

GARAGE

A CONCENTRATED PARKING INFRASTRUCTURE FOR THE PORT OF BEIRUT

P5 Presentation

06/21/2022

Dan Xie



Complex Projects

Introduction

CARS



Introduction

"CARCHITECTURE"



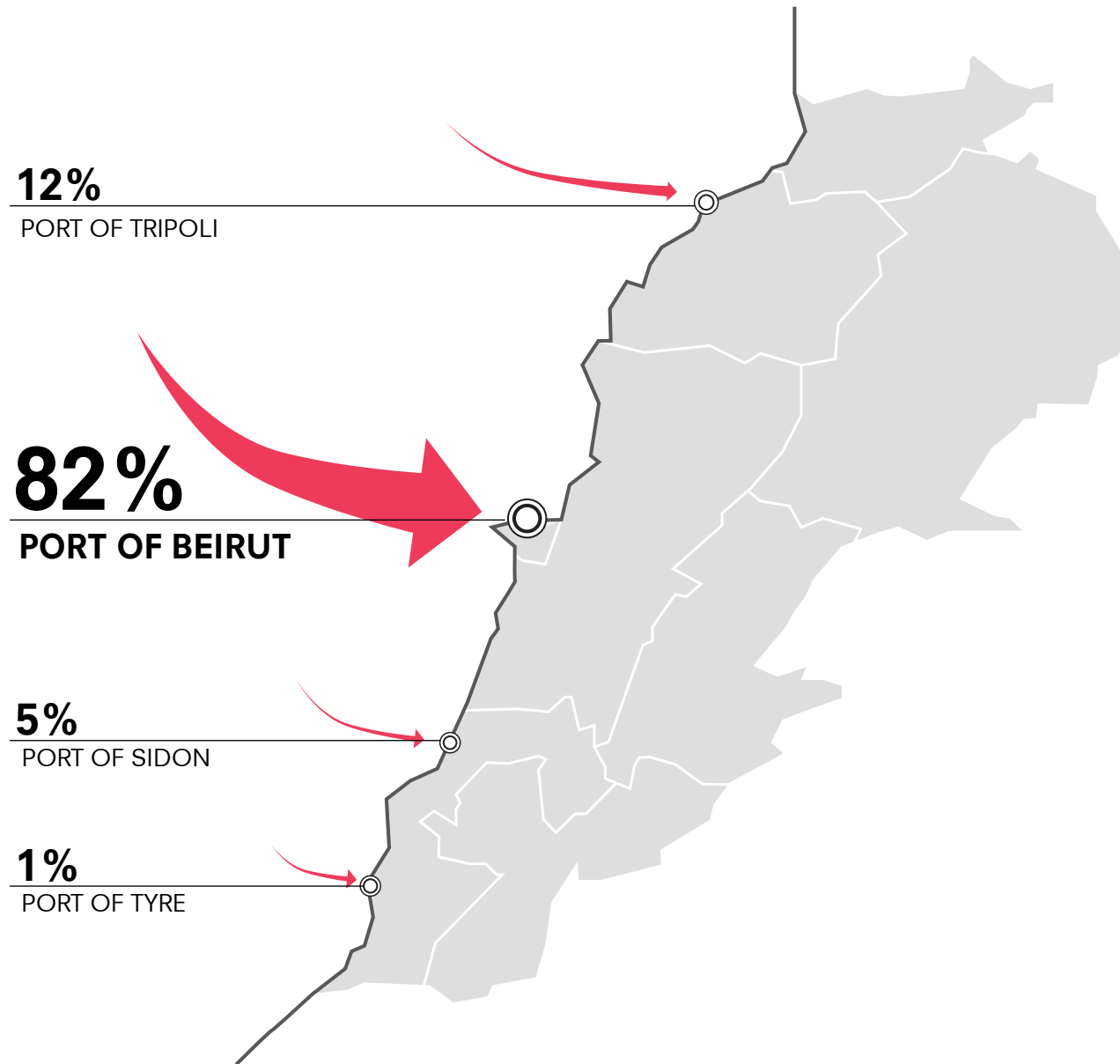
Introduction

"CARS" IN BEIRUT



Introduction

IMPORT



Source: Lebanon Customs

HINTERLAND TRANSPORT

12%

PORT OF TRIPOLI

82%

PORT OF BEIRUT

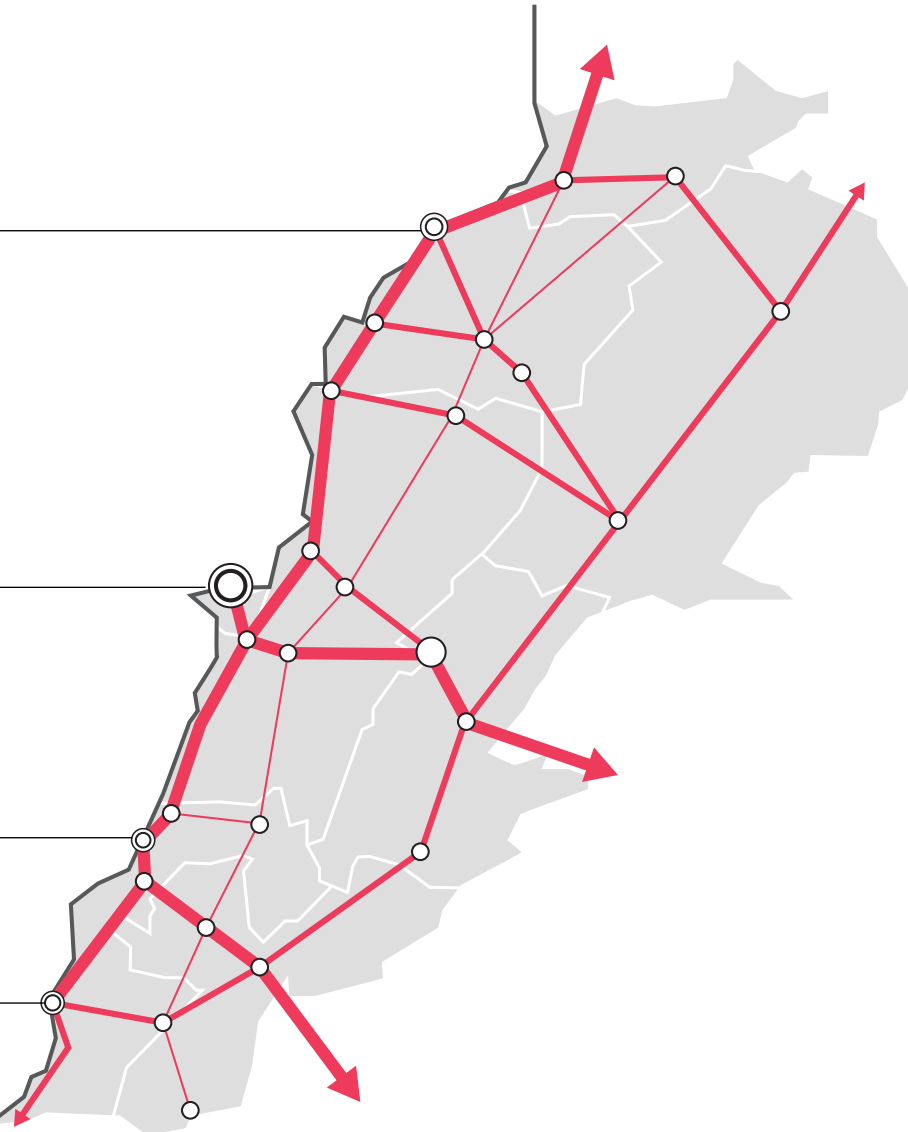
5%

PORT OF SIDON

1%

PORT OF TYRE

Source: Lebanon Customs



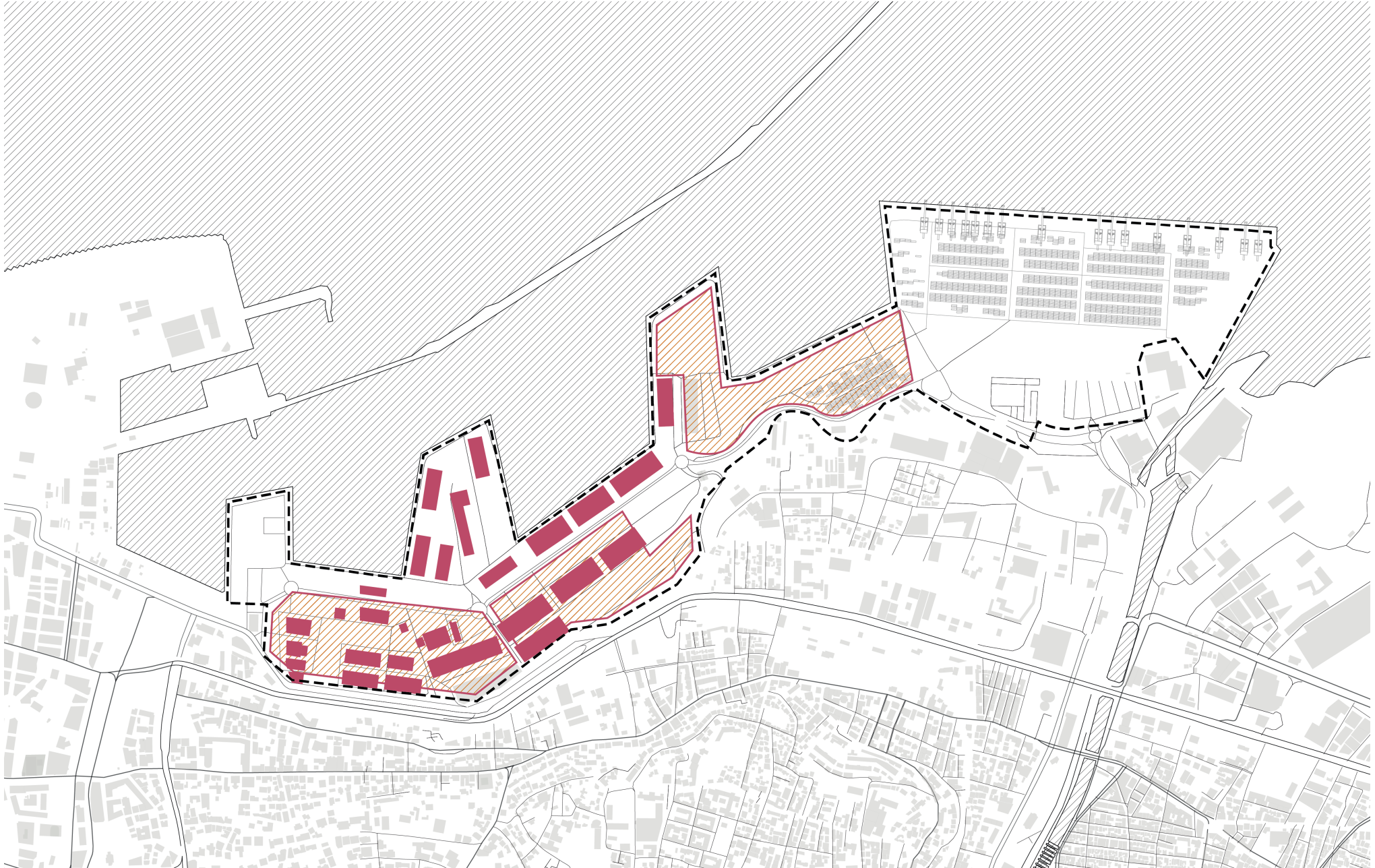






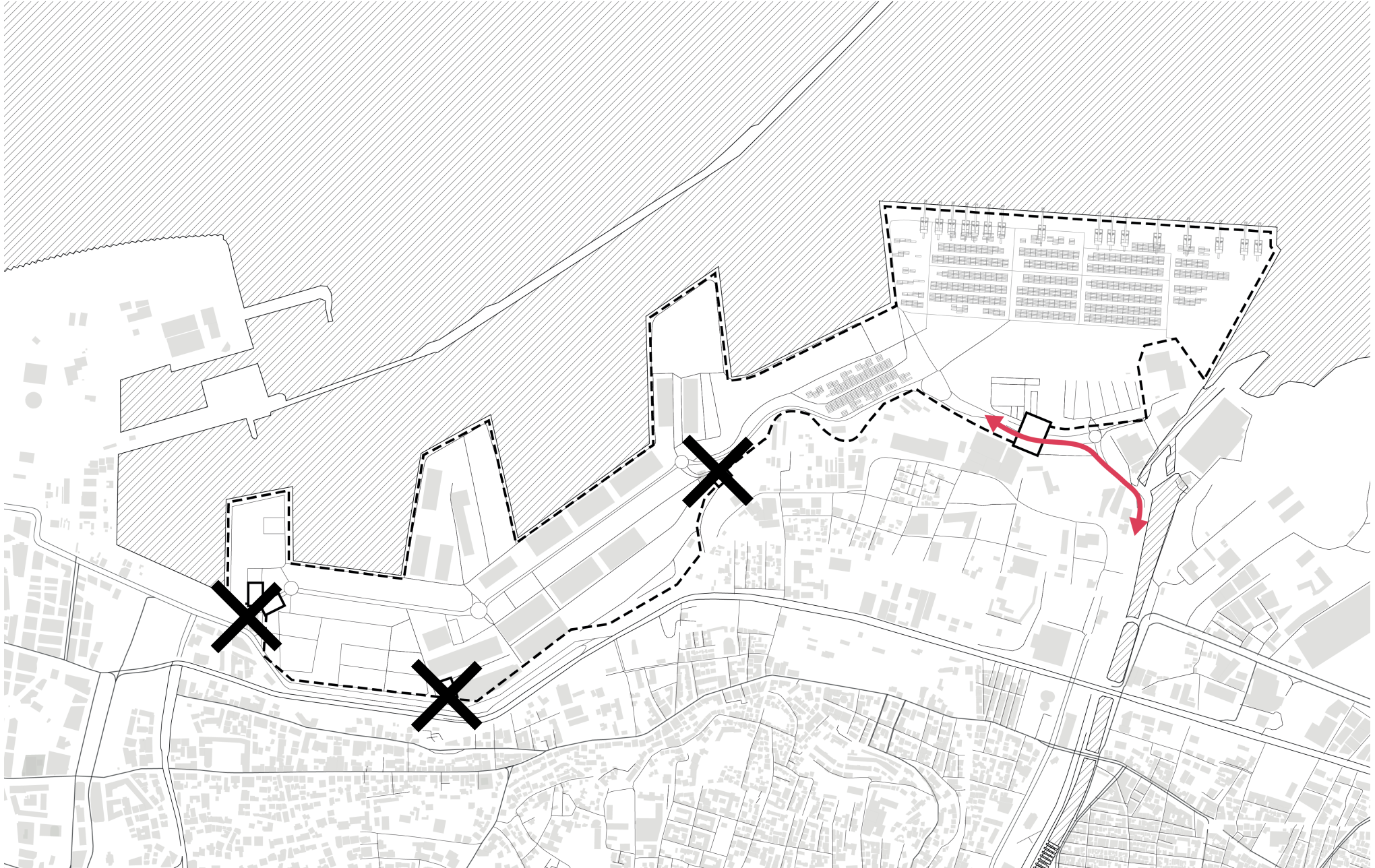
Introduction

FUNCTION DAMAGE



Introduction

ENTRANCE DAMAGE









SUZUKI

Service

Primatone
M A T

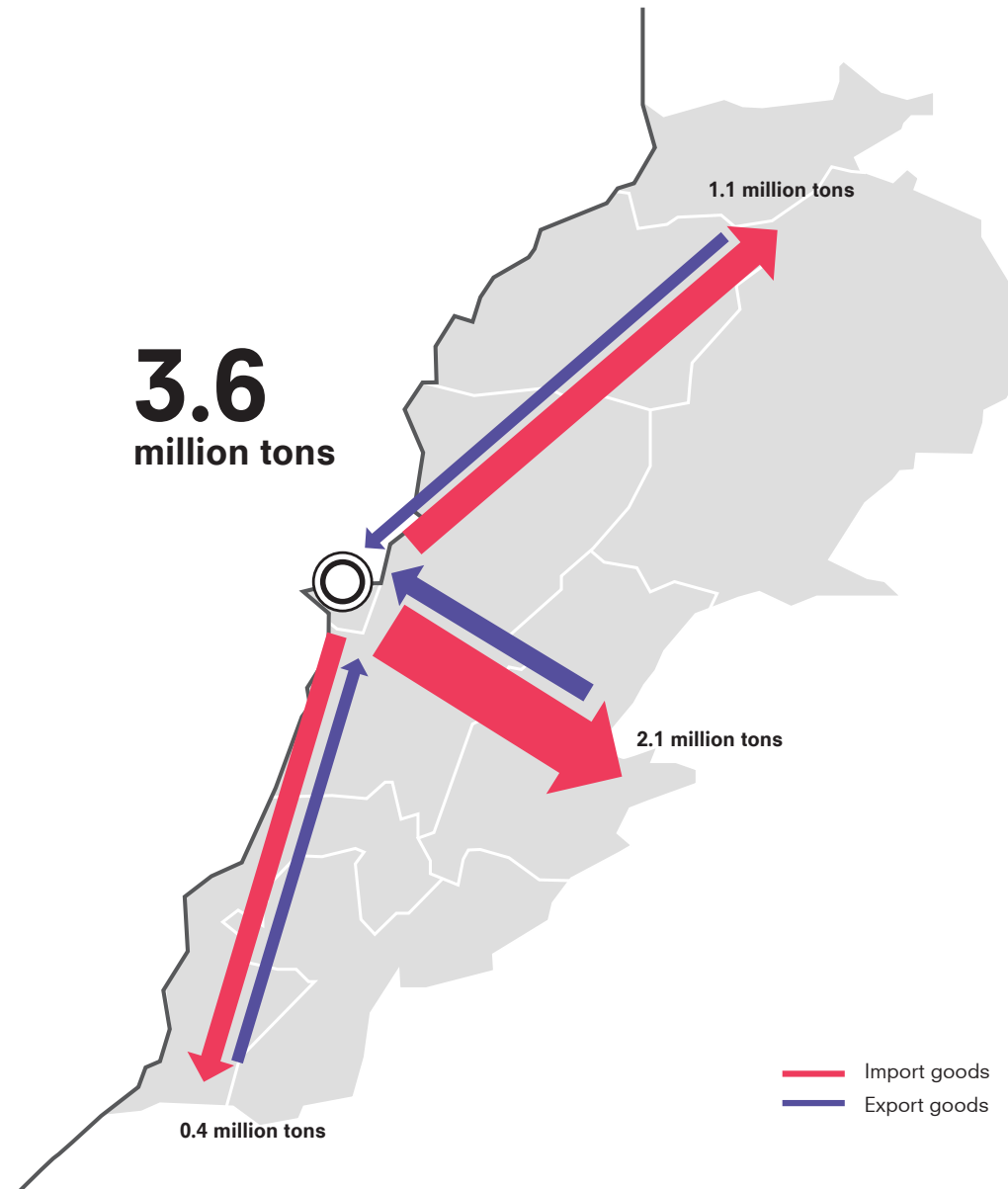
ELC

ELC



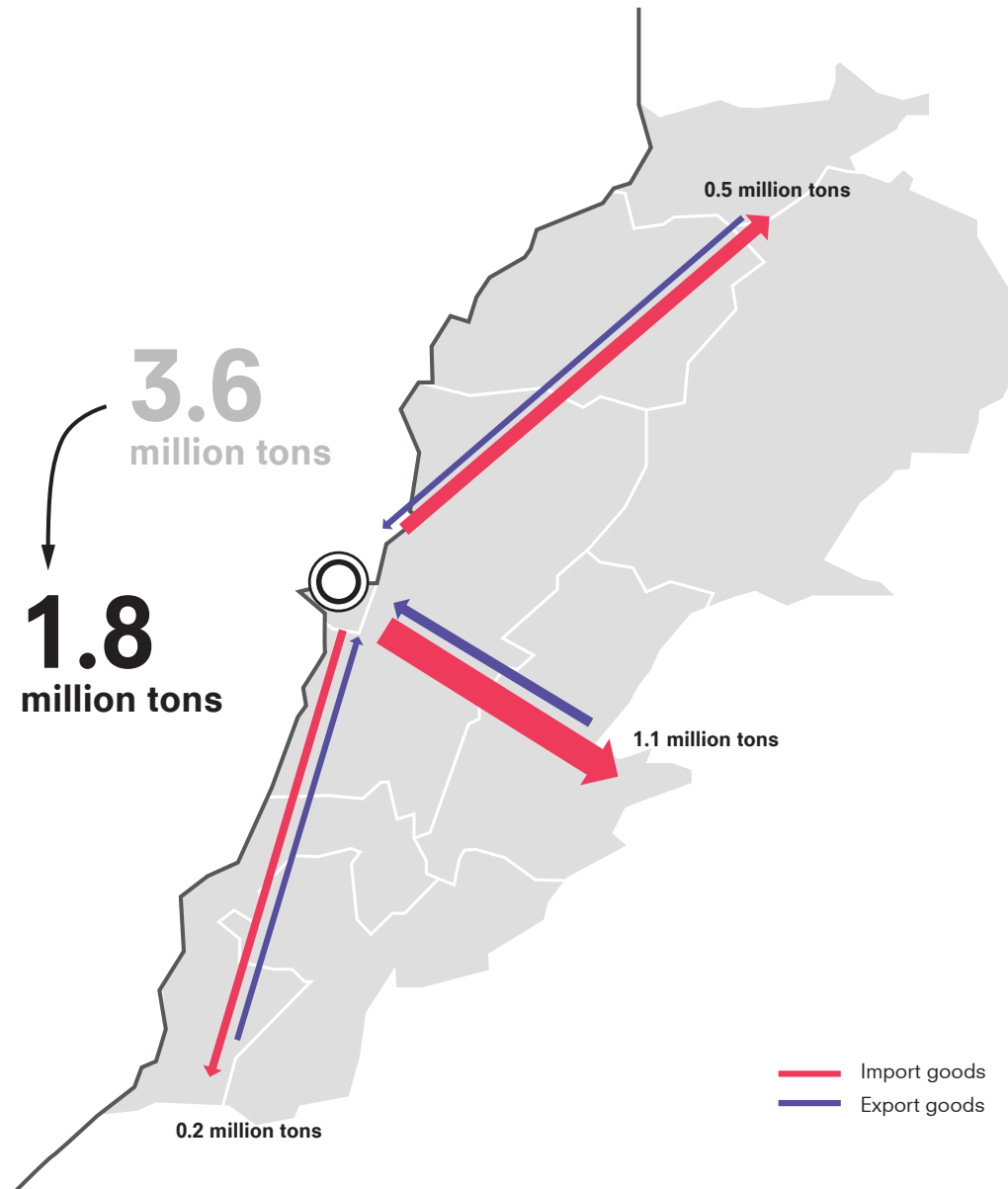


HINTERLAND TRANSPORT VOLUME (2018)



Source: Joining forces for a new Beirut port area, 2021

HINTERLAND TRANSPORT VOLUME (2020)

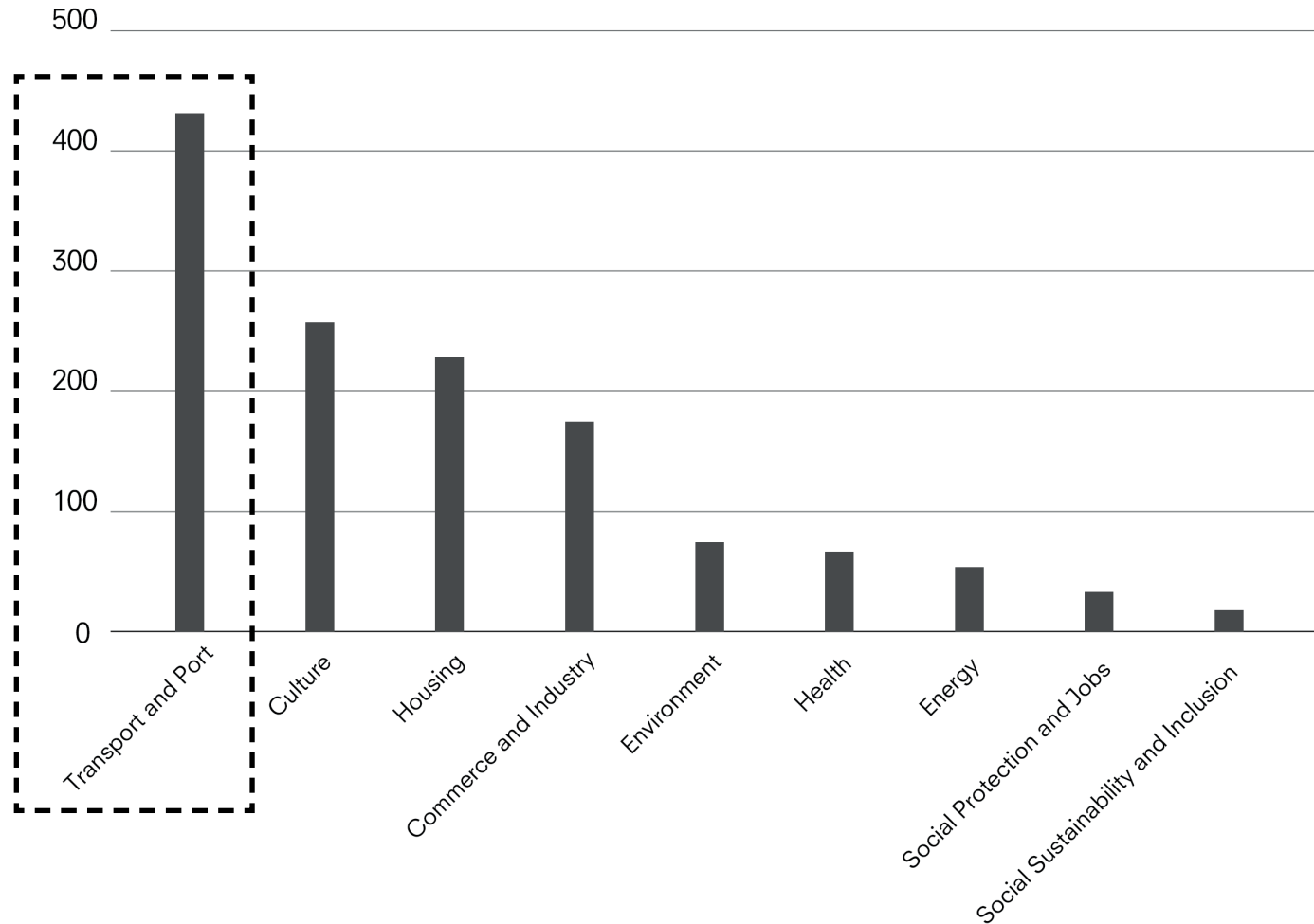


Source: Joining forces for a new Beirut port area, 2021

Introduction

RECONSTRUCTION DEMAND

TOTAL NEEDS (in US\$ million)



Source: Beirut Rapid Damage and Needs Assessment, World Bank Group, 2020

A photograph of a busy port or customs area. In the foreground, several cars are parked, including a dark blue Range Rover and a green van. A large metal structure, possibly a customs checkpoint or a port facility, is in the middle ground. In the background, there is a tall building with a tower. The text "THE PORT URGENTLY NEED TO IMPROVE THE MOBILITY OF GOODS TRANSPORTED TO THE HINTERLAND" is overlaid in white, bold, capital letters.

