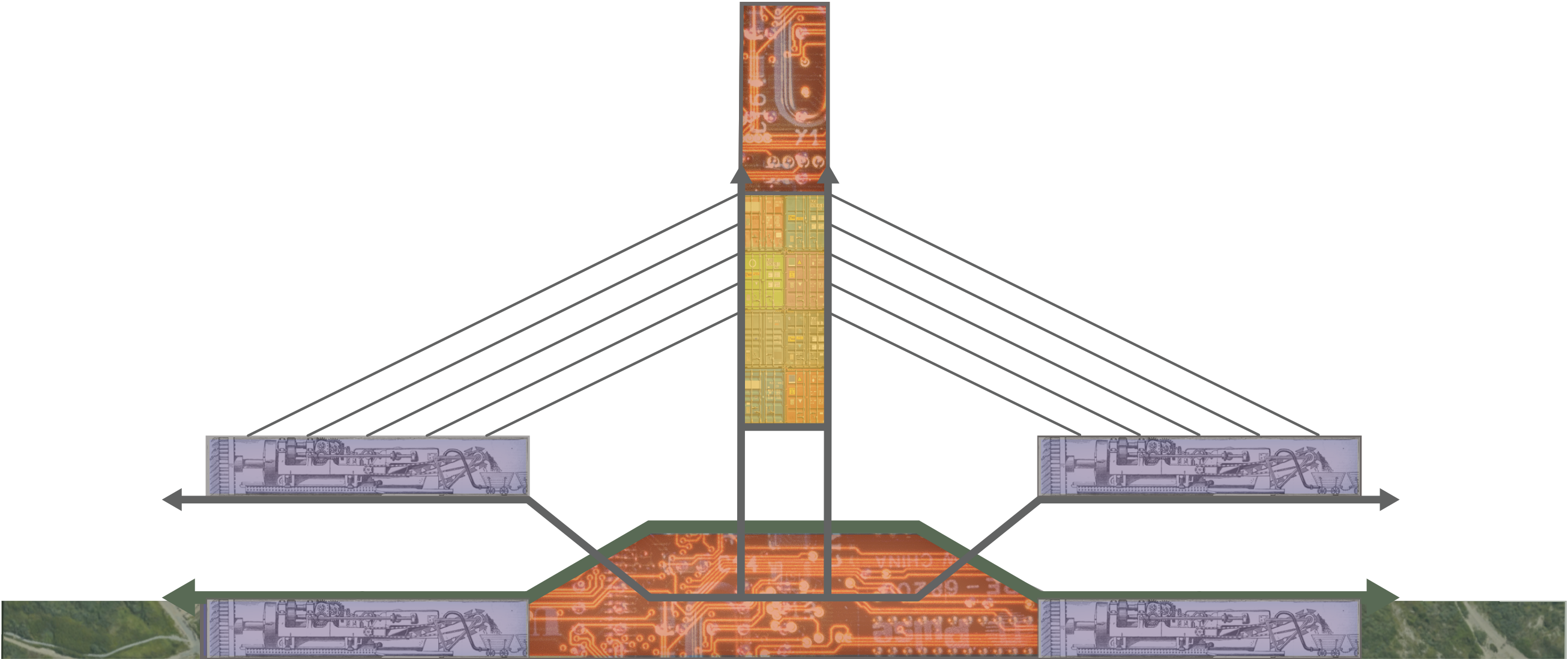
Organisation - section



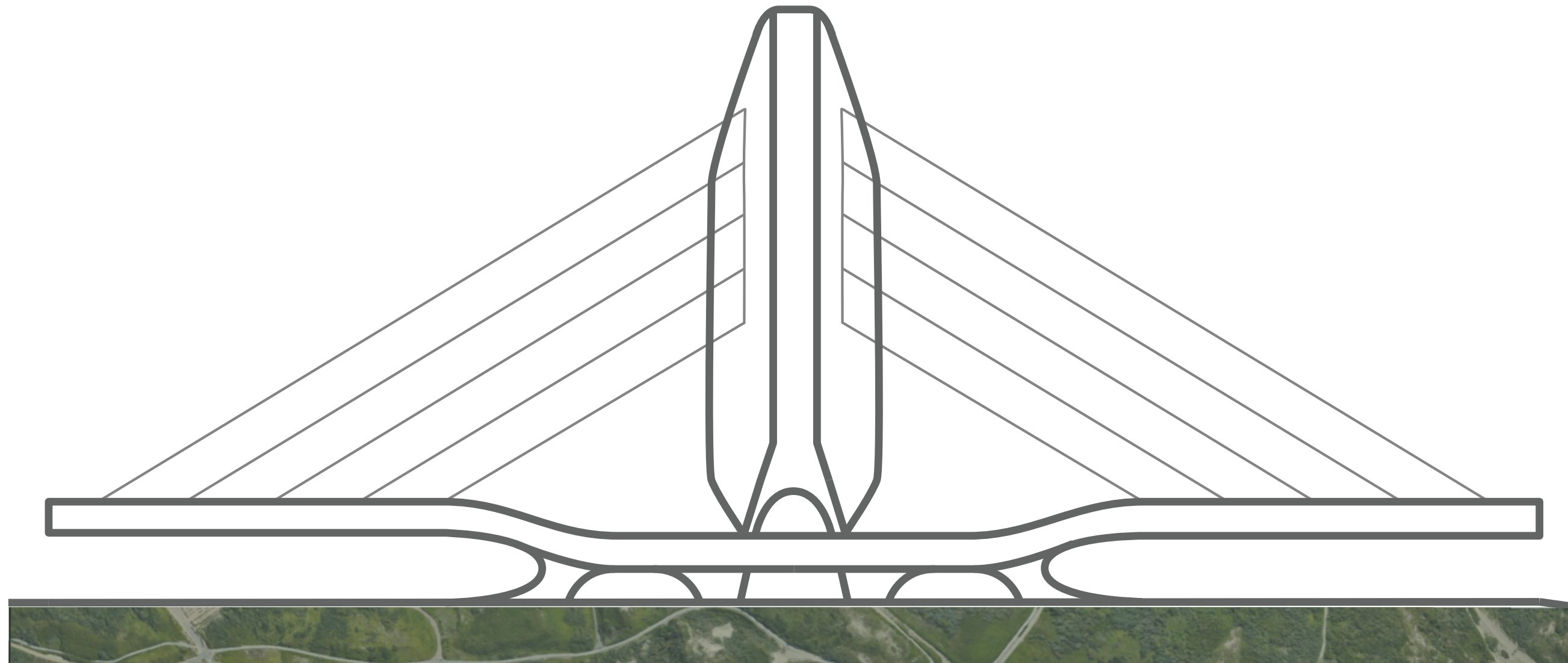
Organisation - section



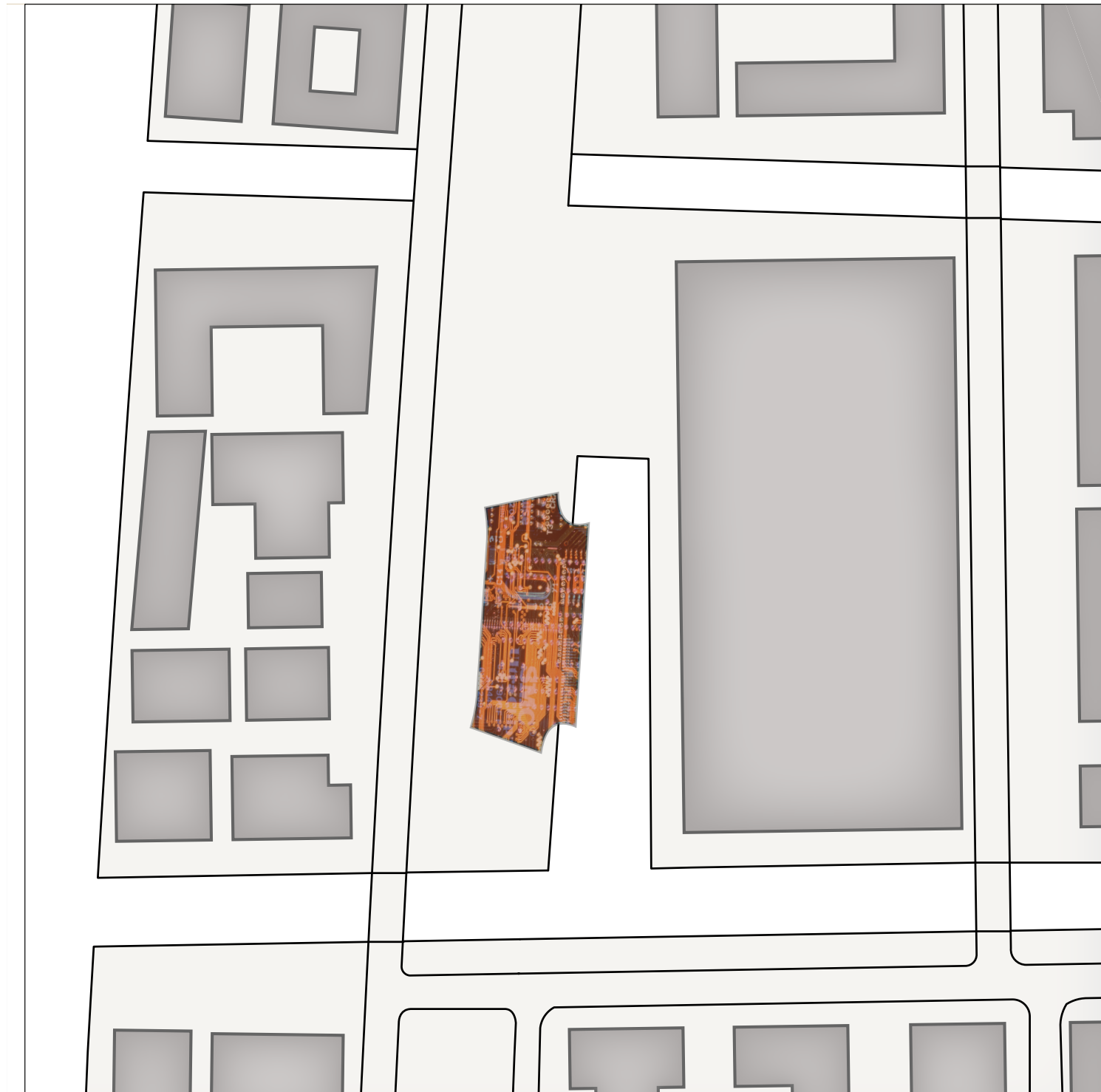
Organisation - section



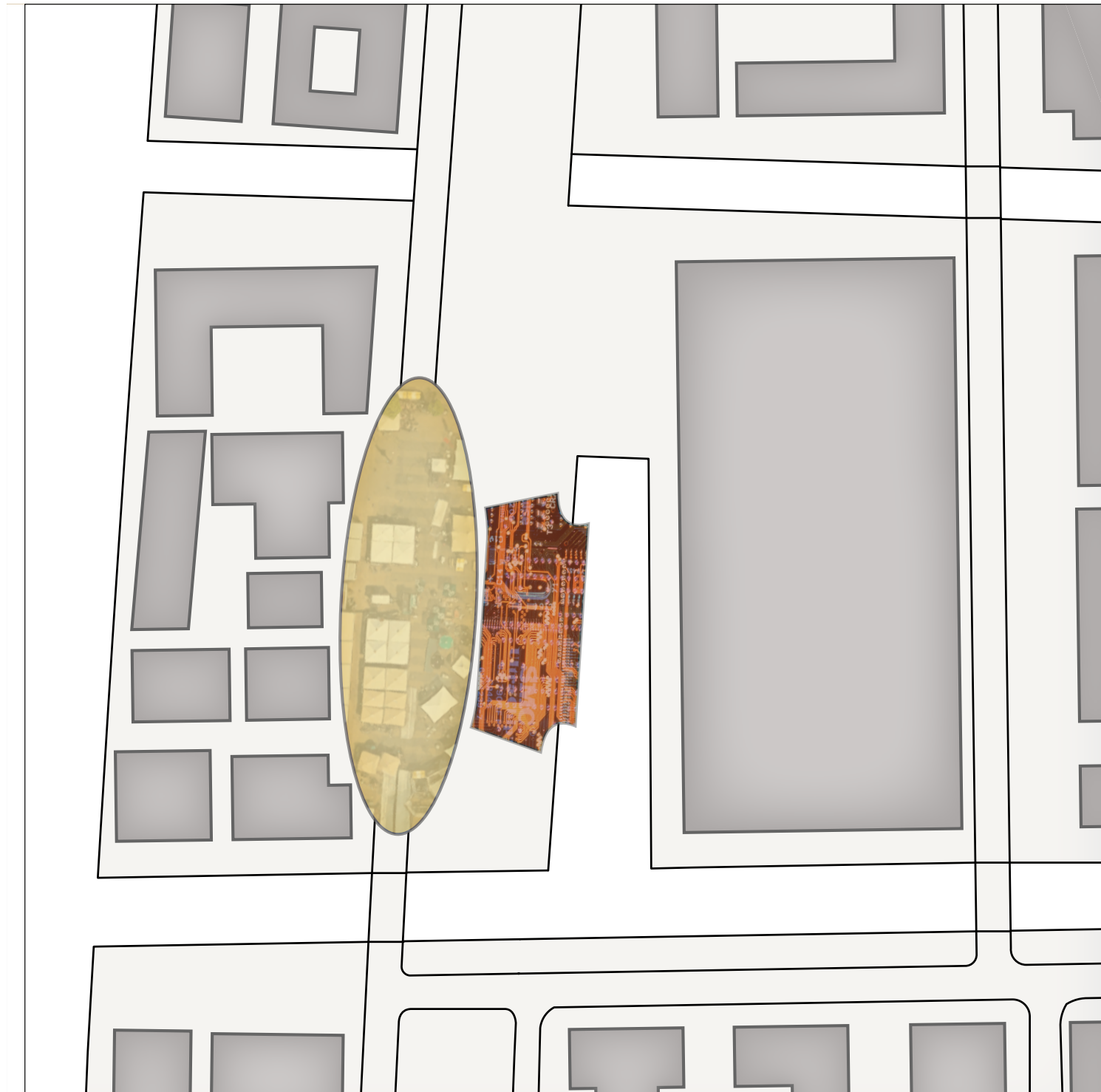
Organisation - section



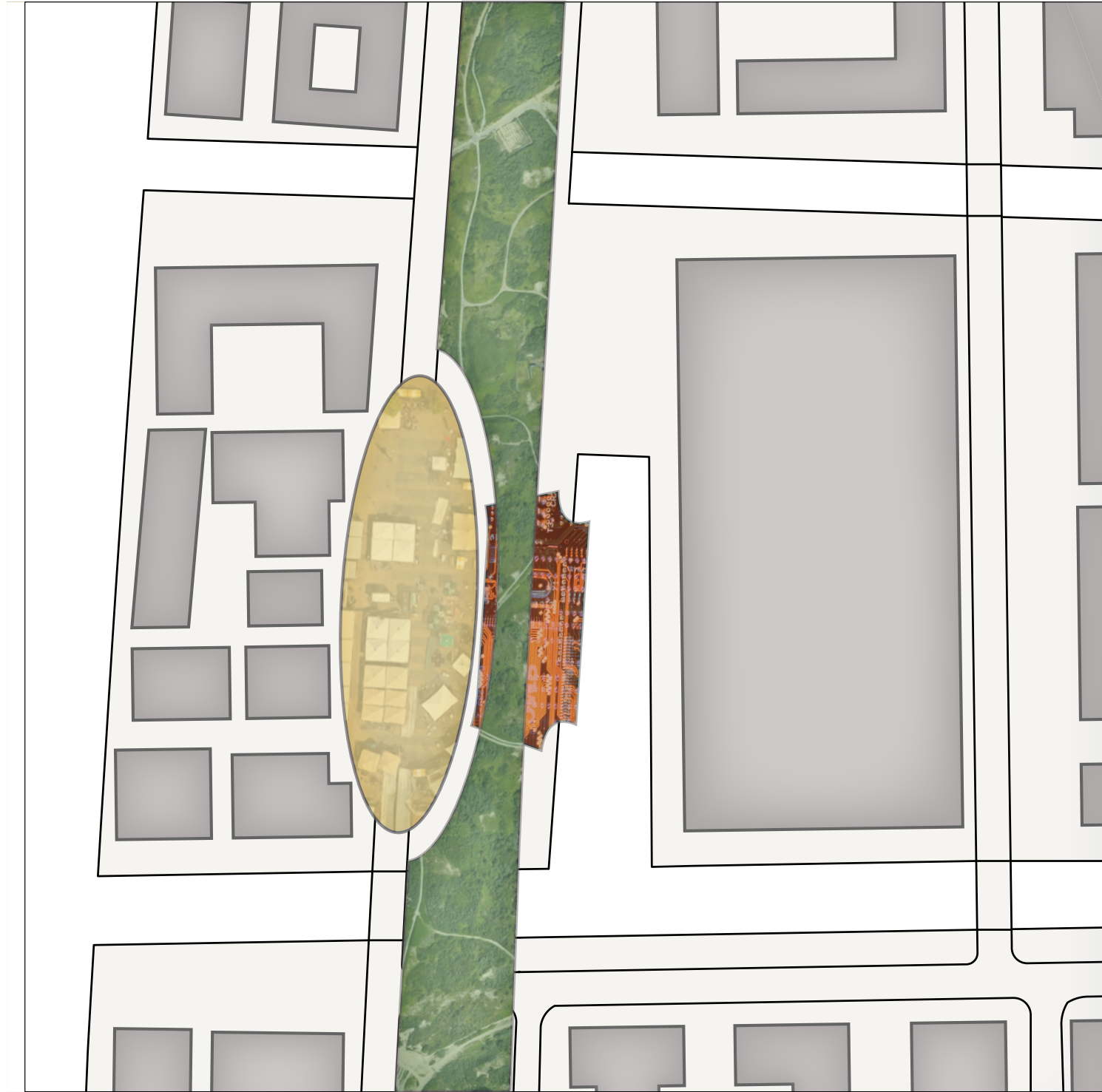
Organisation - plan



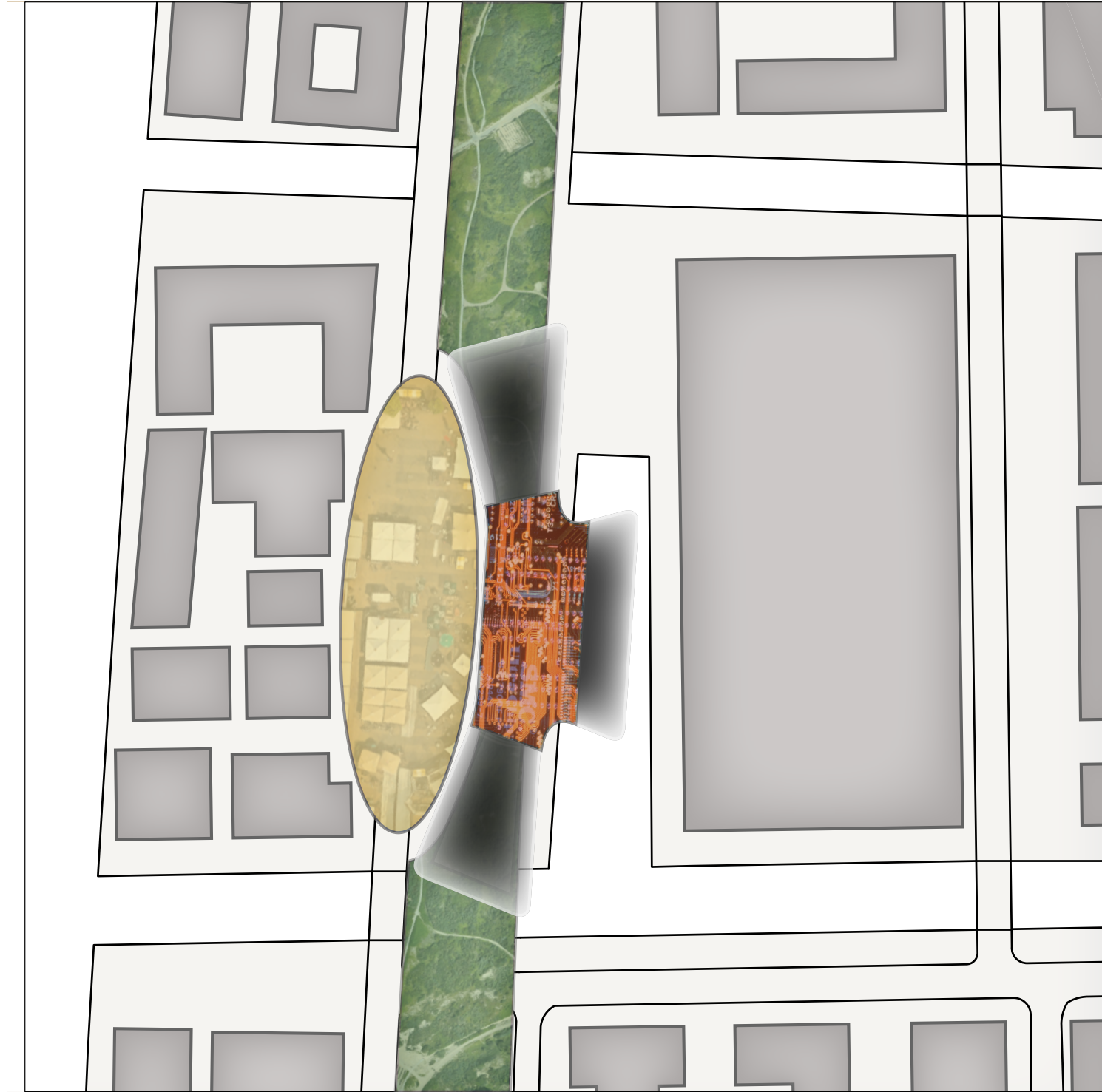
Organisation - plan



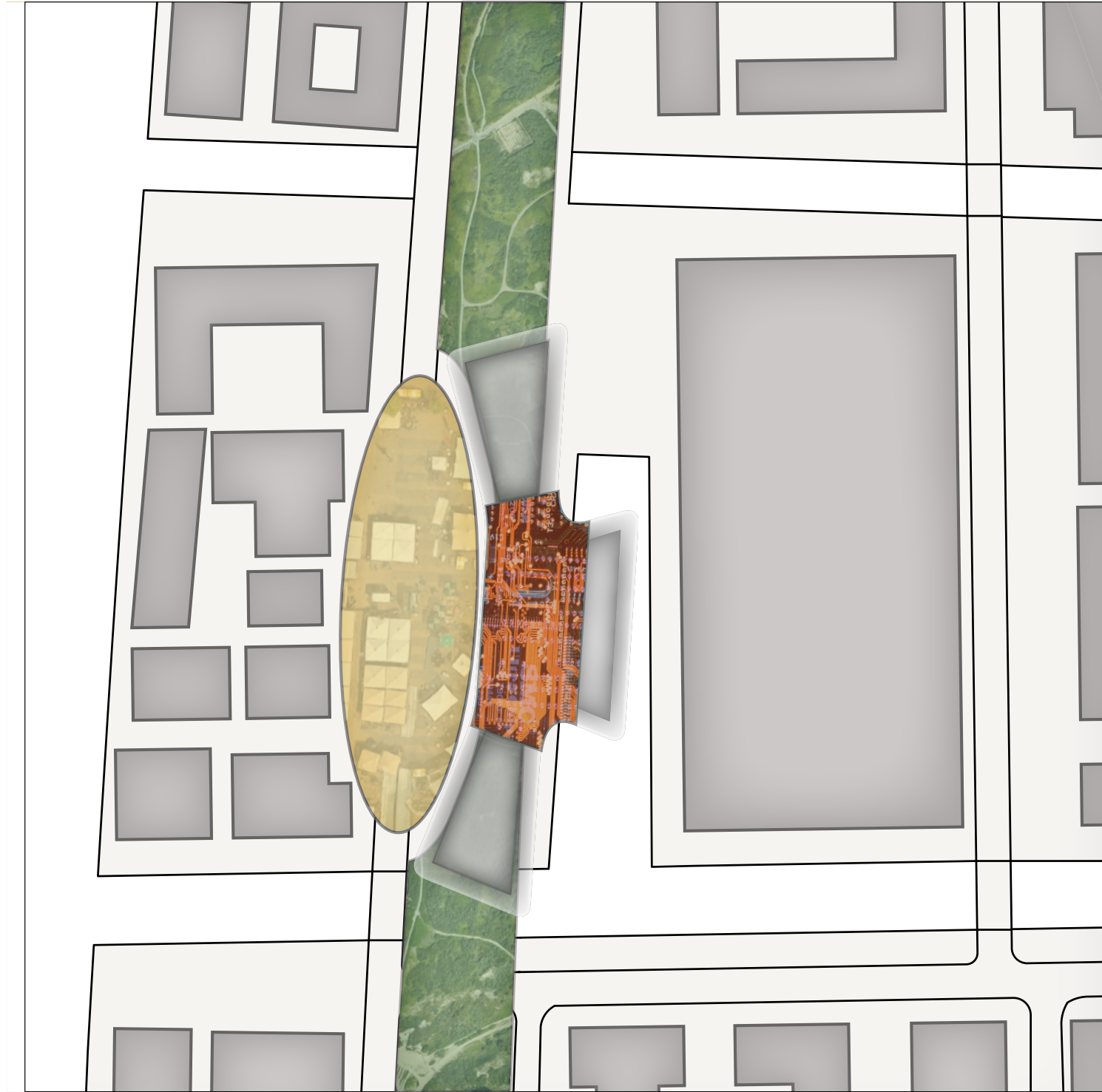
Organisation - plan



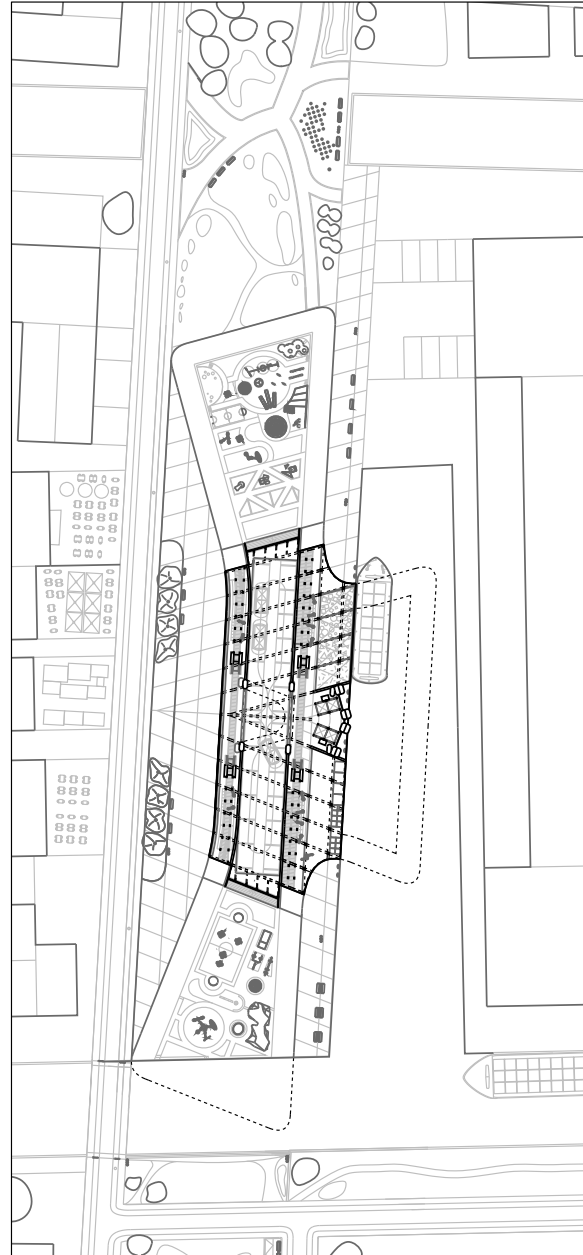
Organisation - plan