**THE PORT URGENTLY NEED TO IMPROVE
THE MOBILITY OF GOODS TRANSPORTED TO
THE HINTERLAND**

PROJECT AMBITION

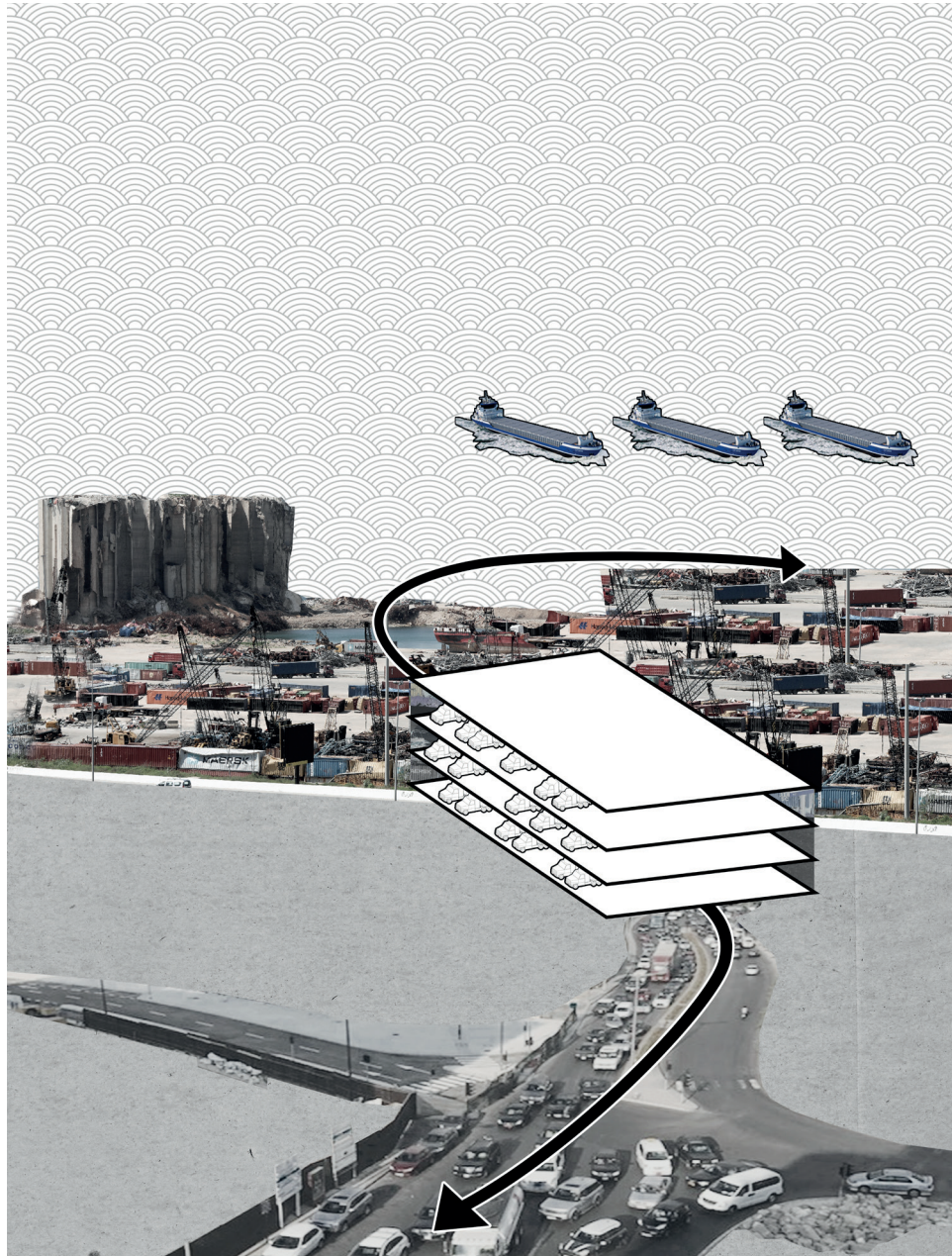
**How to solve the parking shortage at the port,
and improve the goods transportation from the
port to the hinterland?**

A wide-angle, high-angle shot of a busy port yard. In the foreground, several trucks are parked, including a large white semi-trailer with 'MAERSK' written on its side. The middle ground is filled with numerous trucks of various types, including flatbeds, box trucks, and dump trucks, many of which are loaded with shipping containers. The containers are stacked in rows, with colors like blue, red, and yellow visible. In the background, several large gantry cranes are positioned along the waterfront, and a large white cargo ship is docked. The sky is clear and blue. A tall, slender light pole stands prominently in the center-right of the frame.

TRUCK TRANSPORTATION

Introduction

GARAGE

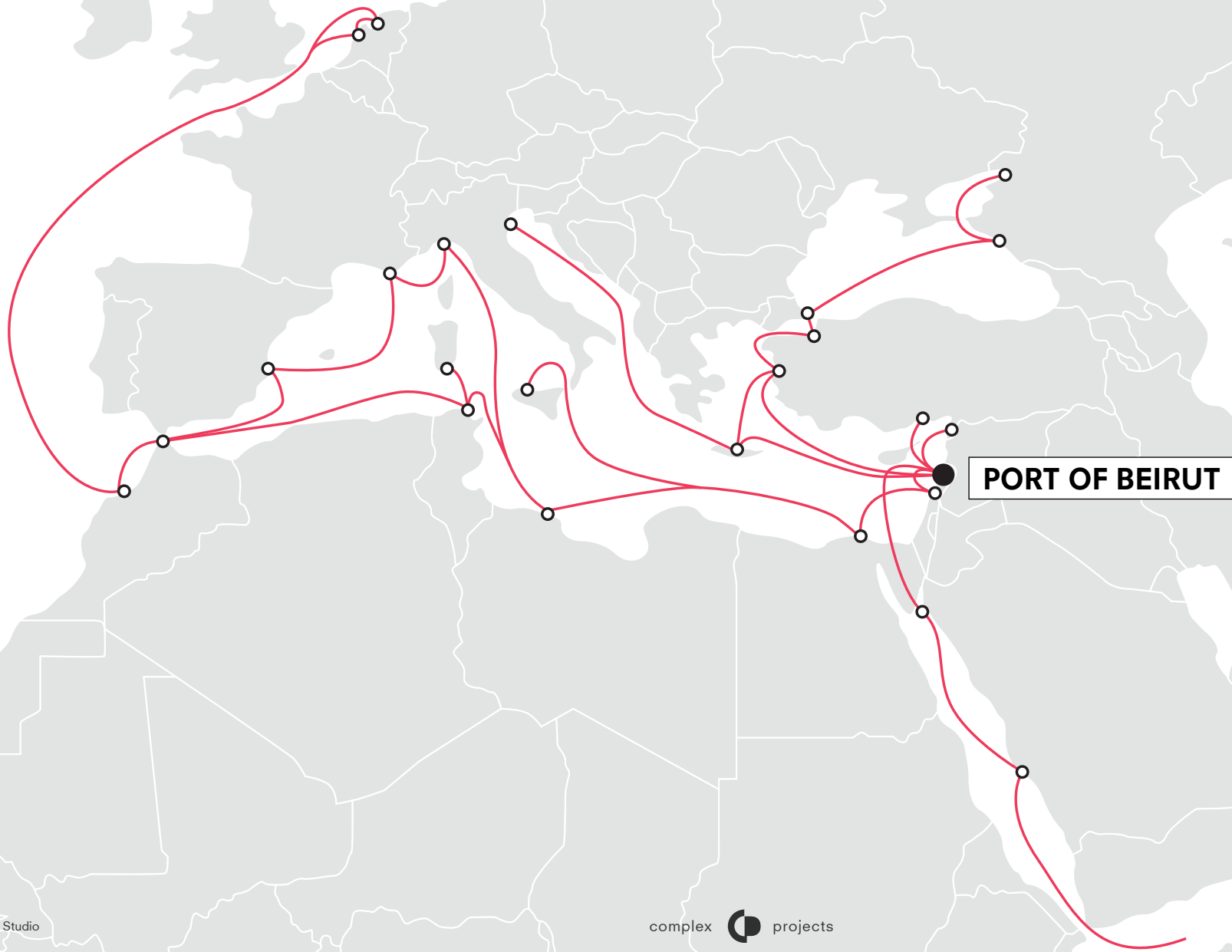


PORT CONTEXT

port context

SEA TRADE CONNECTION

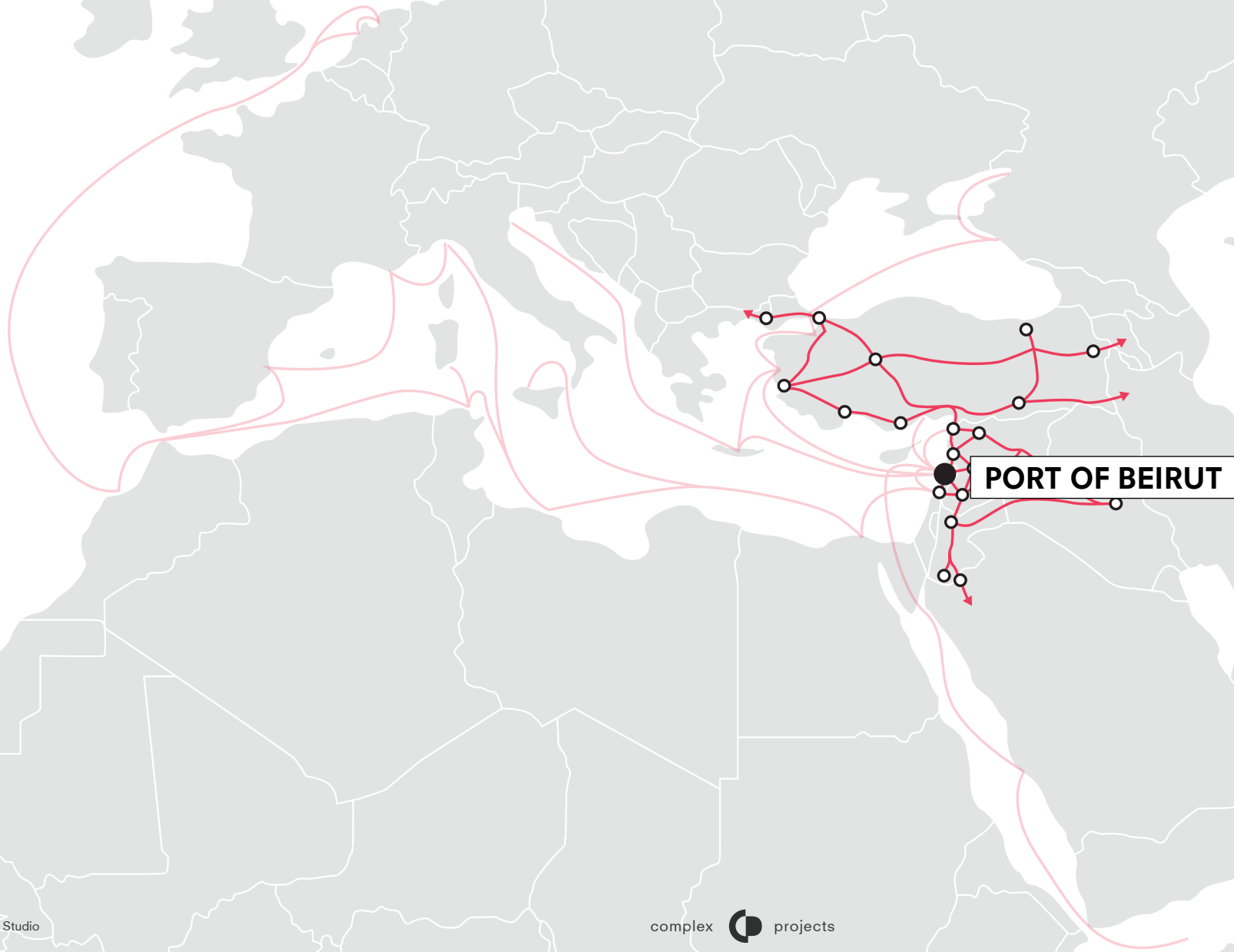
mediterranean region



port context

GROUND TRADE CONNECTION

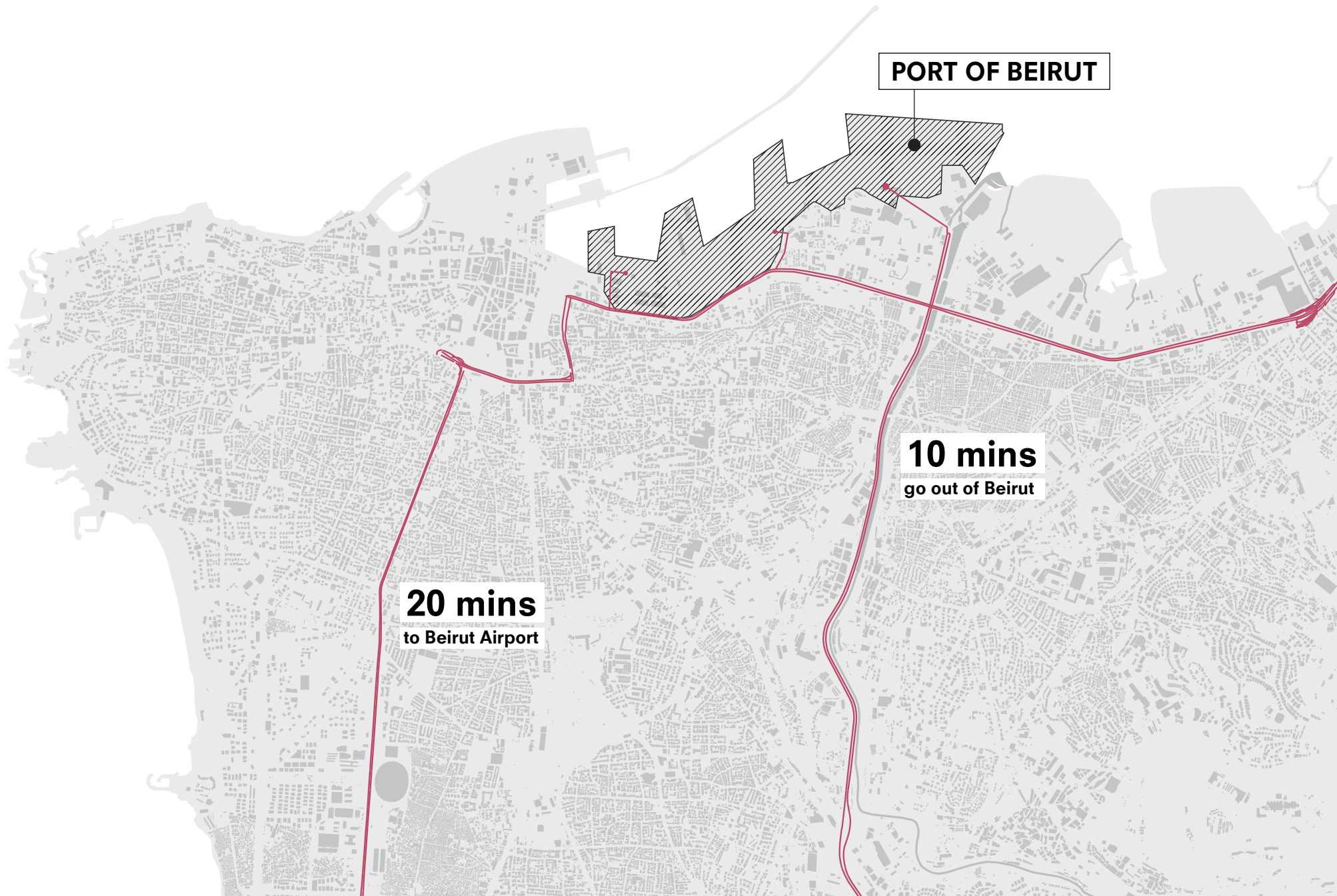
mediterranean region



port context

CITY ROAD CONNECTION

Beirut city



PORT OF BEIRUT

10 mins
go out of Beirut

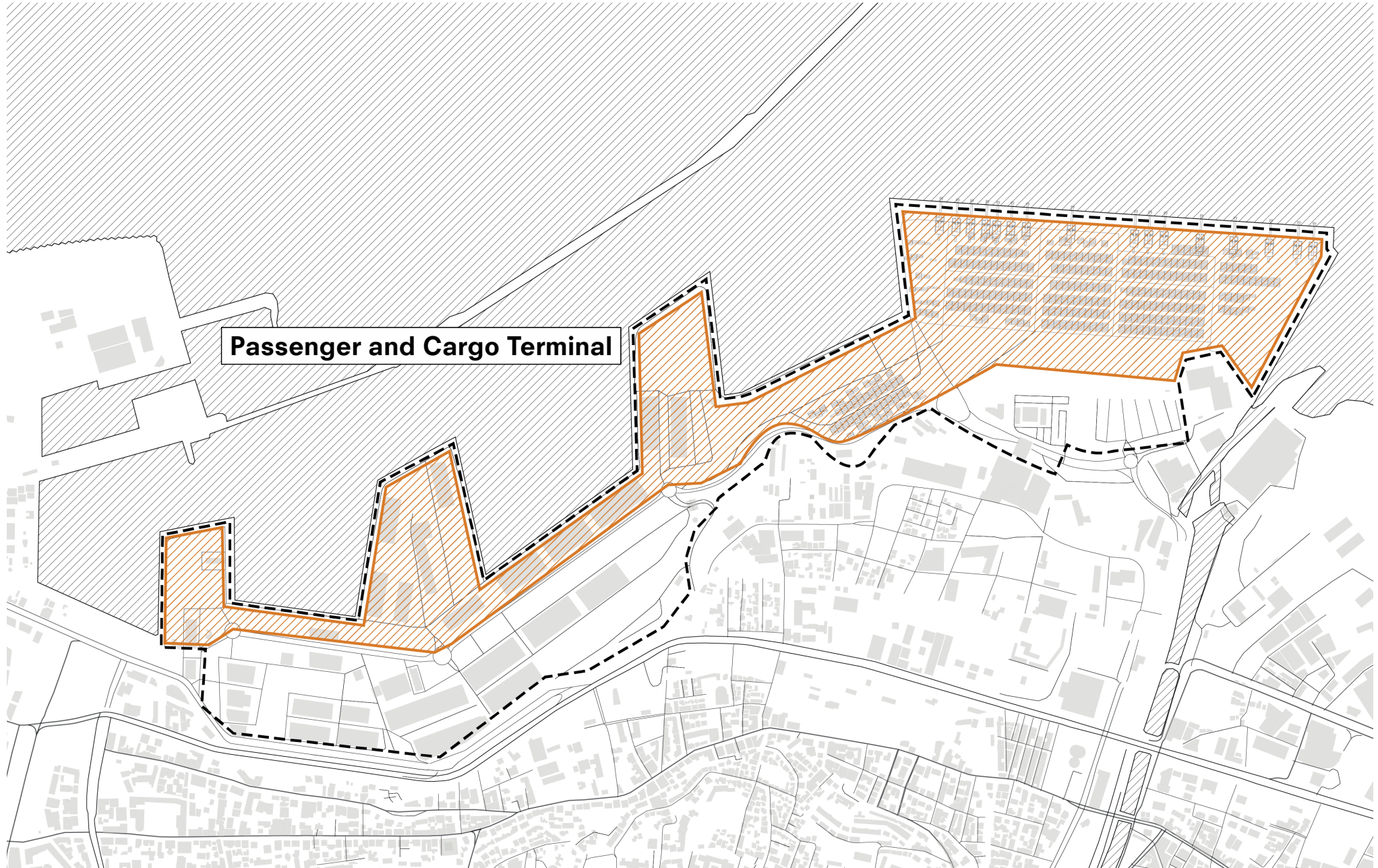
20 mins
to Beirut Airport

A wide-angle photograph of a busy container port. In the foreground, a large blue gantry crane is positioned on the left, with its arm extending over a massive stack of colorful shipping containers. The containers are stacked in neat rows, with many labeled 'MAERSK' and 'CMA CGM'. In the background, more cranes and the port's infrastructure are visible, set against a backdrop of hazy, mountainous hills. The sky is clear and blue.