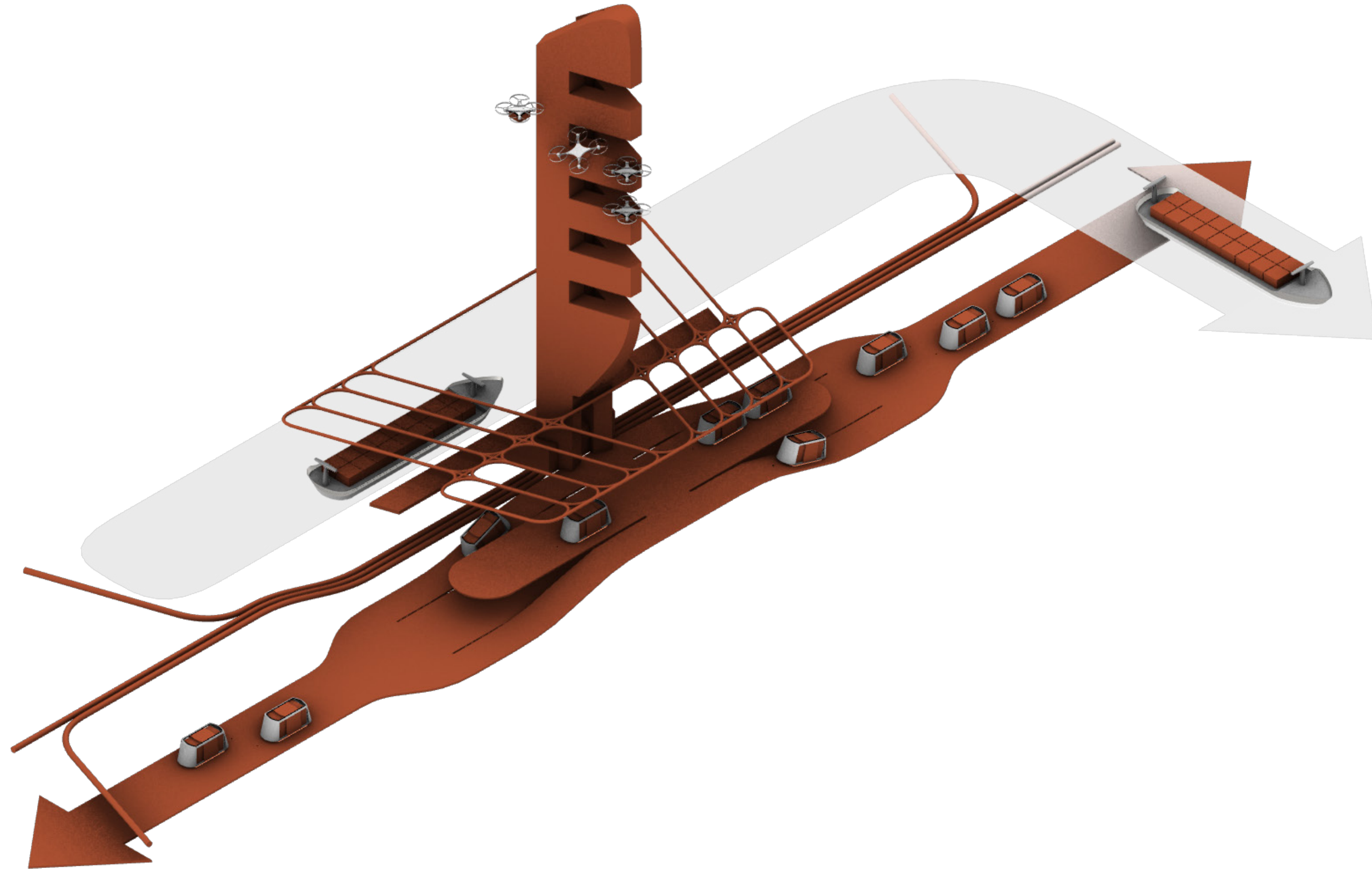
Organisation - plan



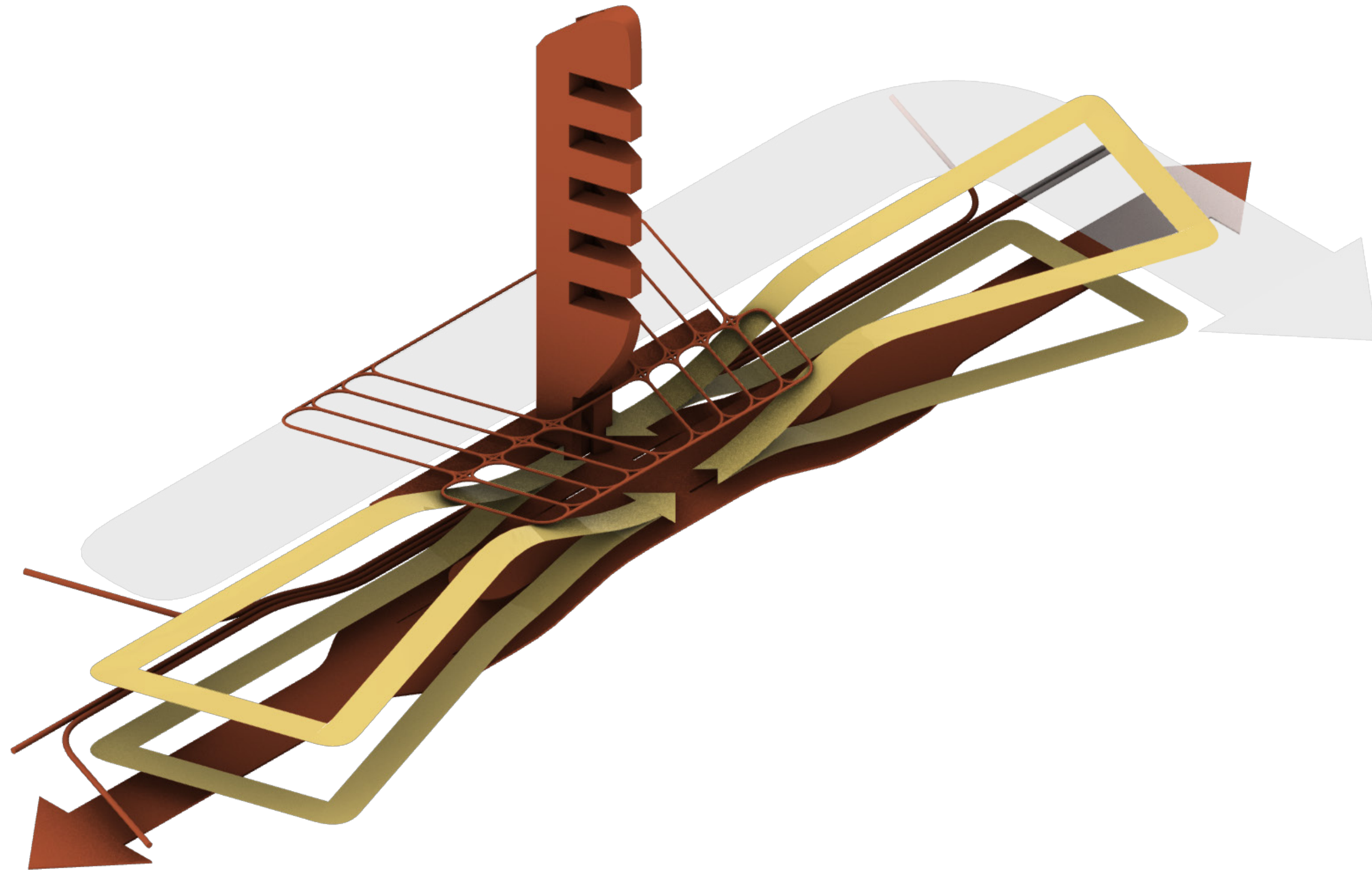
Organisation - plan



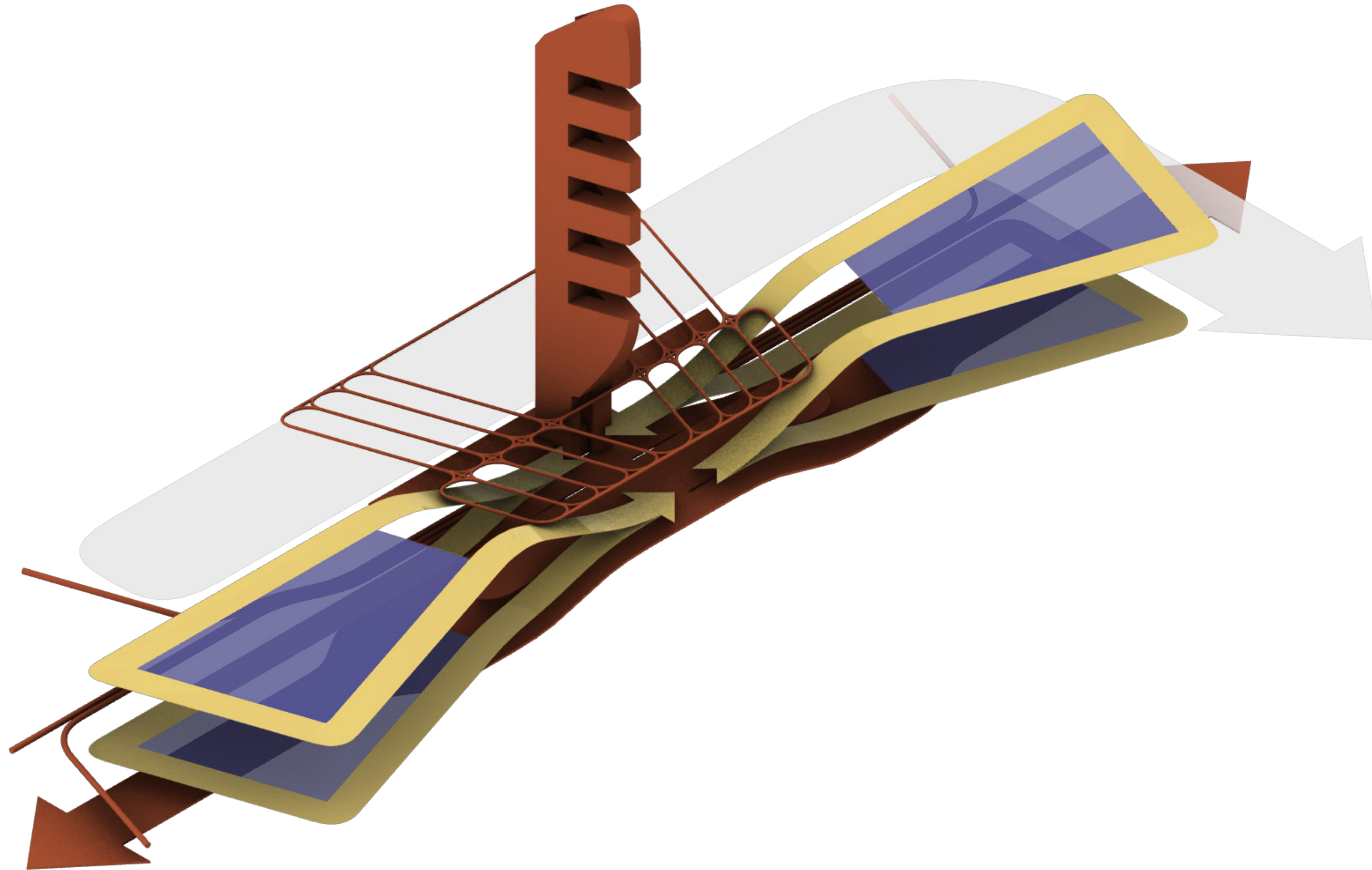
Transportation



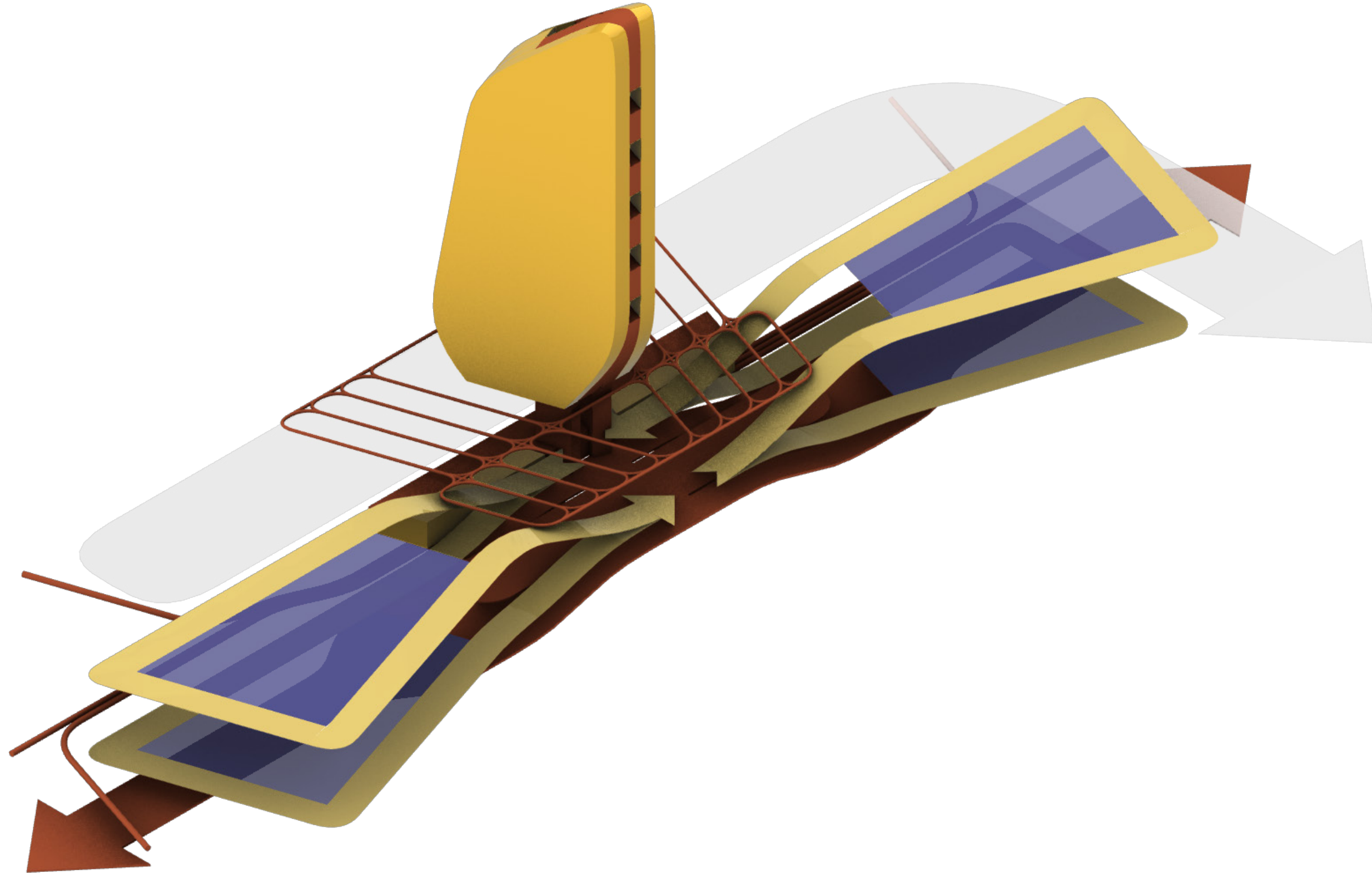
Sorting



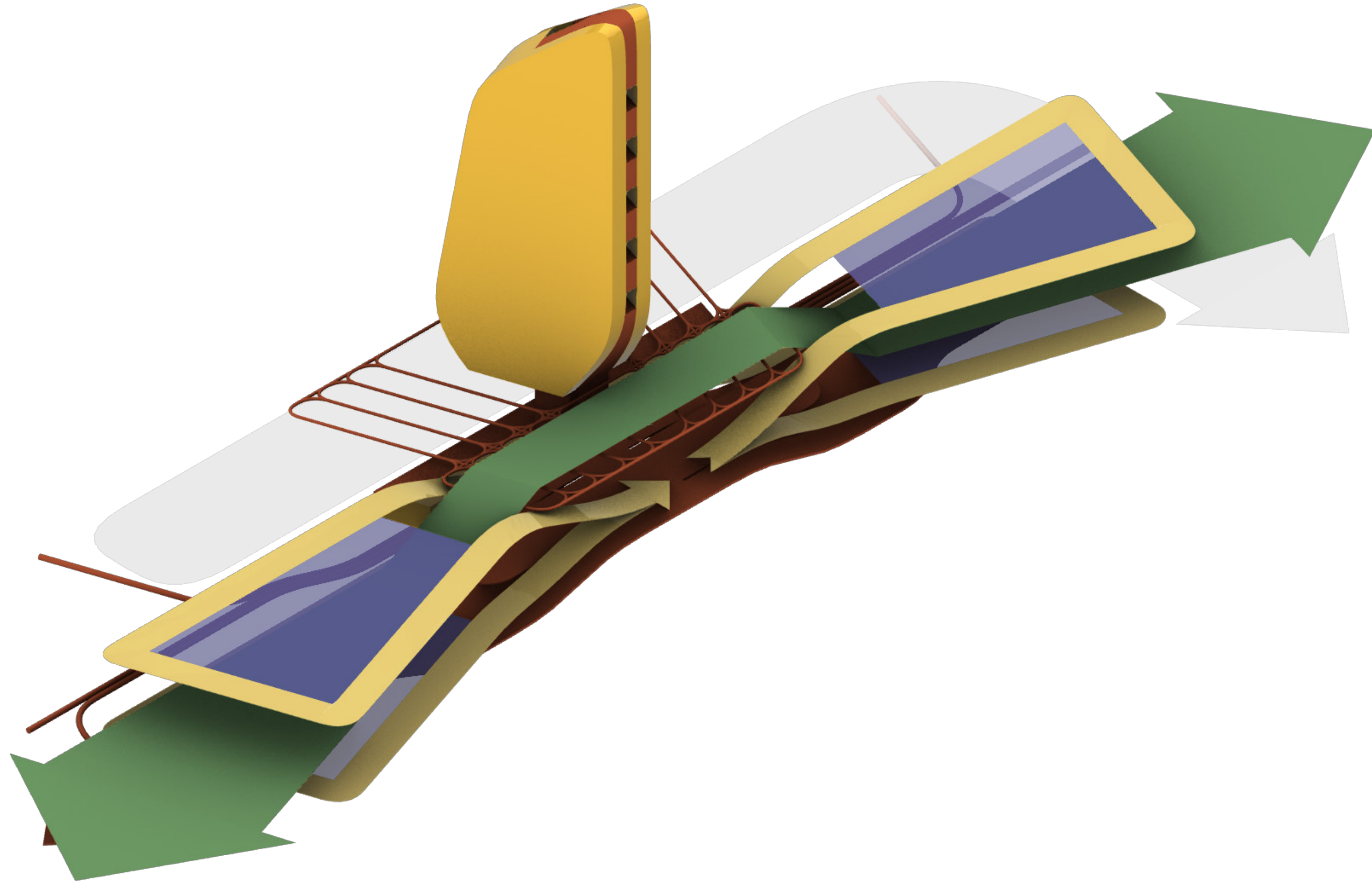
Processing



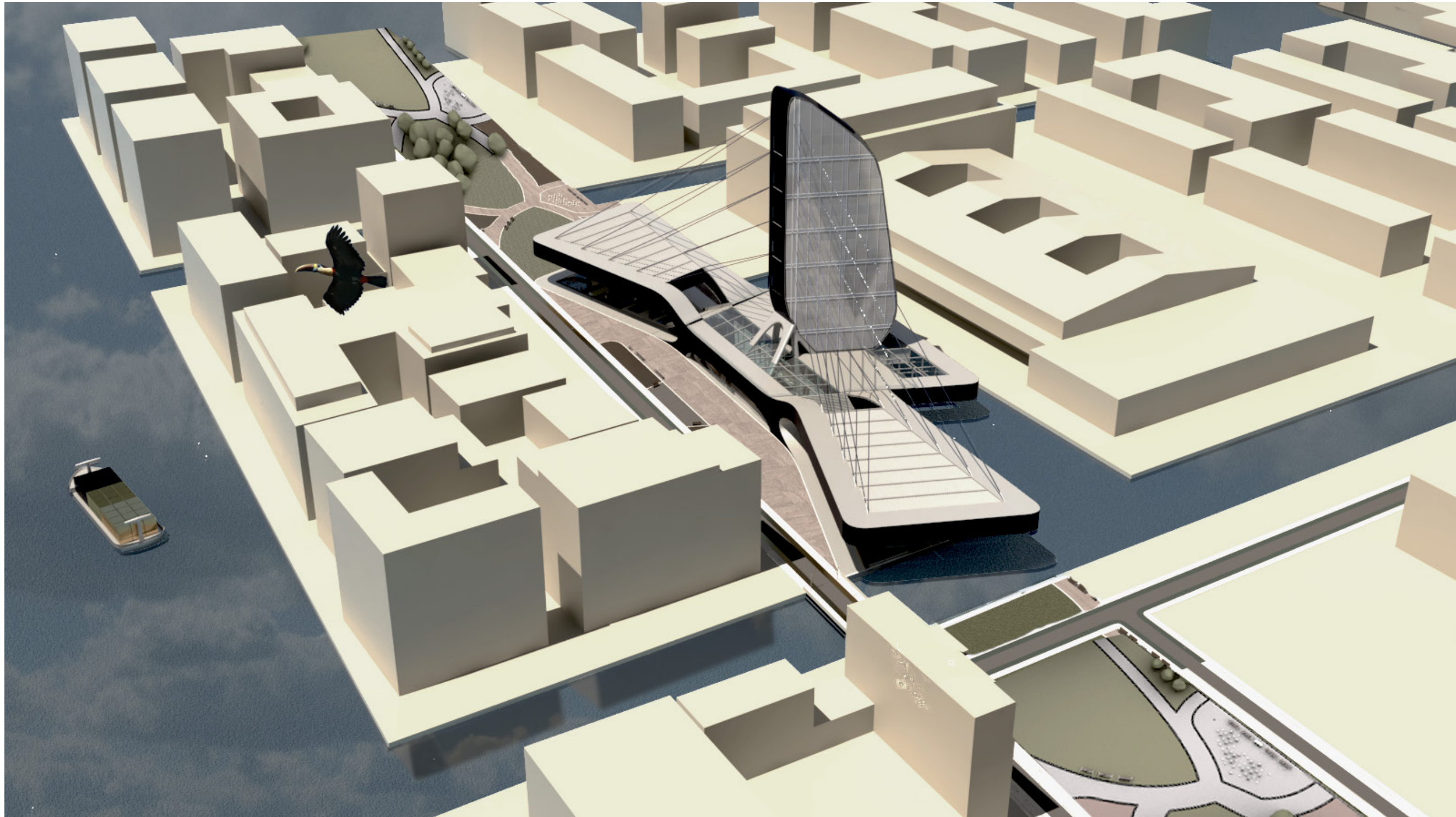
Storage



Public programme

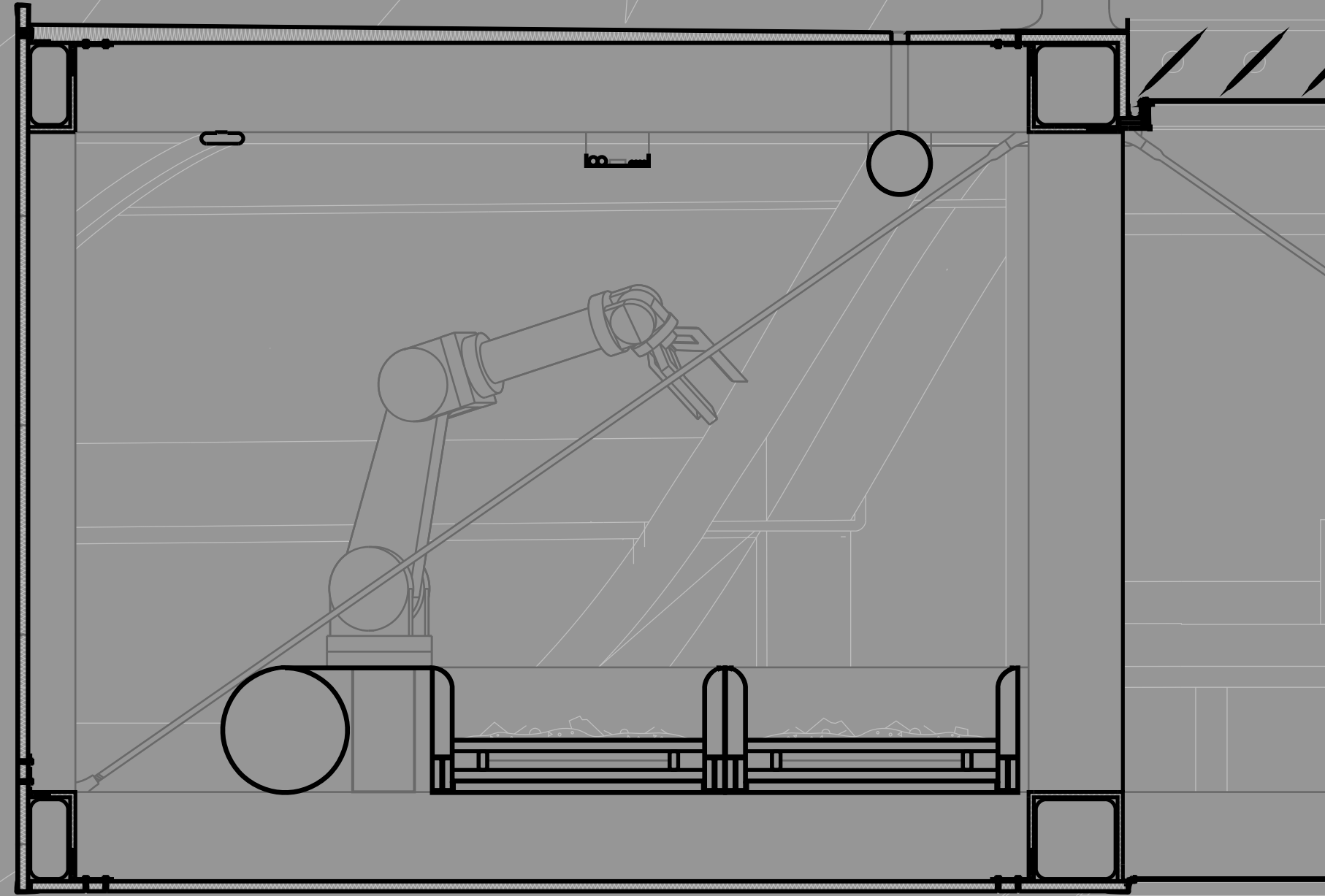


Confrontation man-machine: UFO



Materialisation

(in)human architecture



Amorphous Silicon film (solar energy)

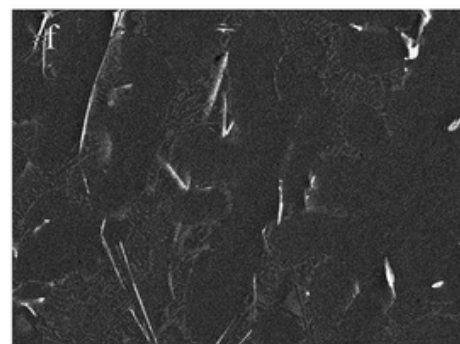
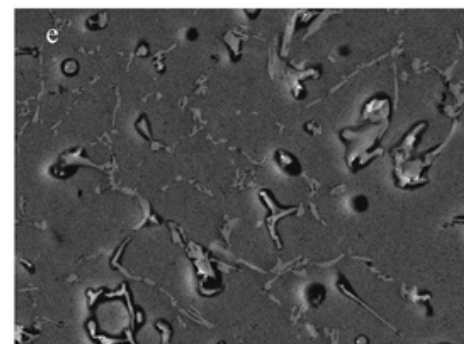
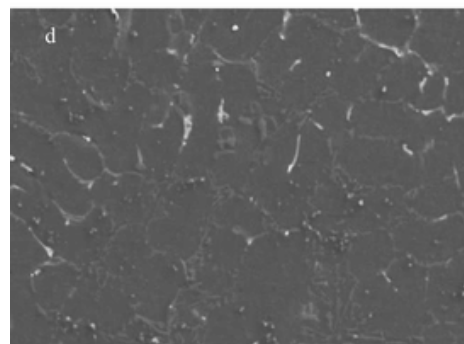
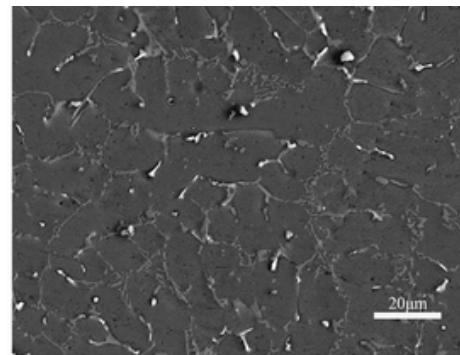
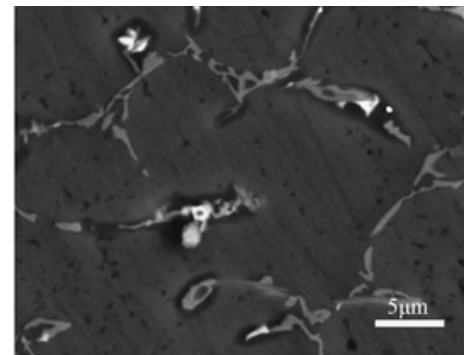
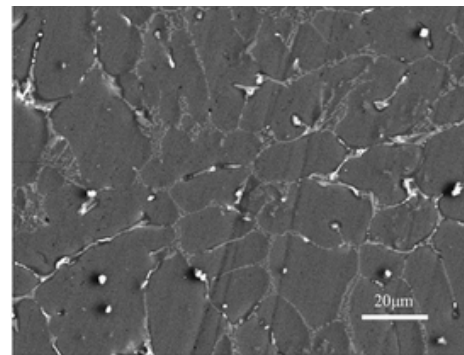
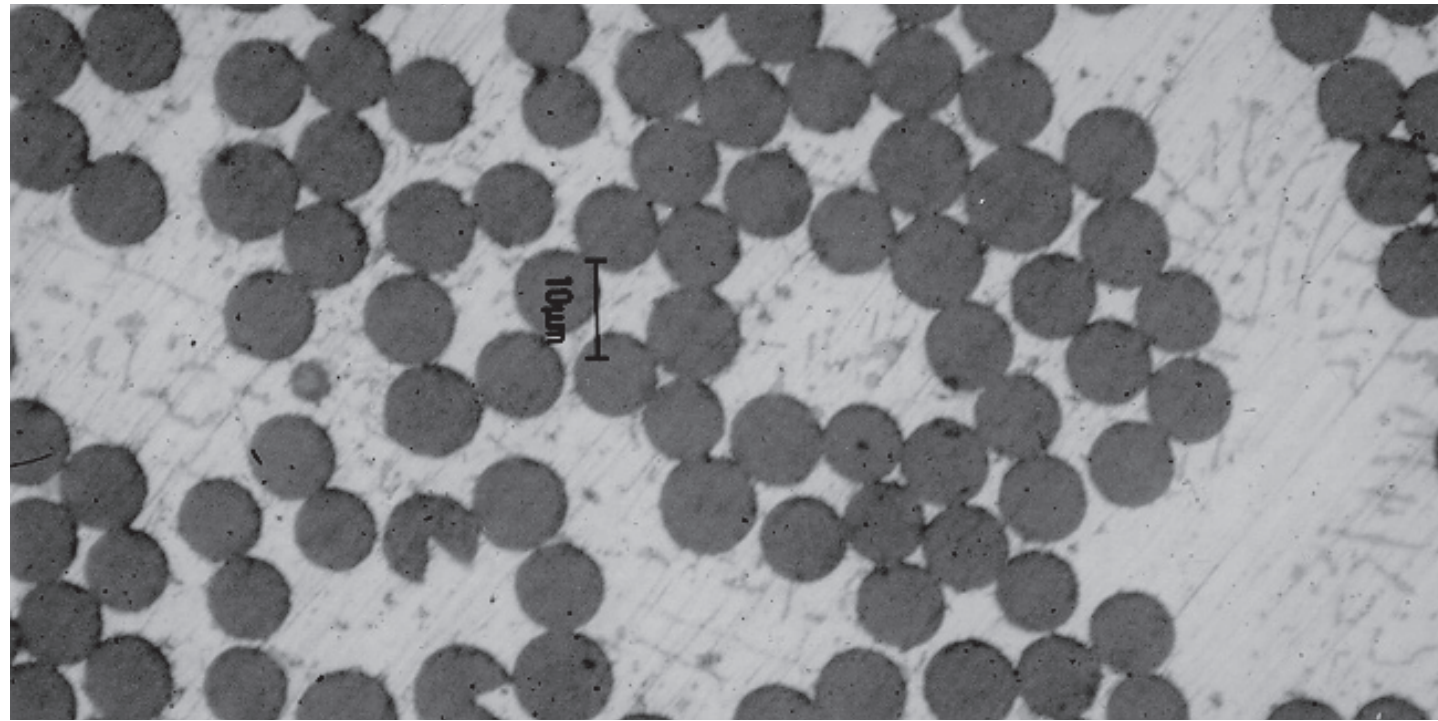


Source: <https://energyinformative.org/amorphous-silicon-solar-panels/>

Amorphous Silicon film (solar energy)



Aluminium Matrix Composite (coated graphite)



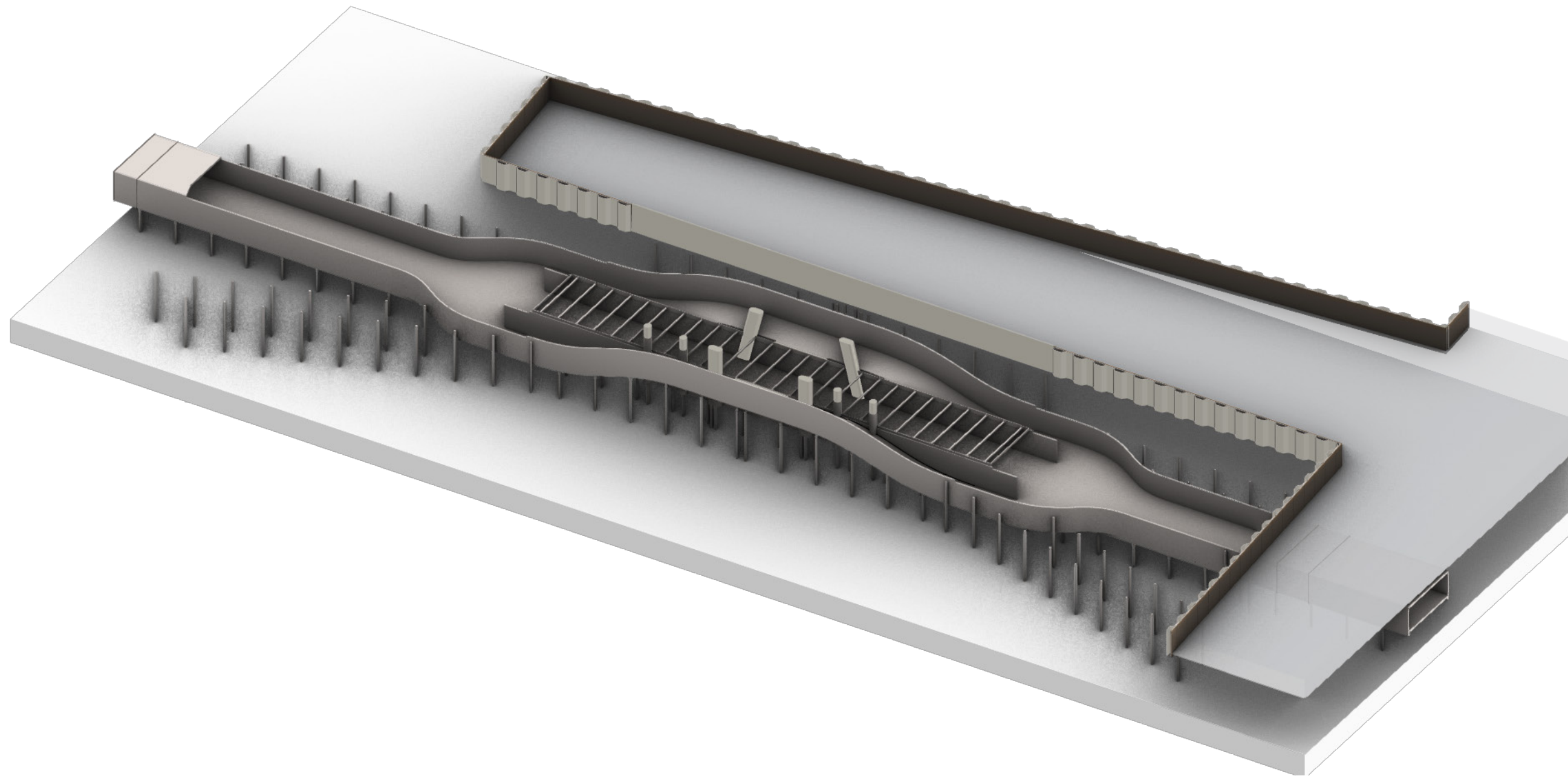
Source: M. K. Surappa, Aluminium matrix composites: Challenges and opportunities

Carbon fibre (graphite) for tensile structures

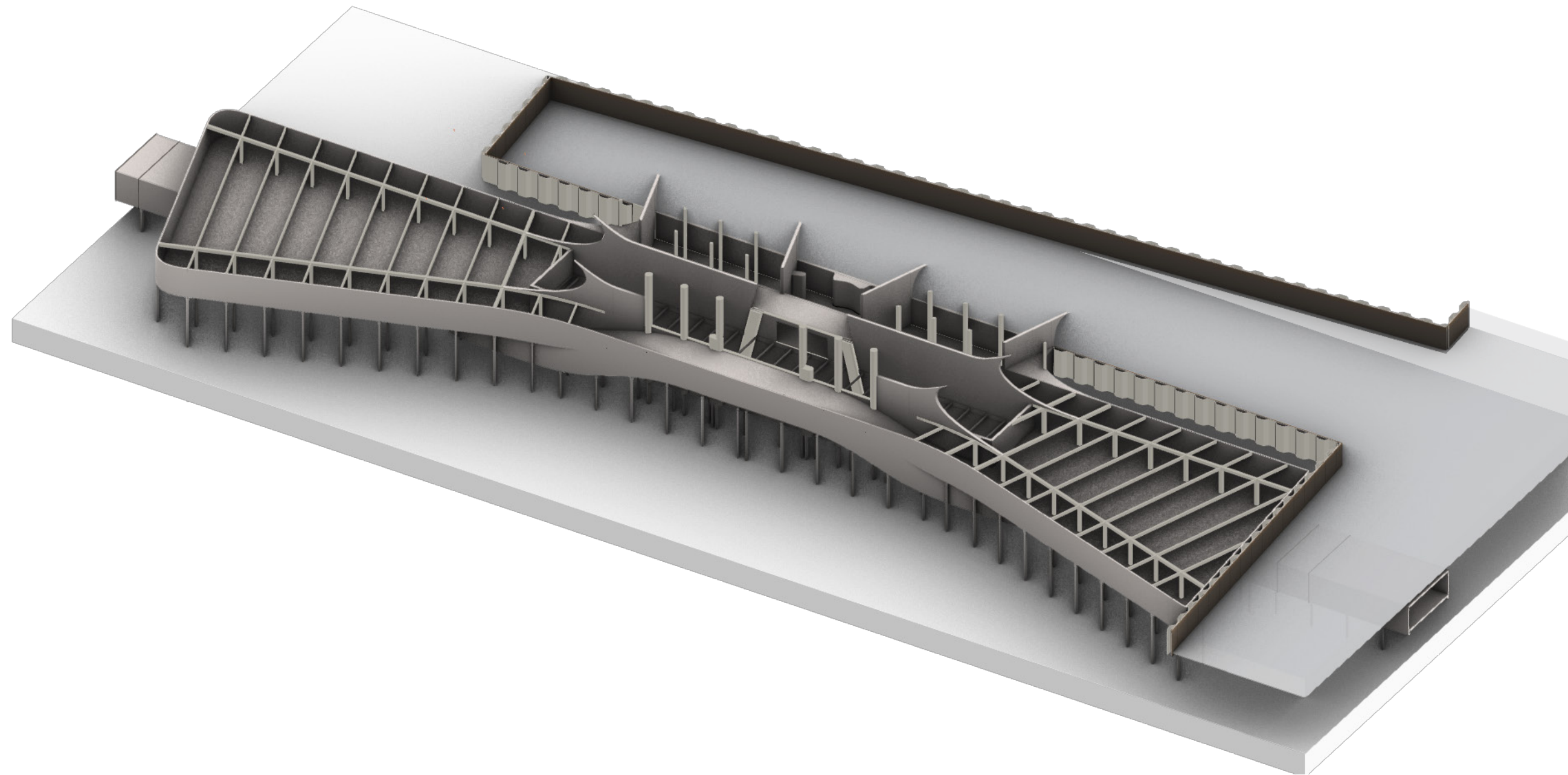


Source: University of Stuttgart, robotically constructed ICD/ITKE Research Pavilion