**PORT OF BEIRUT IS A HUB PORT
FOR THE EAST MEDITERRANEAN REGIONS**

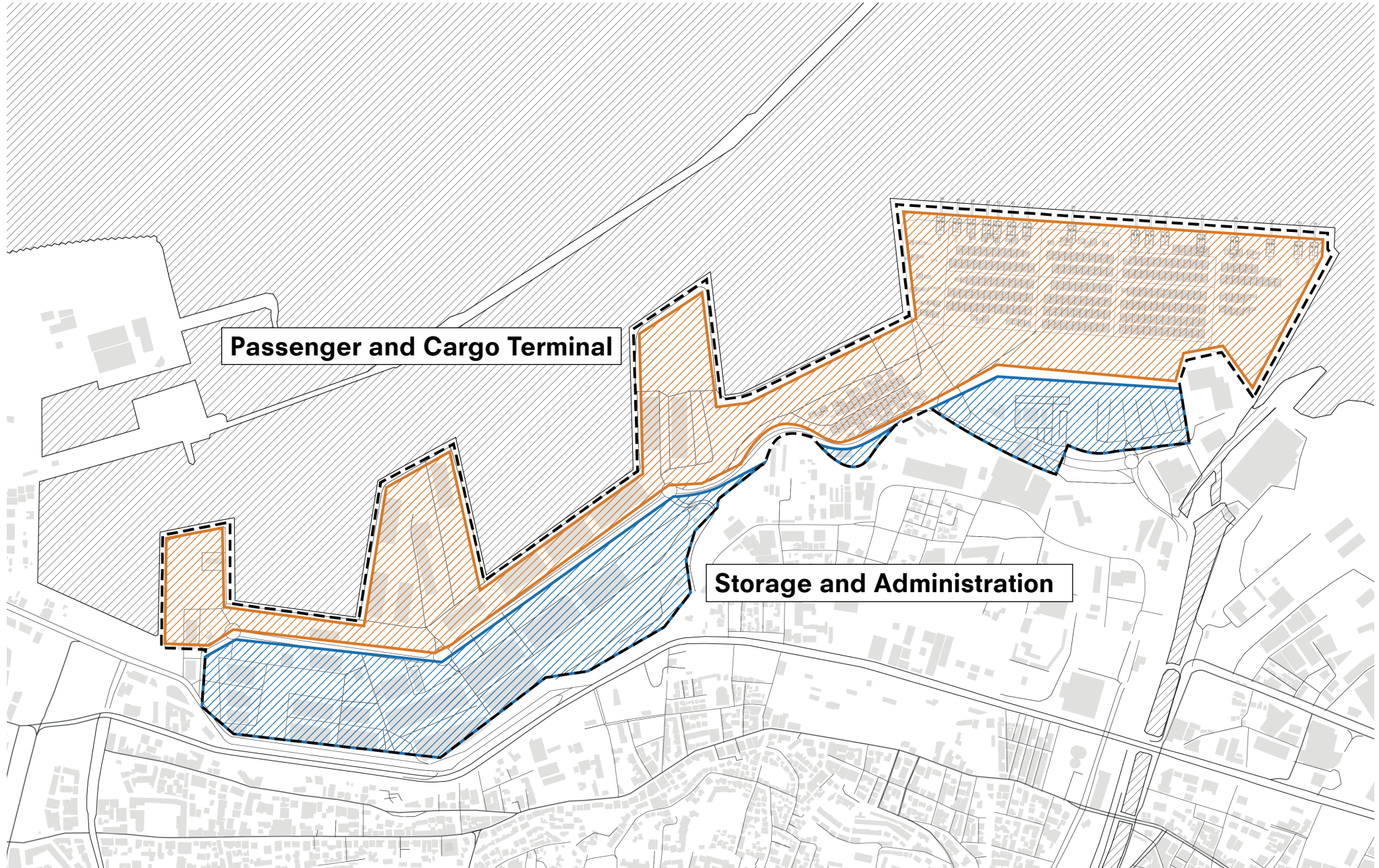
**A HUB CONNECTING BETWEEN
THE MARKETS OF ASIA, EUROPE AND AFRICA**

FUNCTION DIVISION



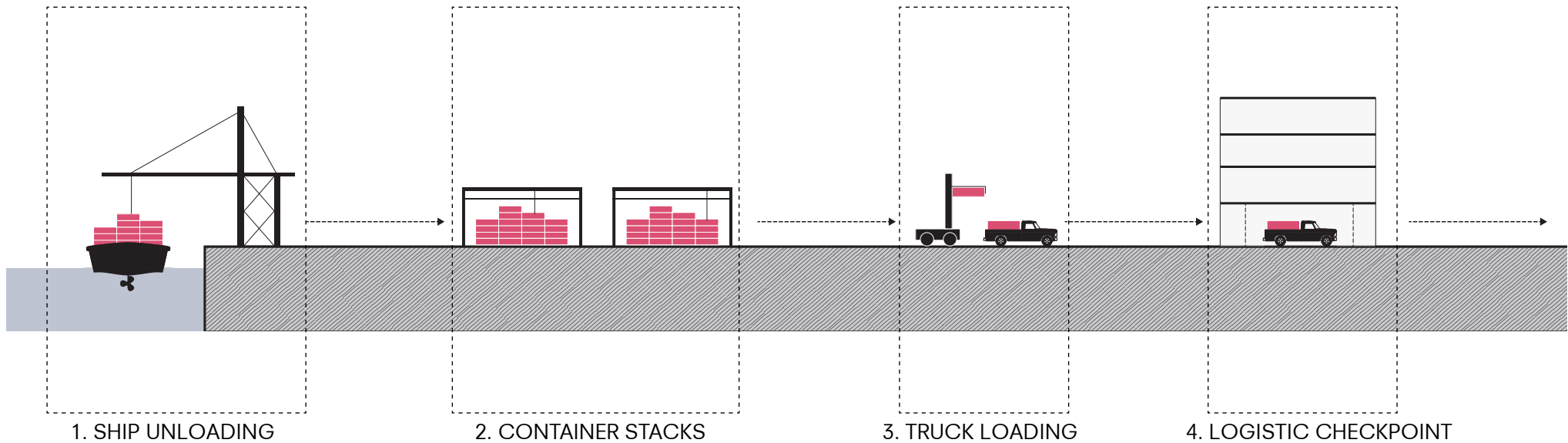


FUNCTION DIVISION



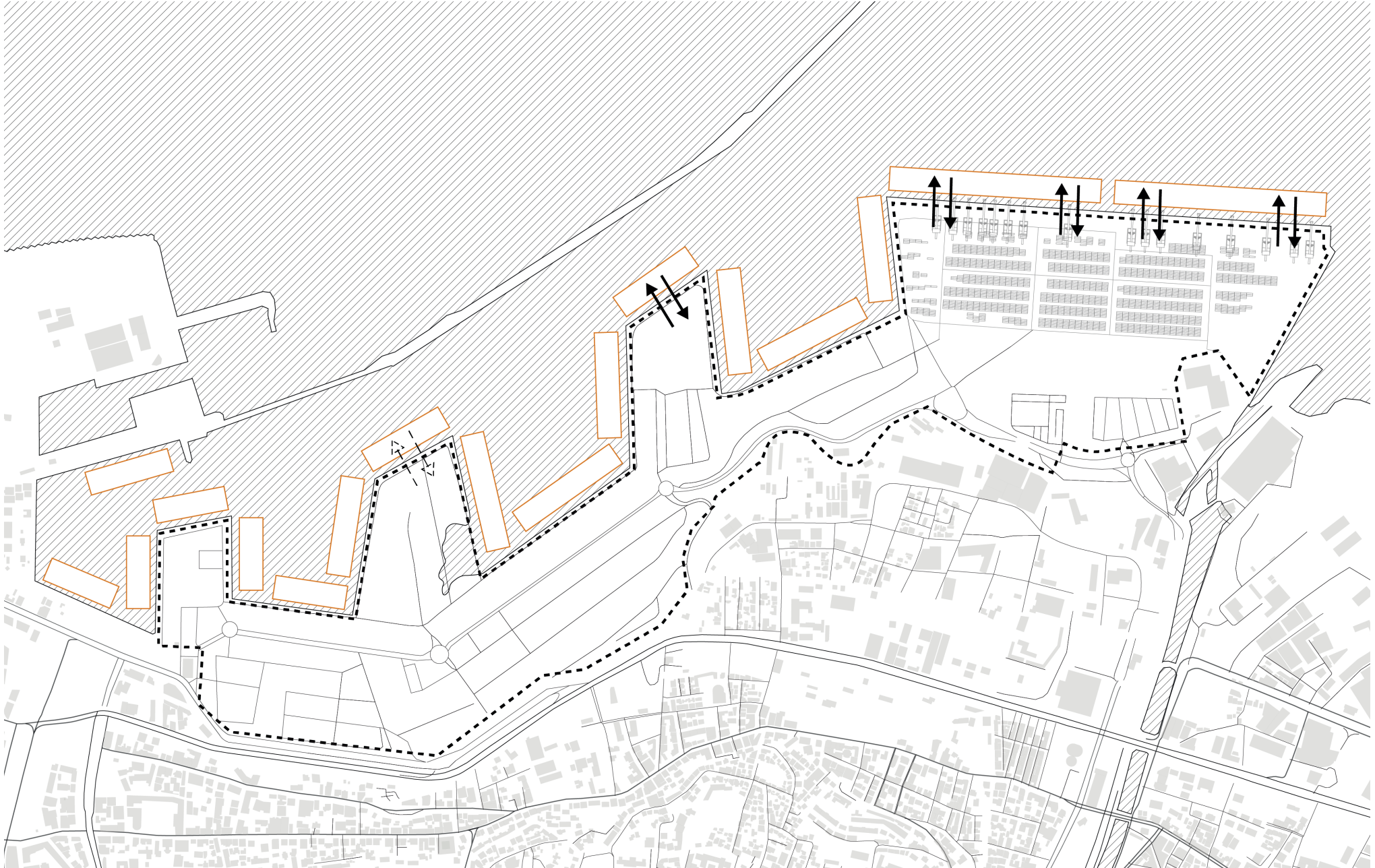


LOGISTIC PROGRESS



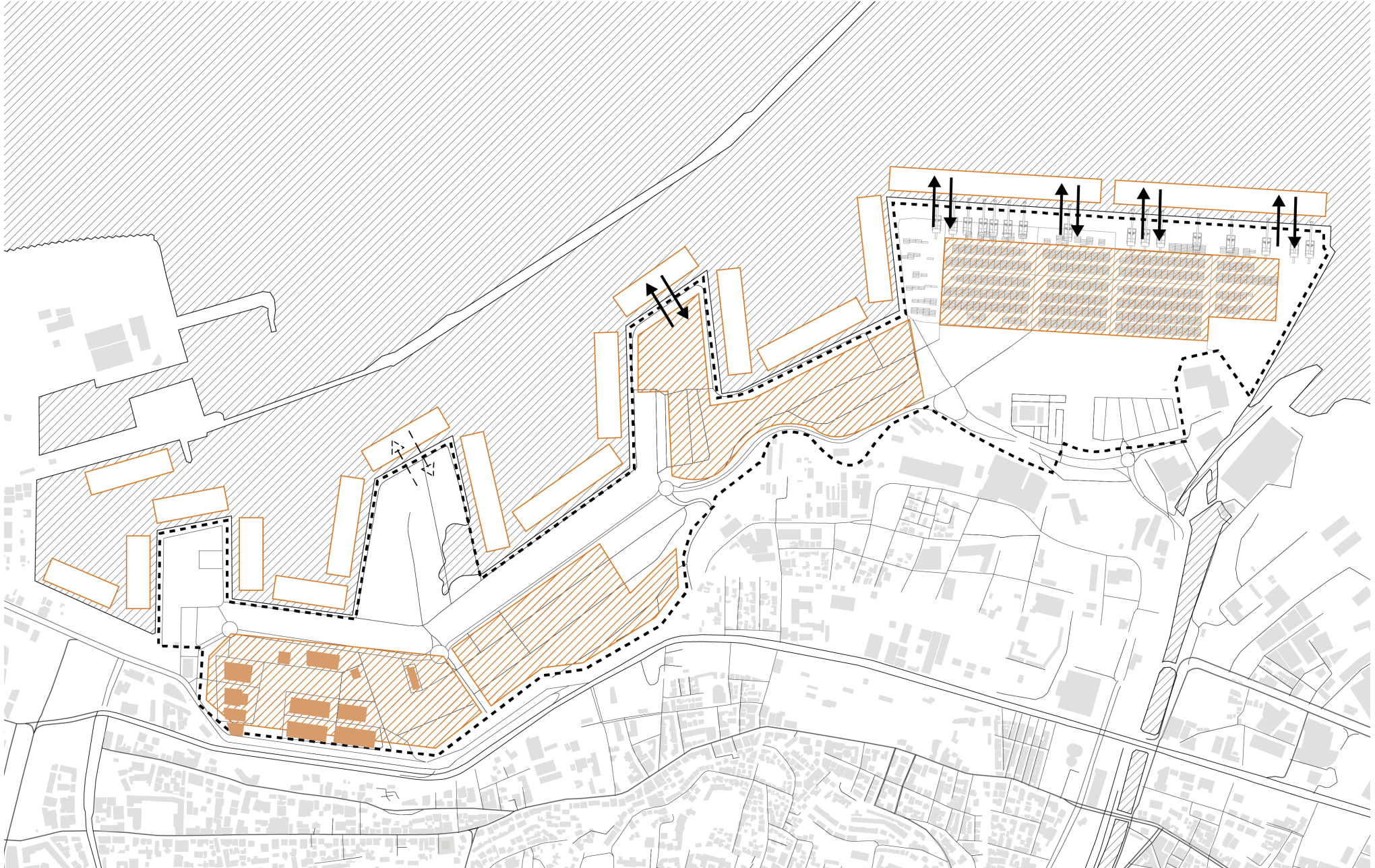
port context

UNLOADING

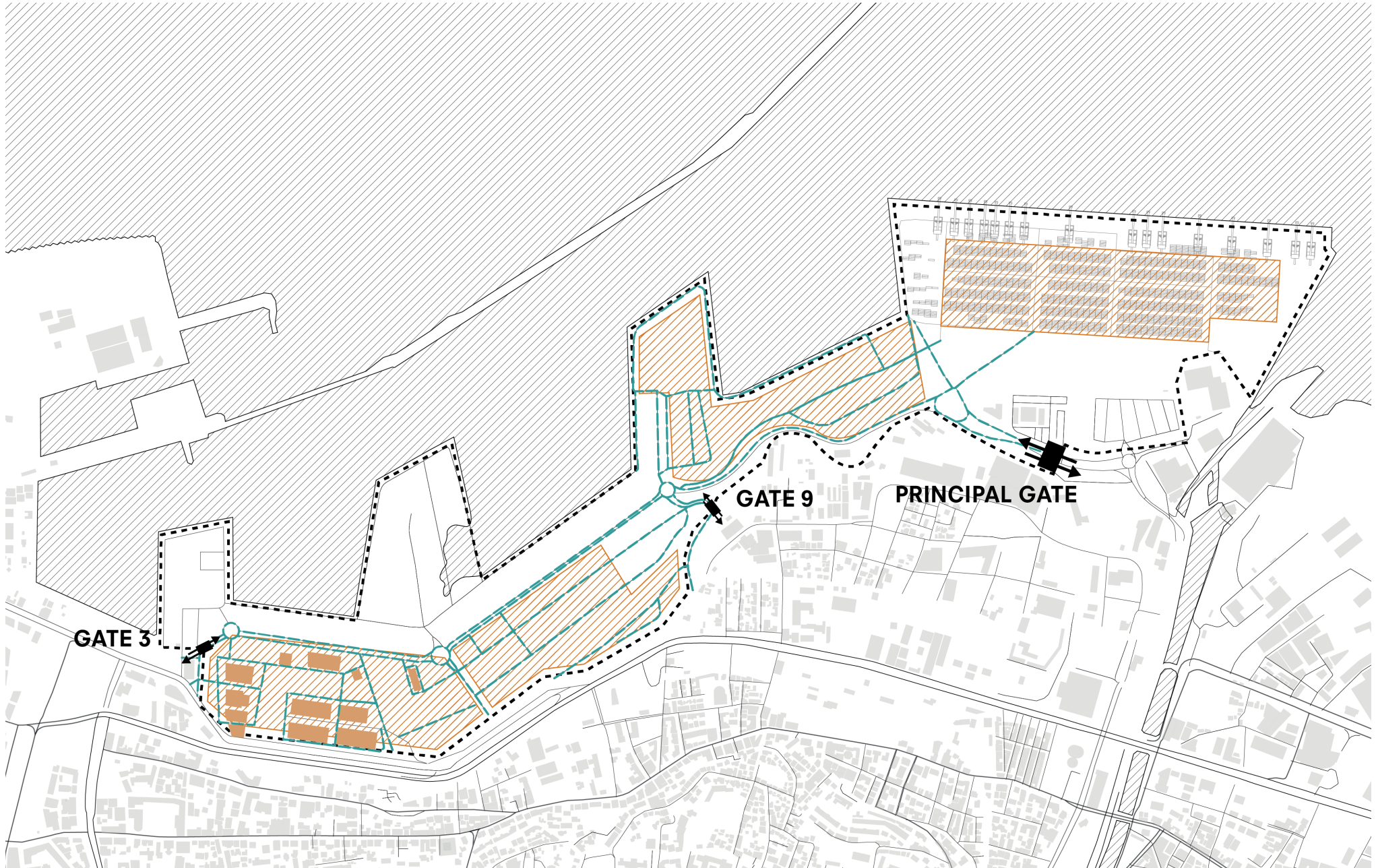


port context

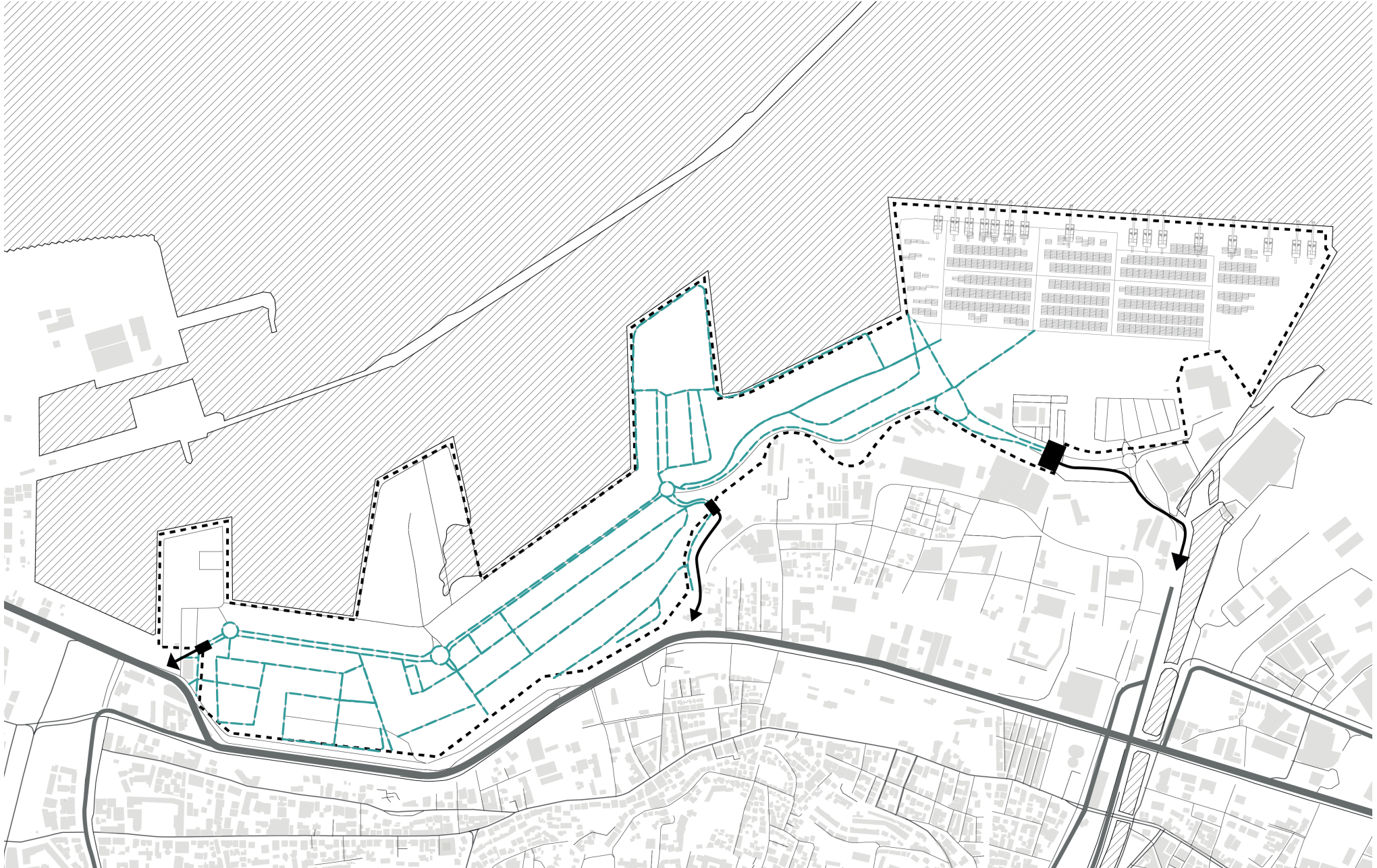
STORAGE



PASS THE CHECKPOINTS



HINTERLAND TRANSFER





PORT TRANSFER

Arabian Business
/ بالعربية

Port of Tripoli: absorbing the crisis

The Lebanese Cabinet took a decision on Wednesday, August 5 to use ports in Tripoli in the north and the smaller ports of Sidon and Tyre to the south. Tripoli, as the second-largest logistics hub in

Home > Middle East > [Lebanon's Tripoli To Serve As Main Port After Beirut Blast](#)

Wed 5 Aug 2020

Lebanon's Tripoli to serve as main port after Beirut blast

The government is assessing

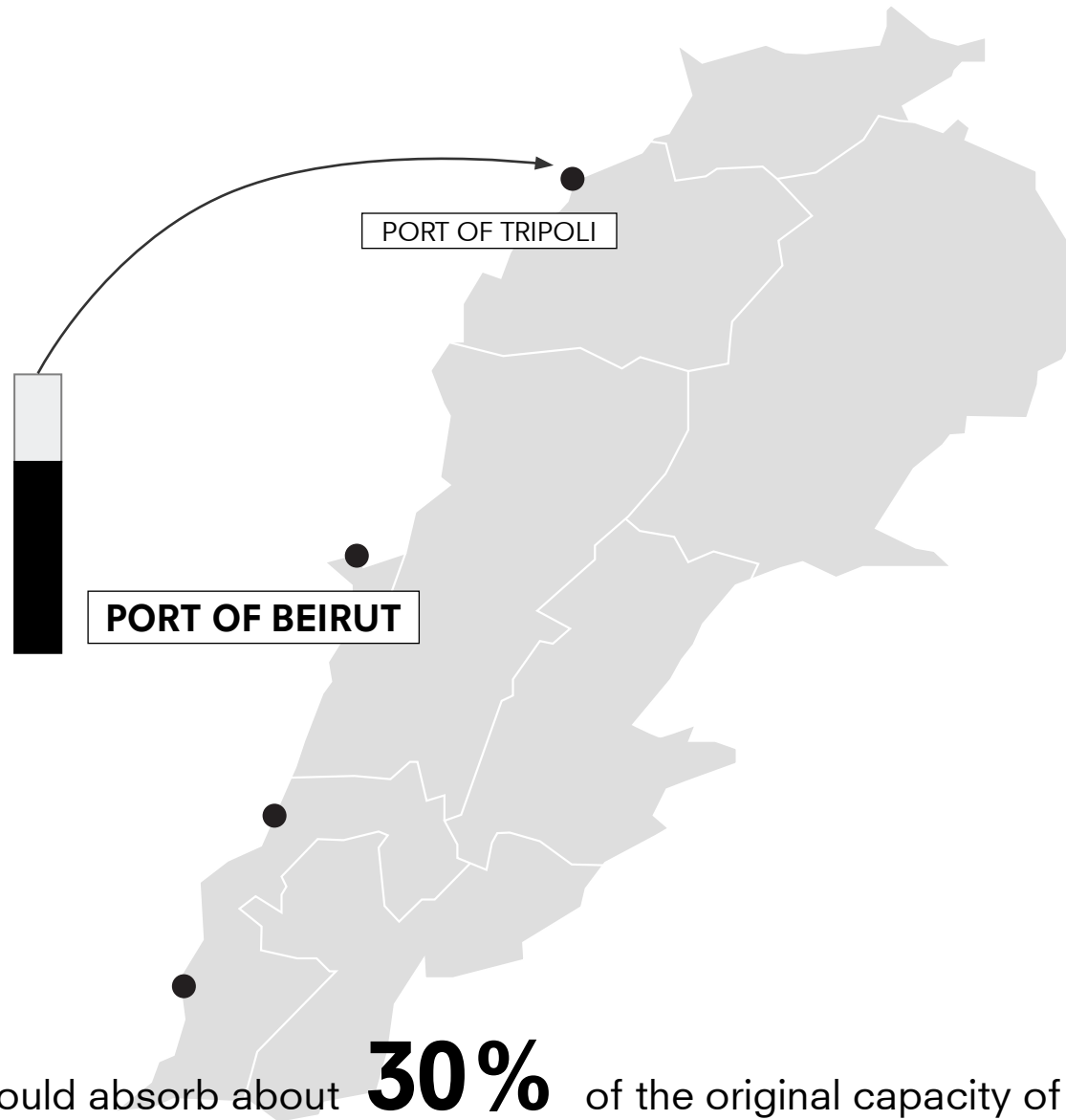
Home > Middle East > [Lebanon's Tripoli Port Readies To Fill In For Blast-Hit Beirut](#)

Thu 13 Aug 2020

Lebanon's Tripoli port readies to fill in for blast-hit Beirut

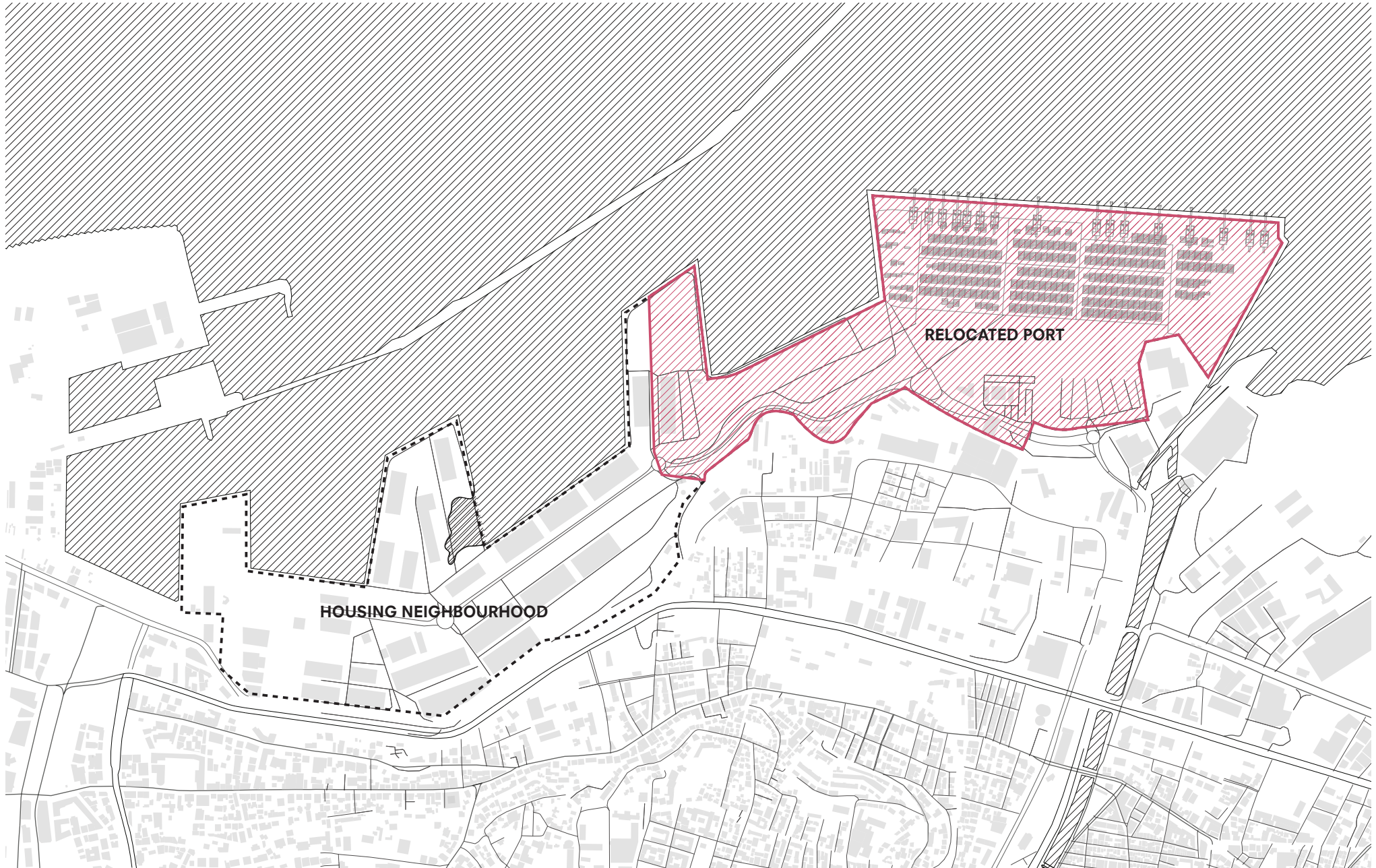
Tripoli port's capacity is smaller than Beirut's, through which the vast majority of Lebanon's food and other imports used to transit