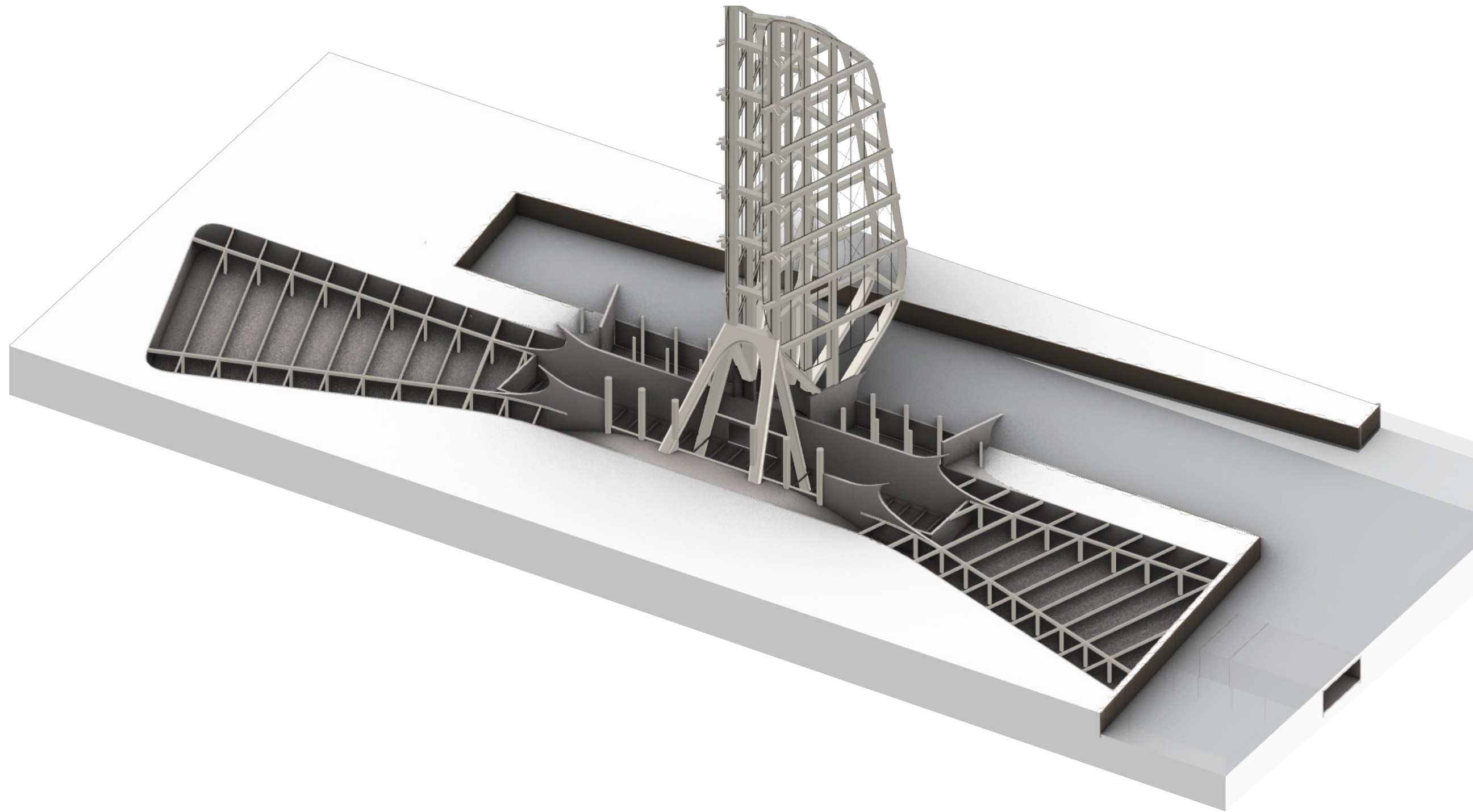
Construction sequence



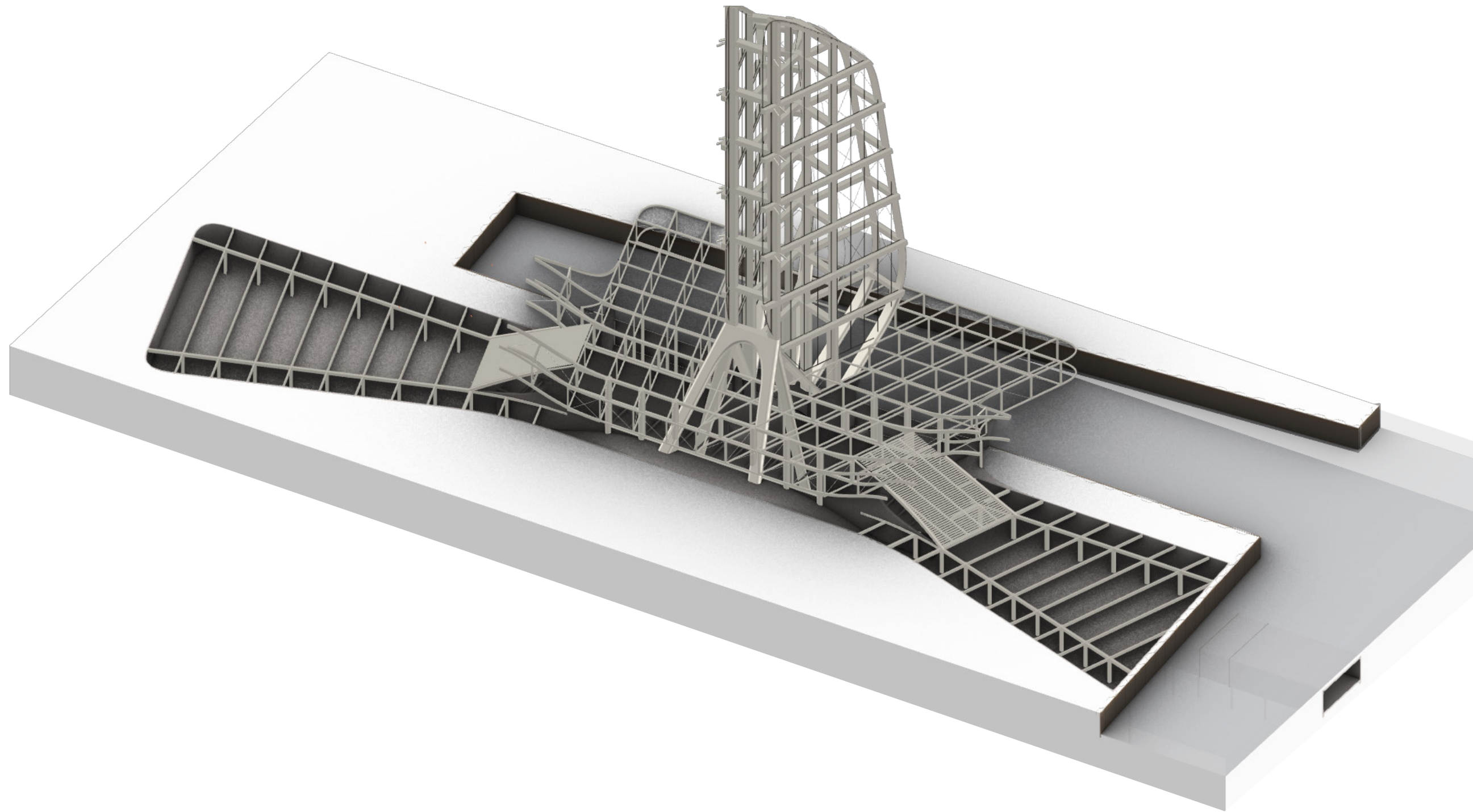
Construction sequence



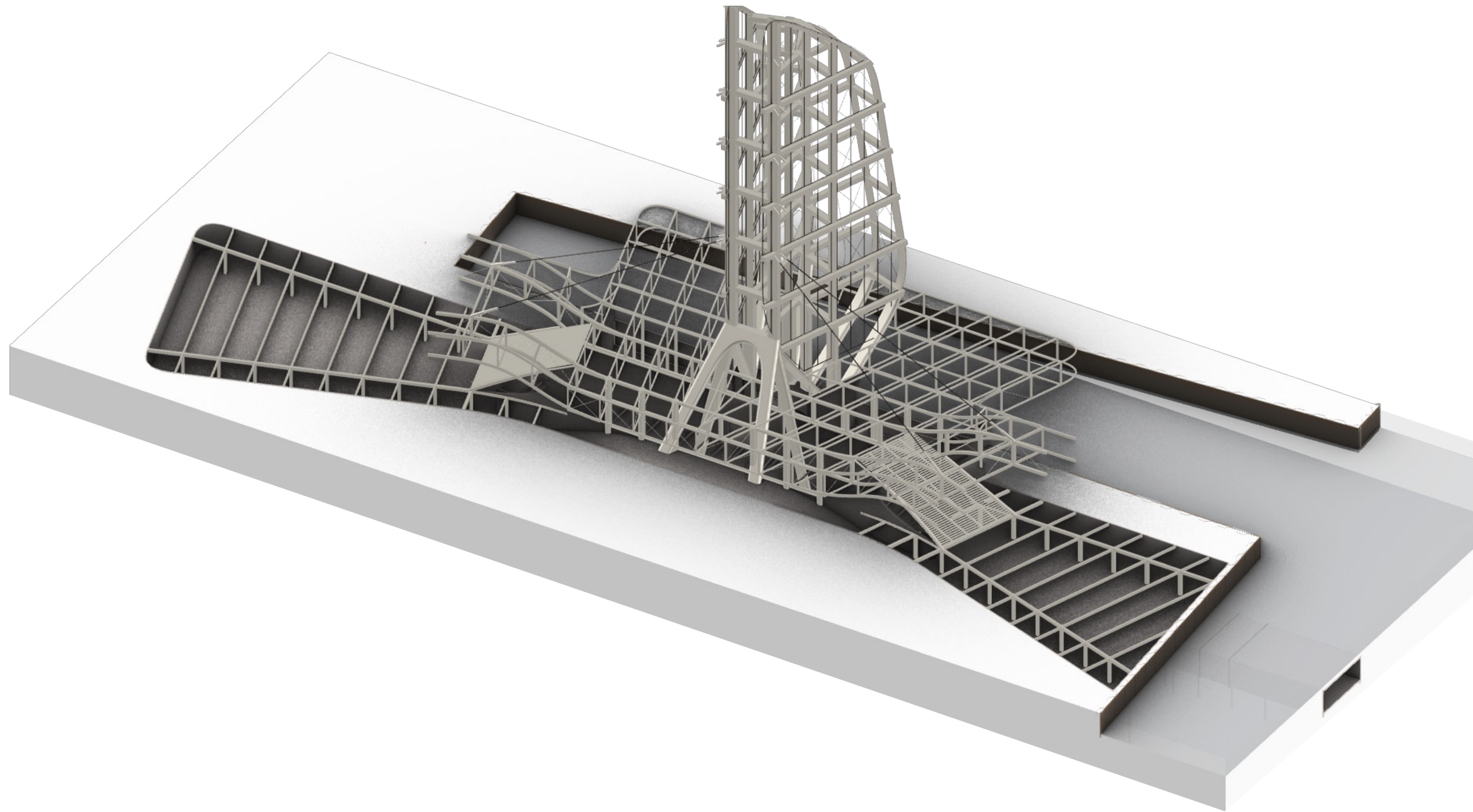
Construction sequence



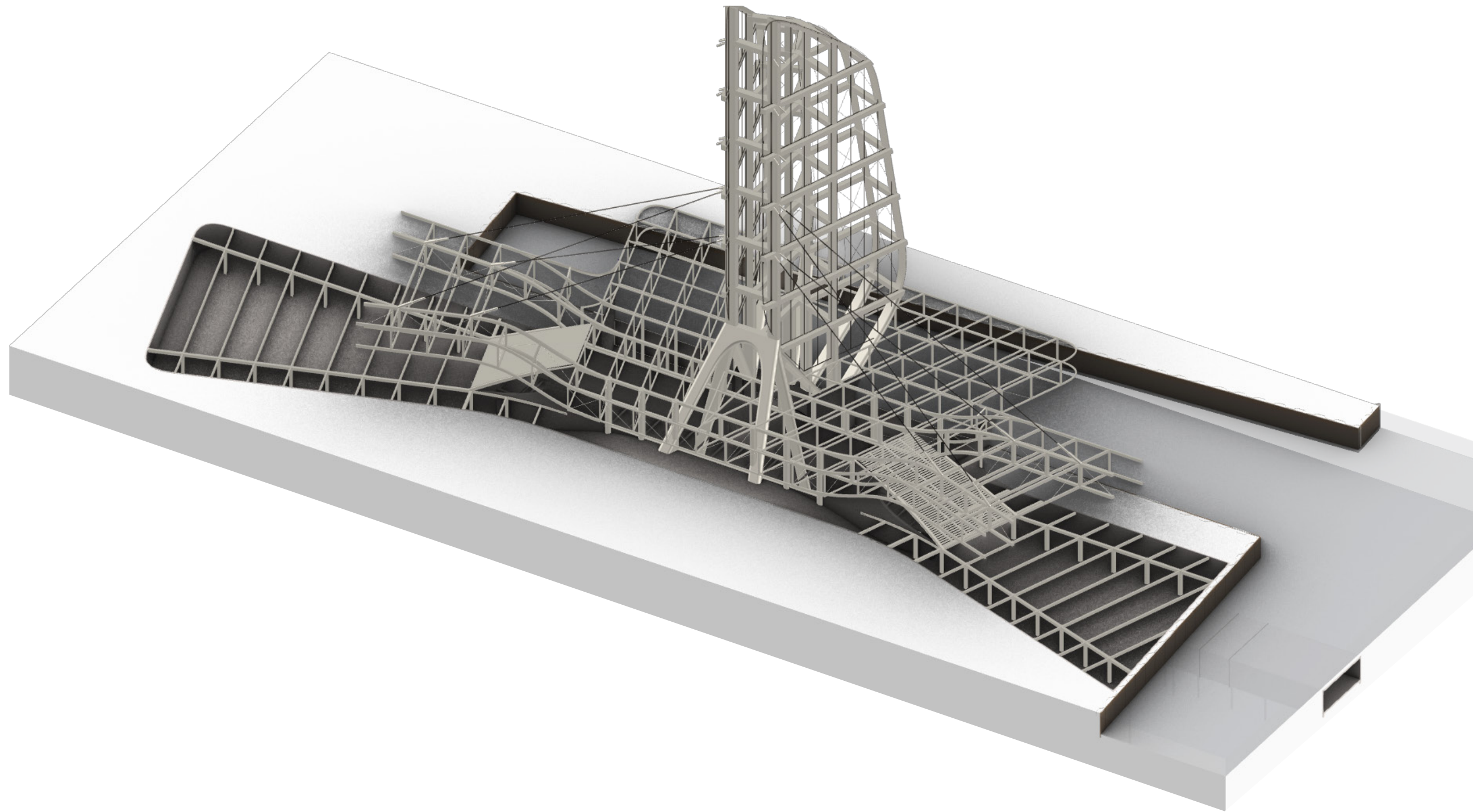
Construction sequence



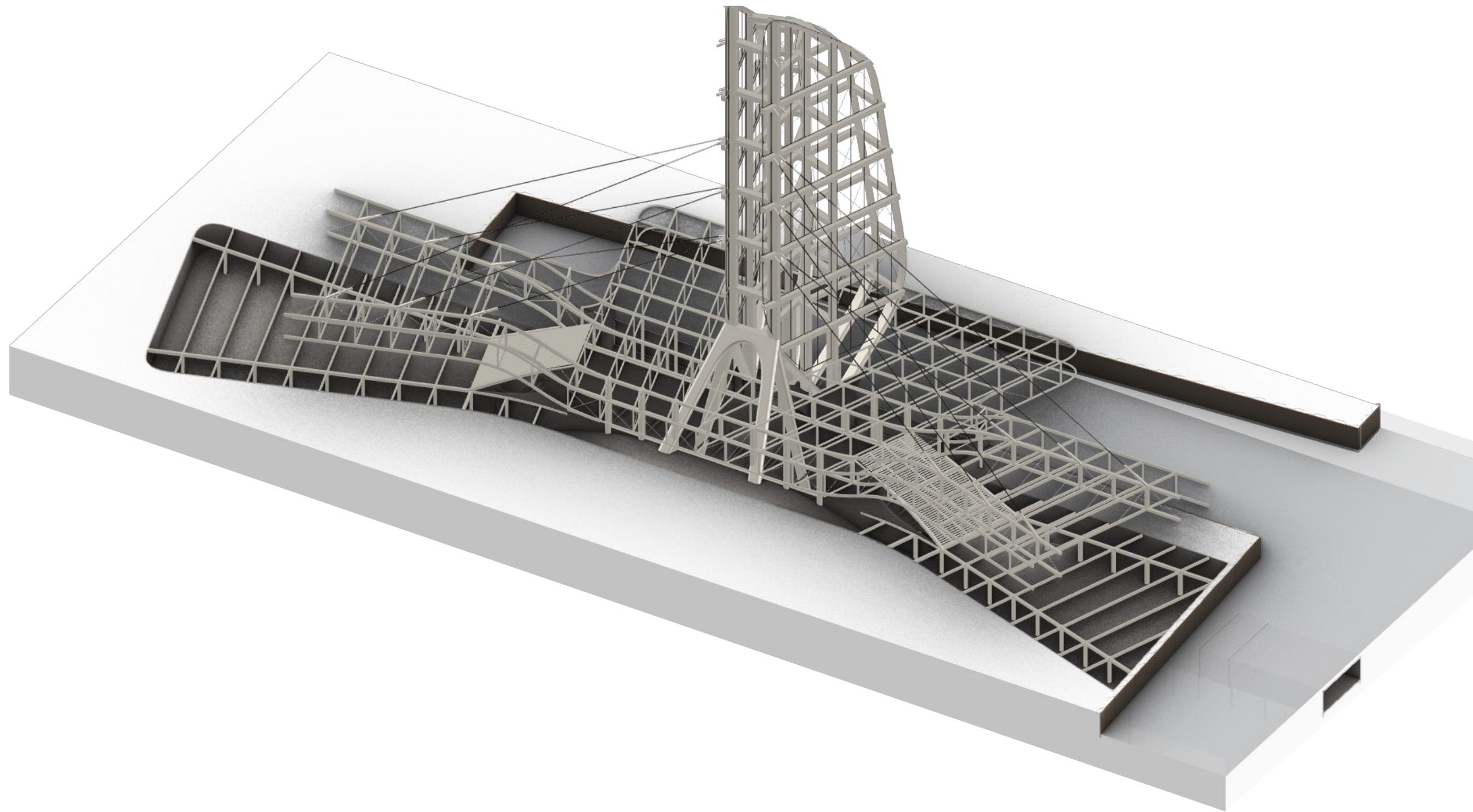
Construction sequence



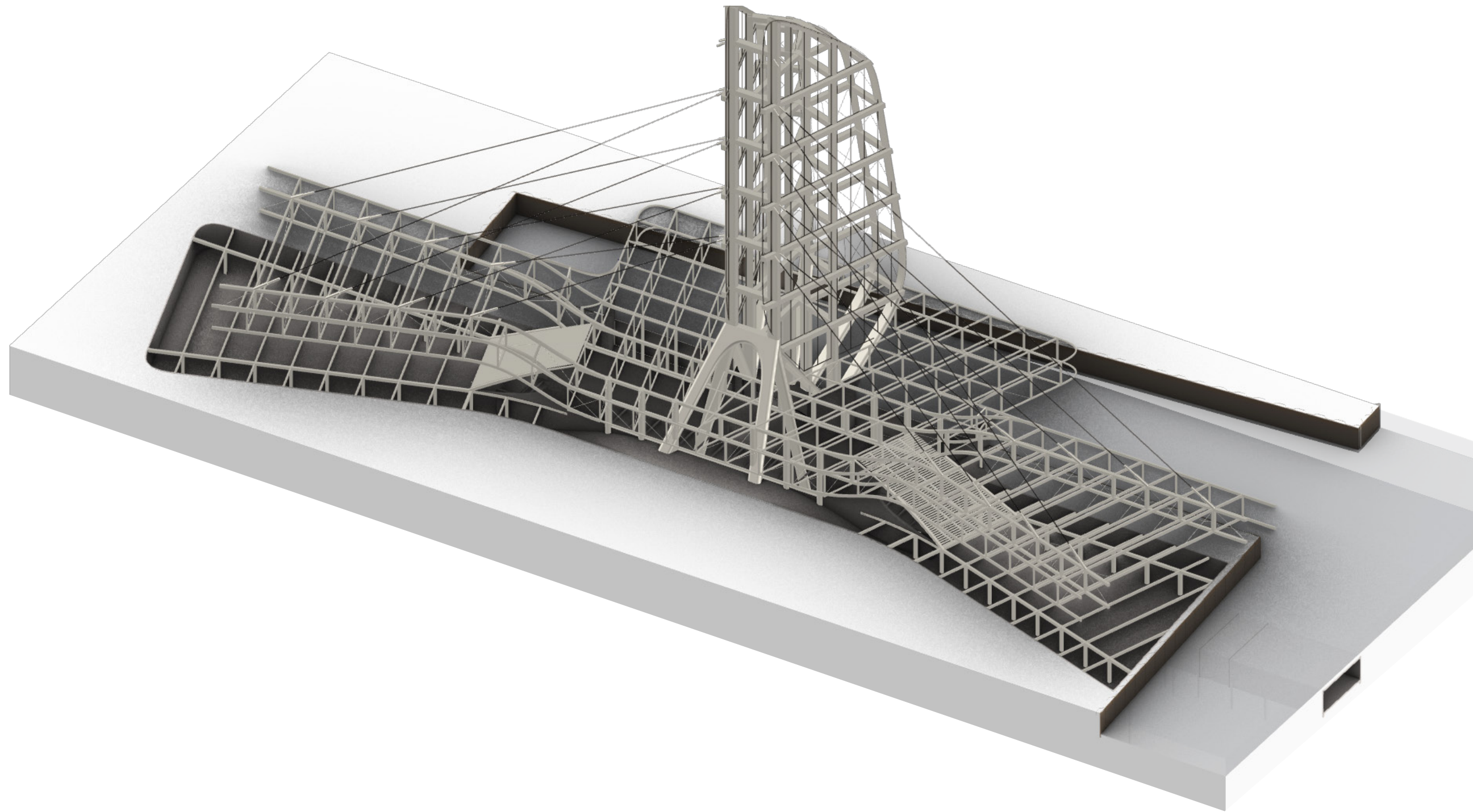
Construction sequence



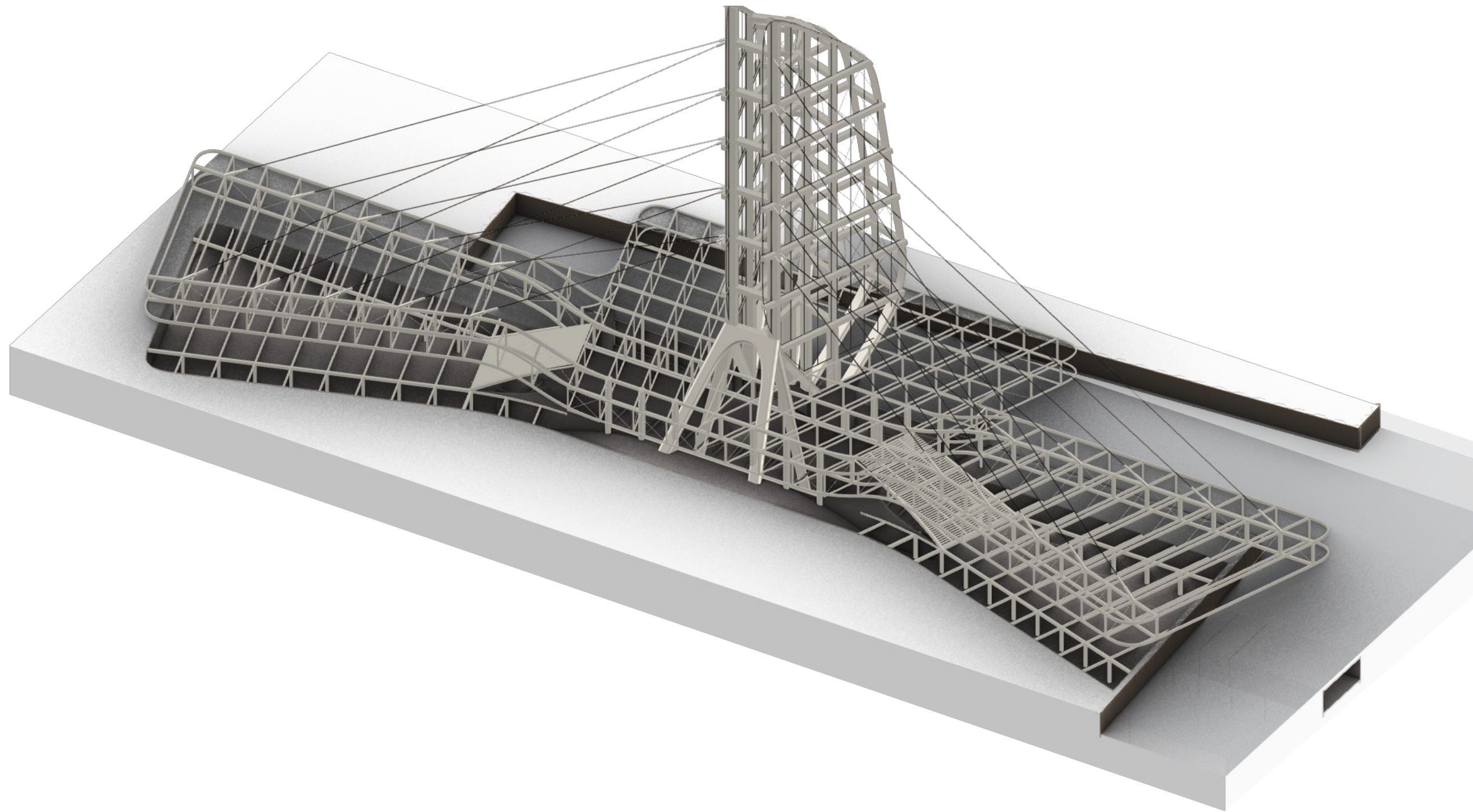
Construction sequence



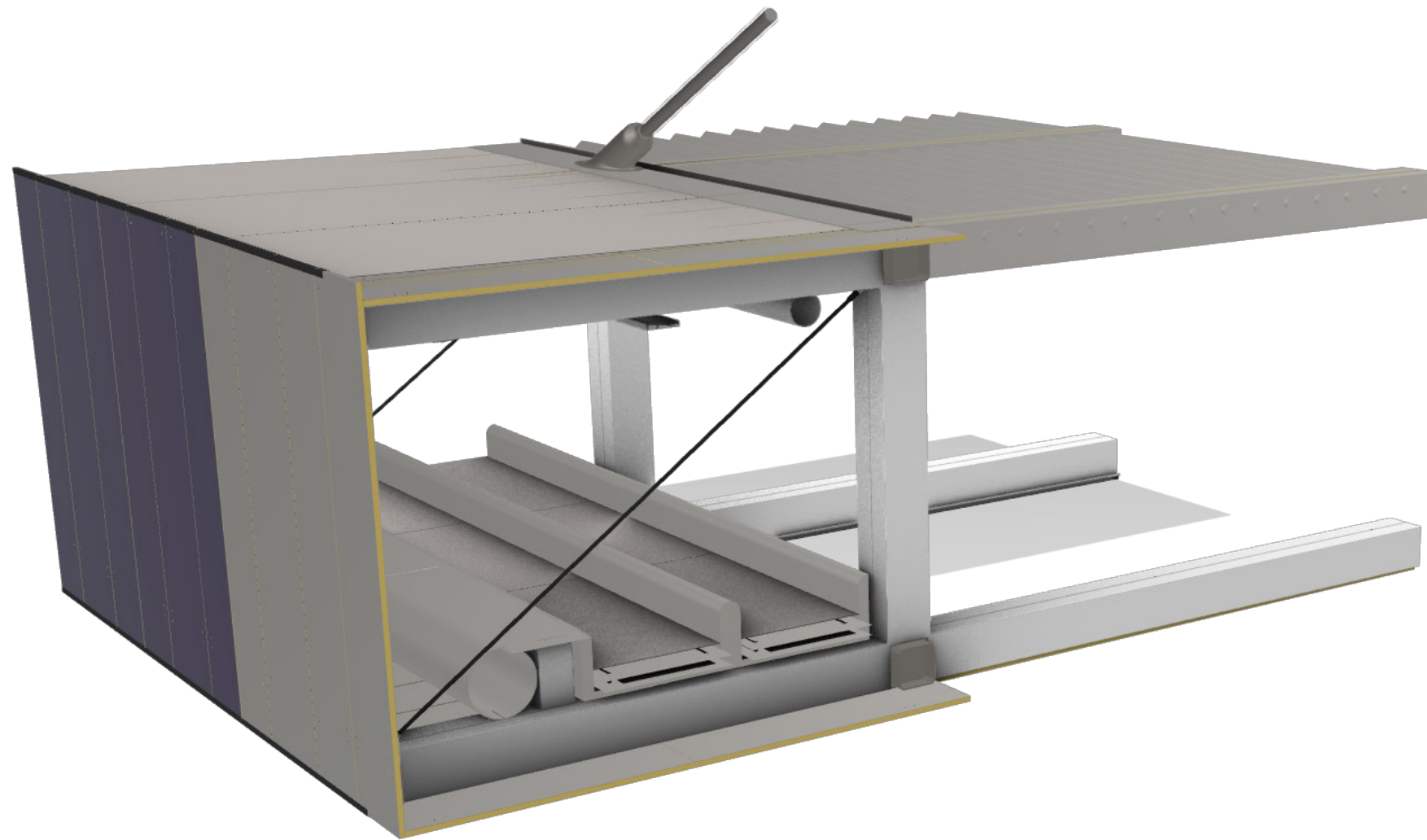
Construction sequence