PORT TRANSFER



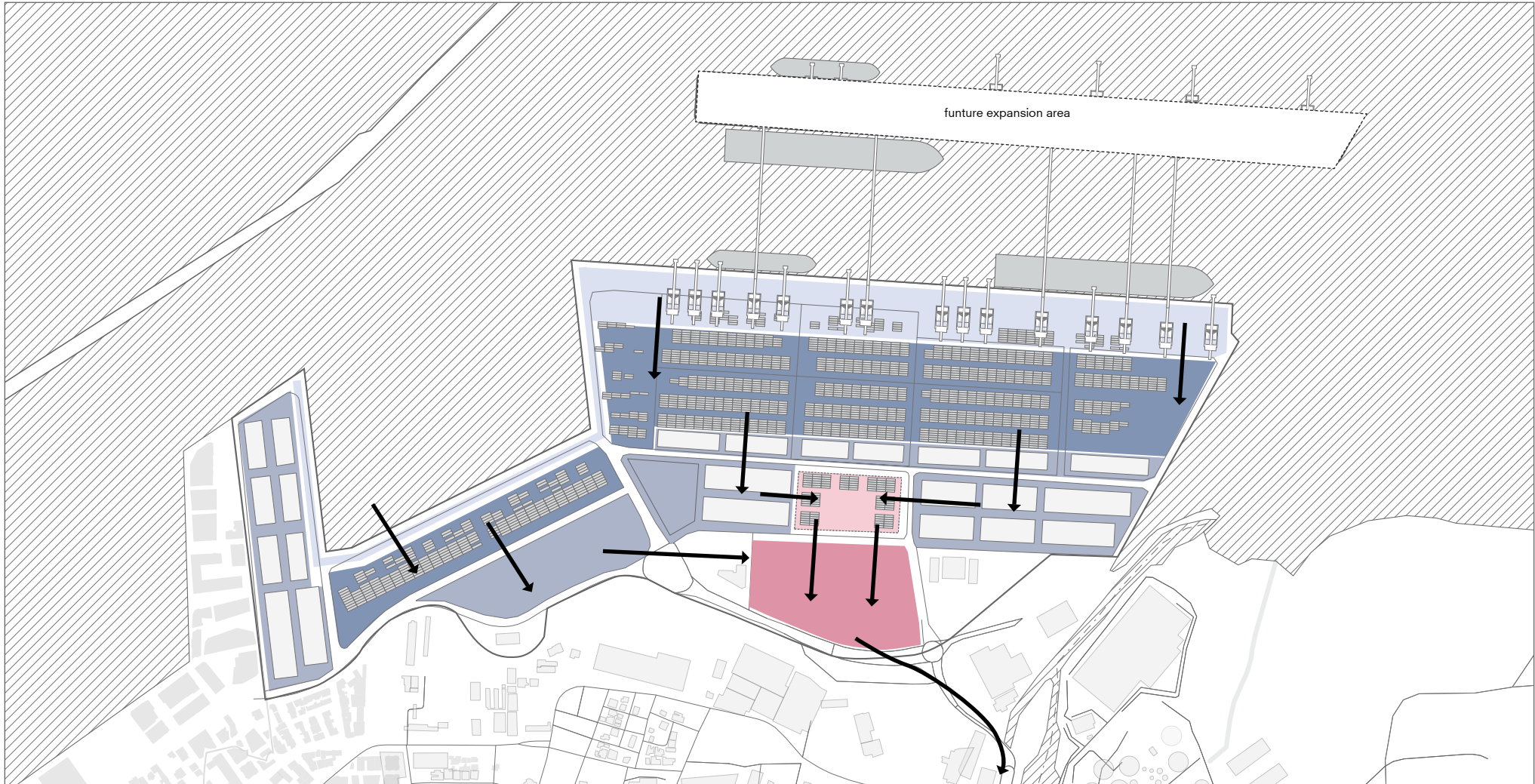
Port of Tripoli could absorb about **30%** of the original capacity of port of Beirut

CONDENSED NEW PORT

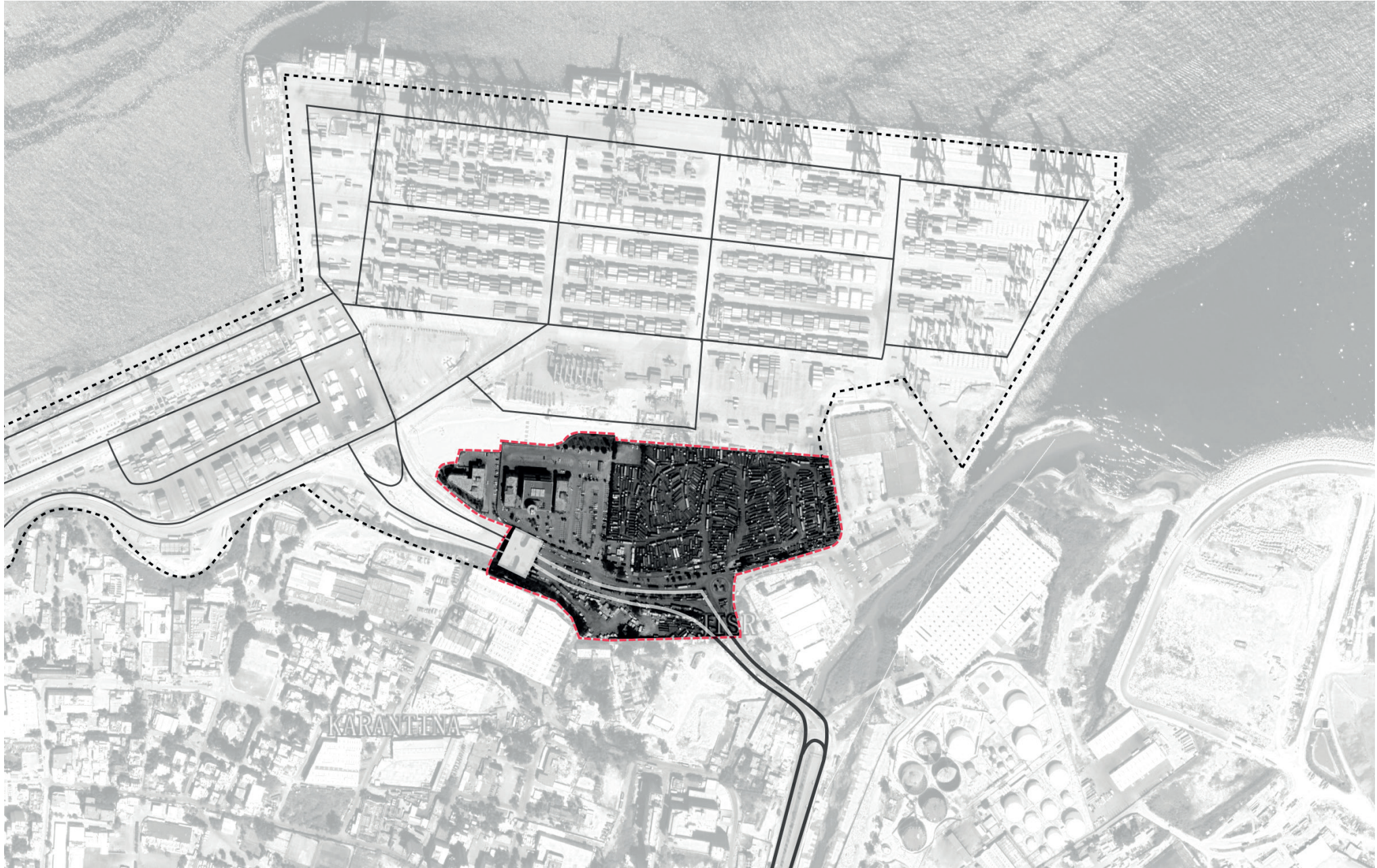


SITE RESEARCH

LOGISTIC PROCESS

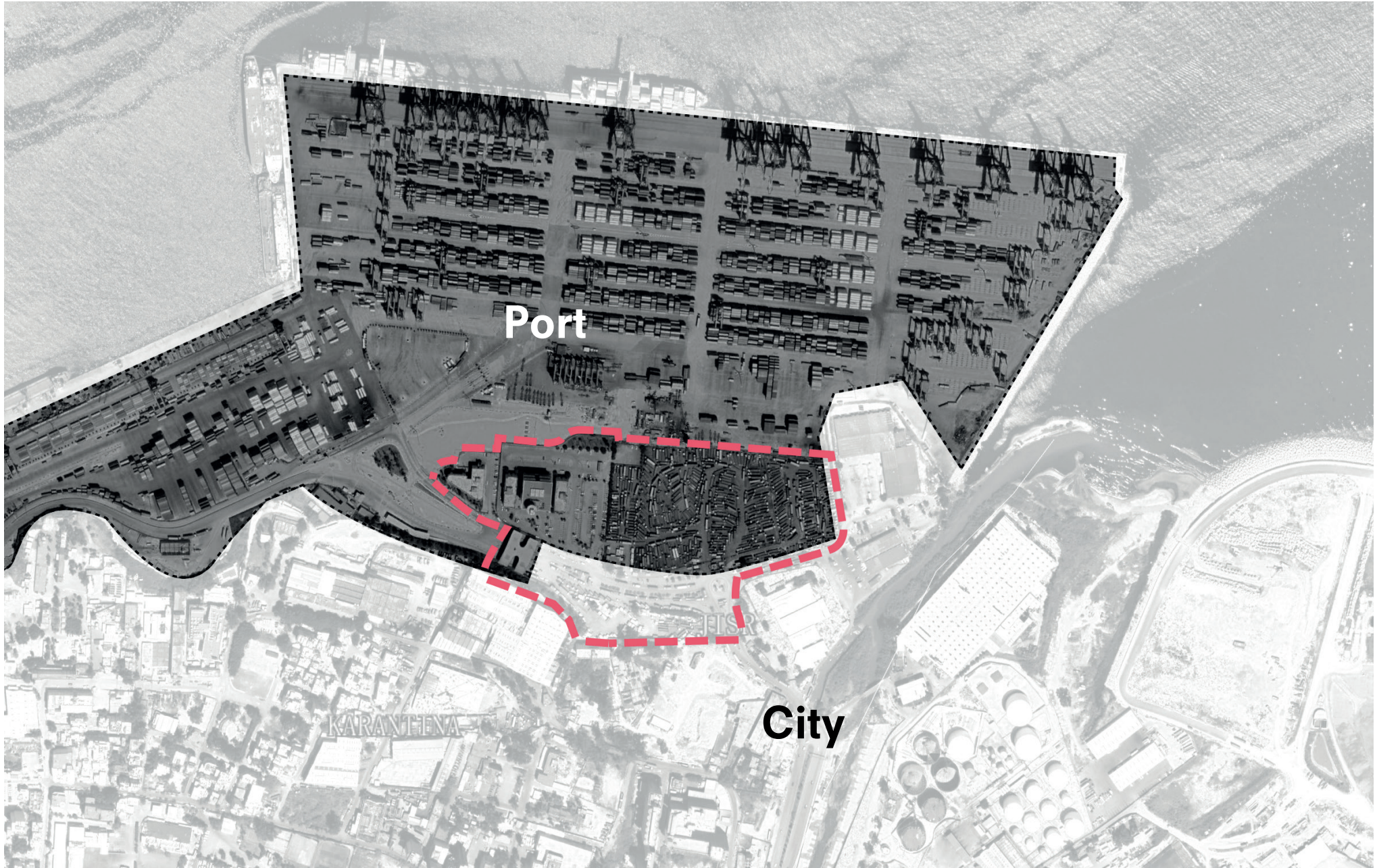


PORT ENTRANCE AREA

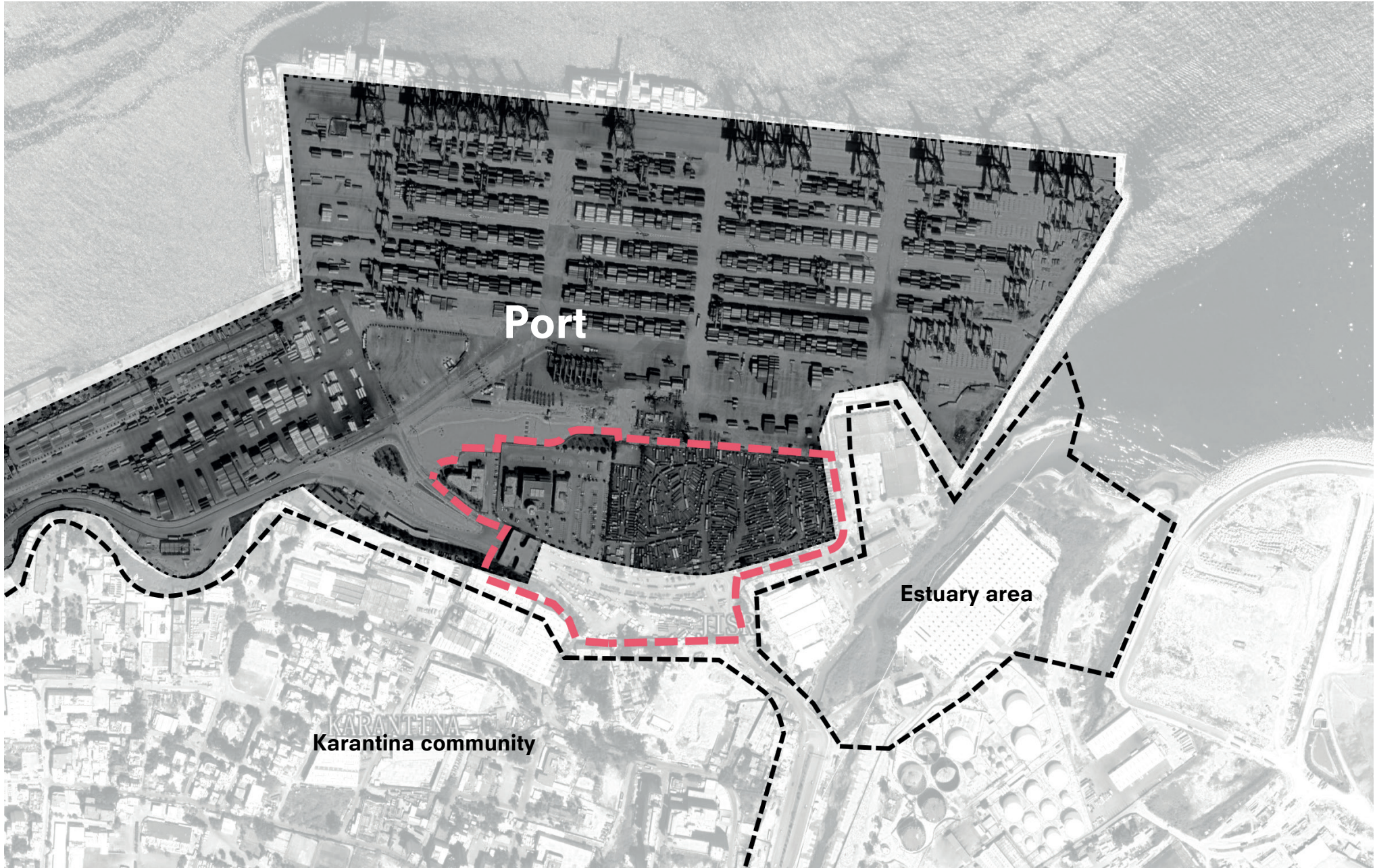


site research

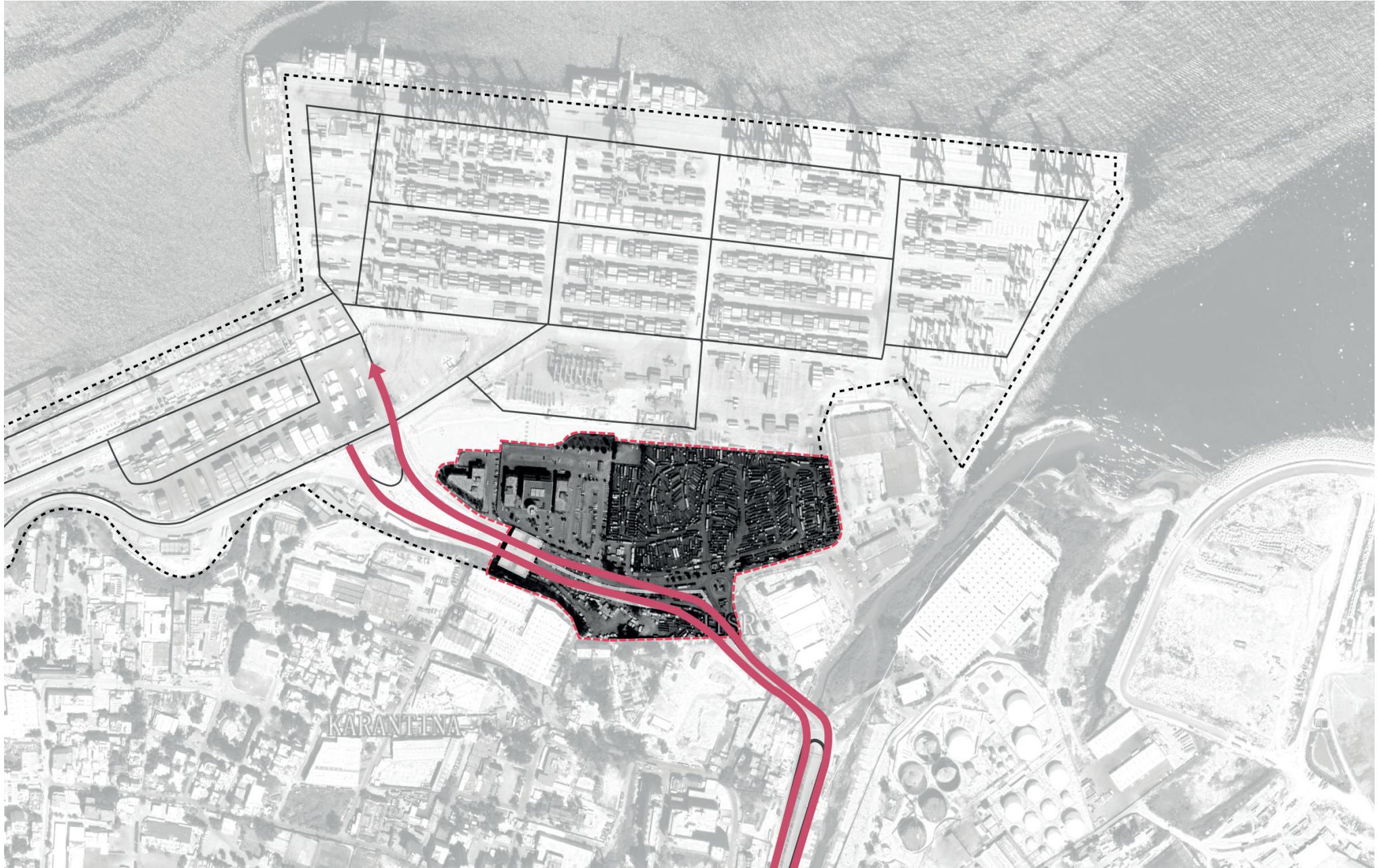
BORDER



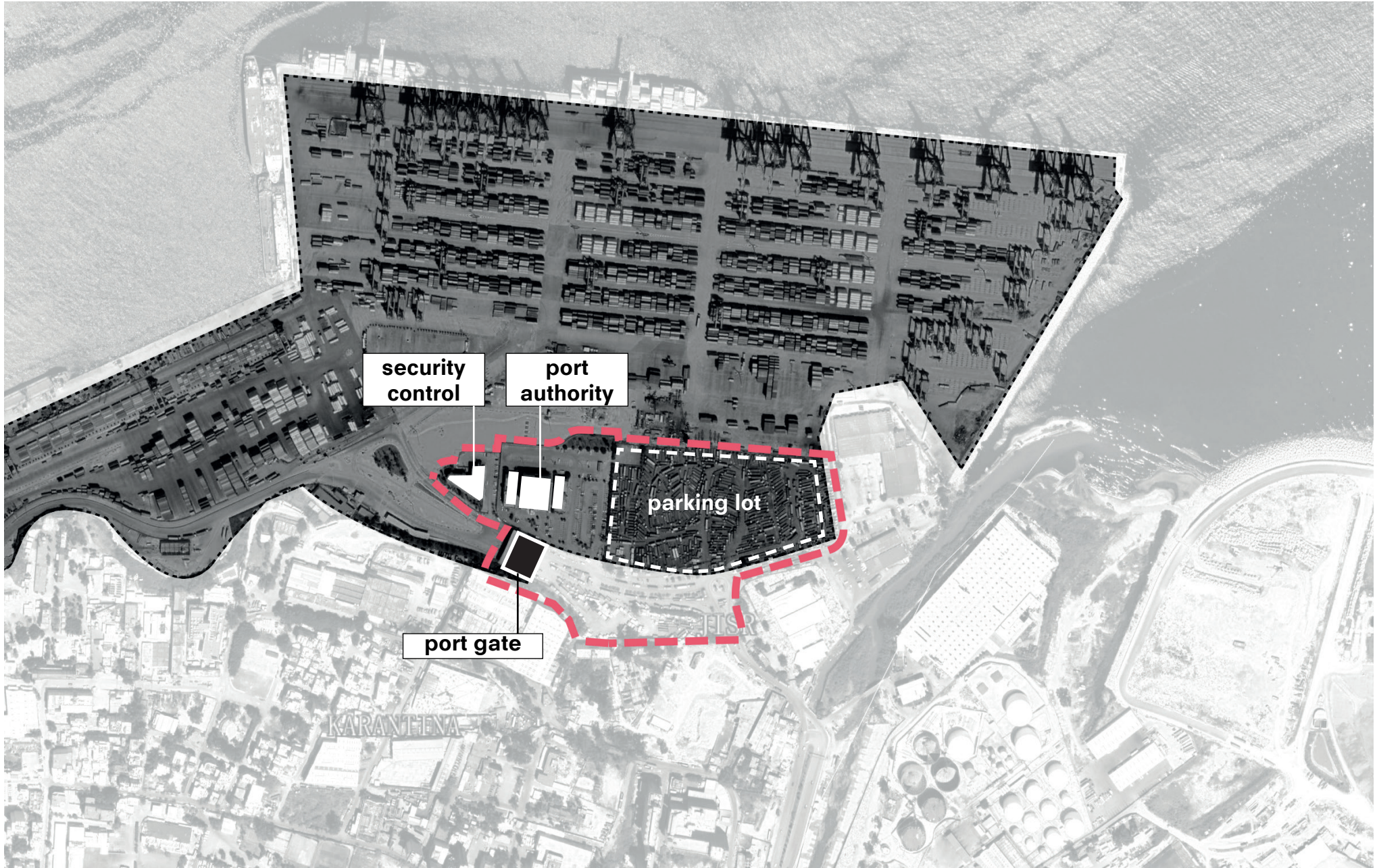
SURROUNDING



FLOW



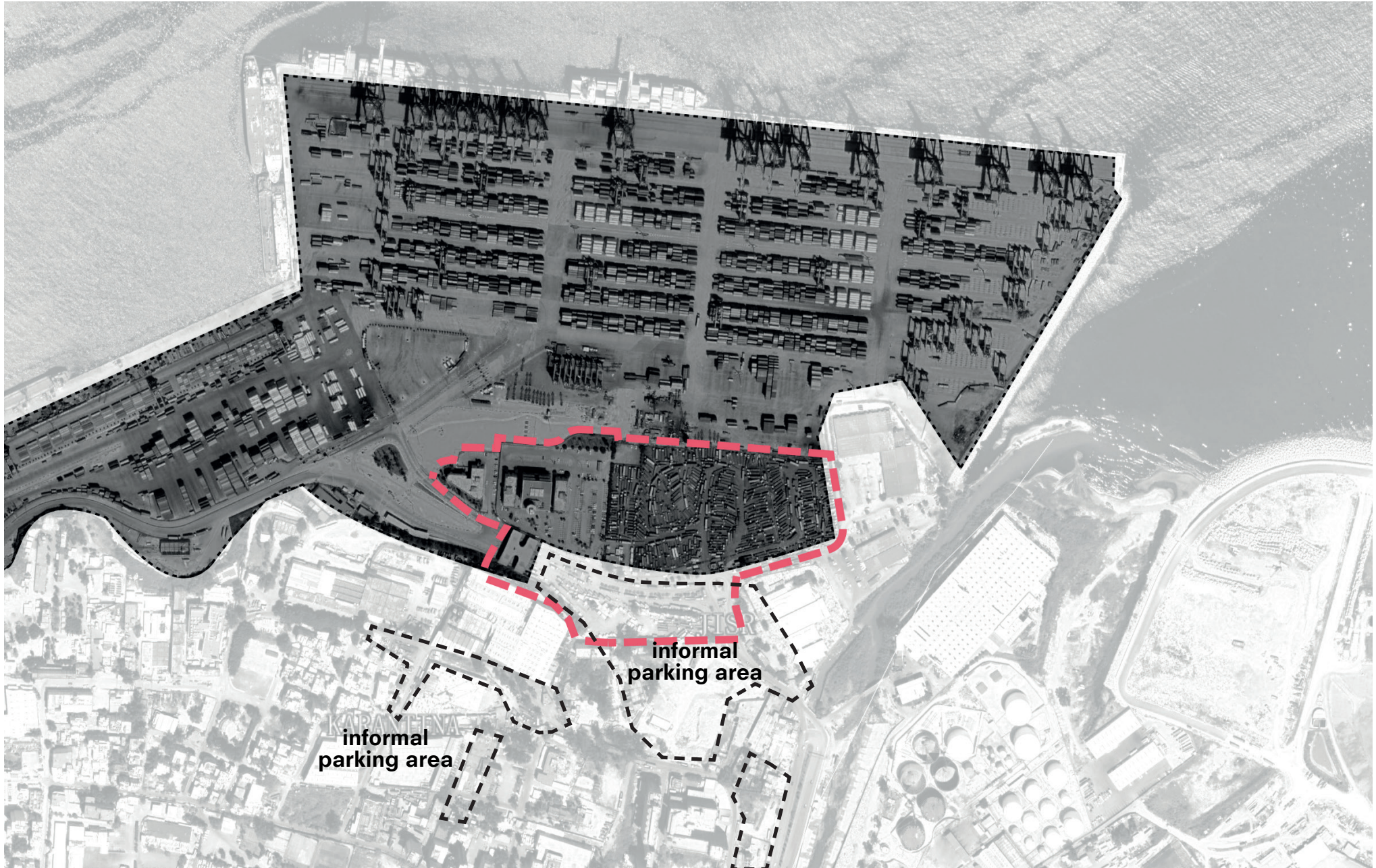
EXISTING FUNCTION



CONGESTED ENTRANCE



INFORMAL PARKING



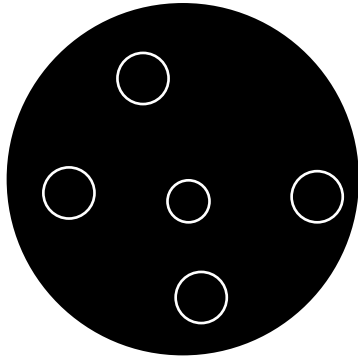
site research

INFORMAL PARKING



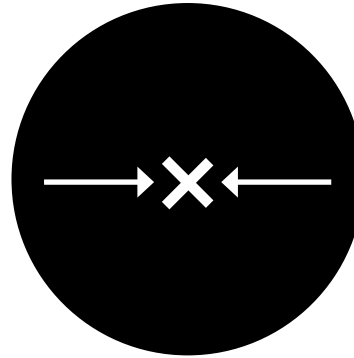
site research

KEY ISSUE



Scattered elements

Vehicle workshops, parking, checkpoints, rest cabins... ... All the related function scattered on the field.



Unorganized Traffic System

Unorganized traffic system and congested trucks lead to poor connectivity between cities and ports

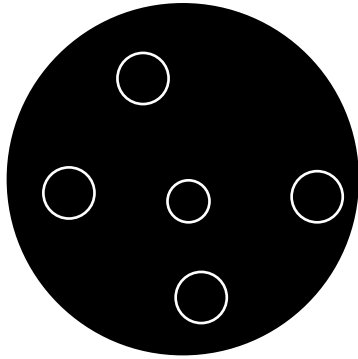


Interference between Different Activities

Interweaving of Different users activities: goods, people, trucks

site research

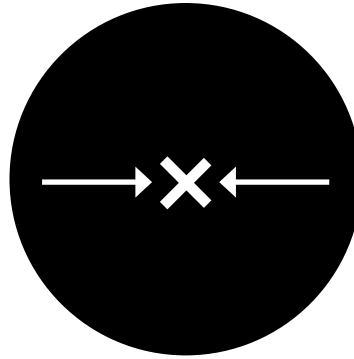
RESPONSE



Scattered elements



Condense



Unorganized Traffic System



Supervision



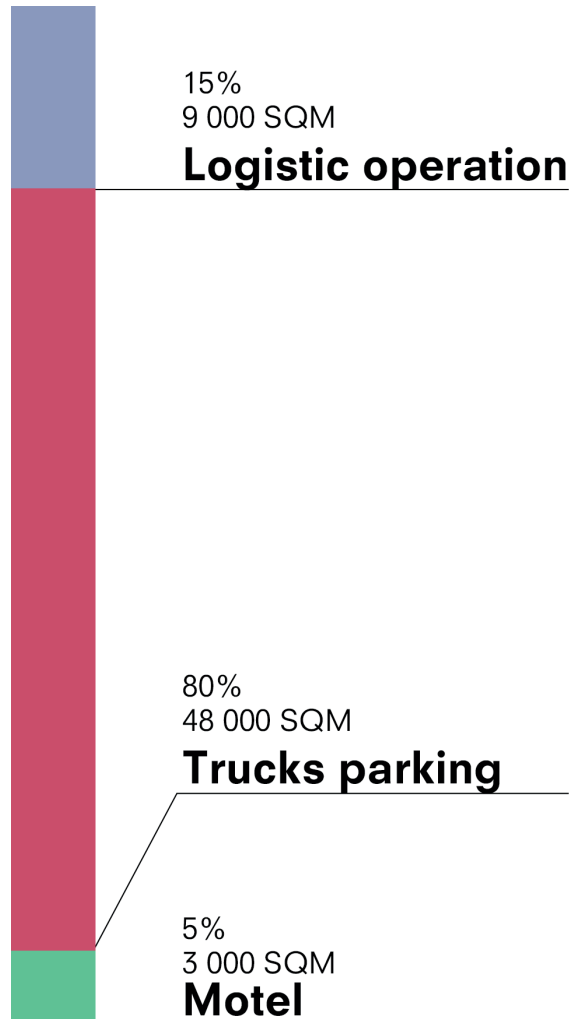
Interference between
Different Activities



Divide

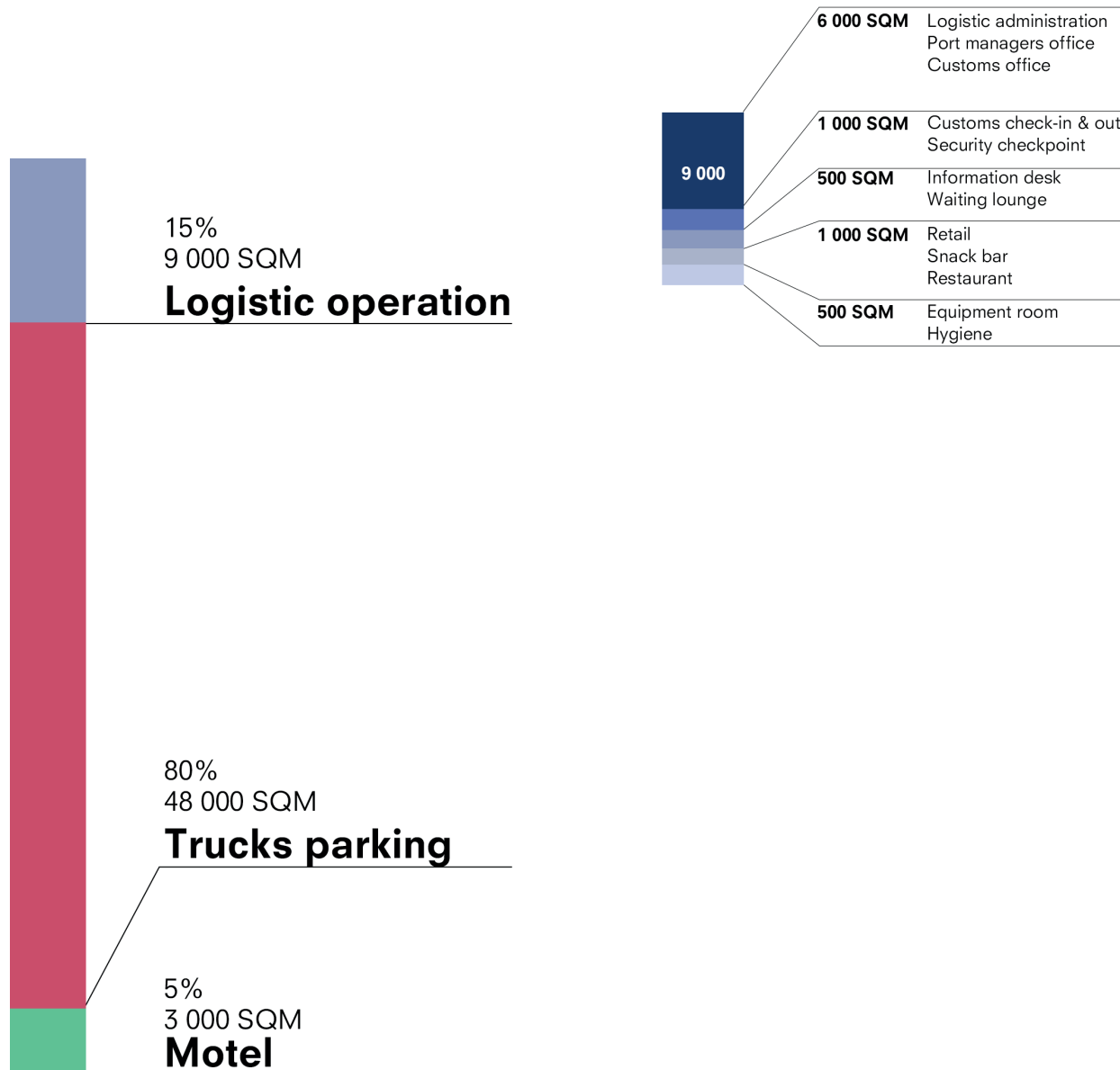
site research

PROGRAM

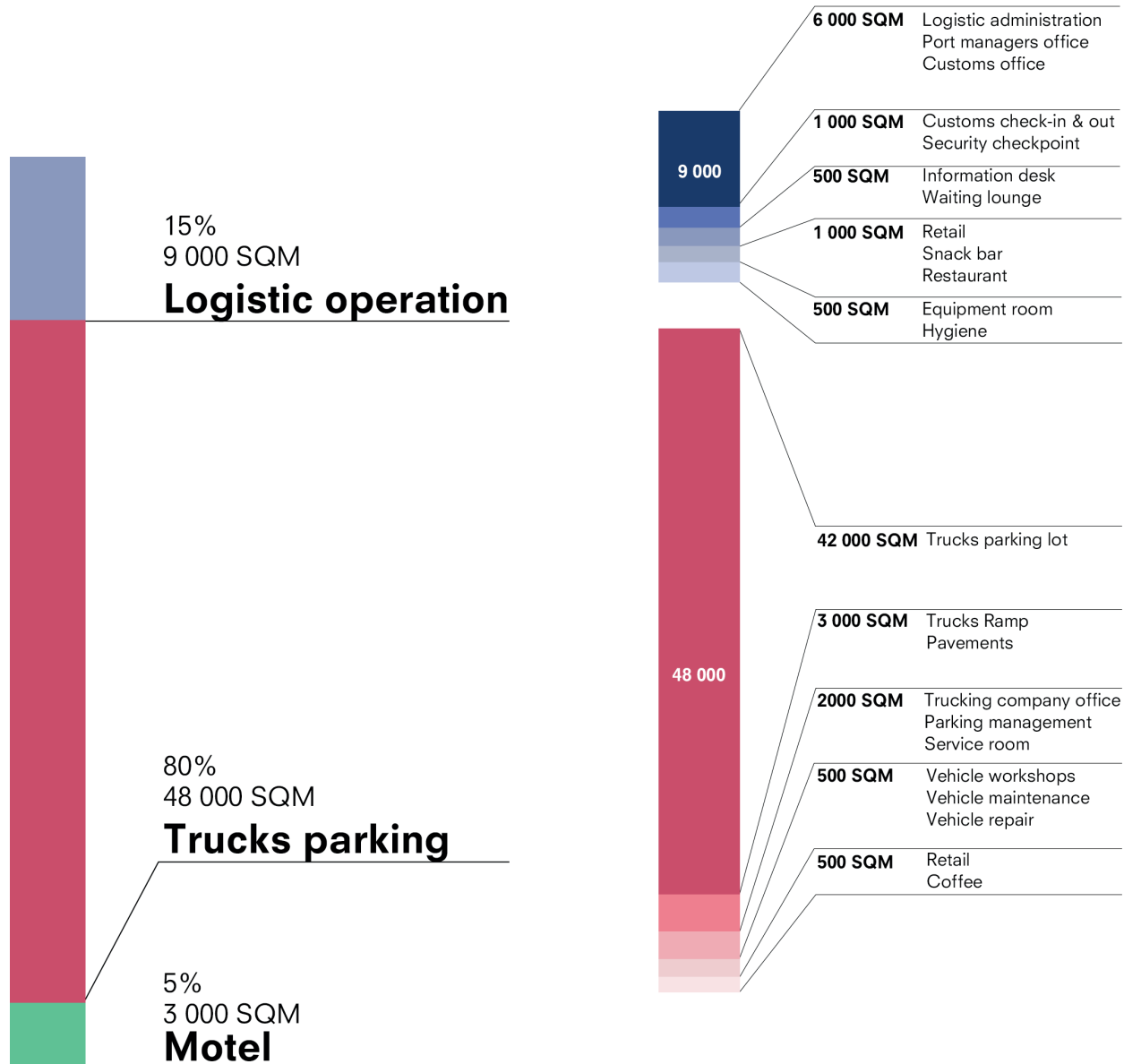


site research

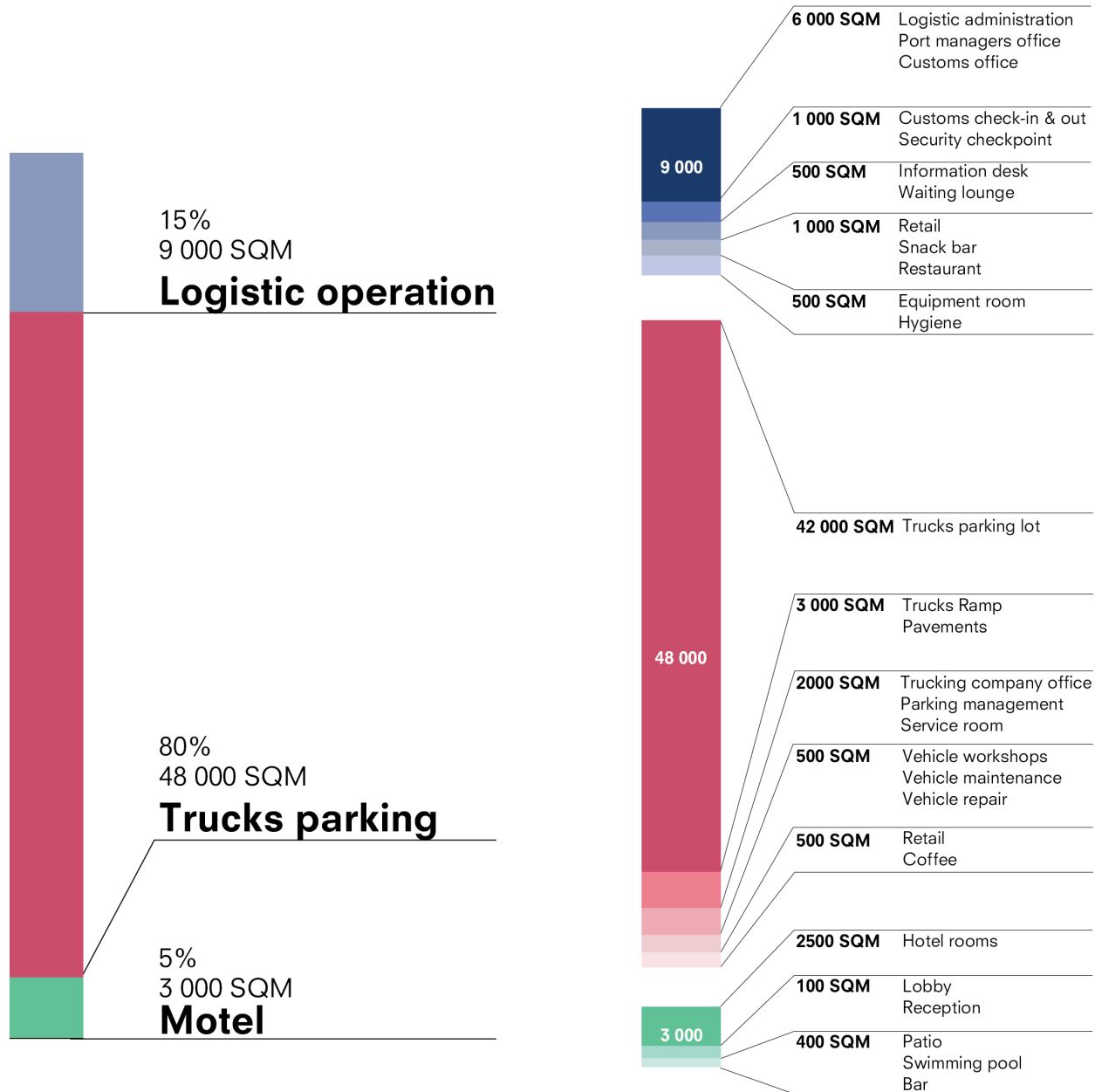
PROGRAM



site research PROGRAM

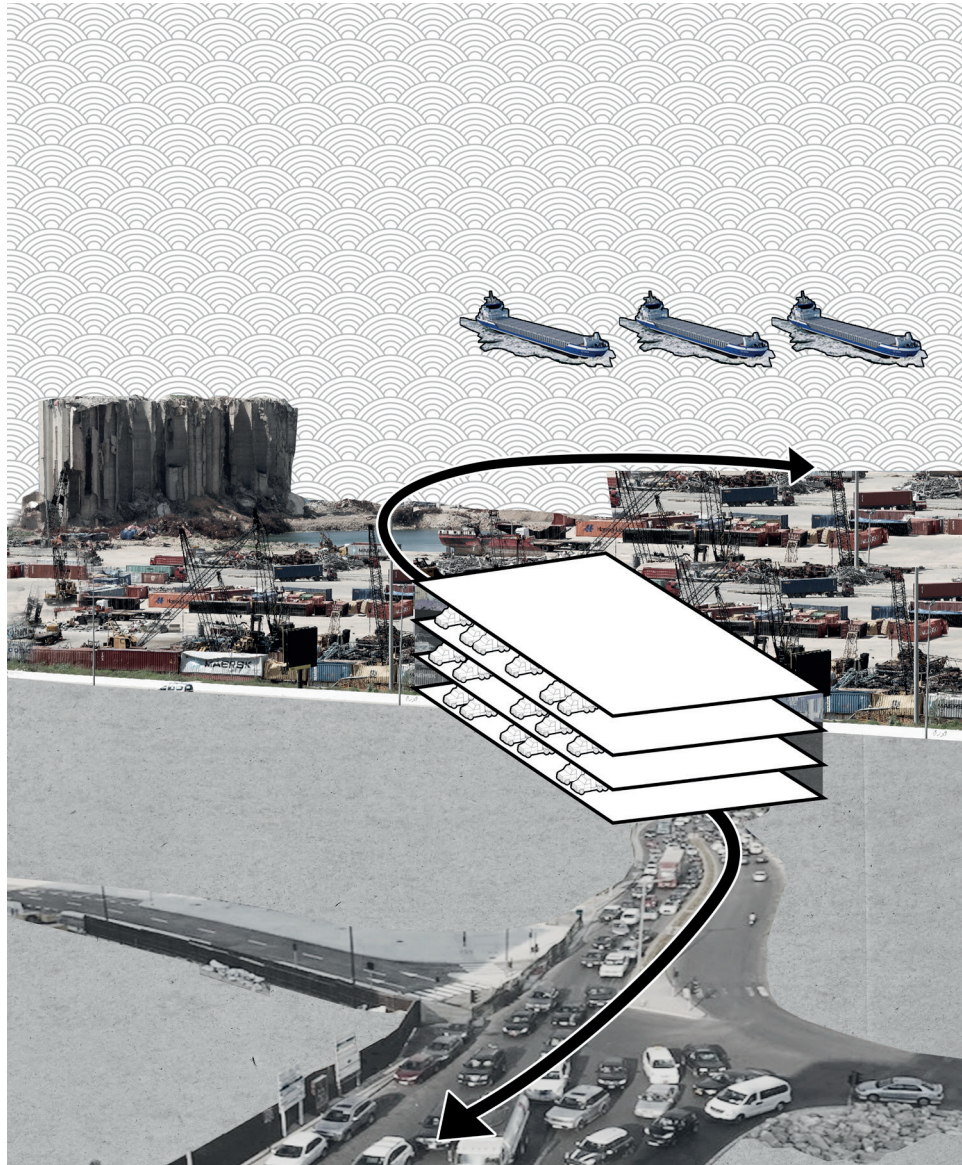


site research PROGRAM



site research

GARAGE



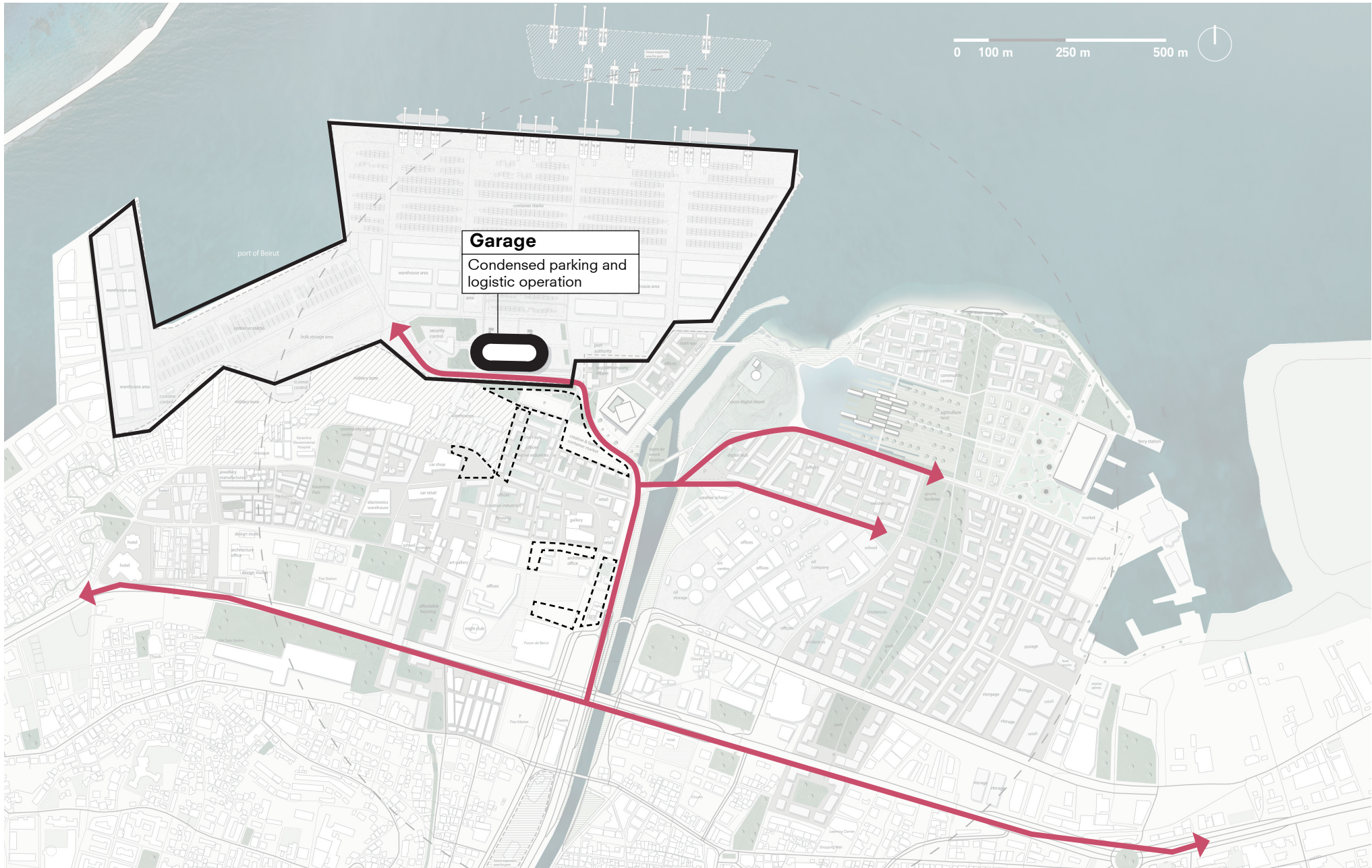
- A parking building for trucks
- A complex serves for drivers and port logistic operation