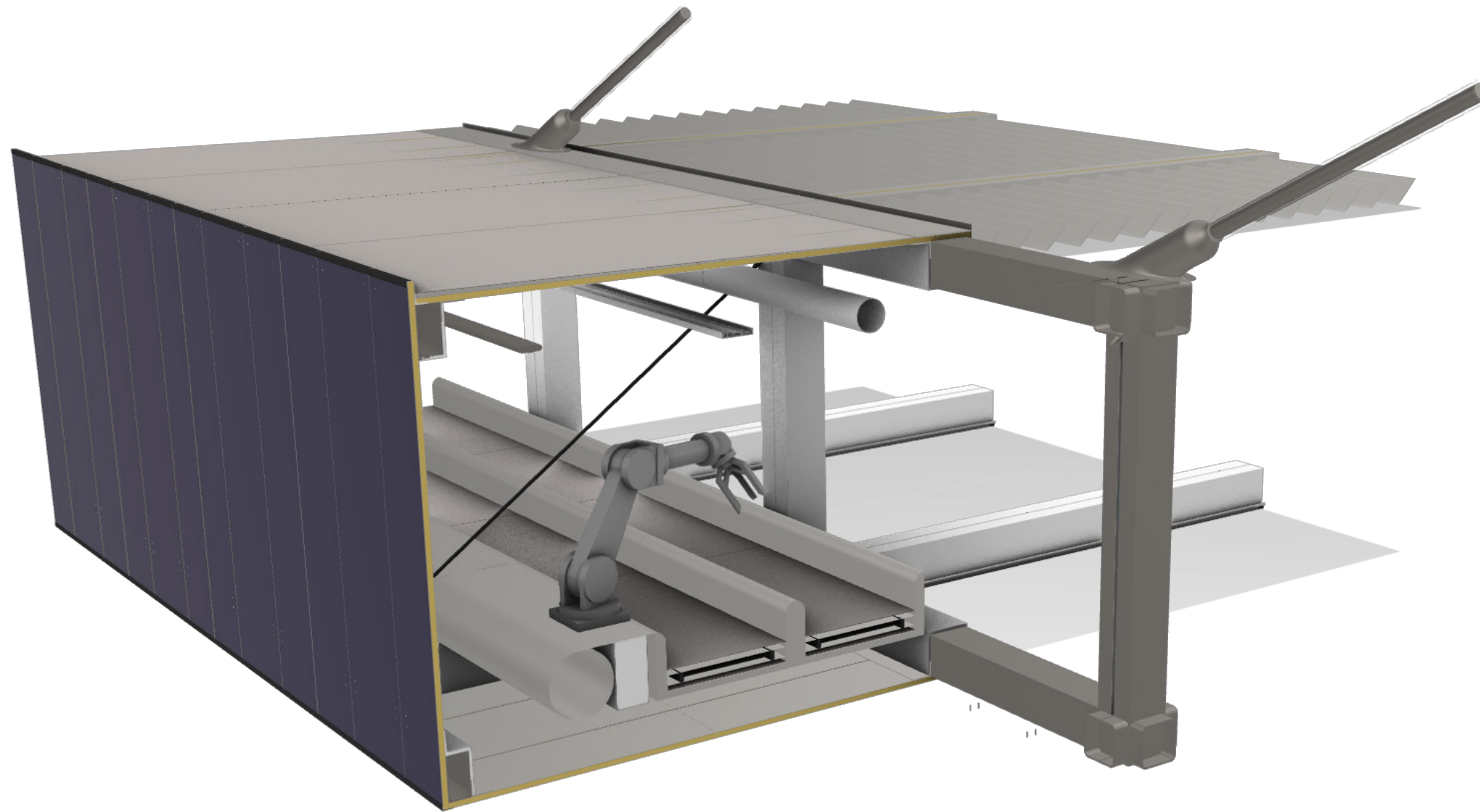
Construction sequence



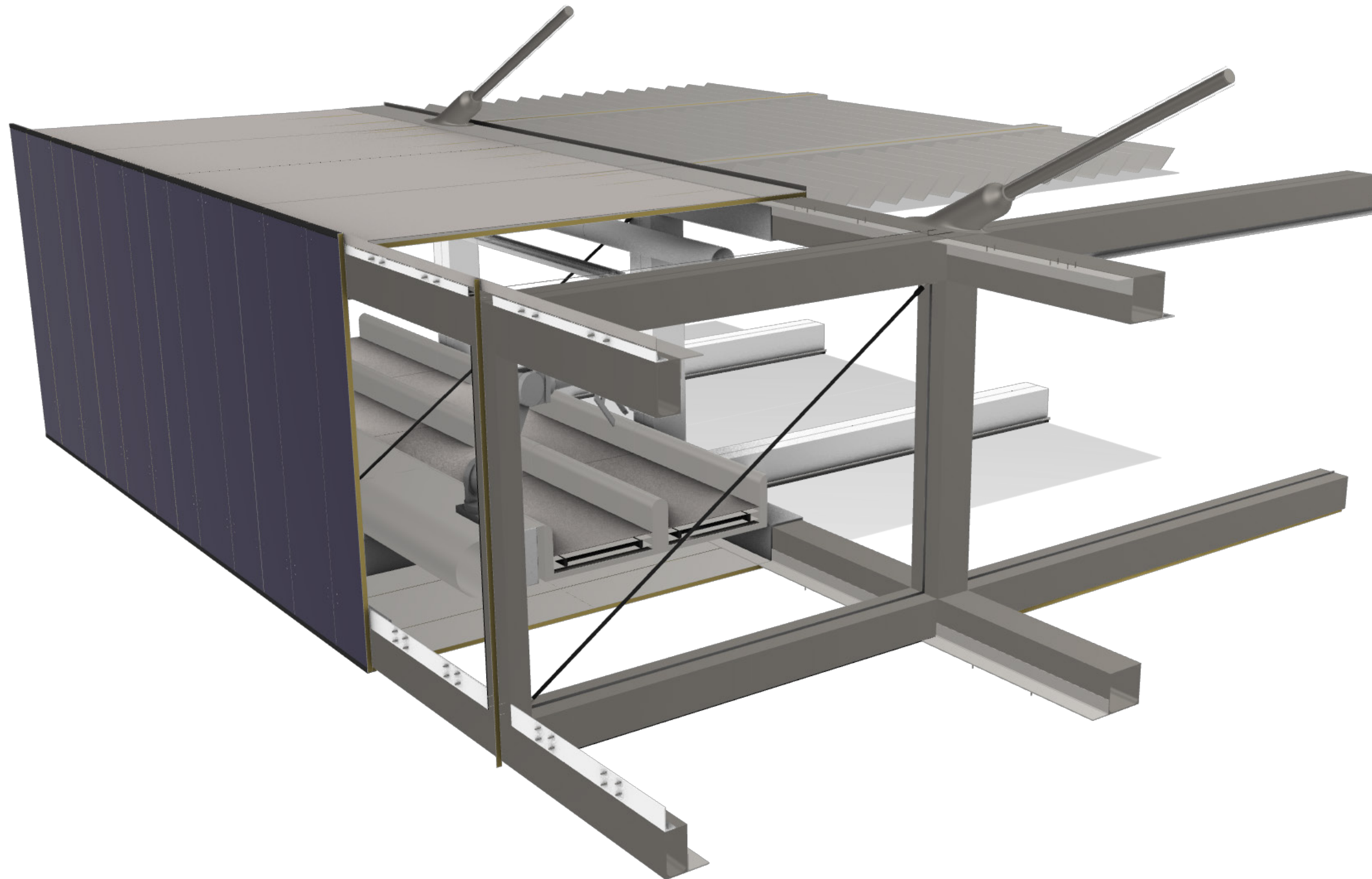
Canopy detail



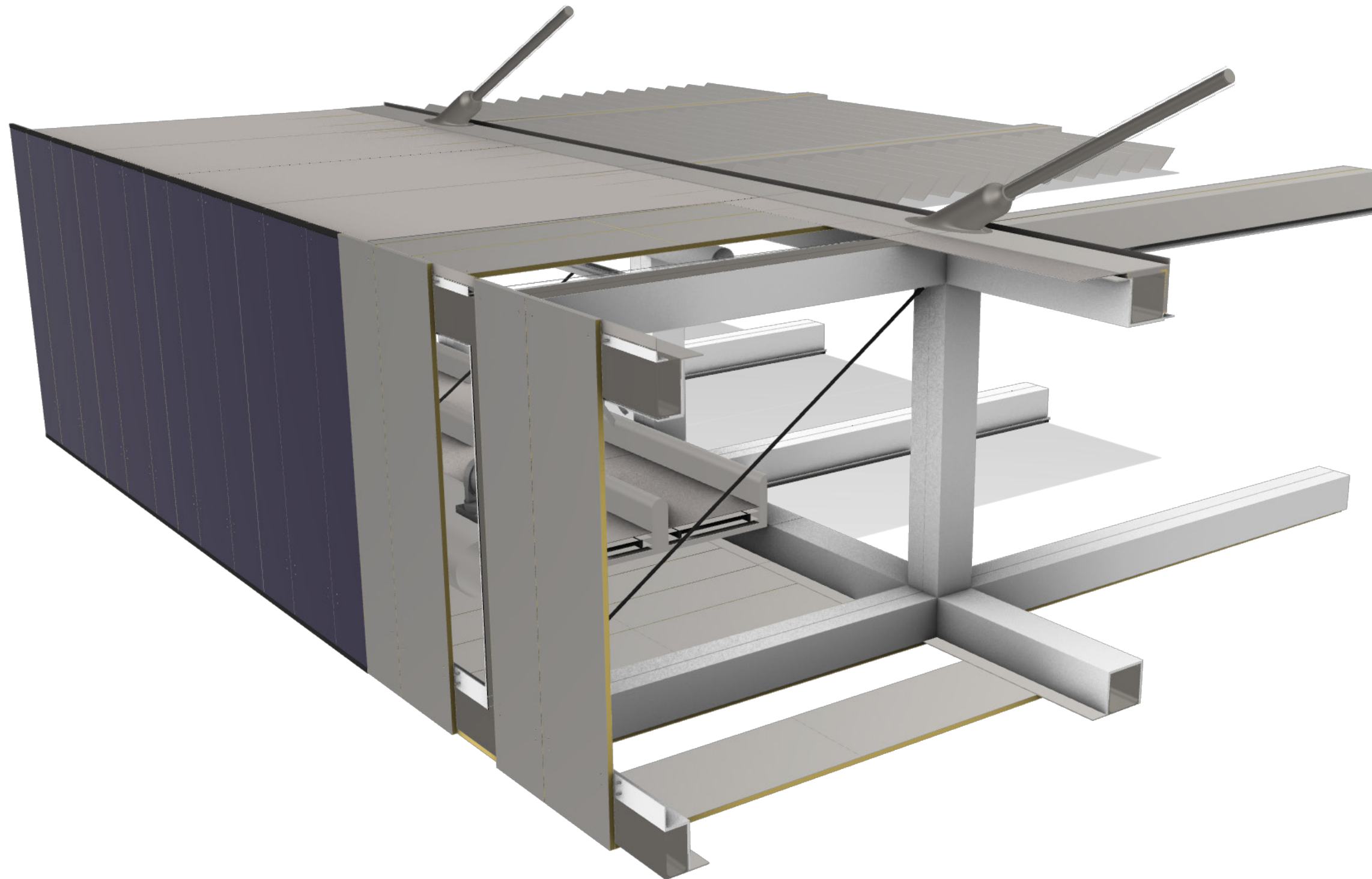
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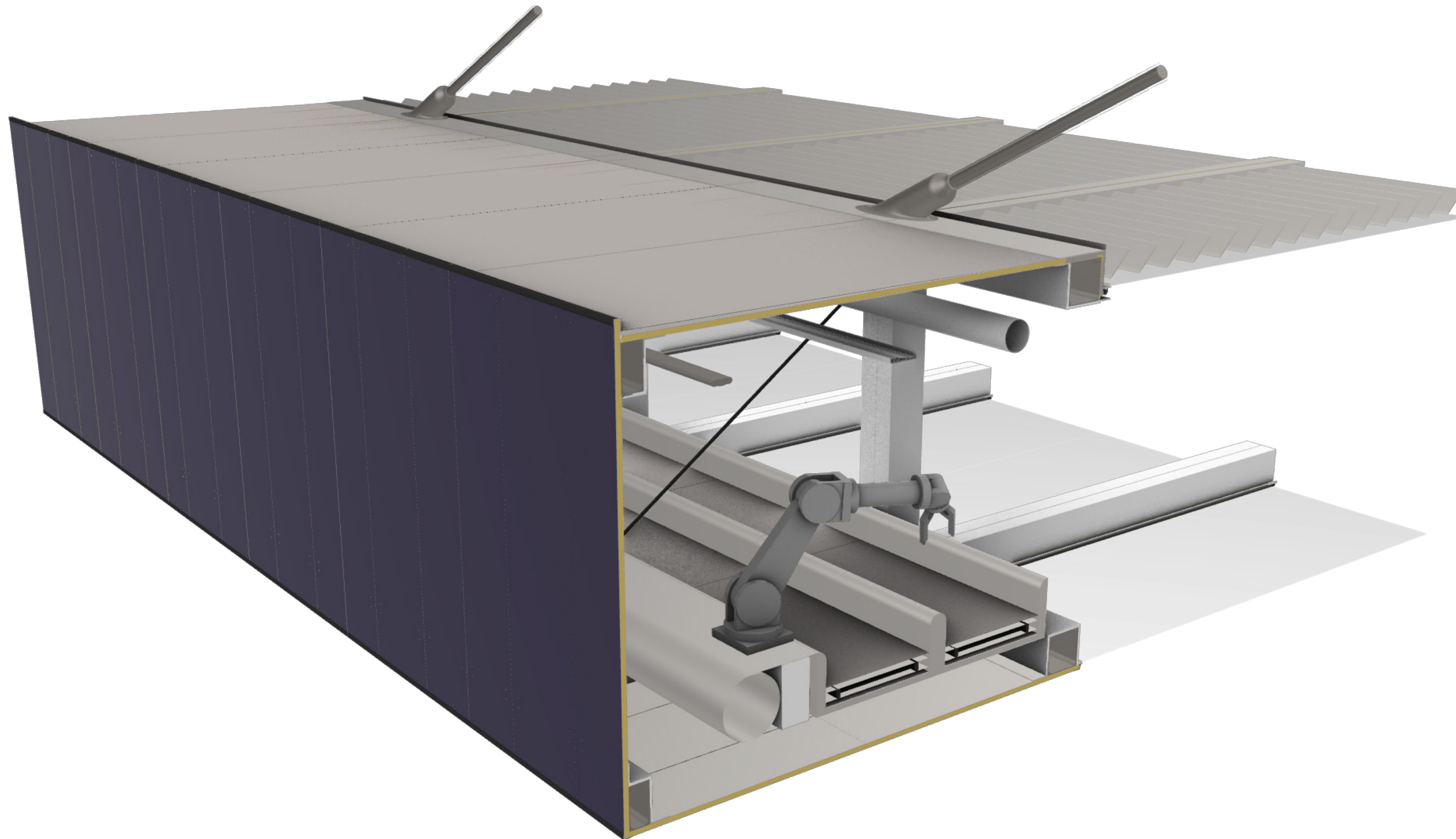
Canopy detail



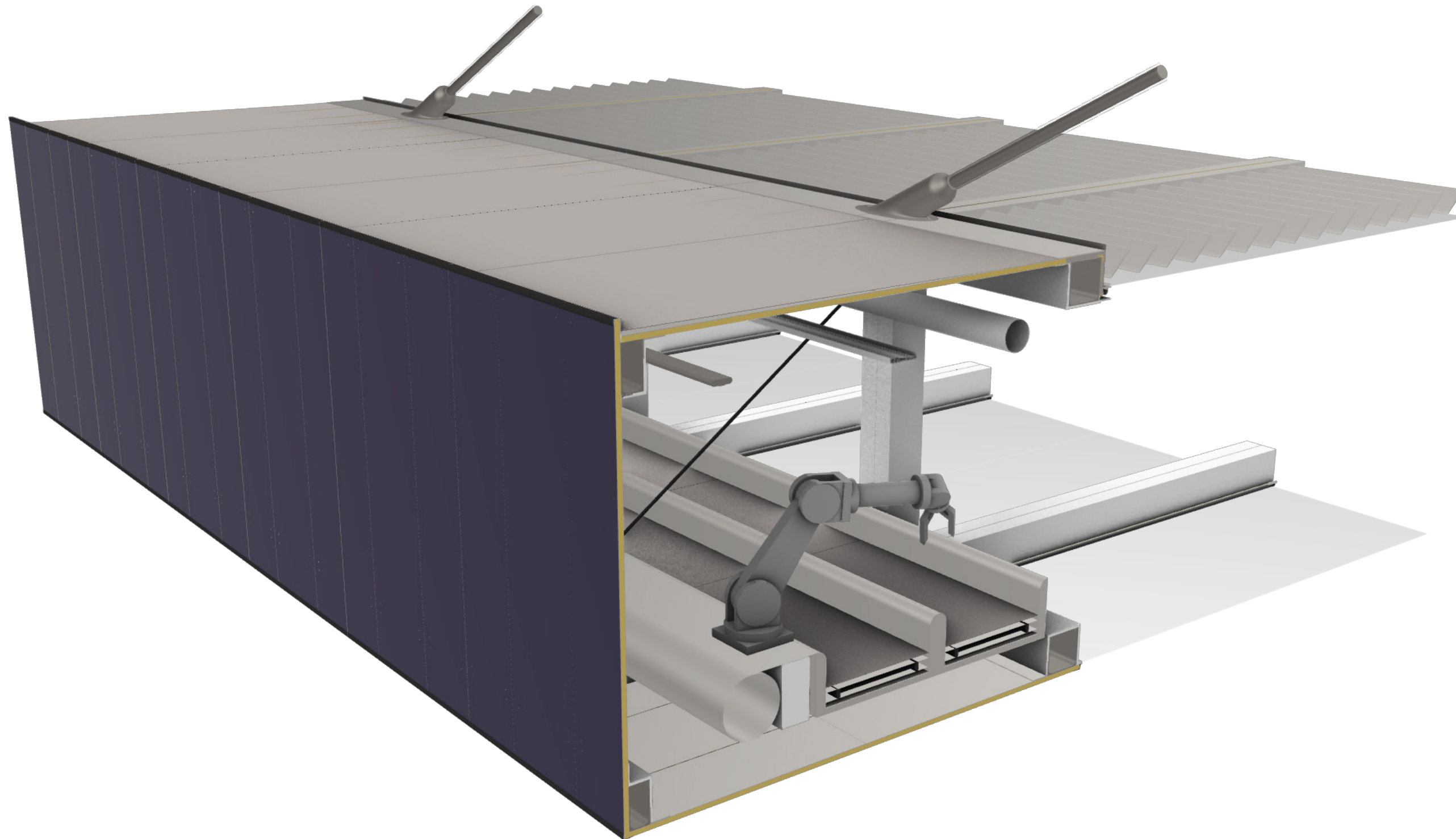
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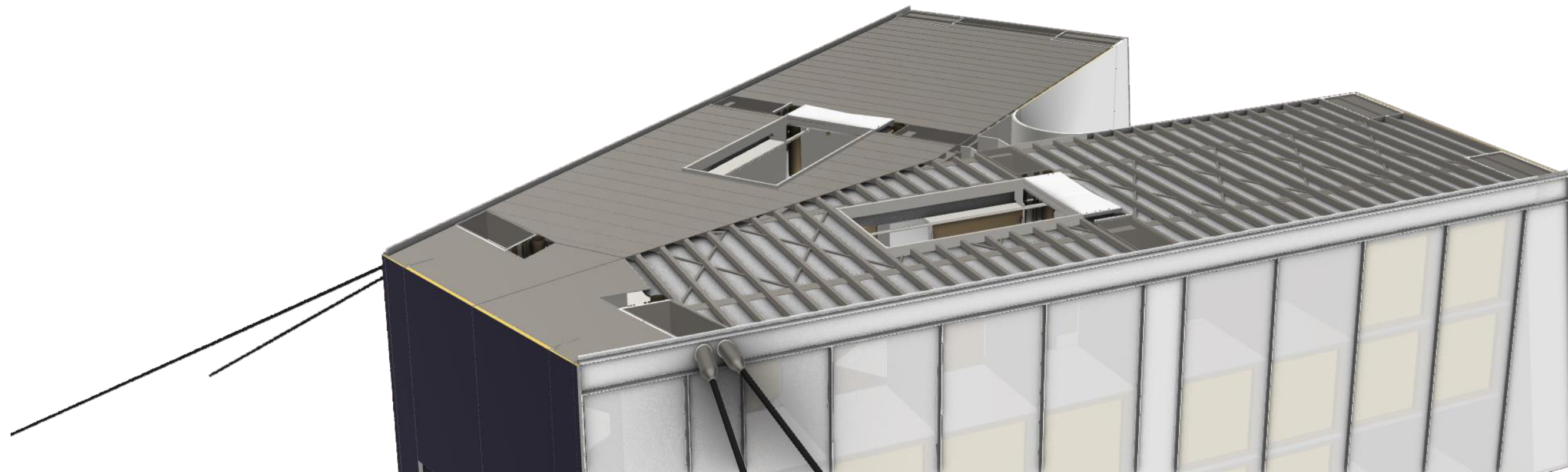
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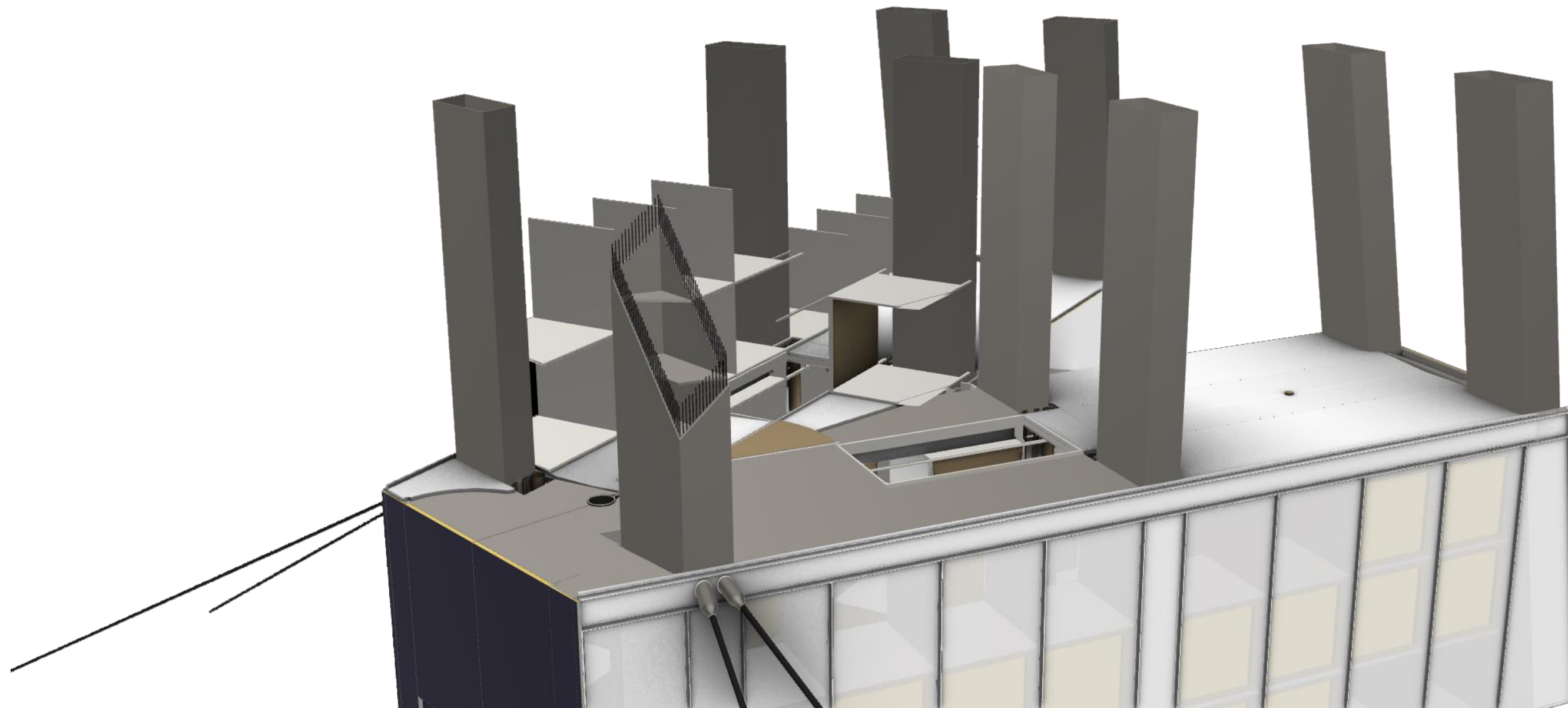
Canopy detail