site research

URBAN PROPOSAL

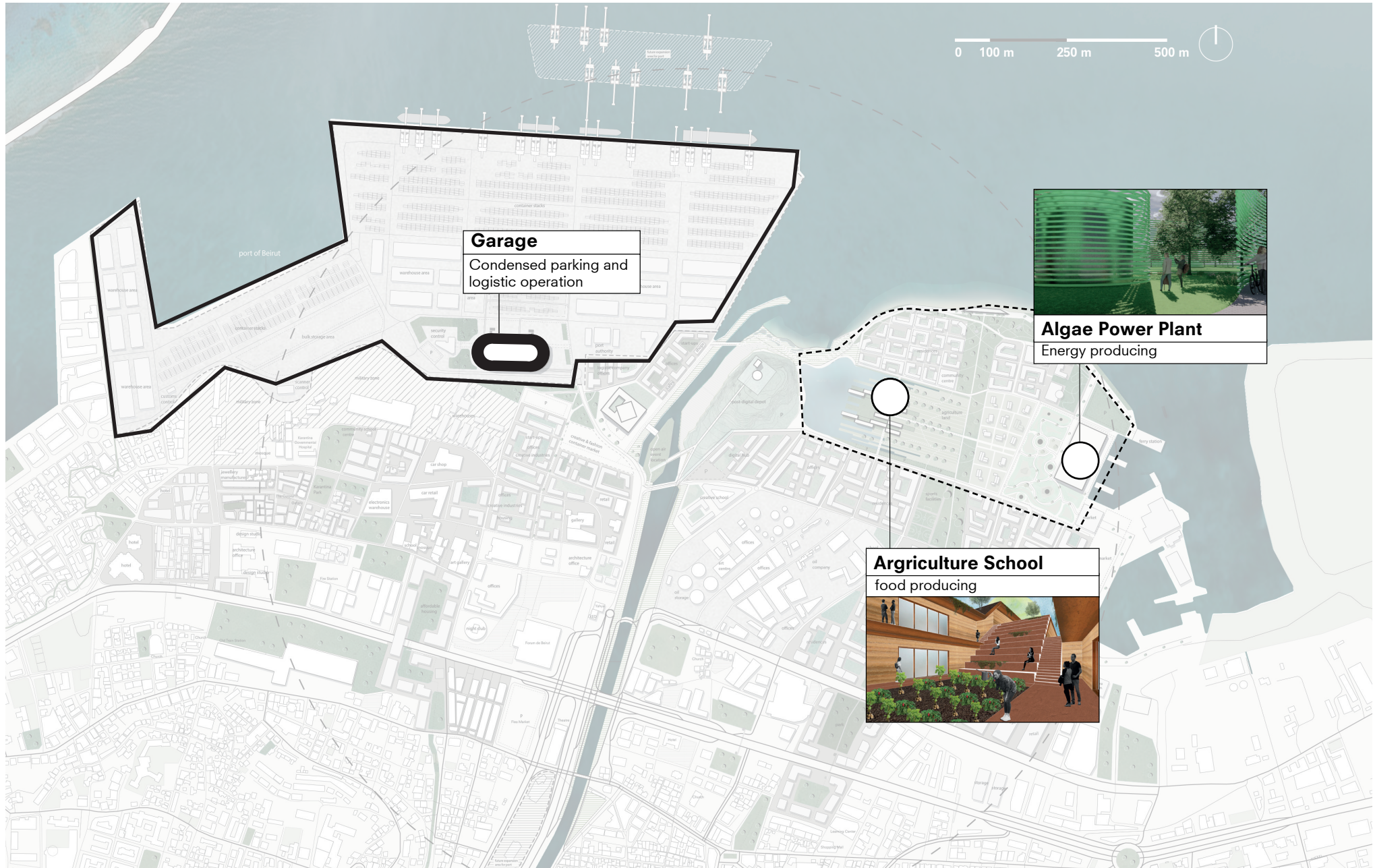


STRENGTHEN CONNECTION

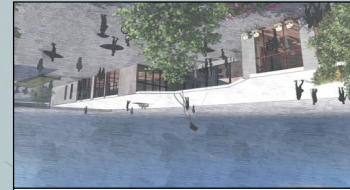


site research

COLLABORATION



site research



Garage
Condensed parking and logistic operation

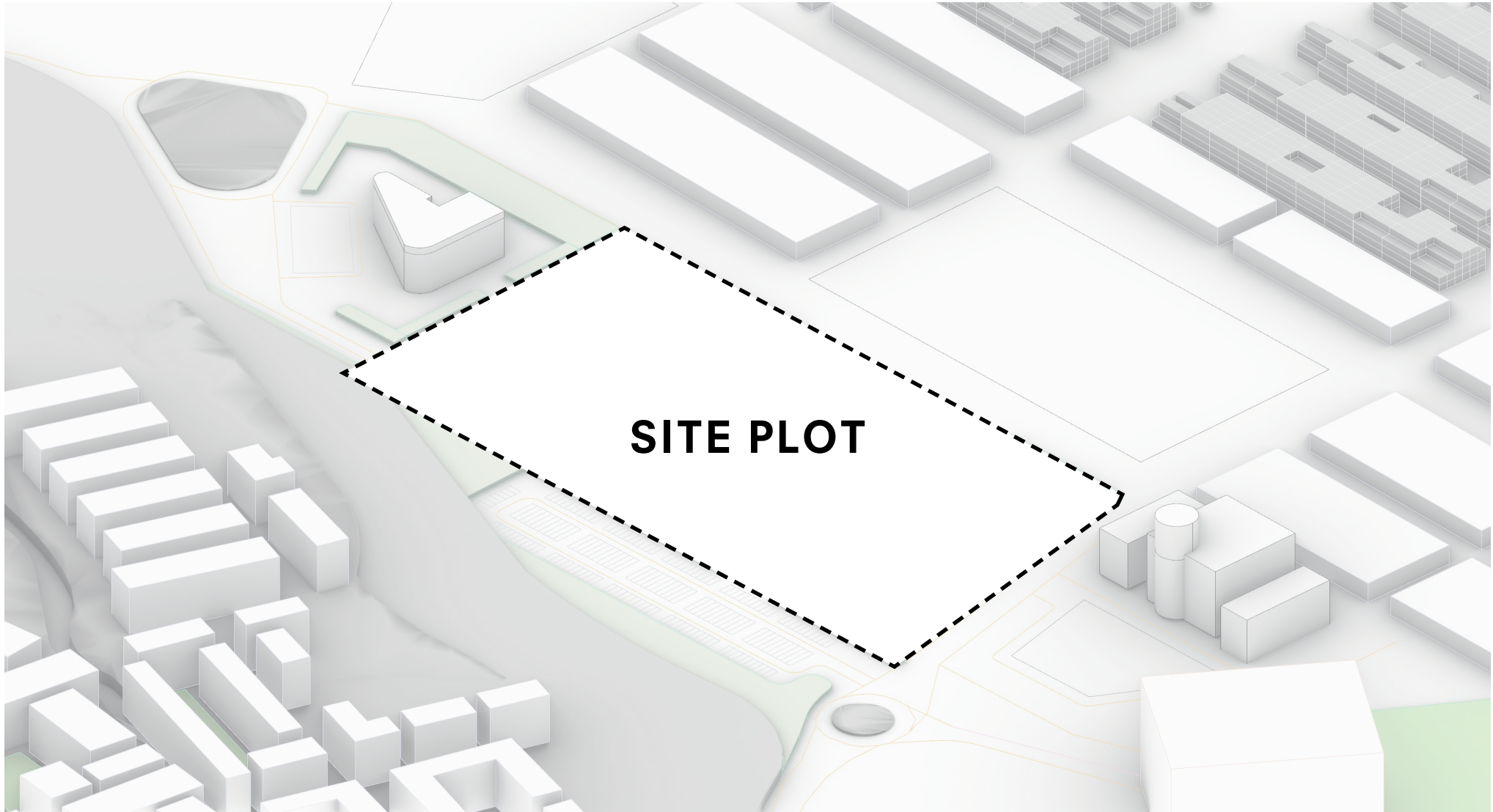
site research



INTERVENTION

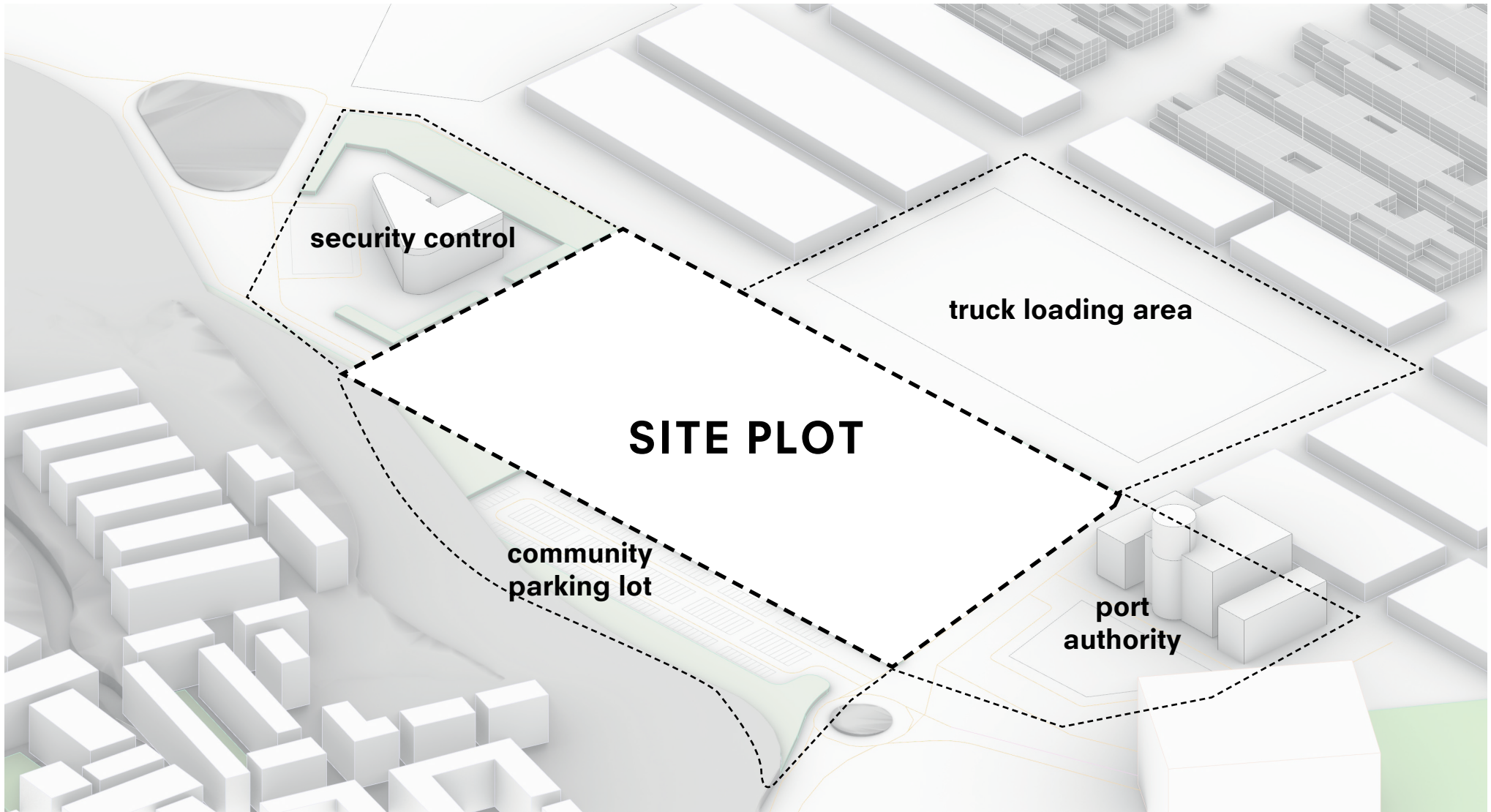
intervention

SITE PLOT



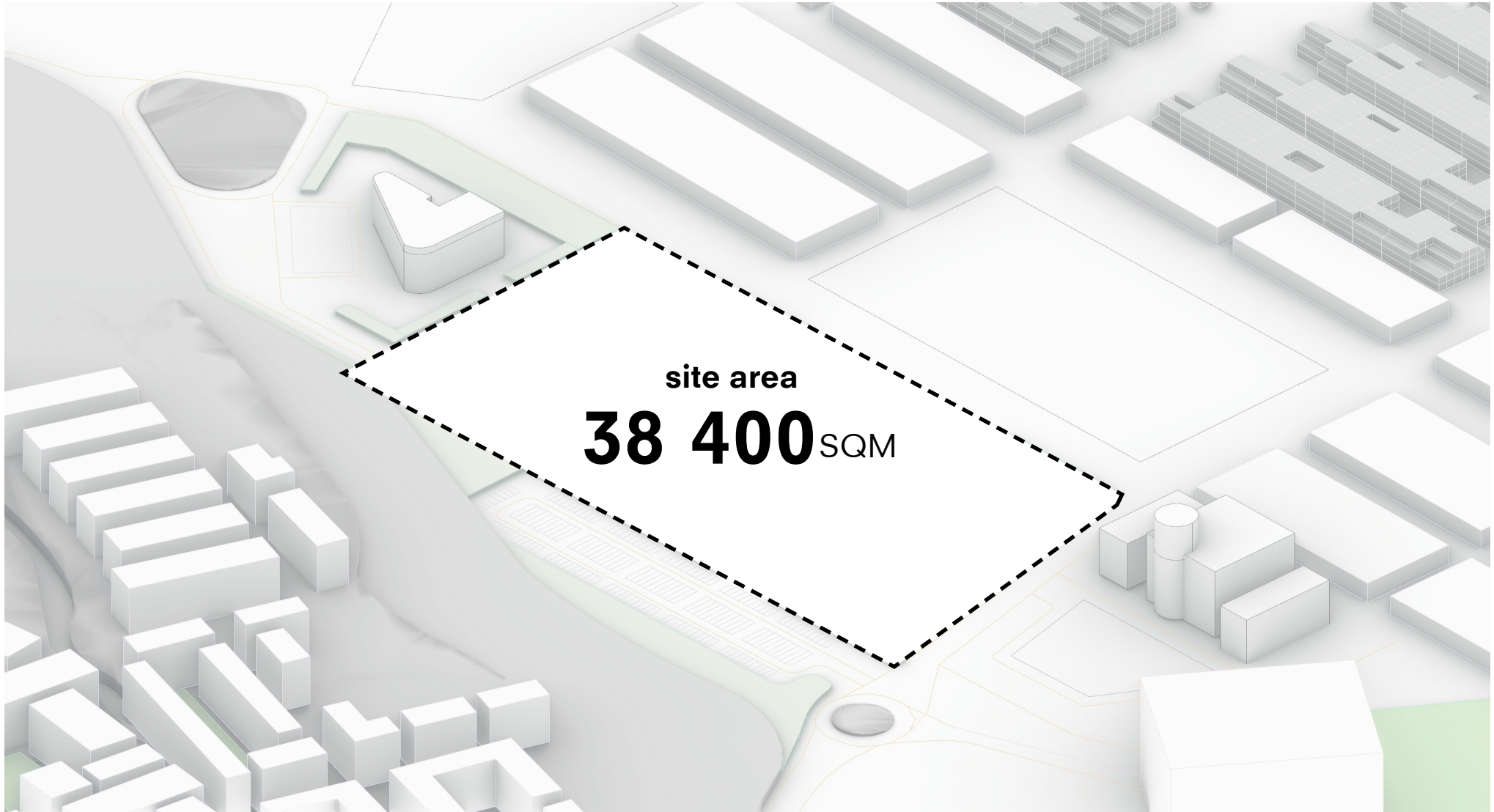
intervention

SITE PLOT



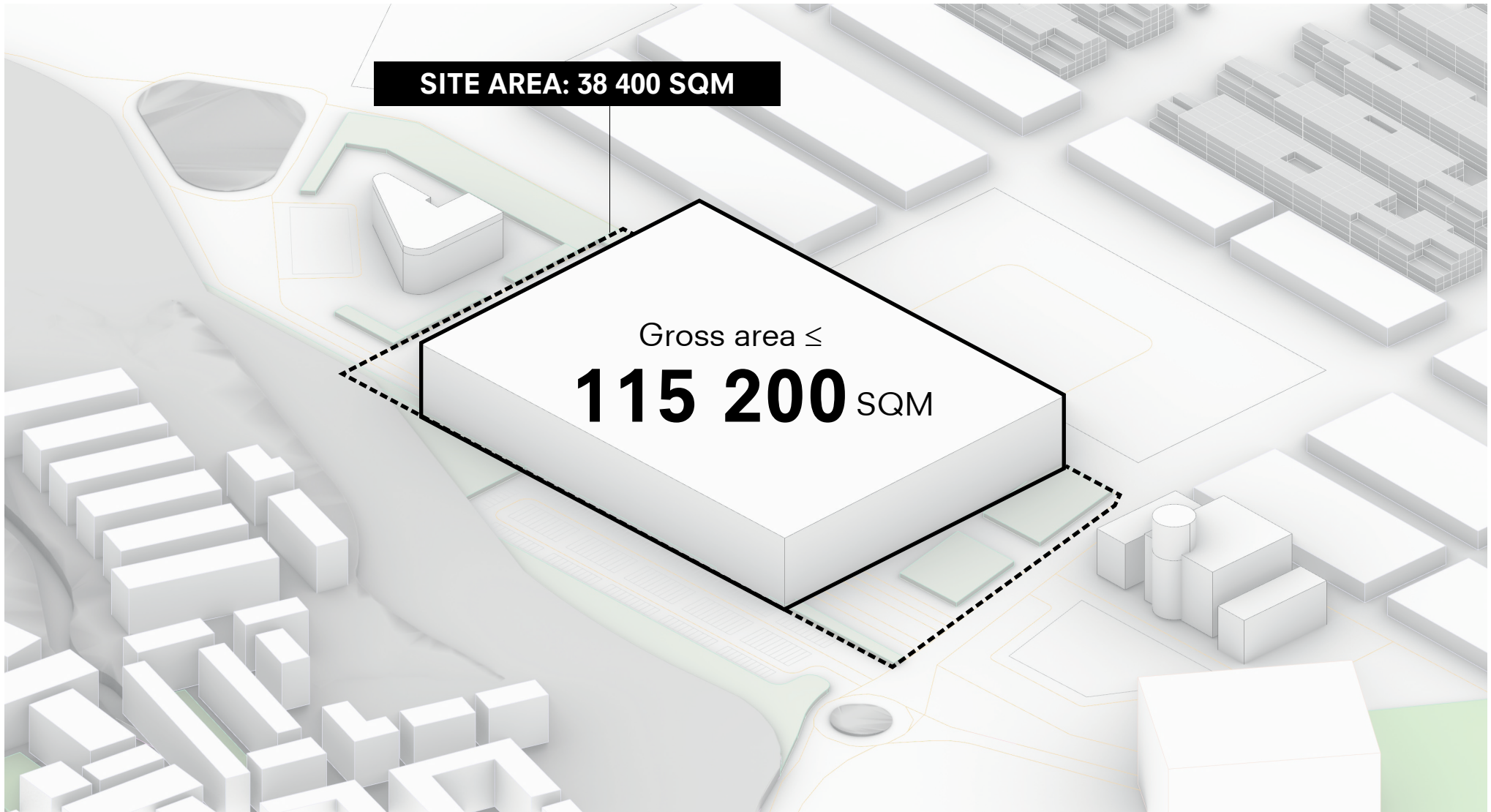
intervention

SITE PLOT



intervention

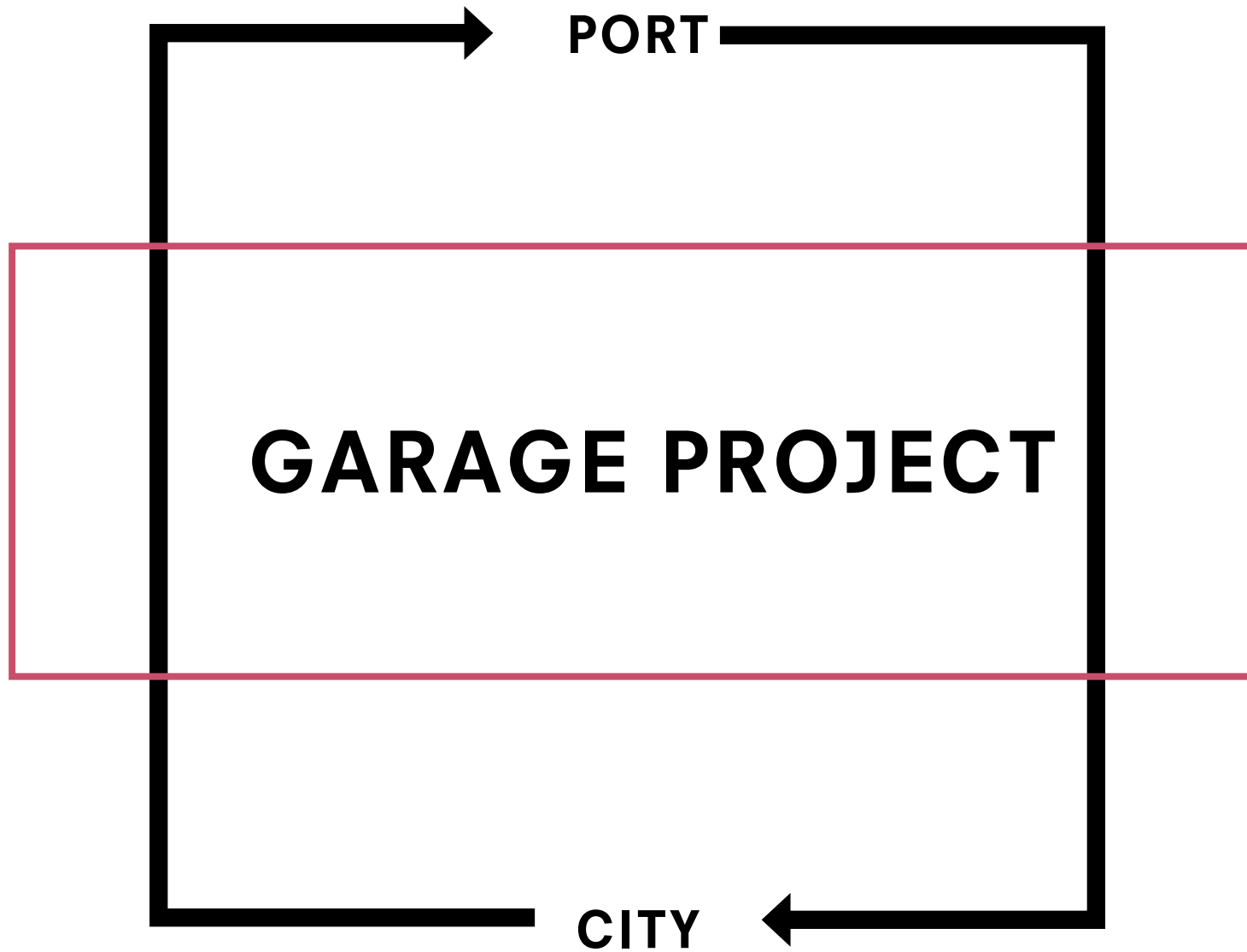
URBAN LIMIT



FAR no more than 3
Coverage ratio no more than 70%

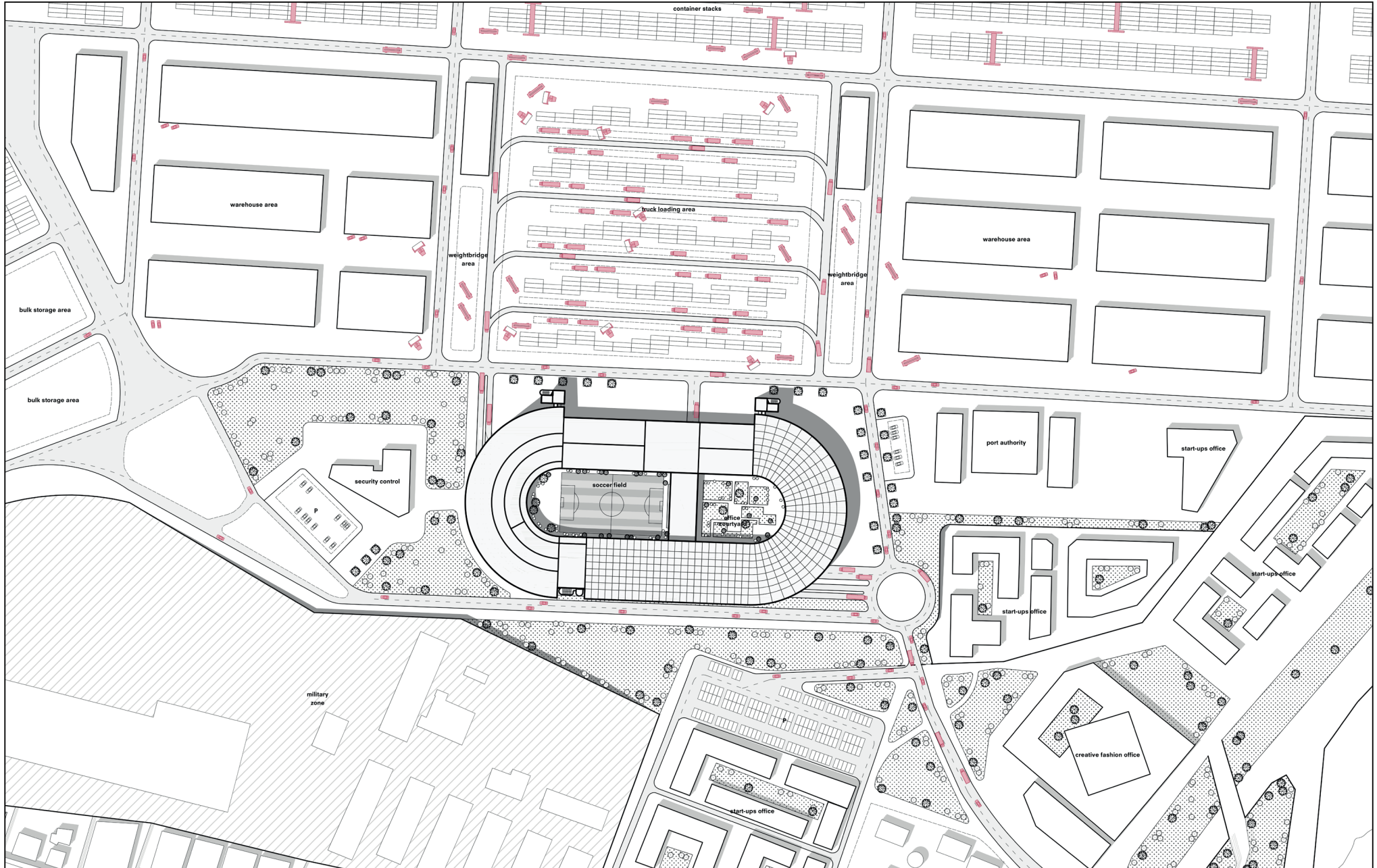
intervention

CIRCULATION



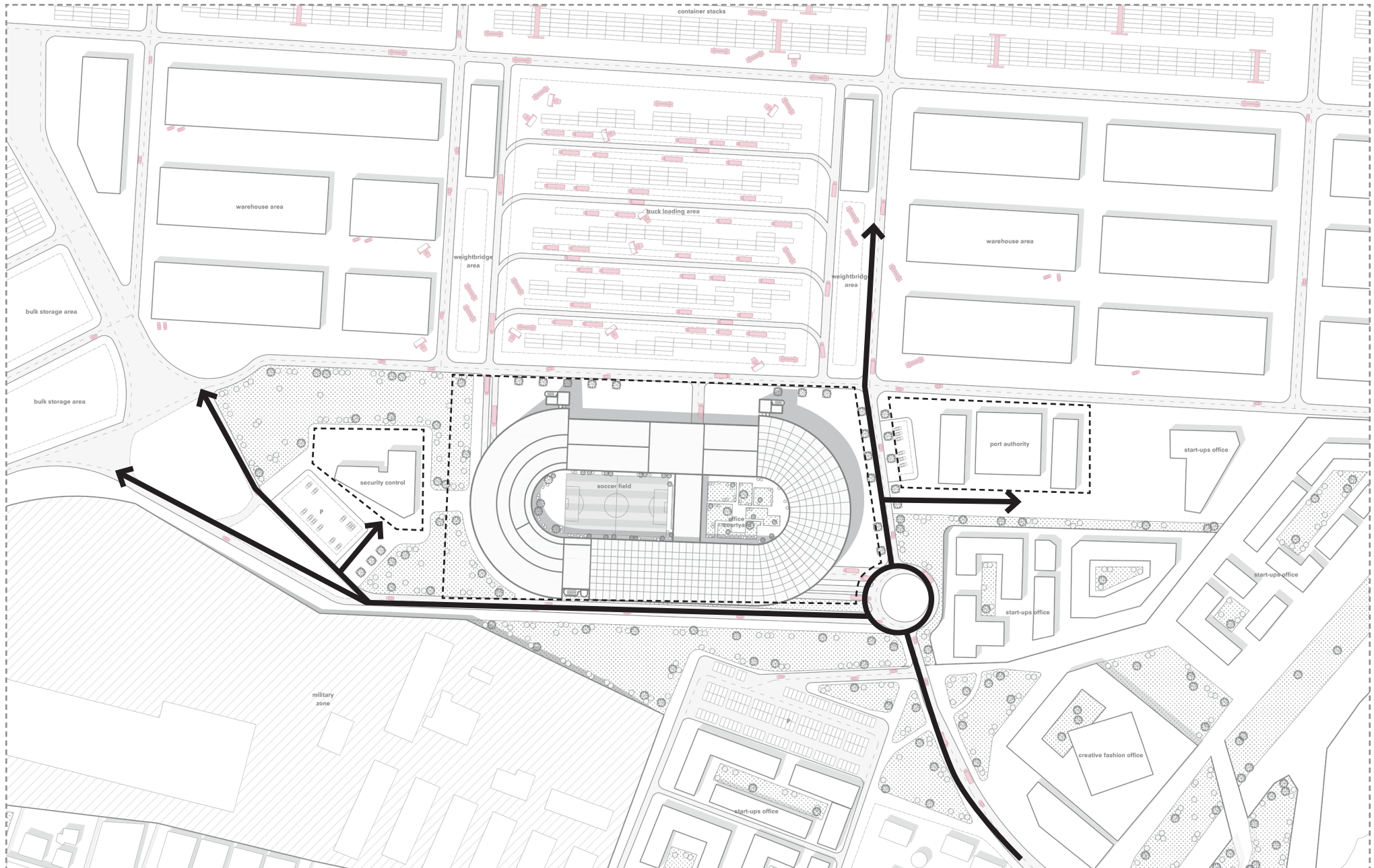
intervention

SITE PLAN



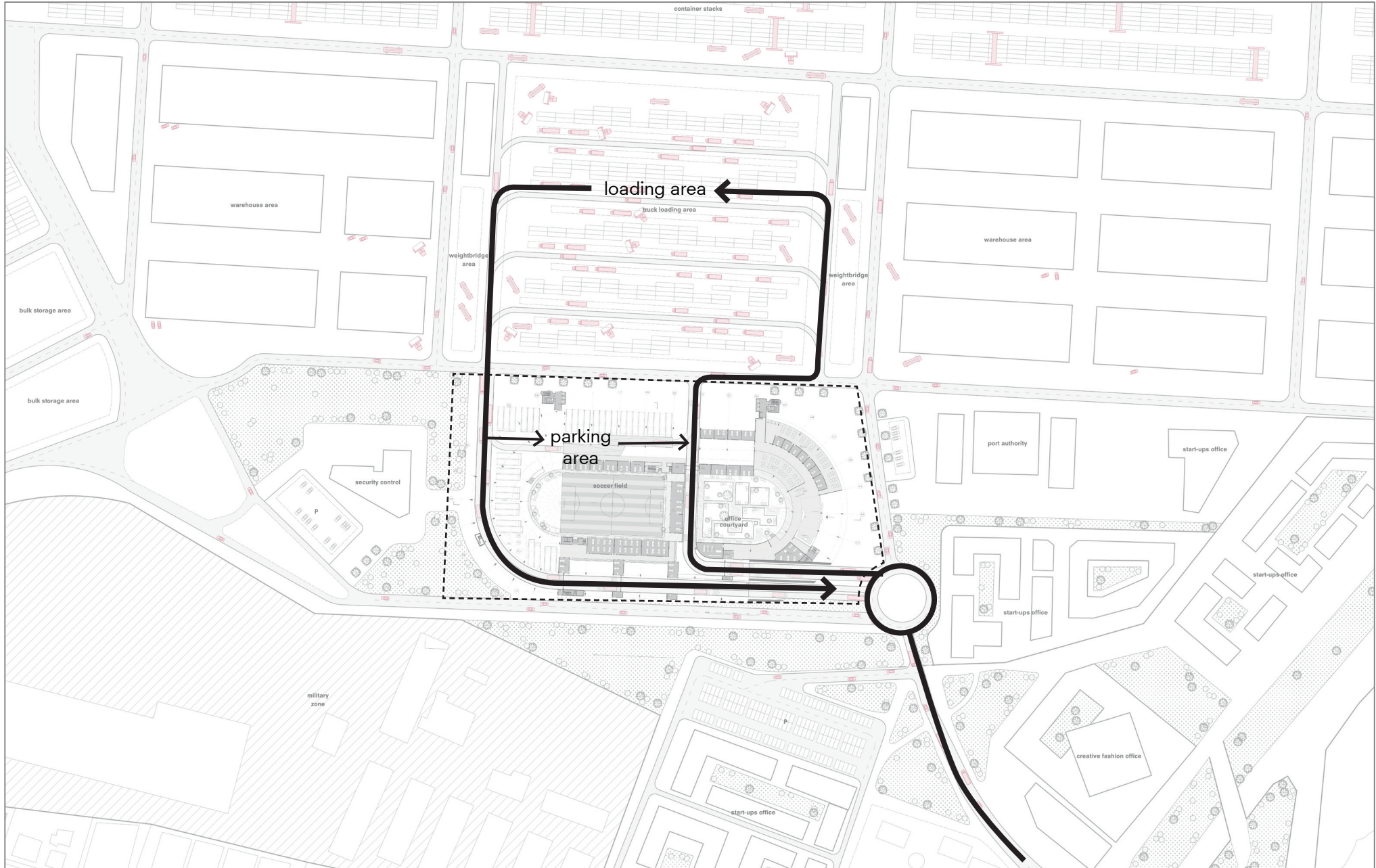
intervention

PORT MANAGER FLOW



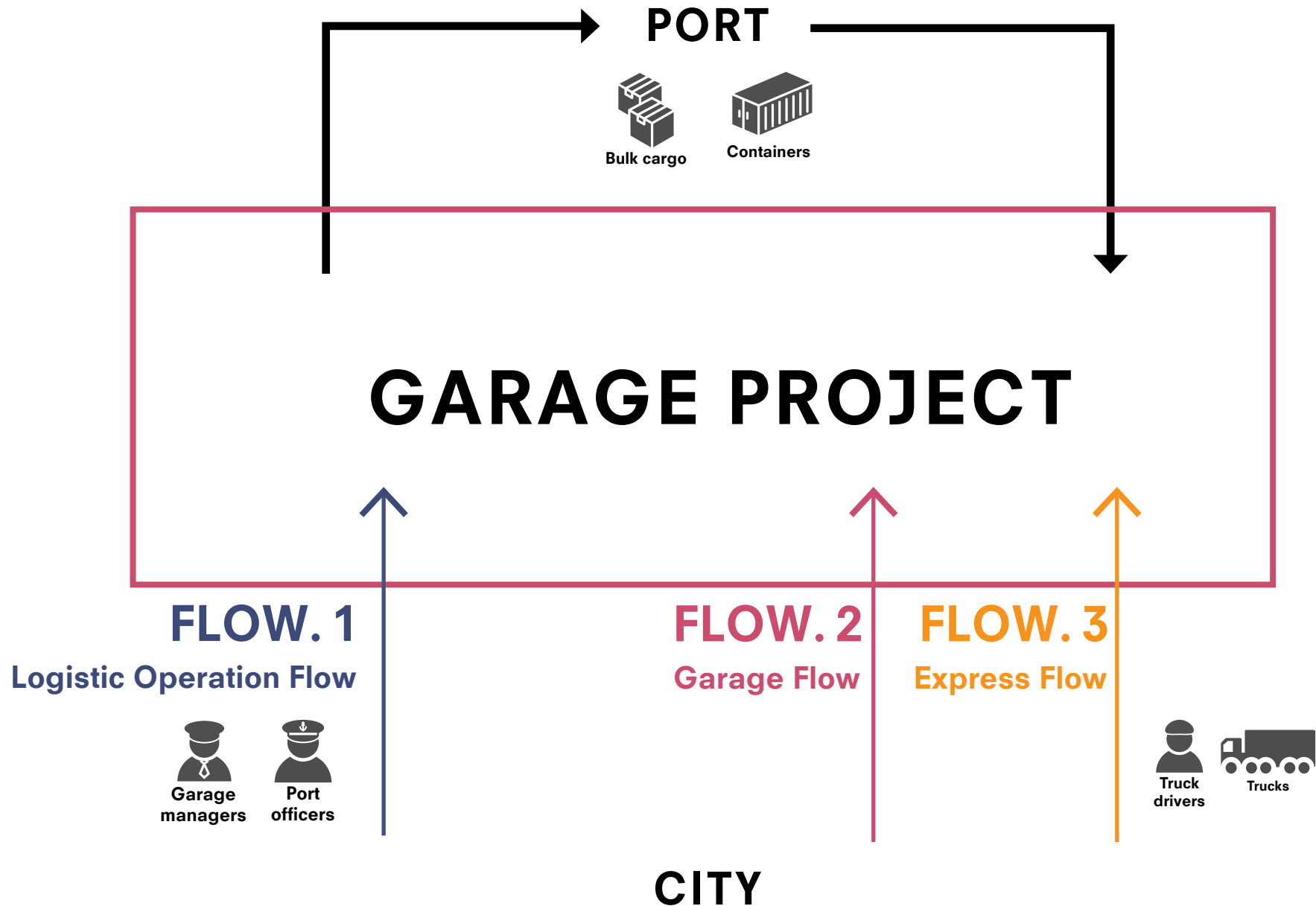
intervention

TRUCK FLOW



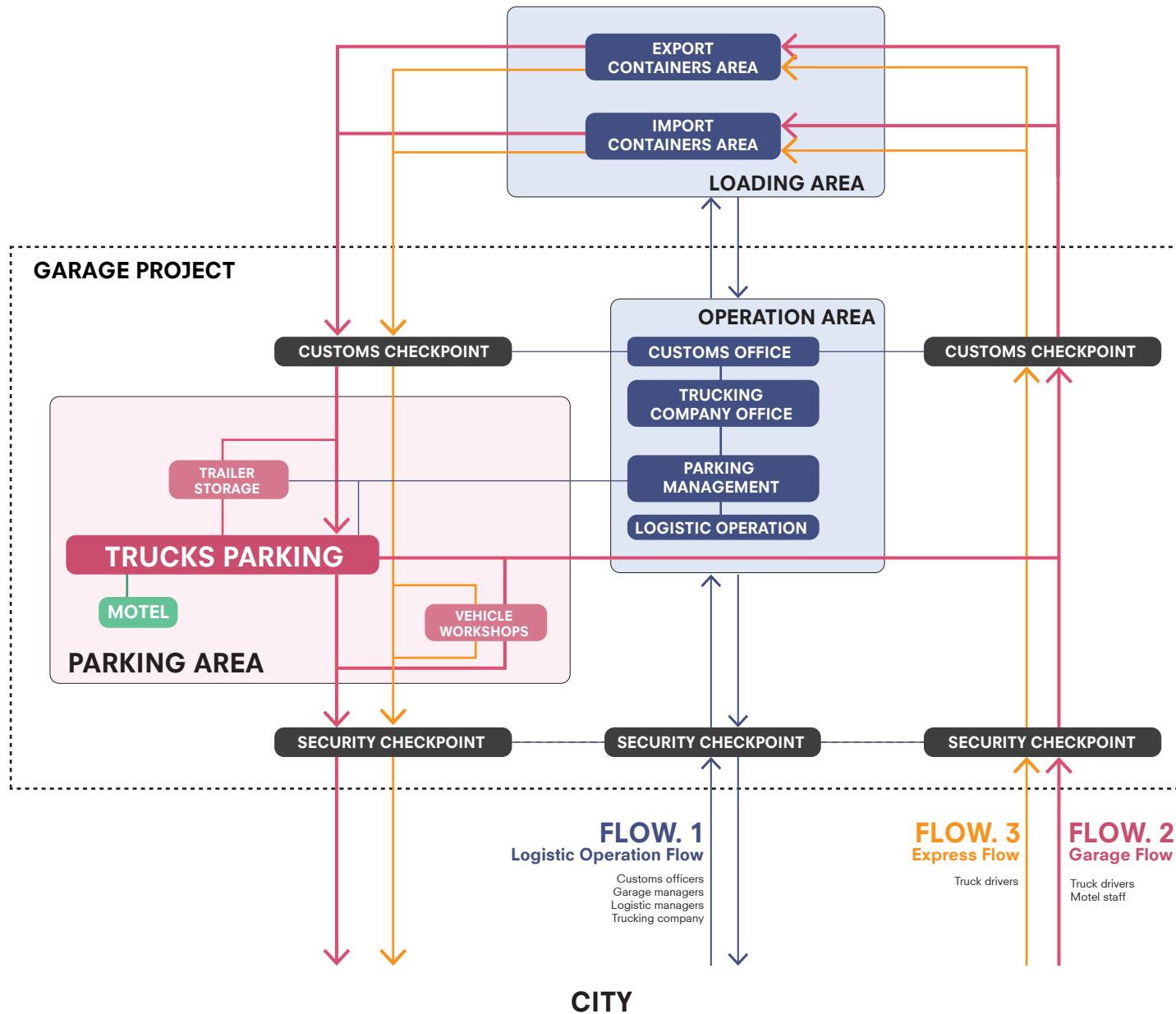
intervention

CIRCULATION



intervention CIRCULATION SYSTEM

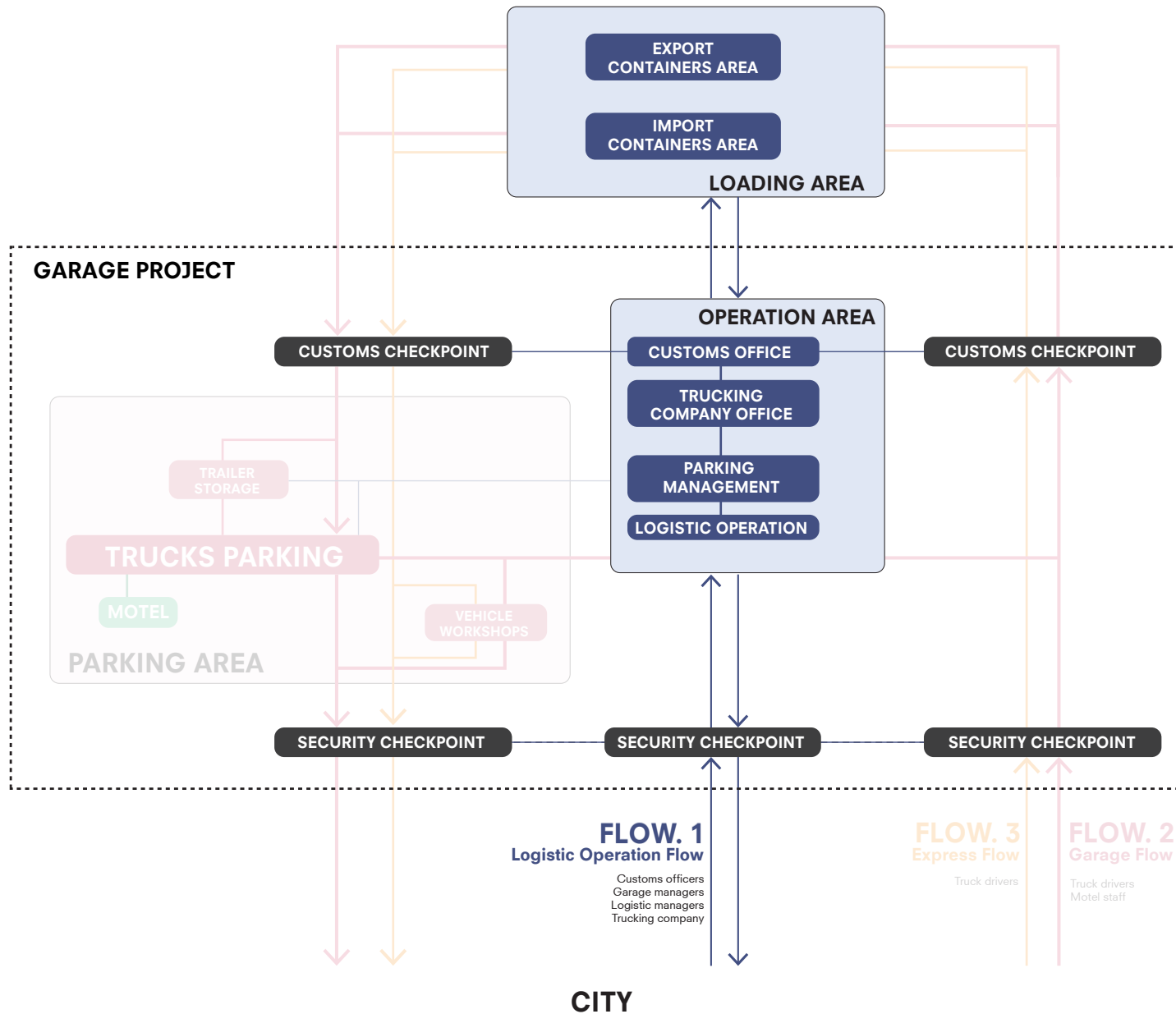
PORT



intervention

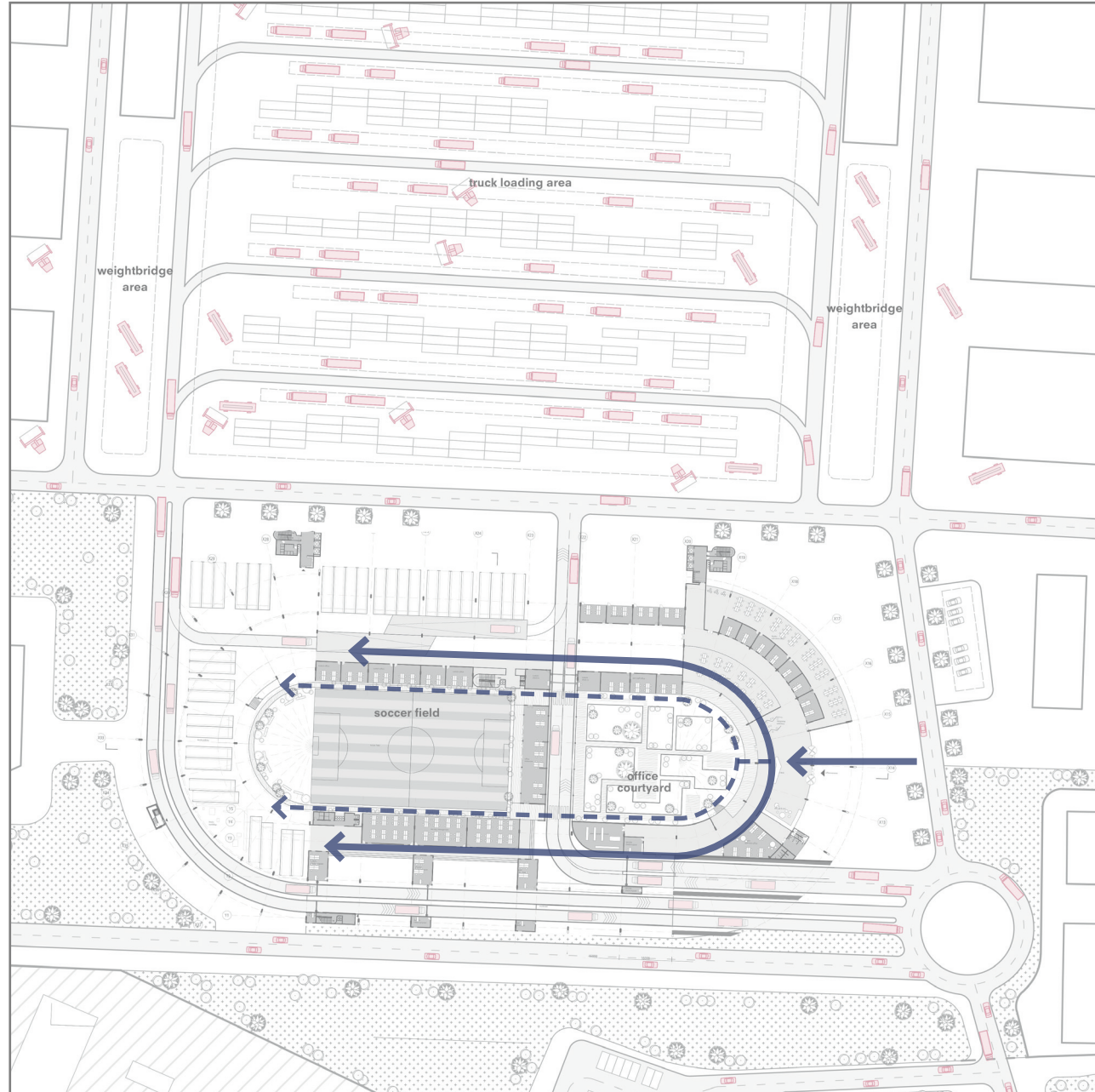
CIRCULATION SYSTEM

PORT



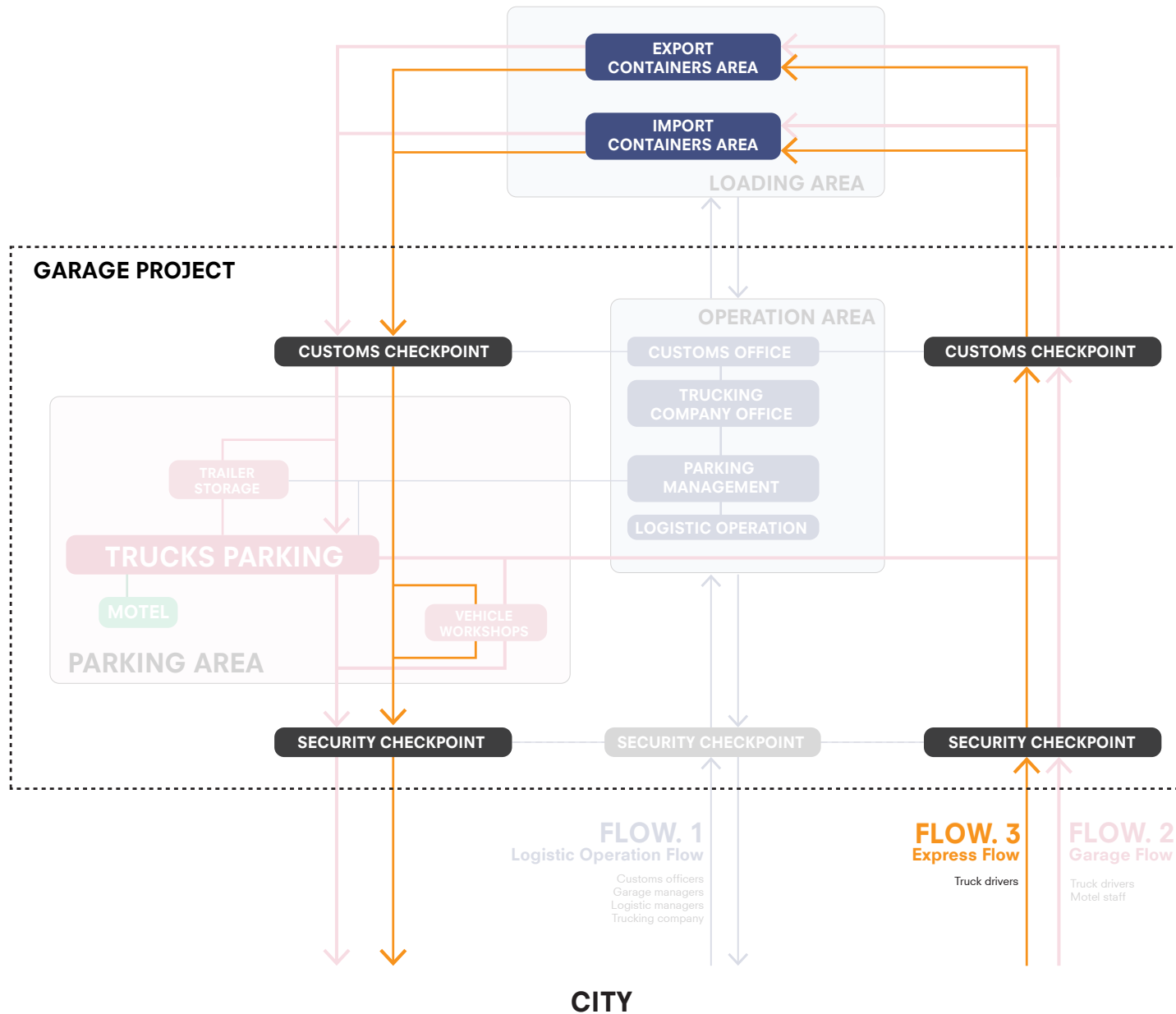
intervention

OFFICE FLOW