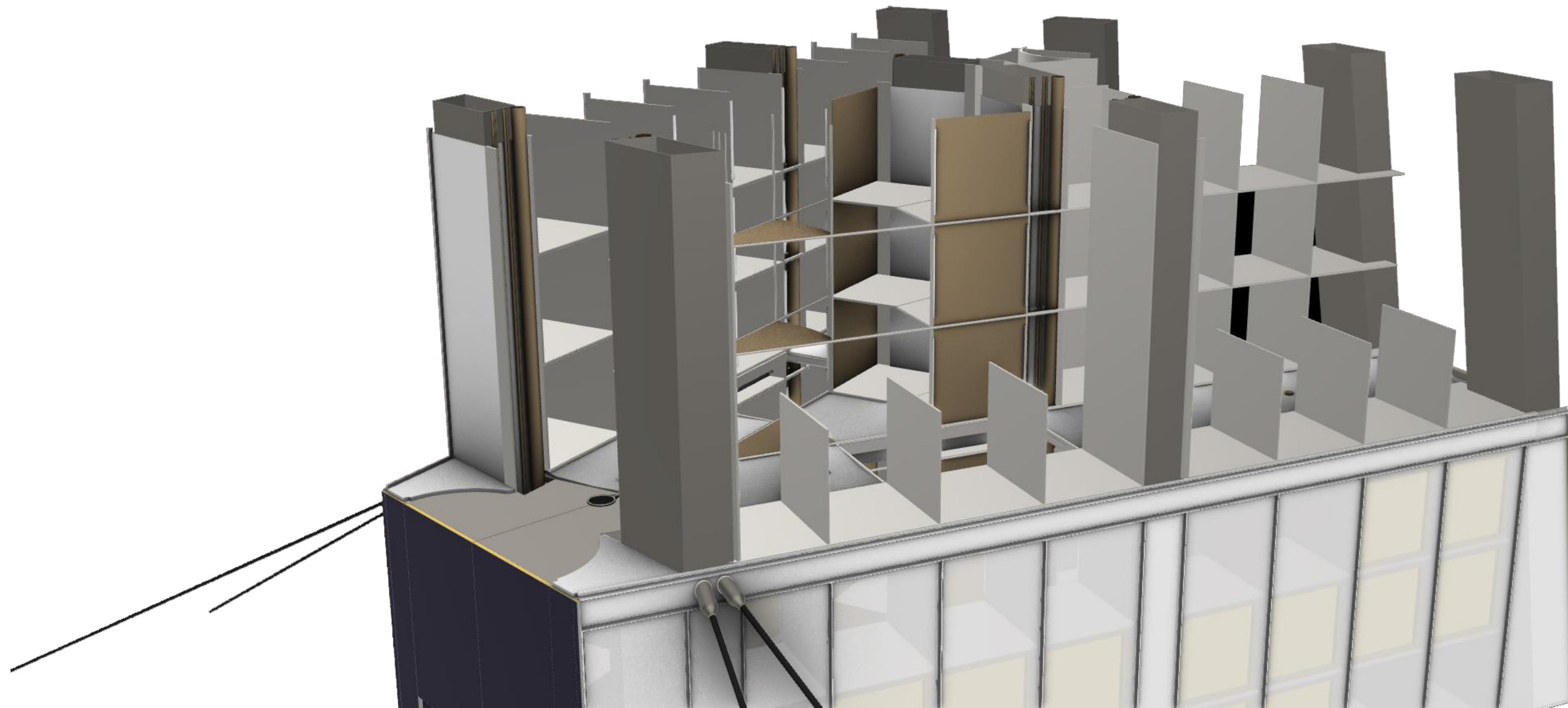
Storage tower detail



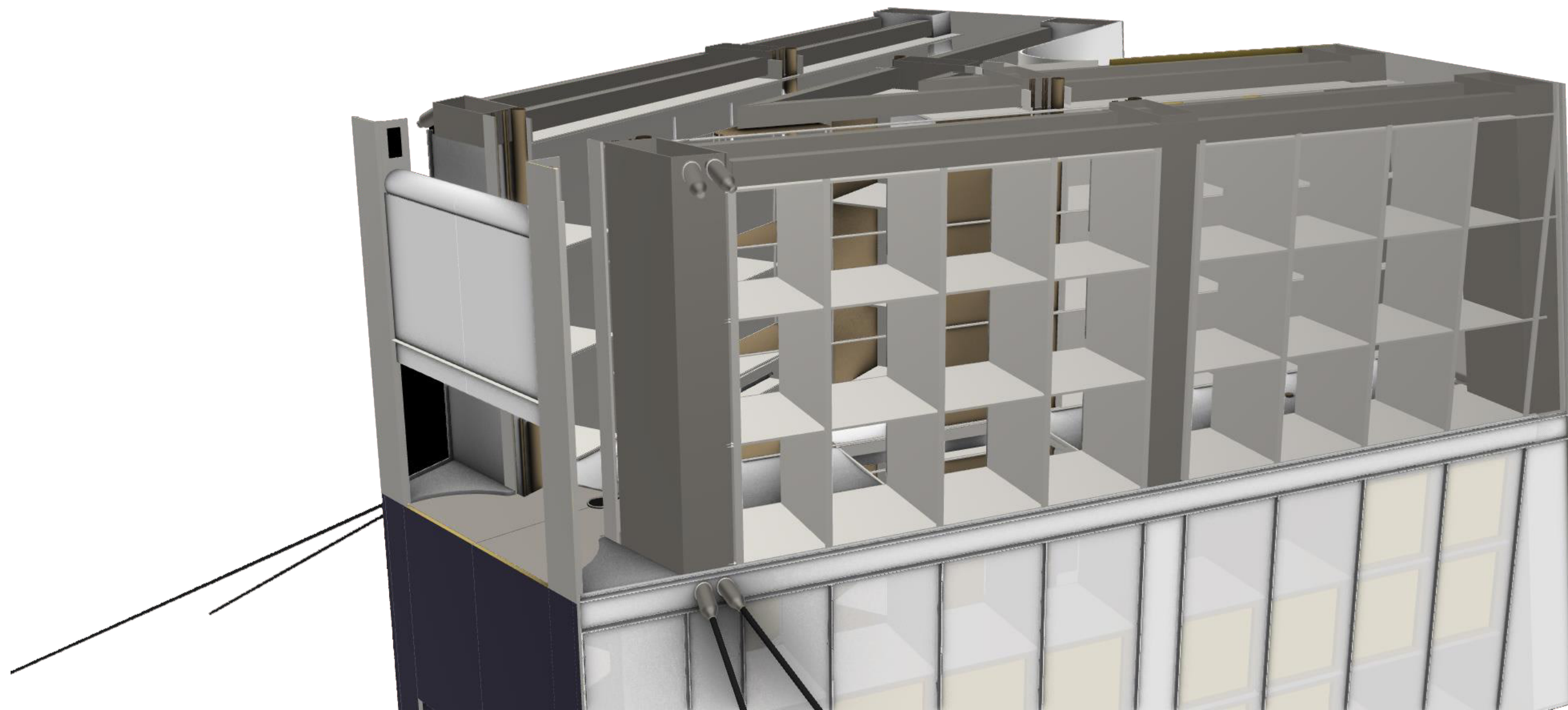
Storage tower detail



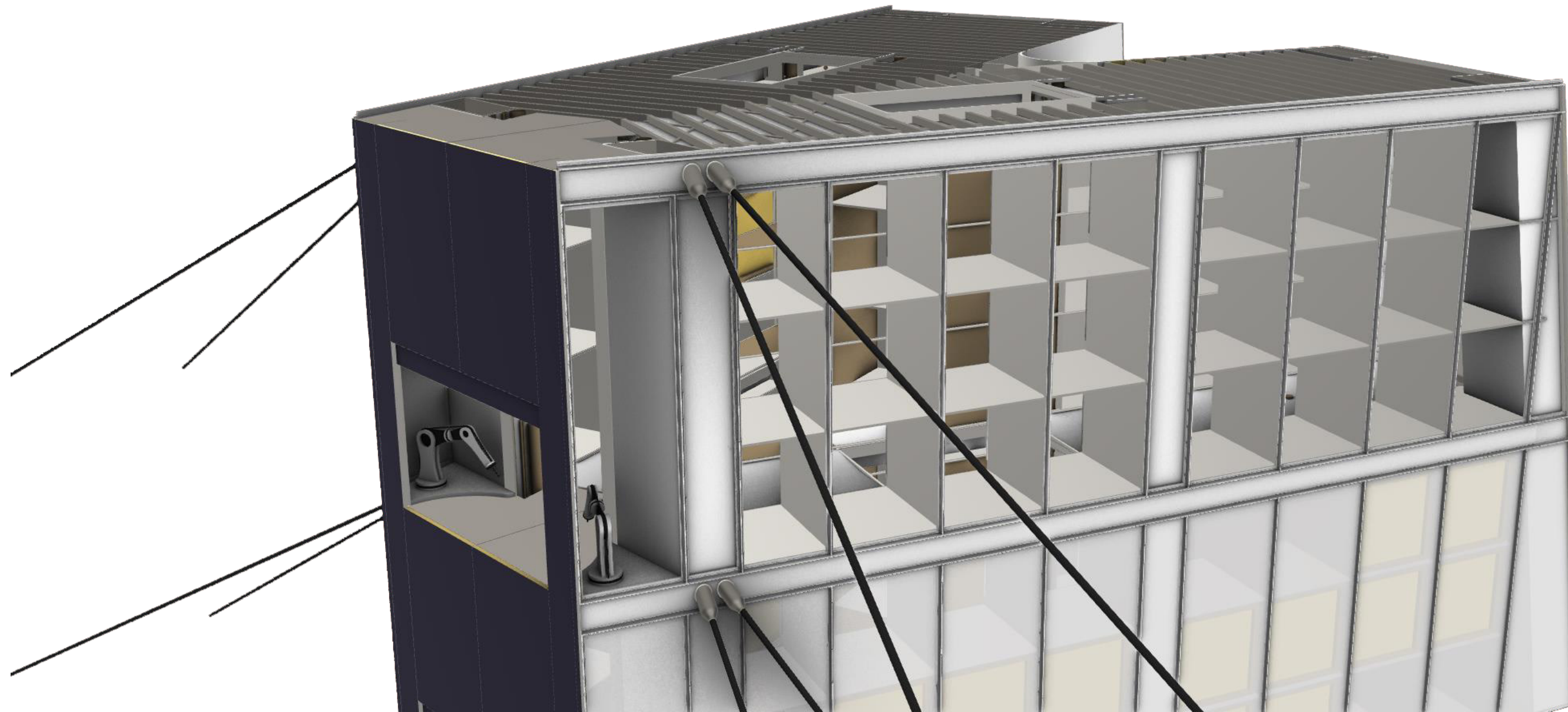
Storage tower detail



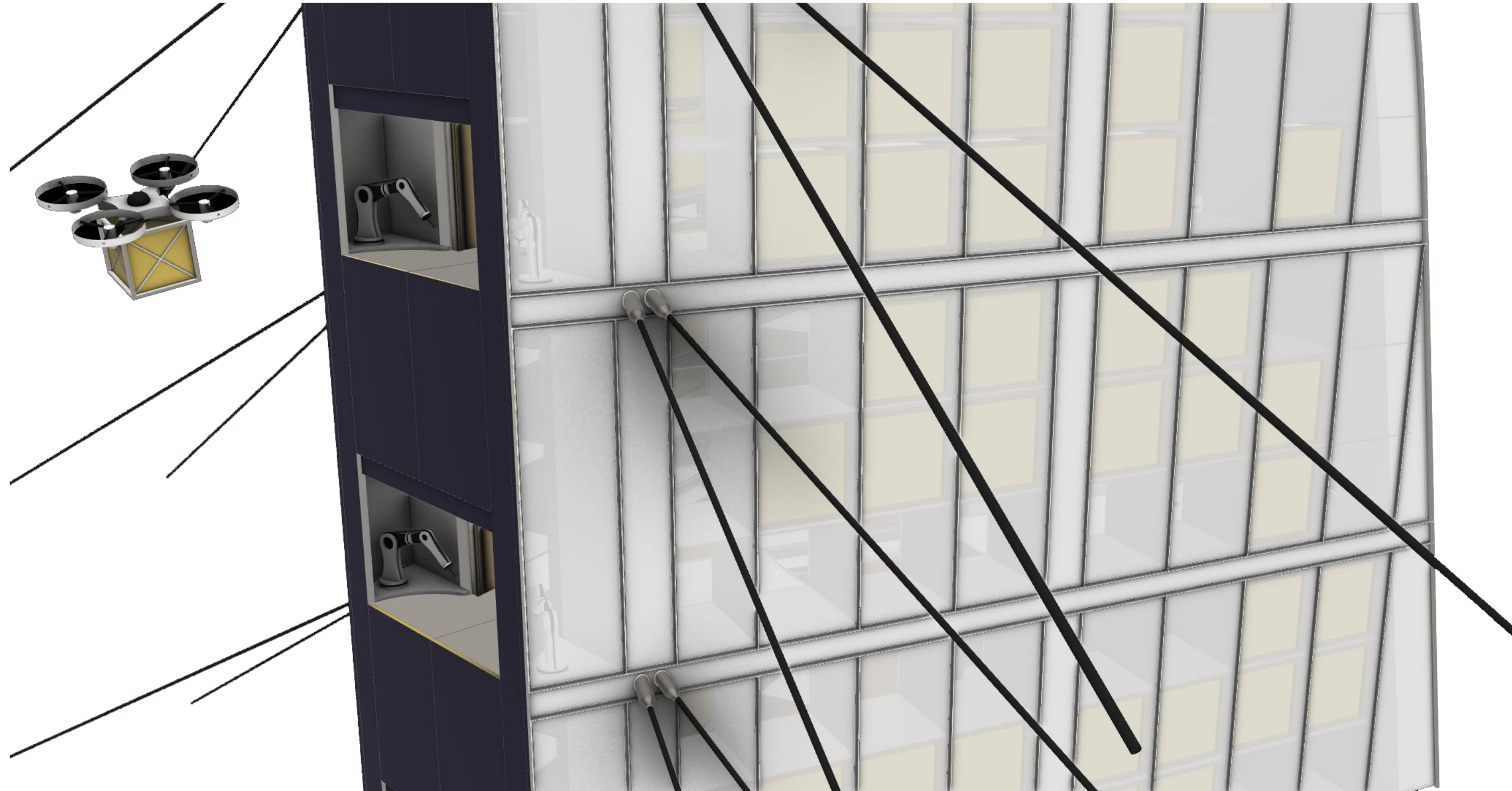
Storage tower detail



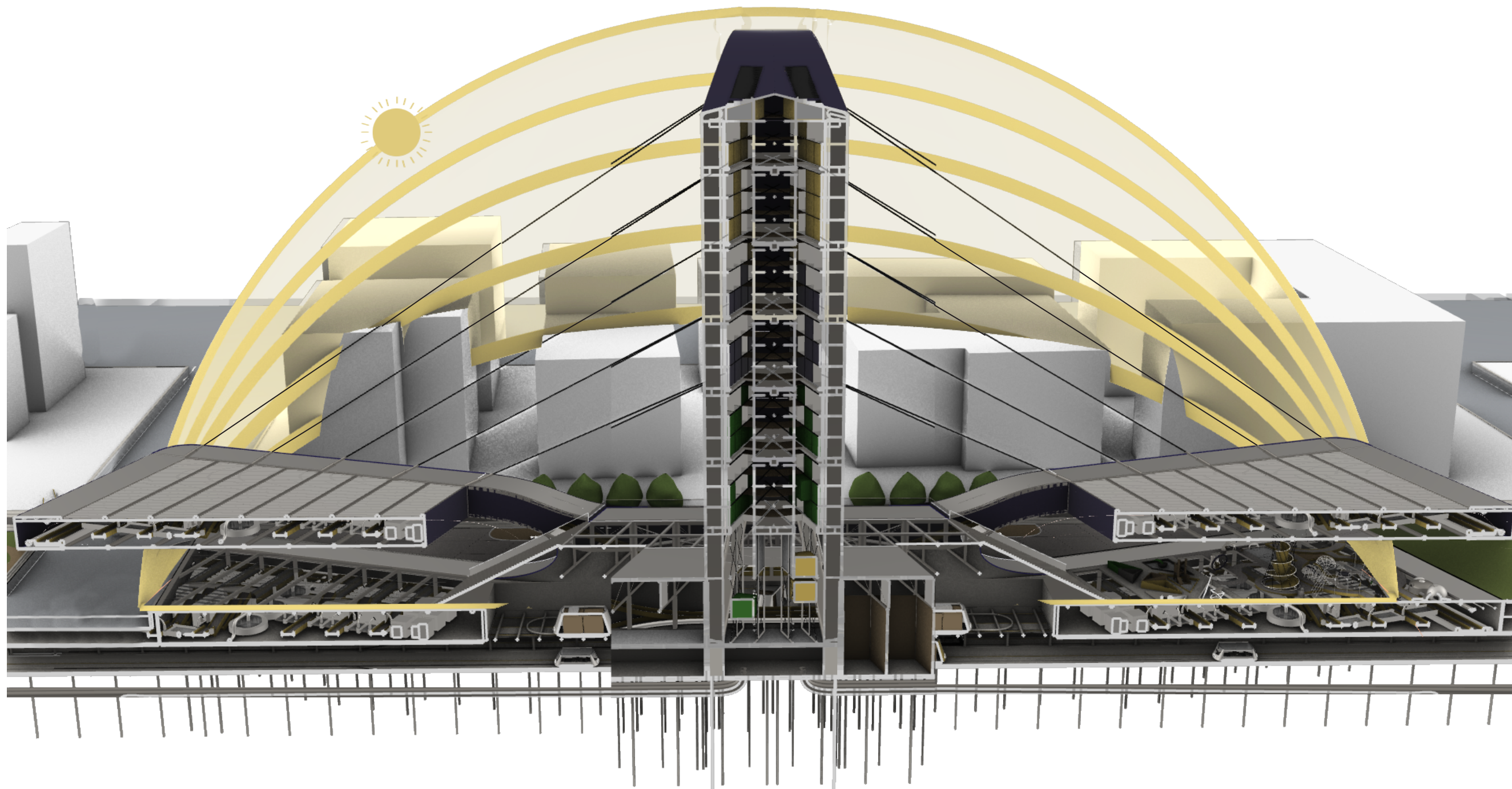
Storage tower detail



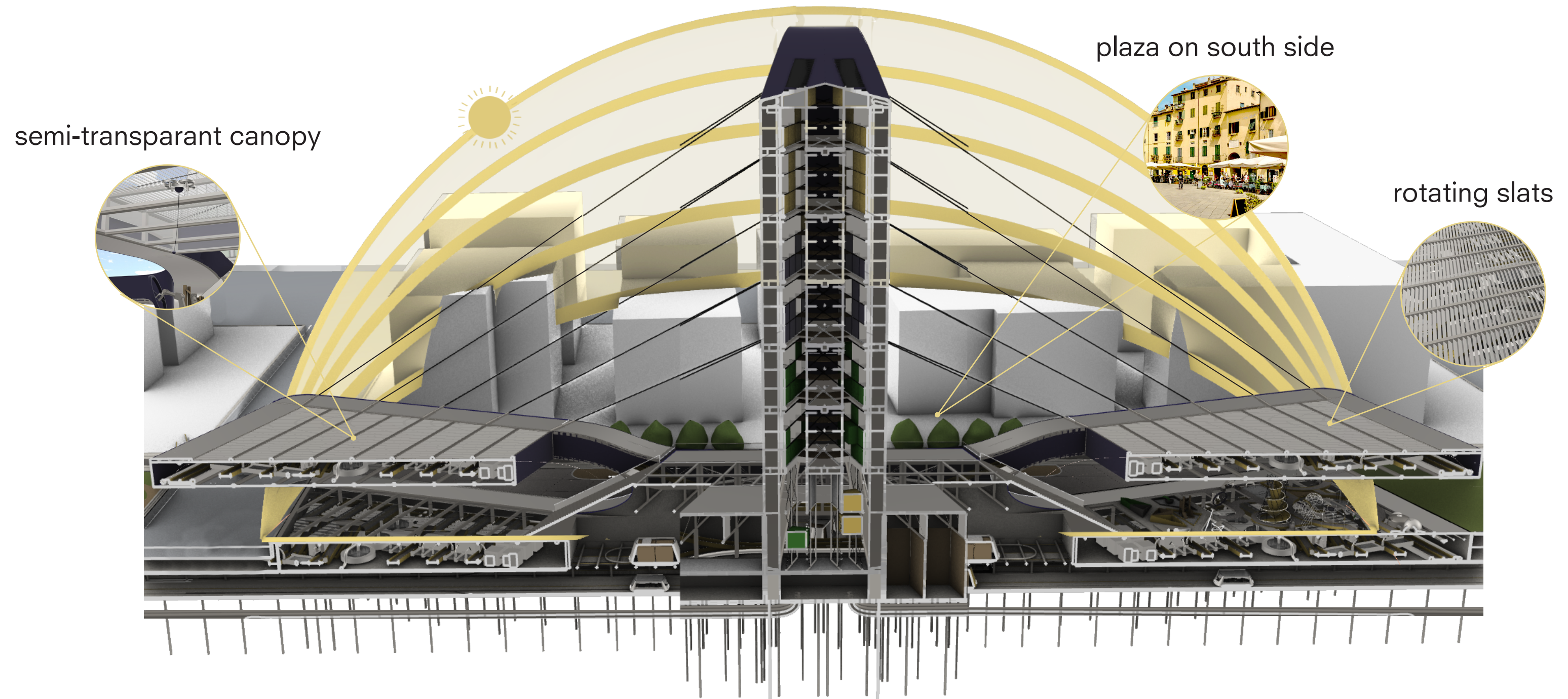
Storage tower detail



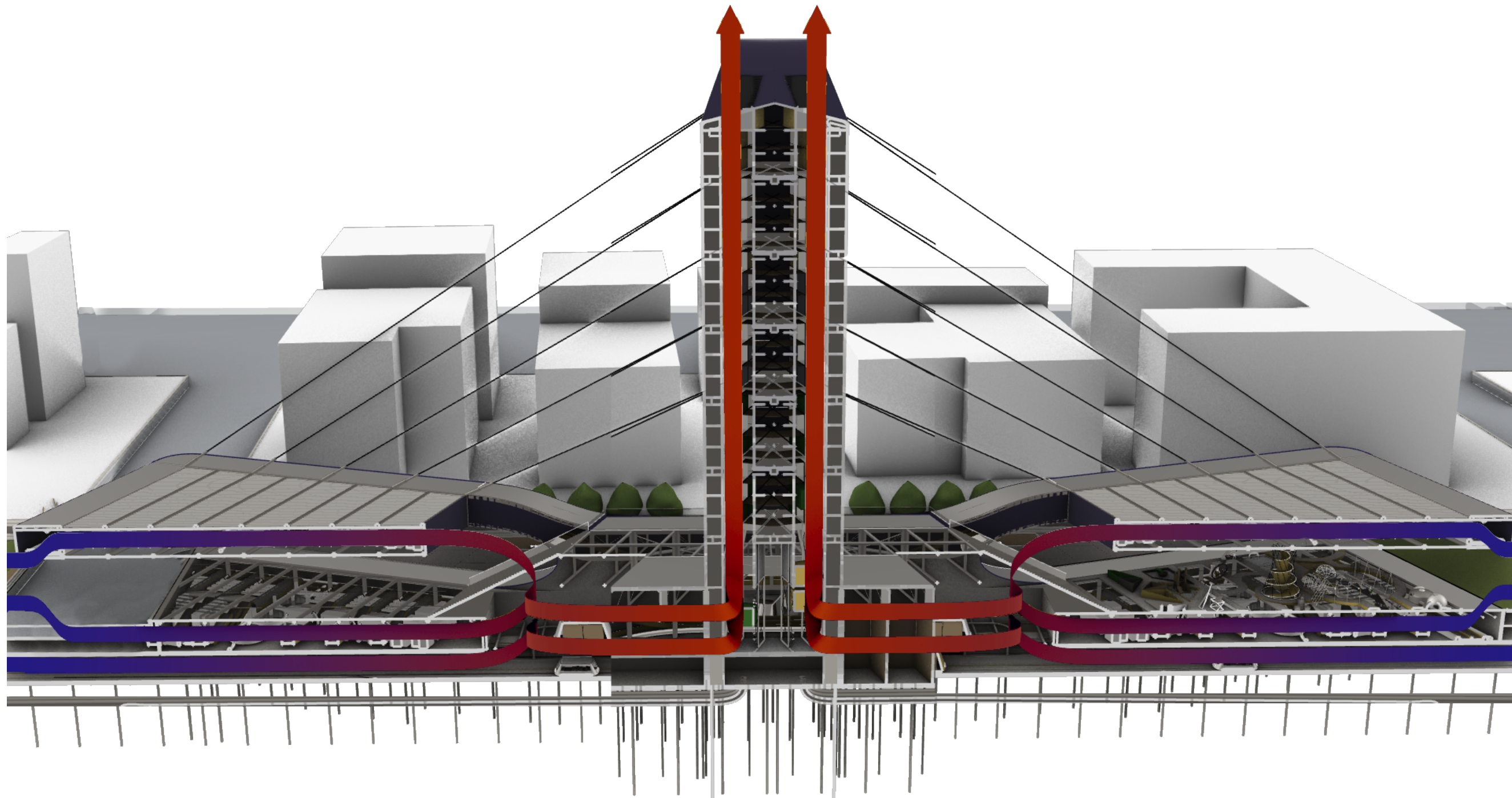
Climate - sun



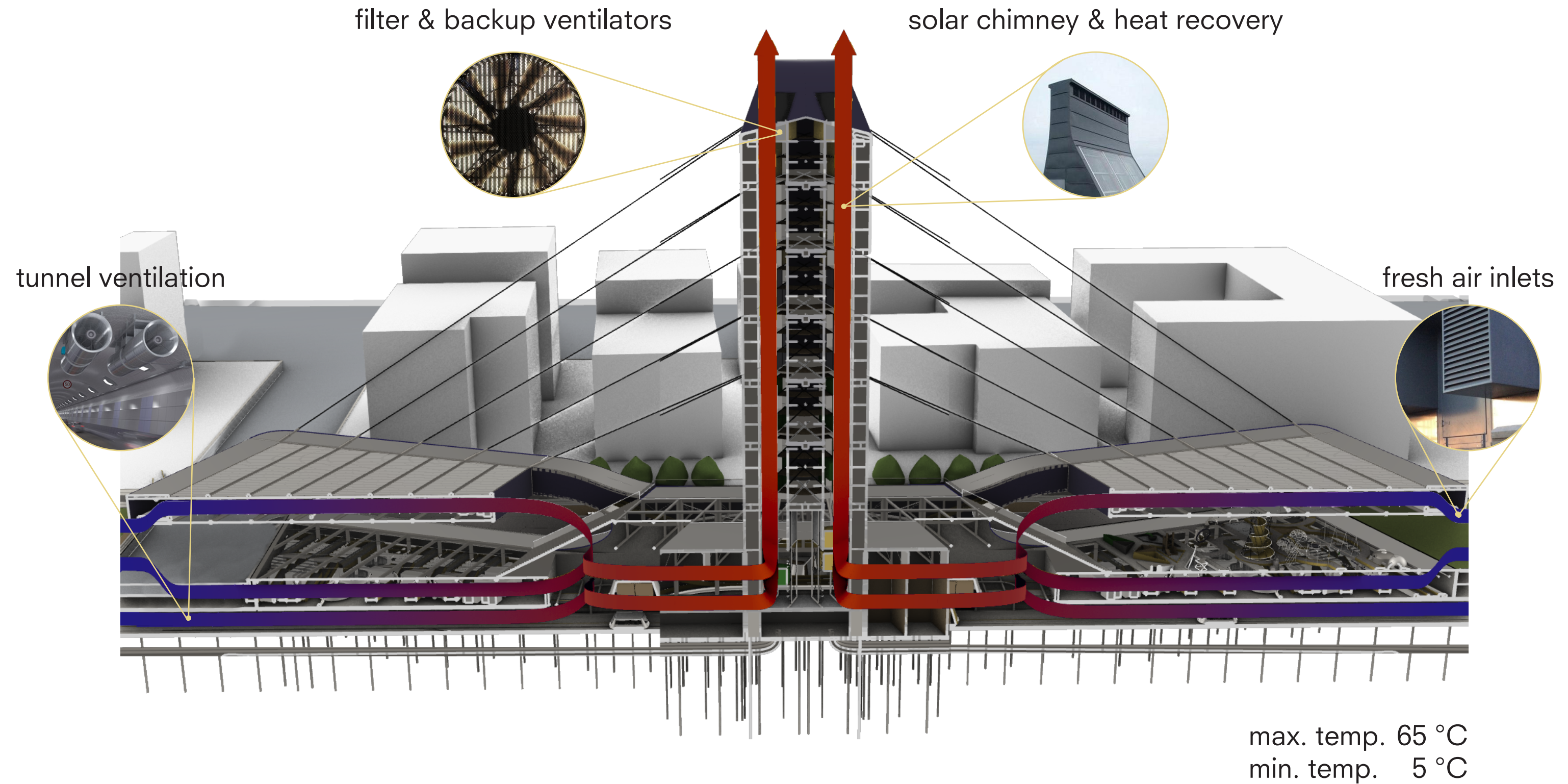
Climate - sun



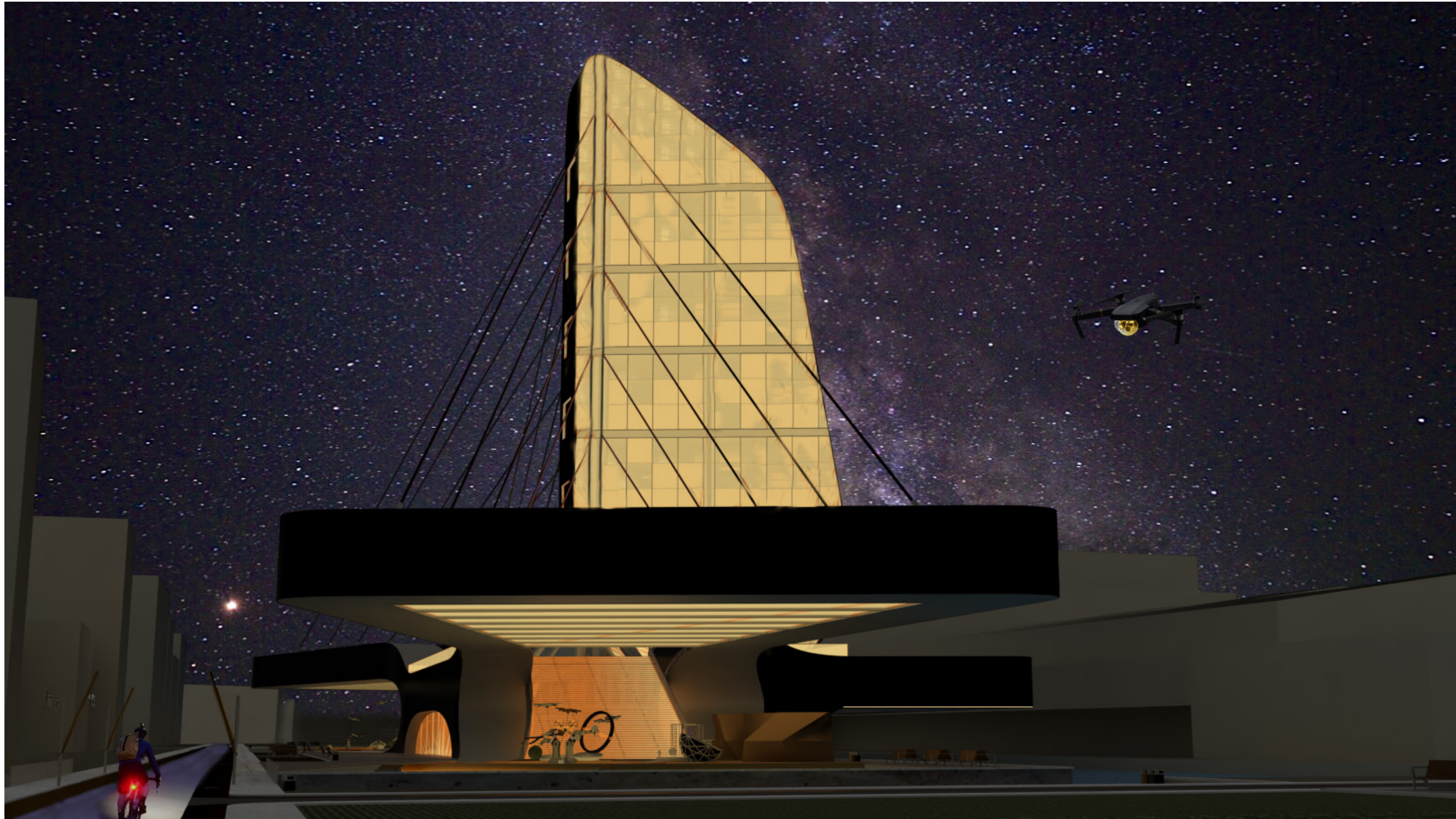
Climate - inside temperature & ventilation



Climate - inside temperature & ventilation



Show lights



Architecture for Automation

(in)human architecture

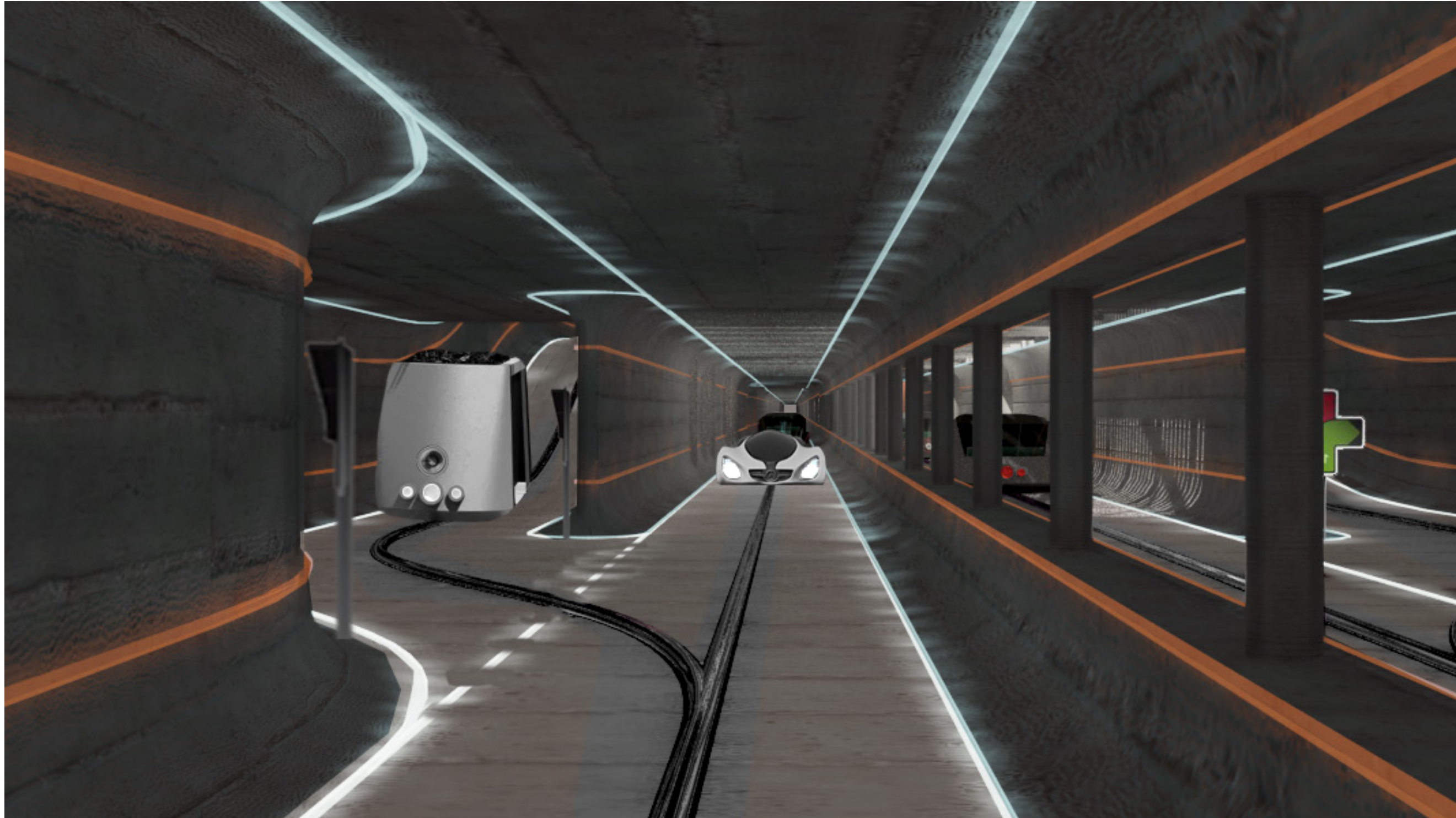


New materials & parametric architecture

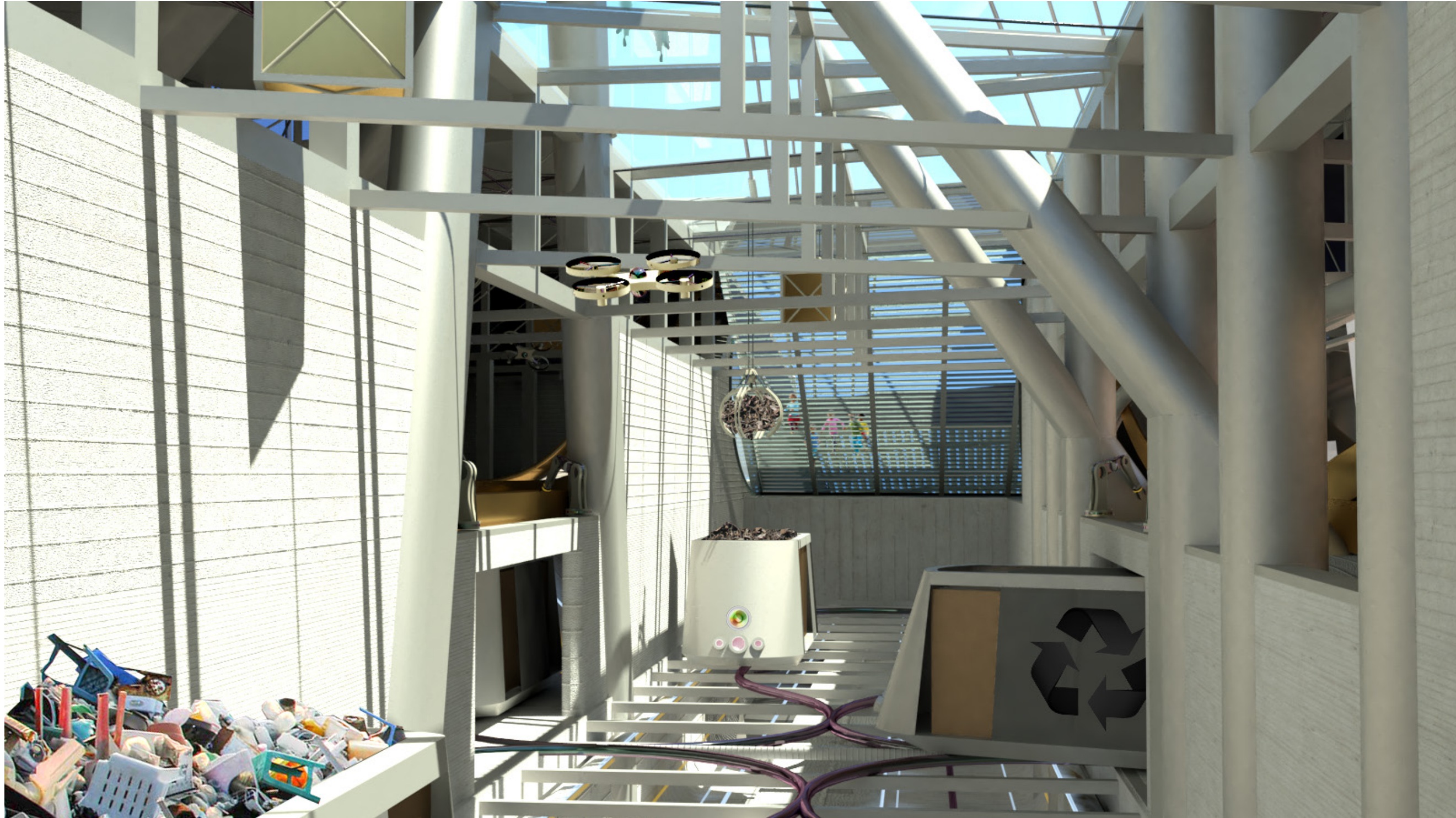


Source: Philip Michael Brown Studio - design studies

Underground pod system



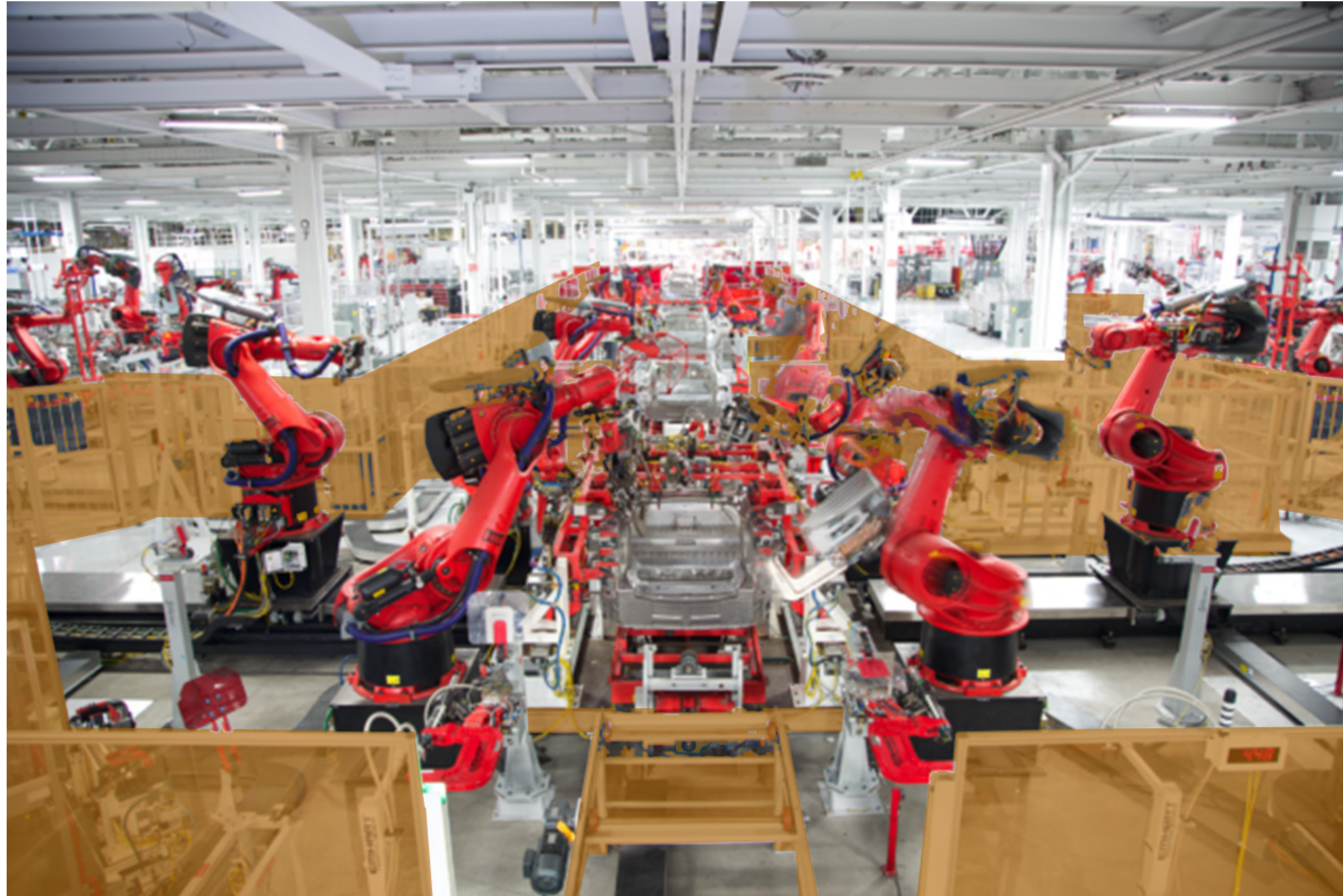
Underground pod system



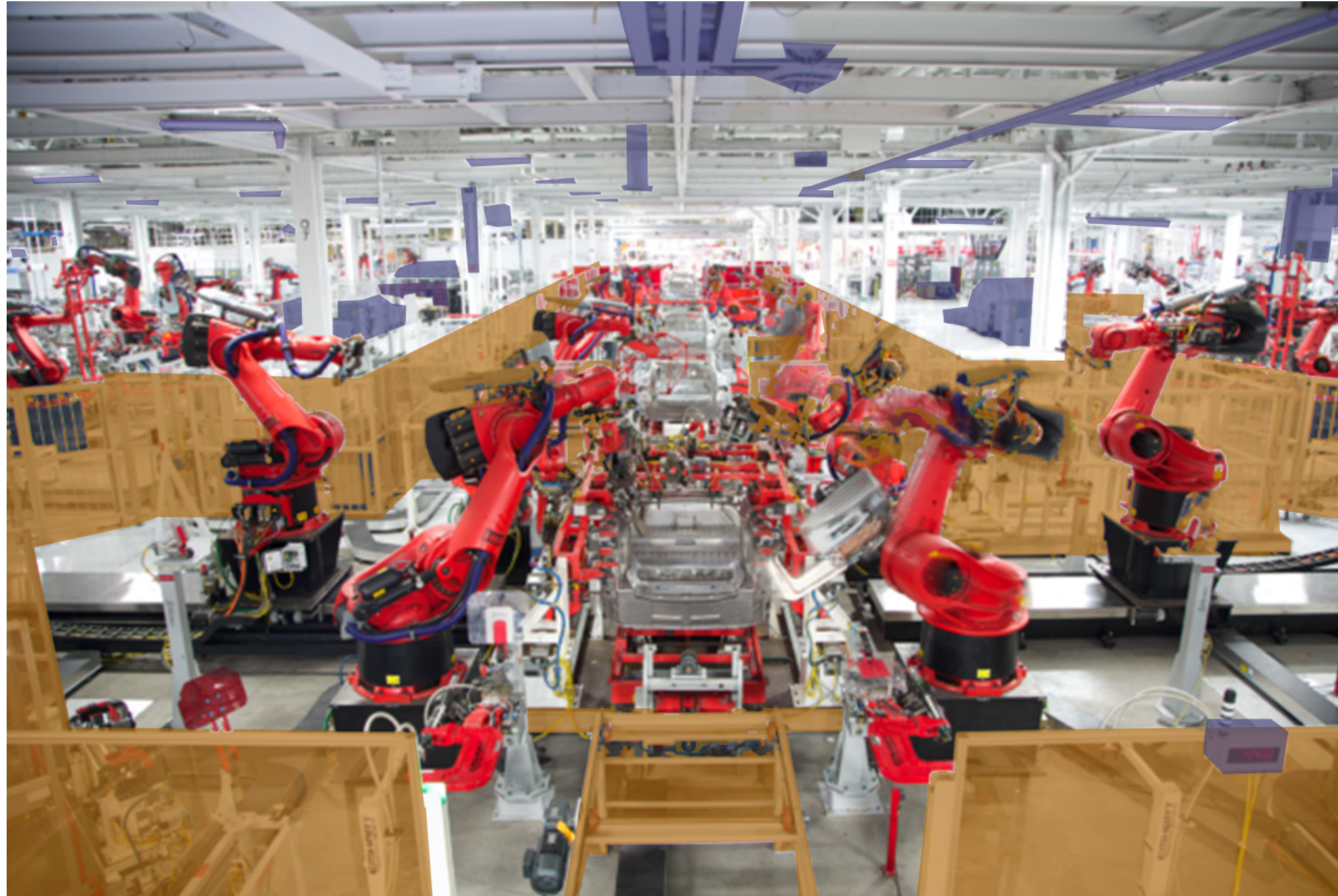
Inhuman architecture



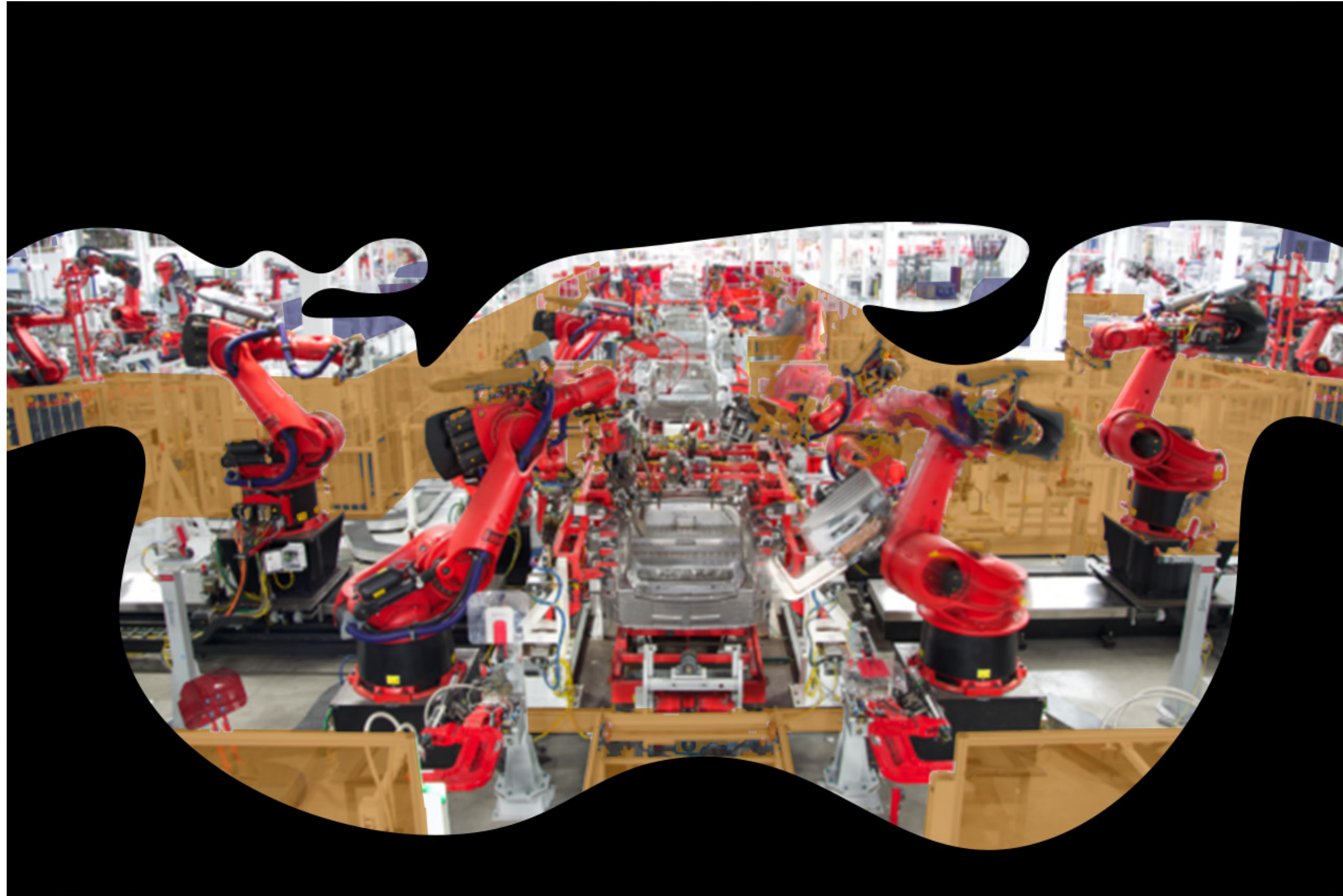
Safety divisions



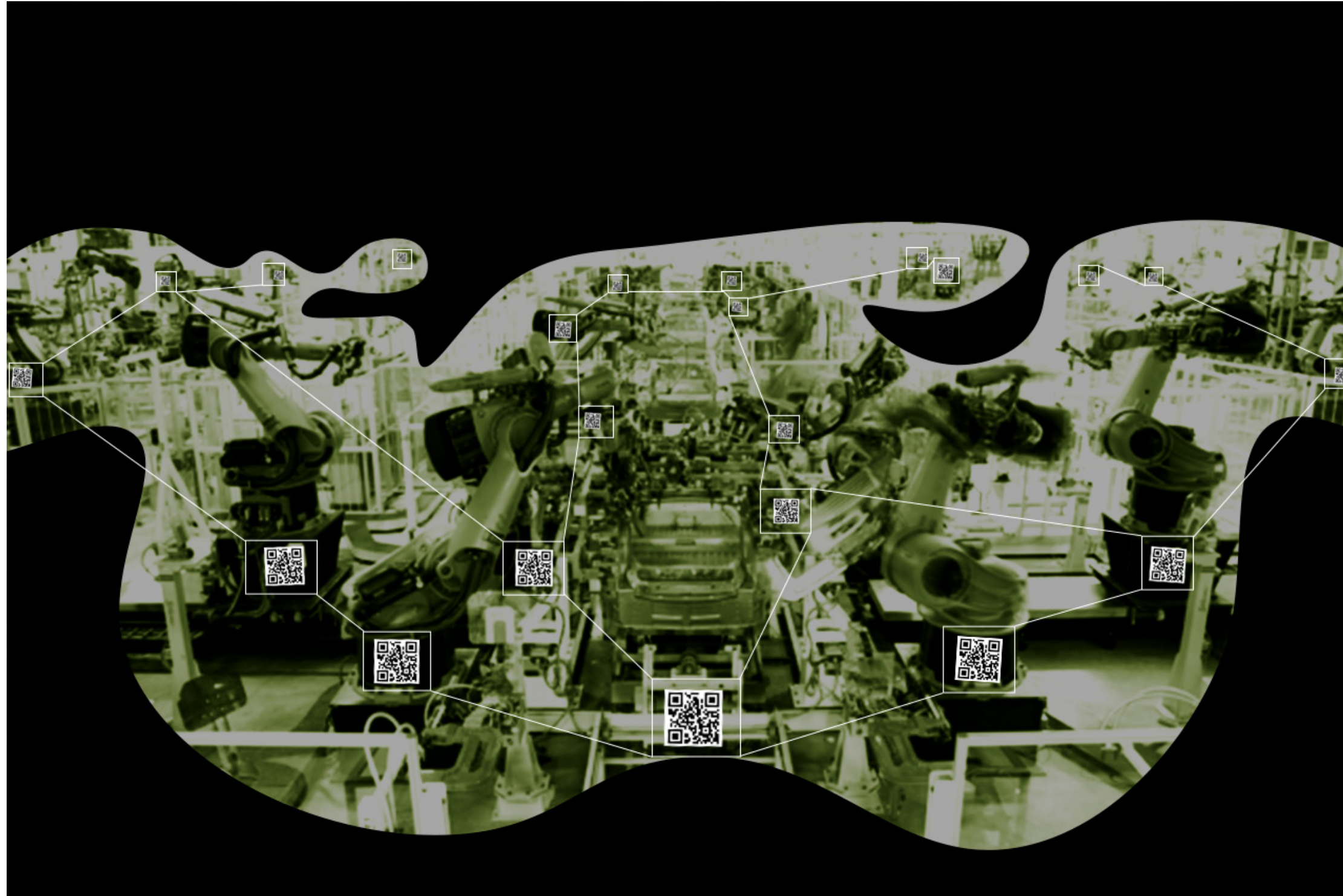
Human operation & climatisation



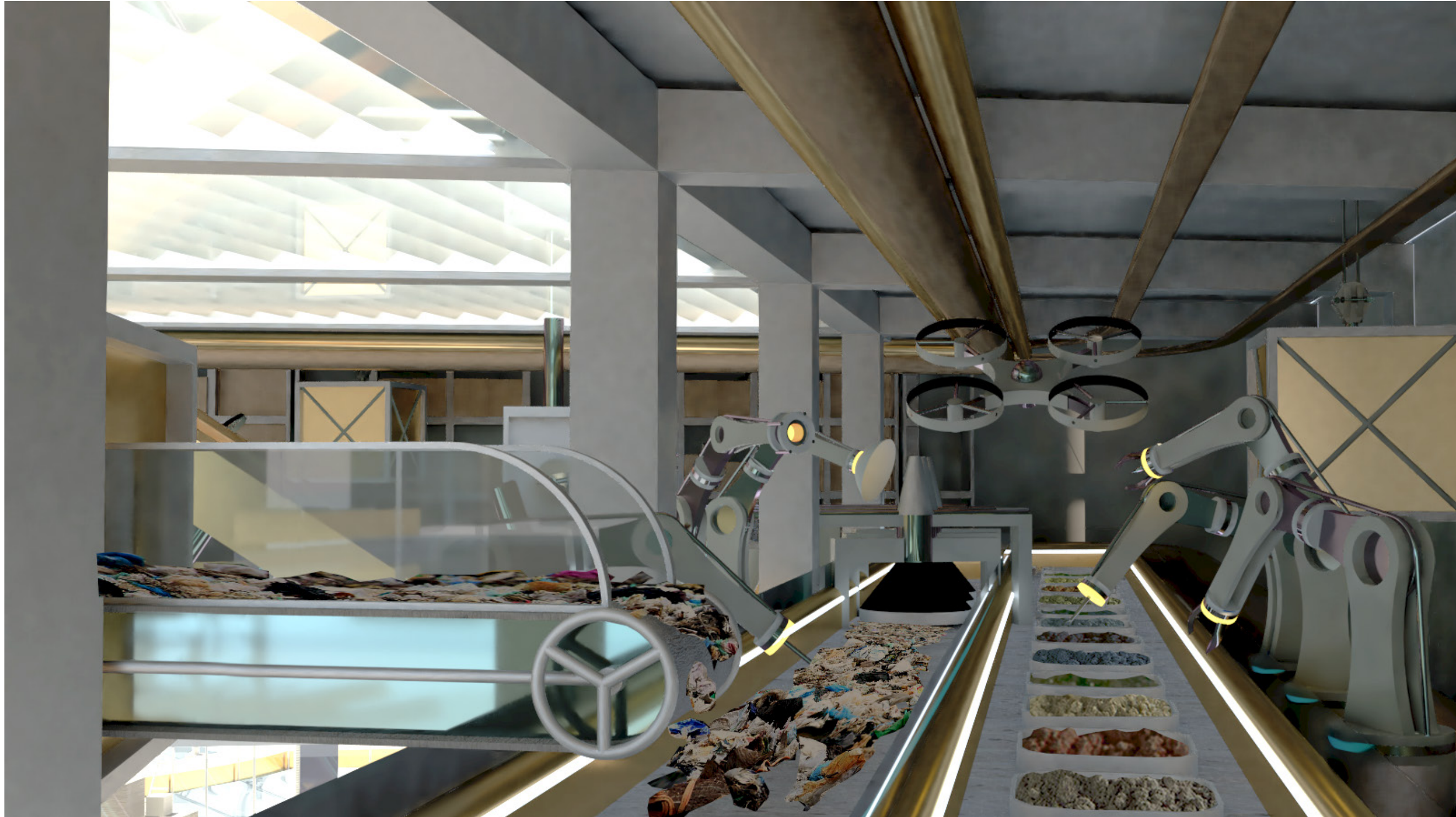
Actual workspace



Robot experience



Inhuman architecture



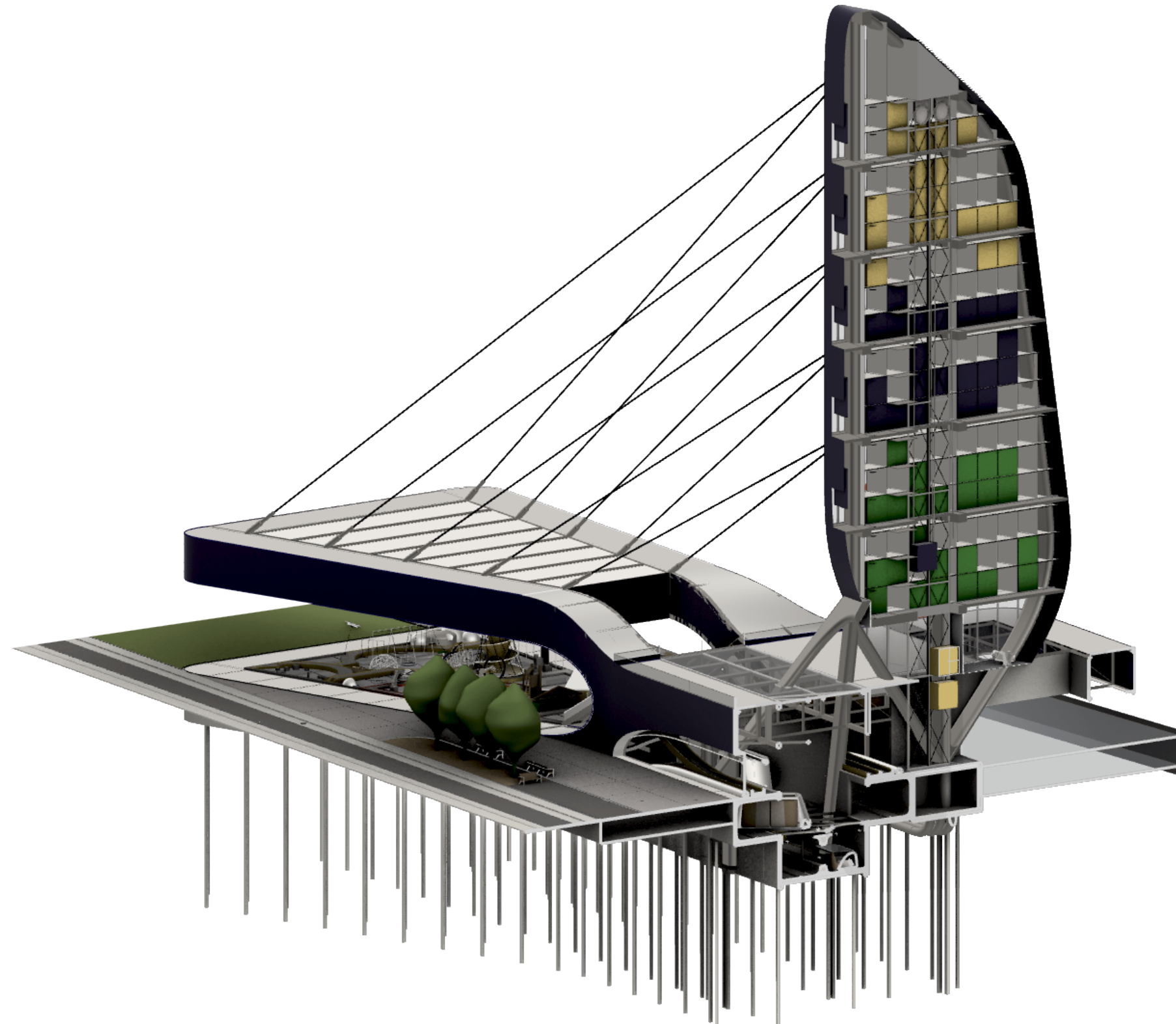
Storage system



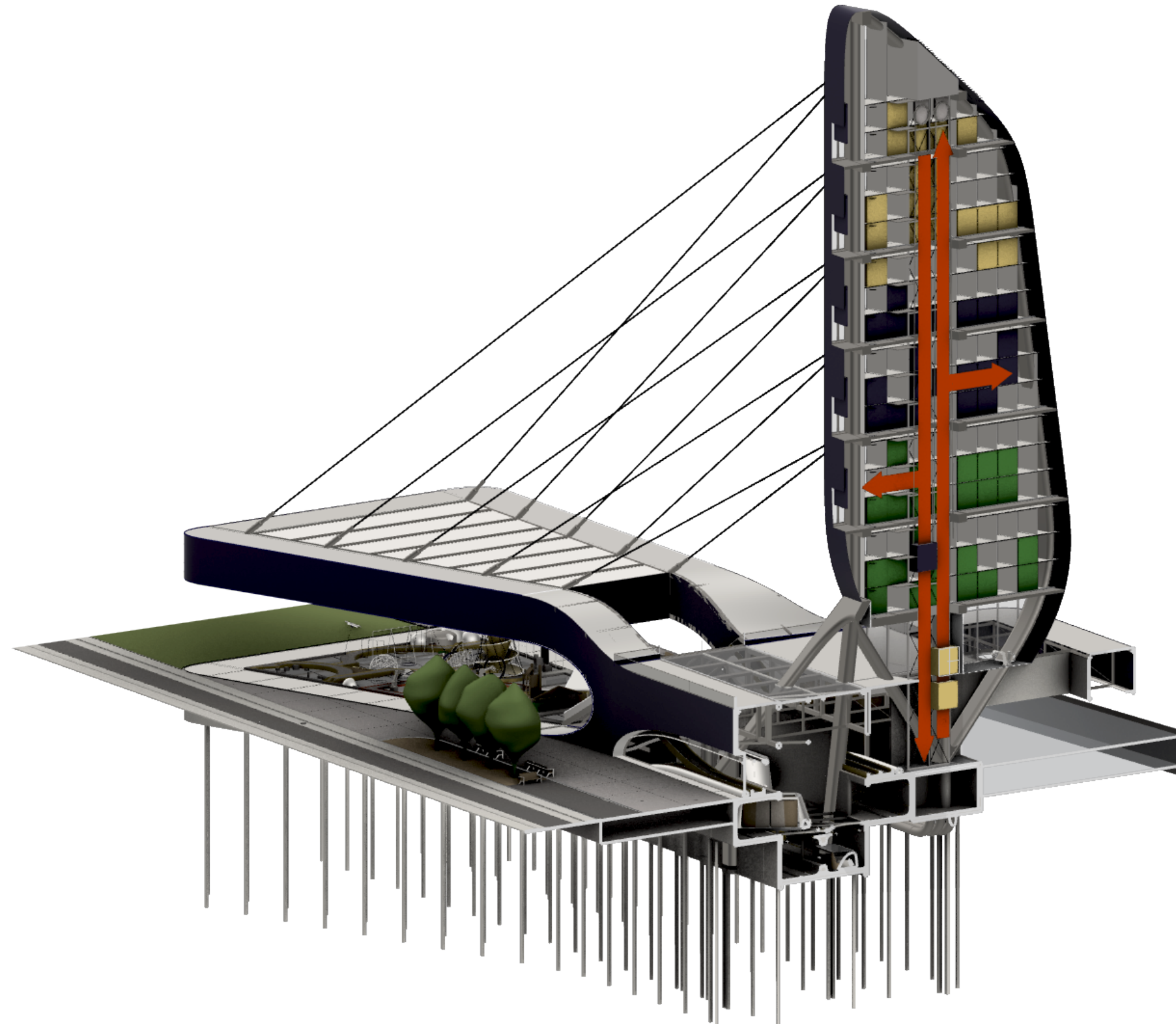
Storage system



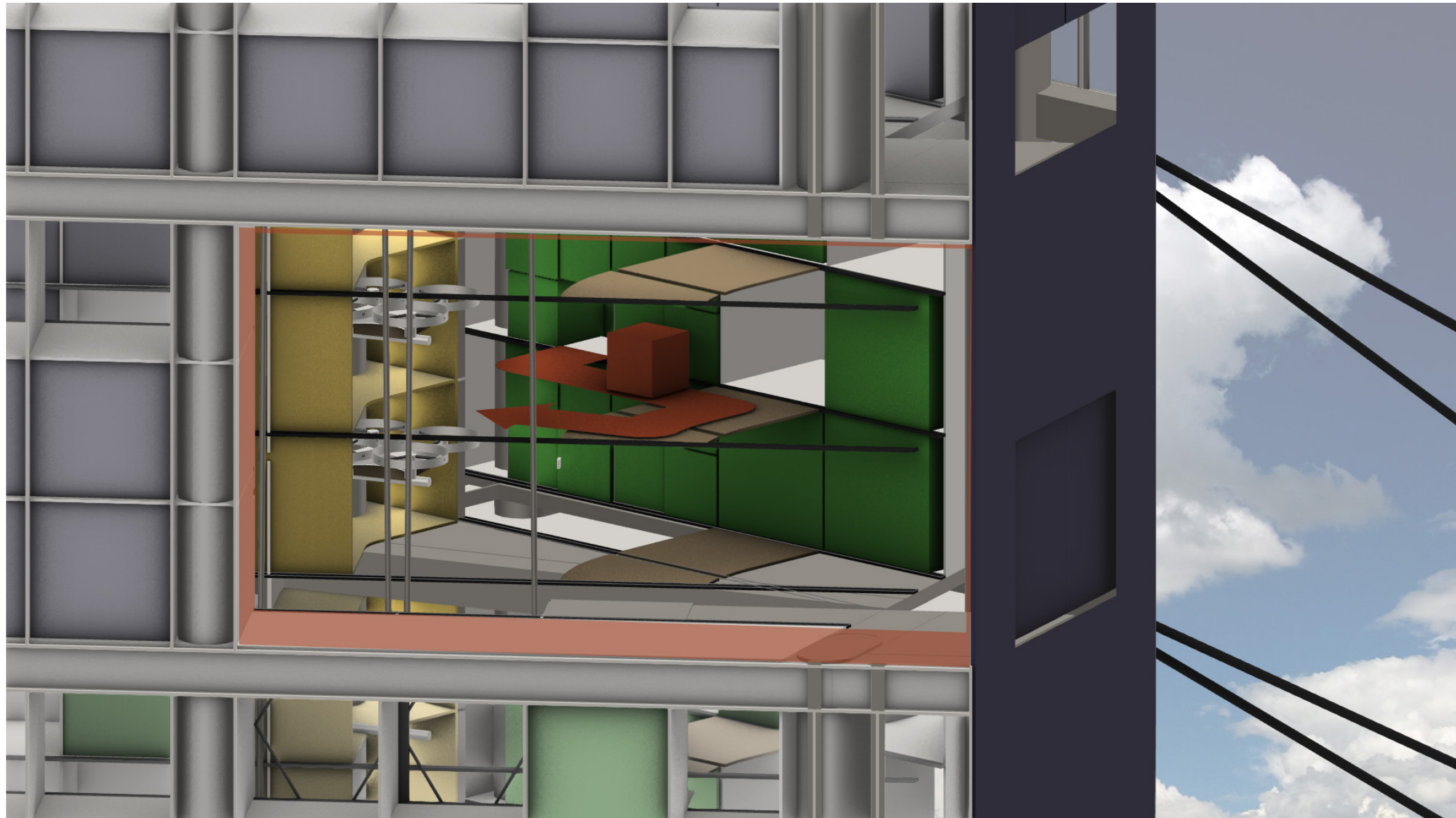
Storage system



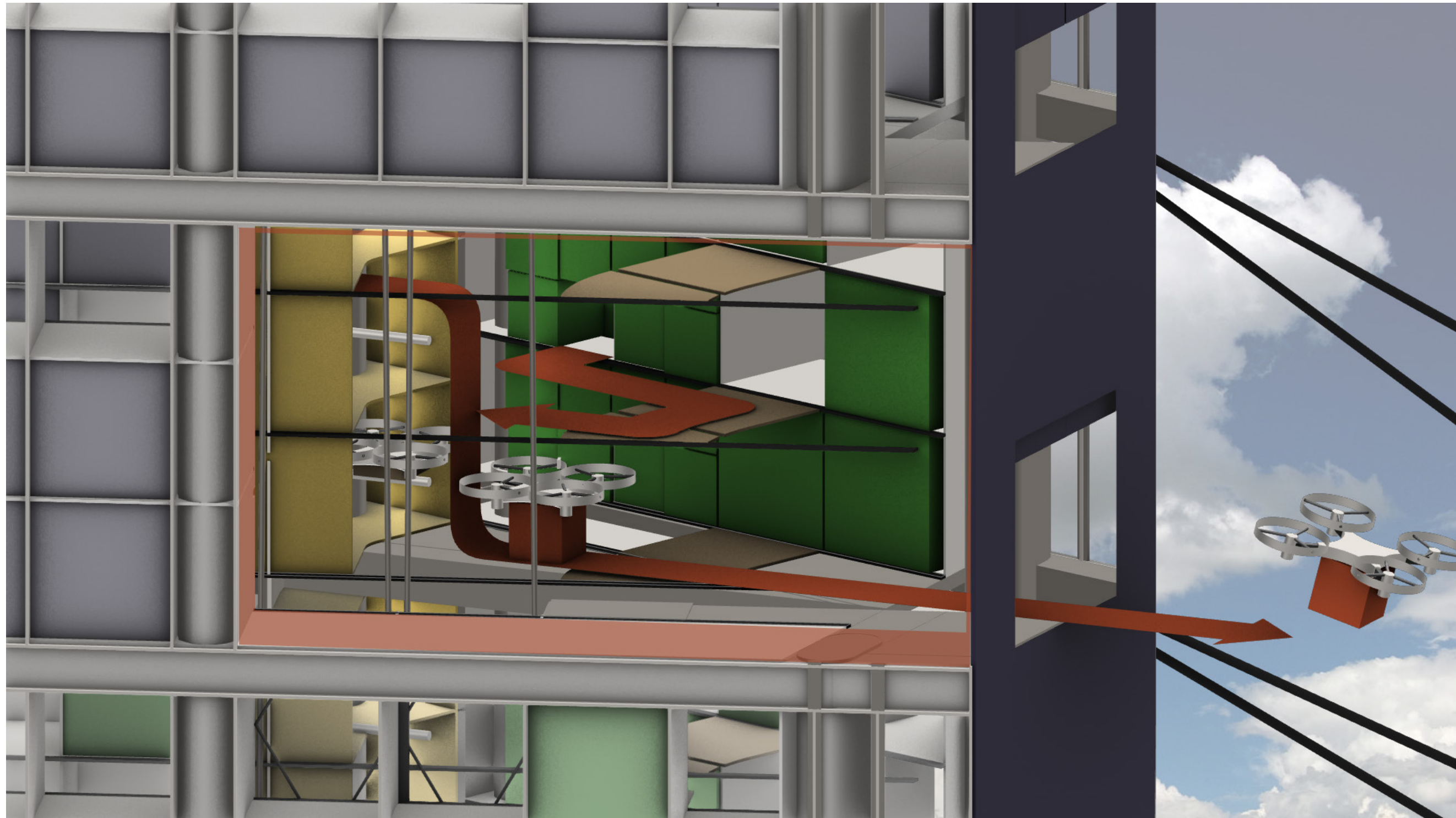
Storage system



Drone platforms



Drone platforms



Typical safe playground



Dangerous playground 1900s



Sensation & creativity



Innovative playgrounds



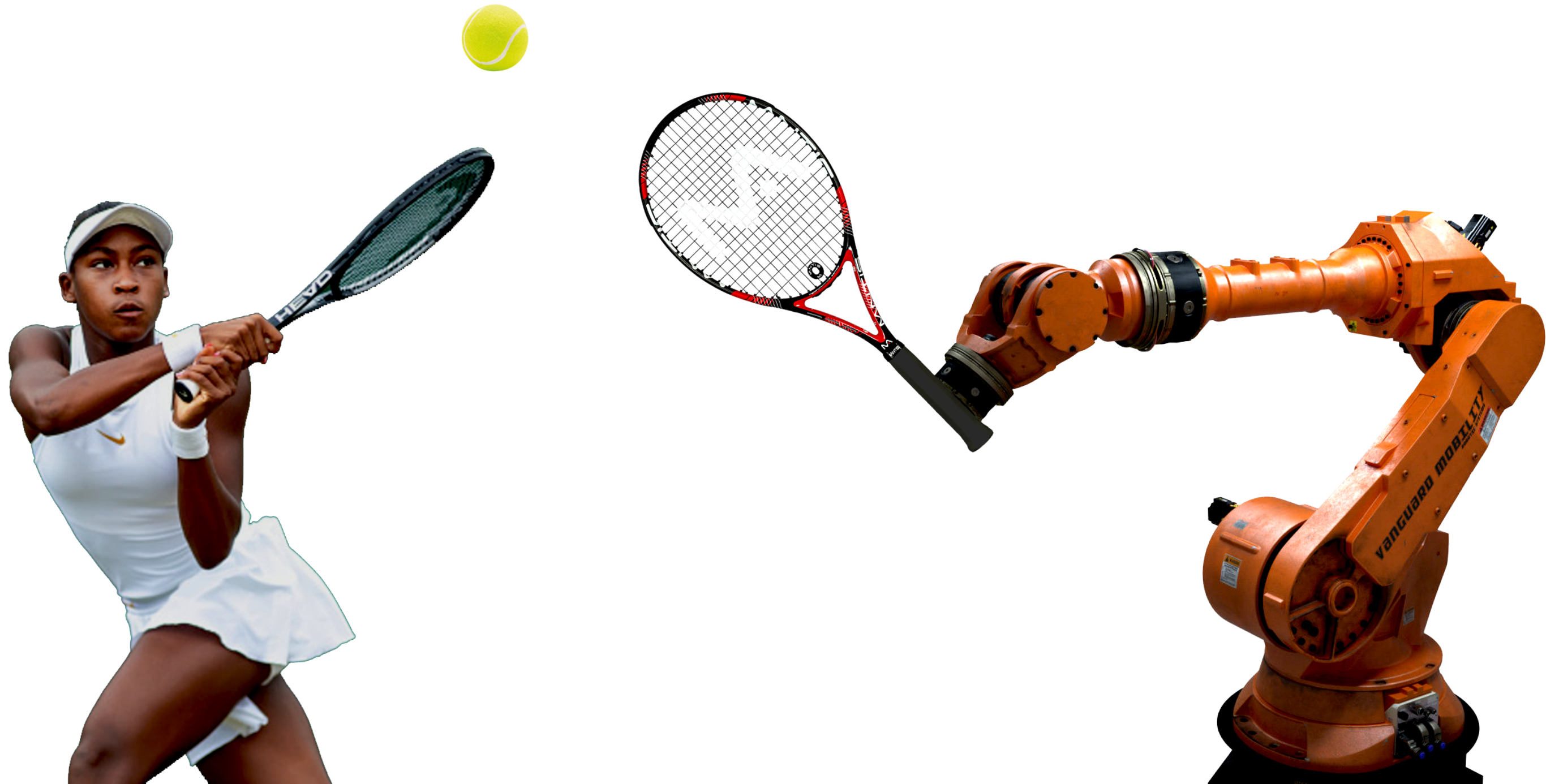
Source: Adventure playground, Berkeley. <https://www.cityofberkeley.info/adventureplayground/>

Innovative playgrounds

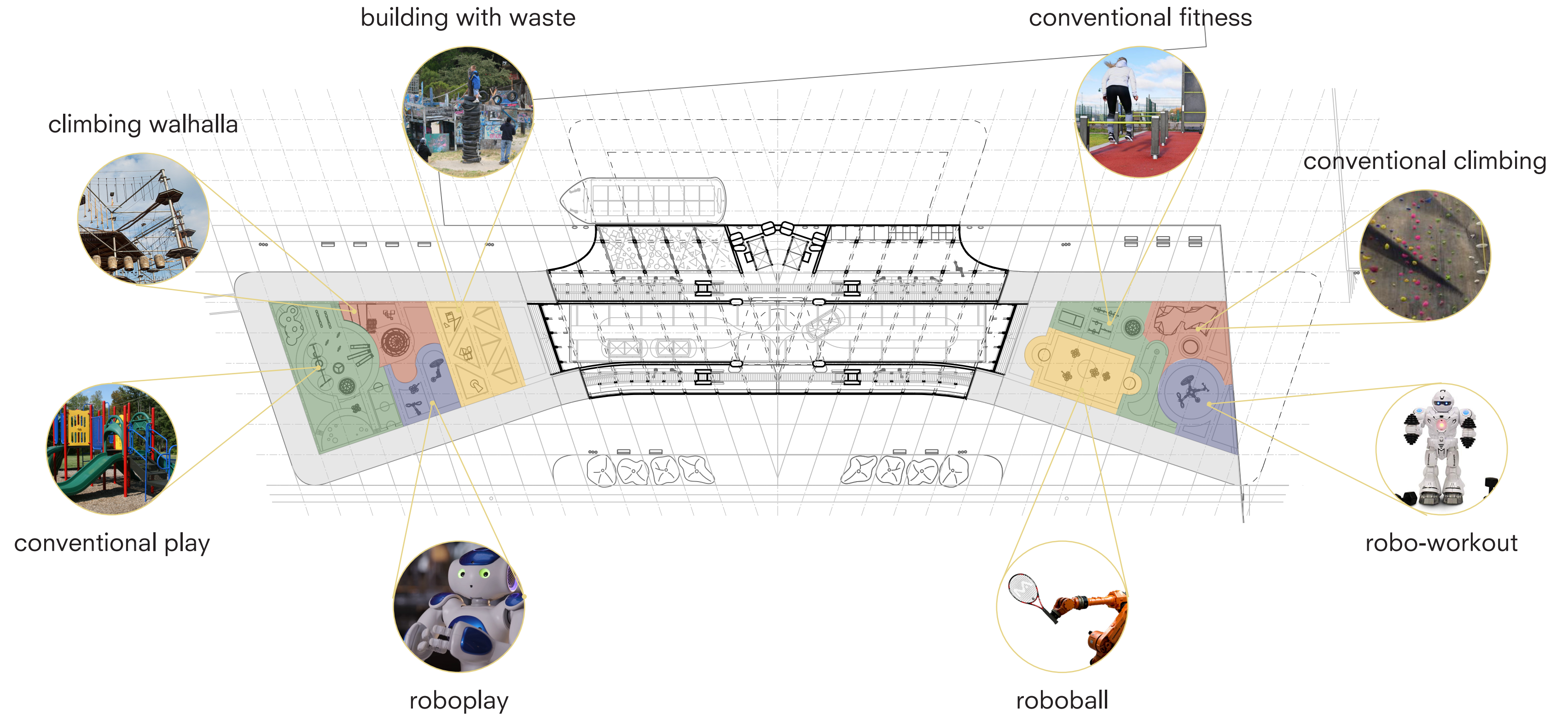


Source: Adventure playground, Berkeley. <https://www.cityofberkeley.info/adventureplayground/>

AI pattern recognition & calibration

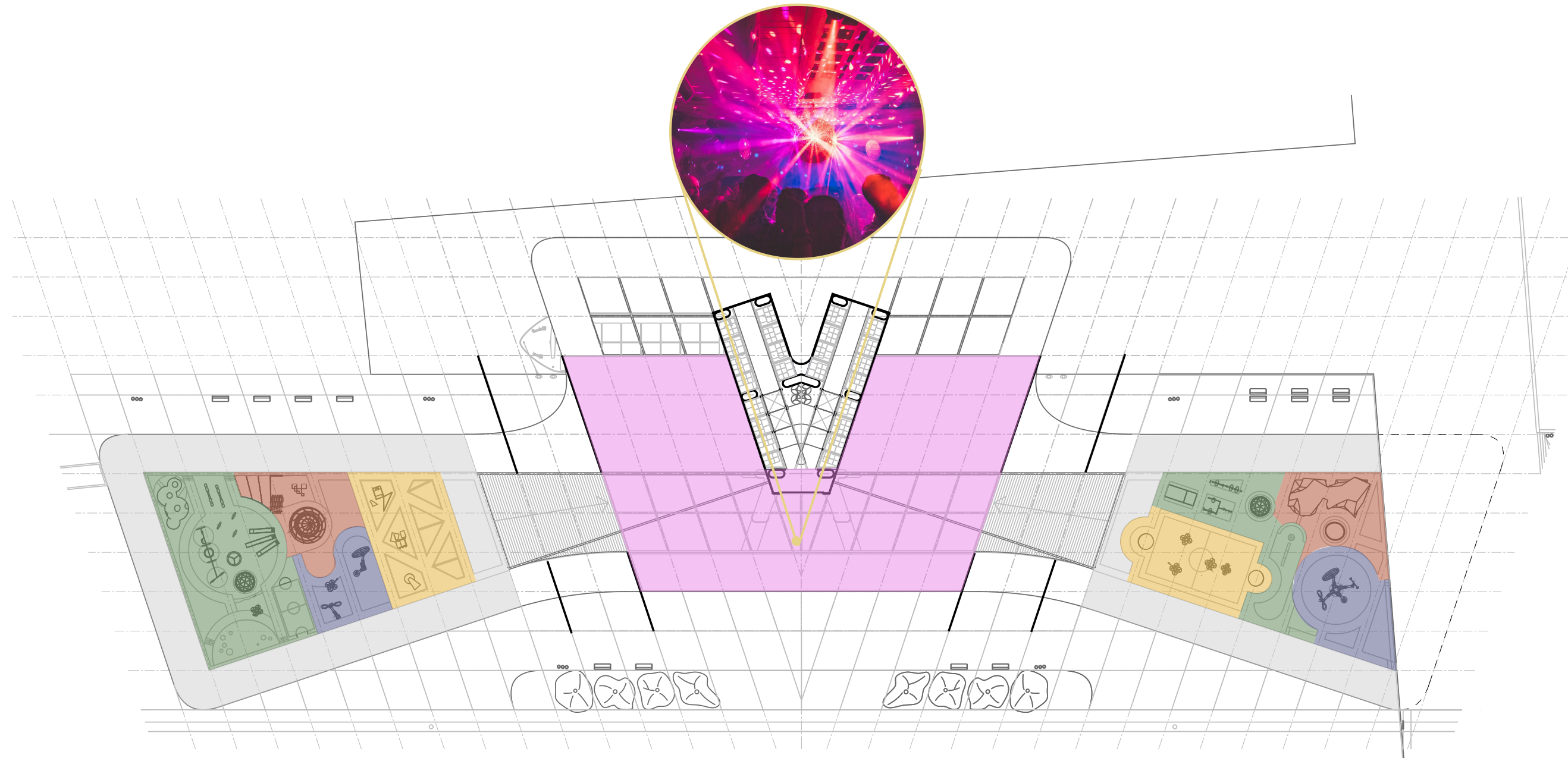


Playground 2100



Playground 2100

flexible programming



Conclusion

(in)human architecture





















(in)human architecture