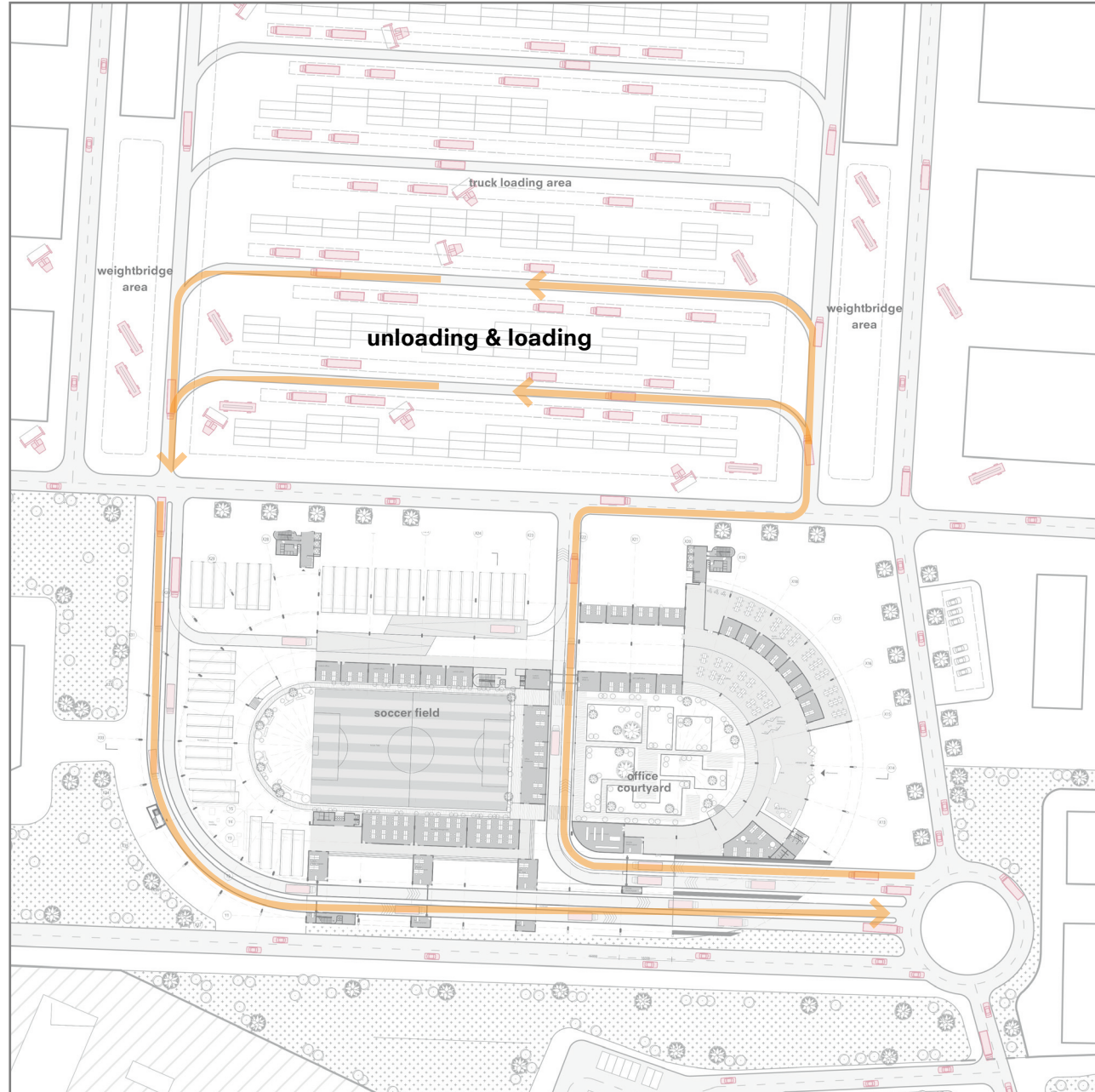
intervention CIRCULATION SYSTEM

PORT



intervention

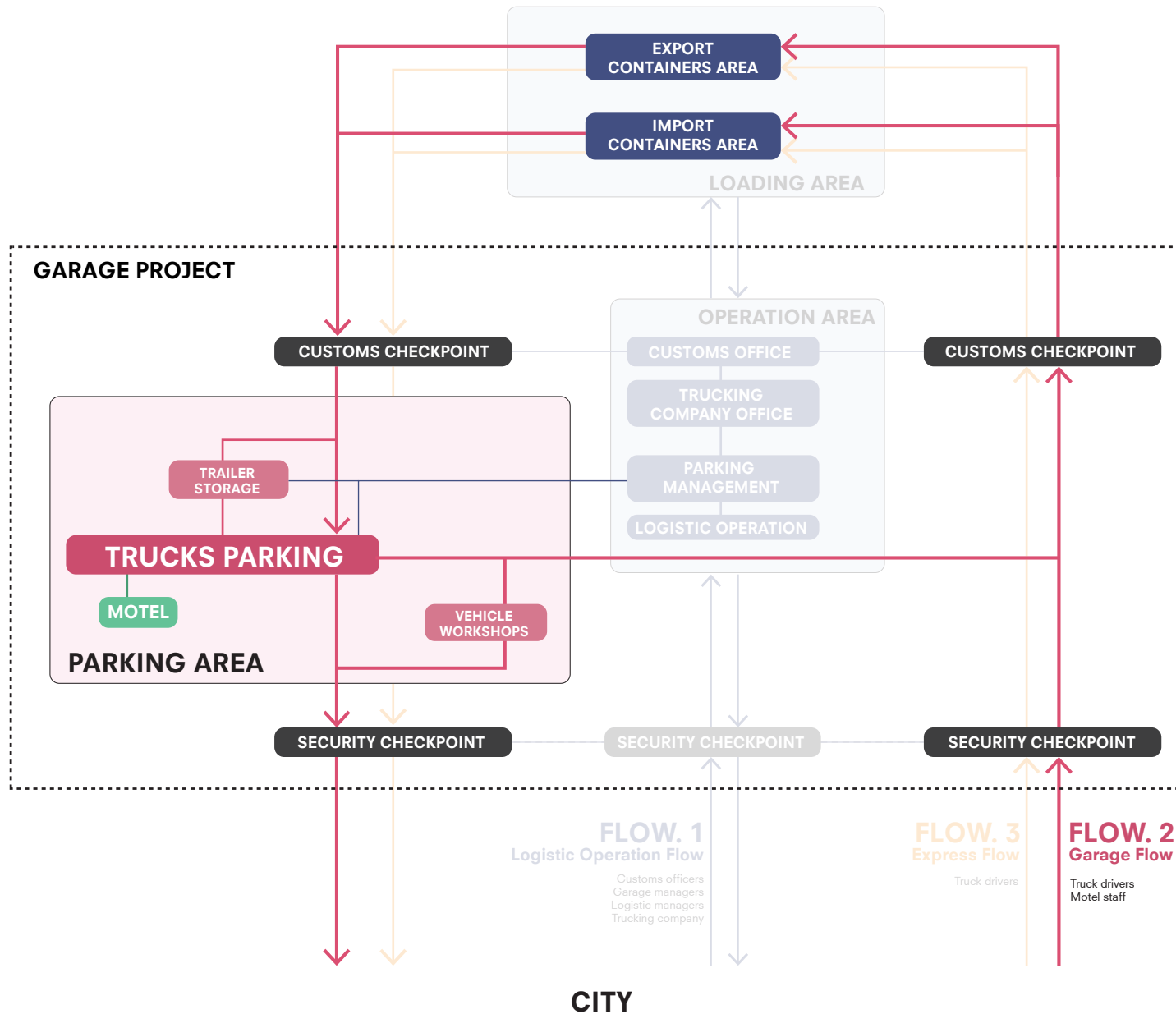
EXPRESS FLOW



intervention

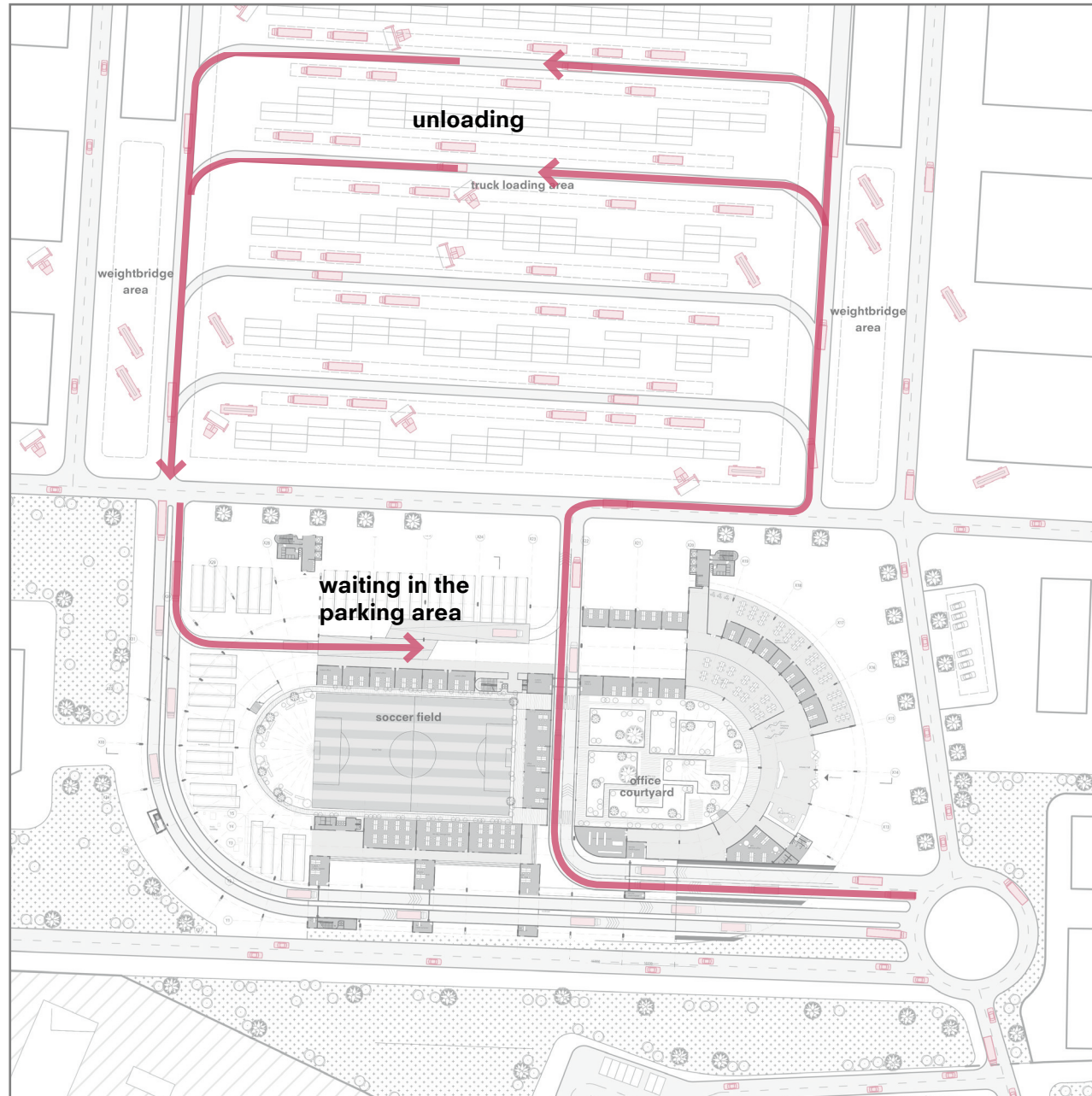
CIRCULATION SYSTEM

PORT



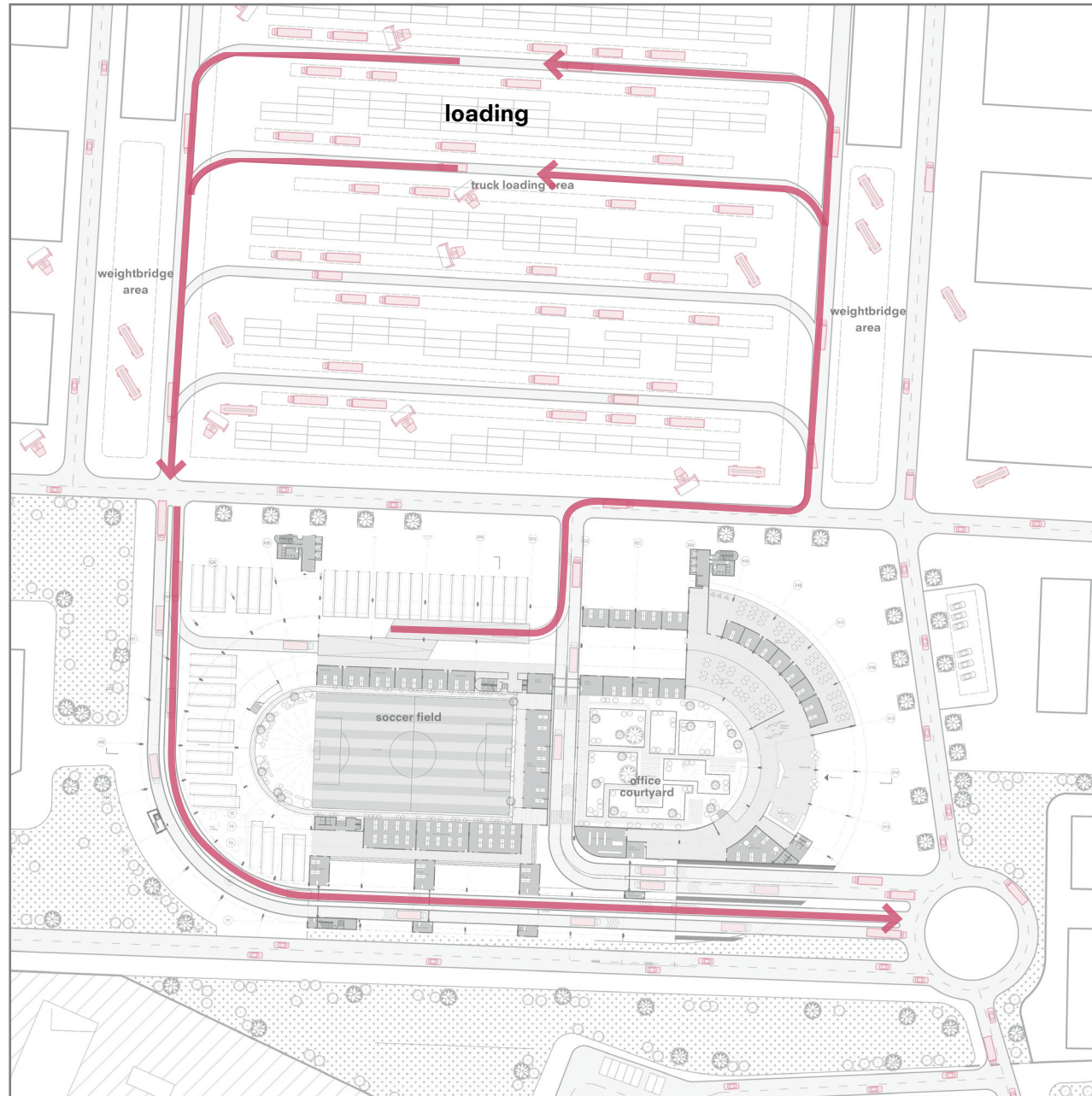
intervention

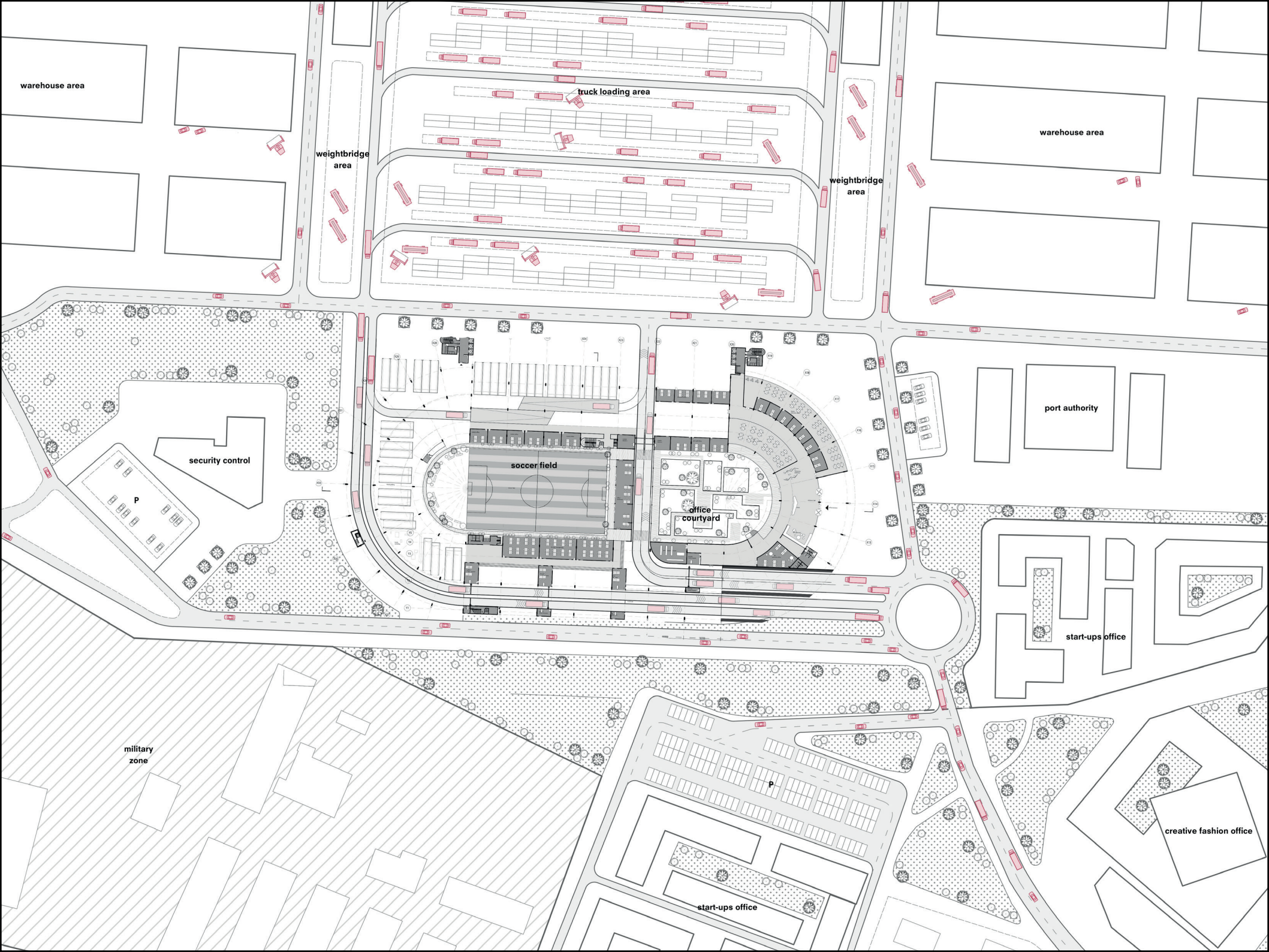
GARAGE FLOW



intervention

GARAGE FLOW





warehouse area

warehouse area

weightbridge area

truck loading area

weightbridge area

security control

P

soccer field

office courtyard

port authority

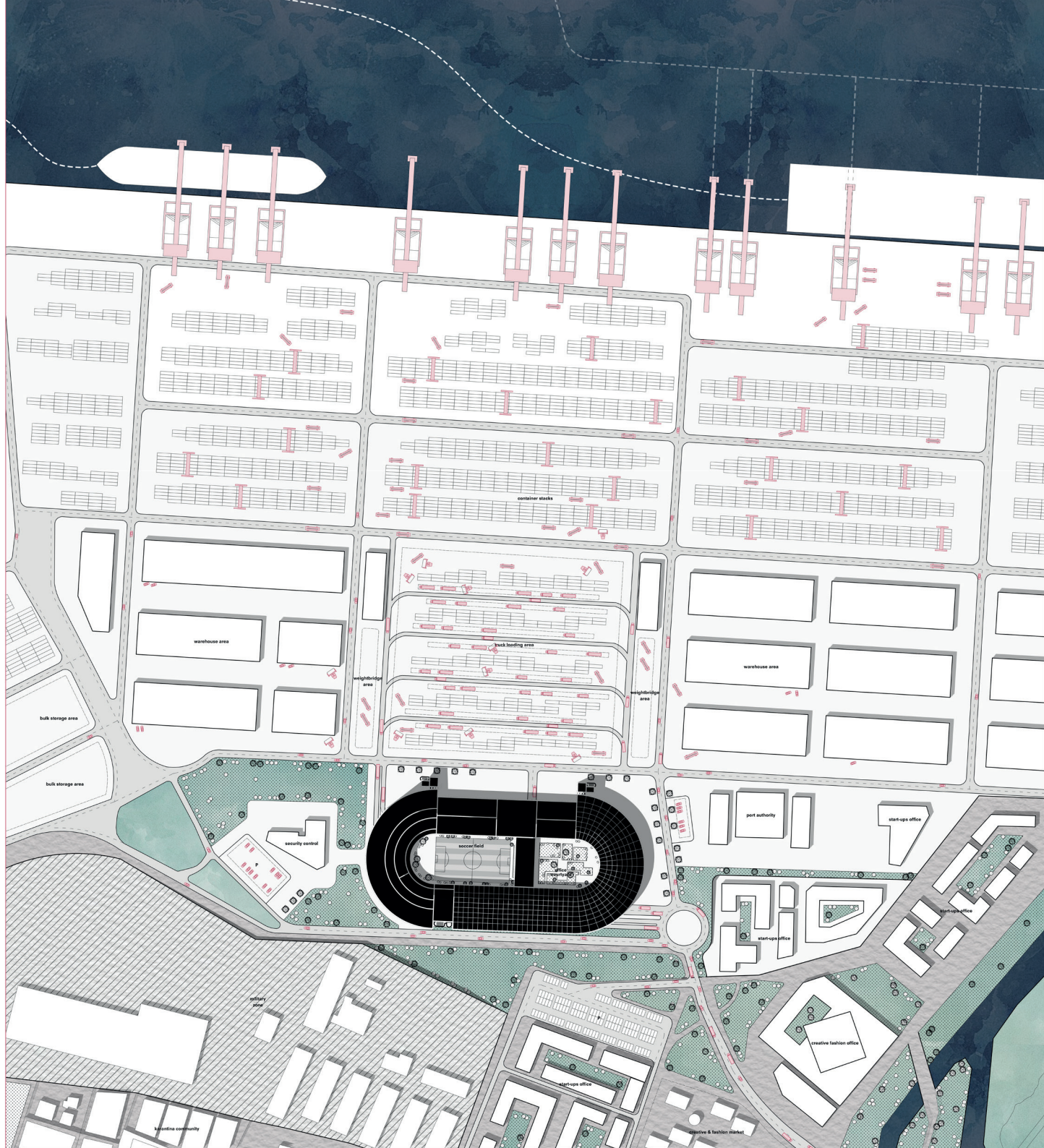
start-ups office

military zone

P

start-ups office

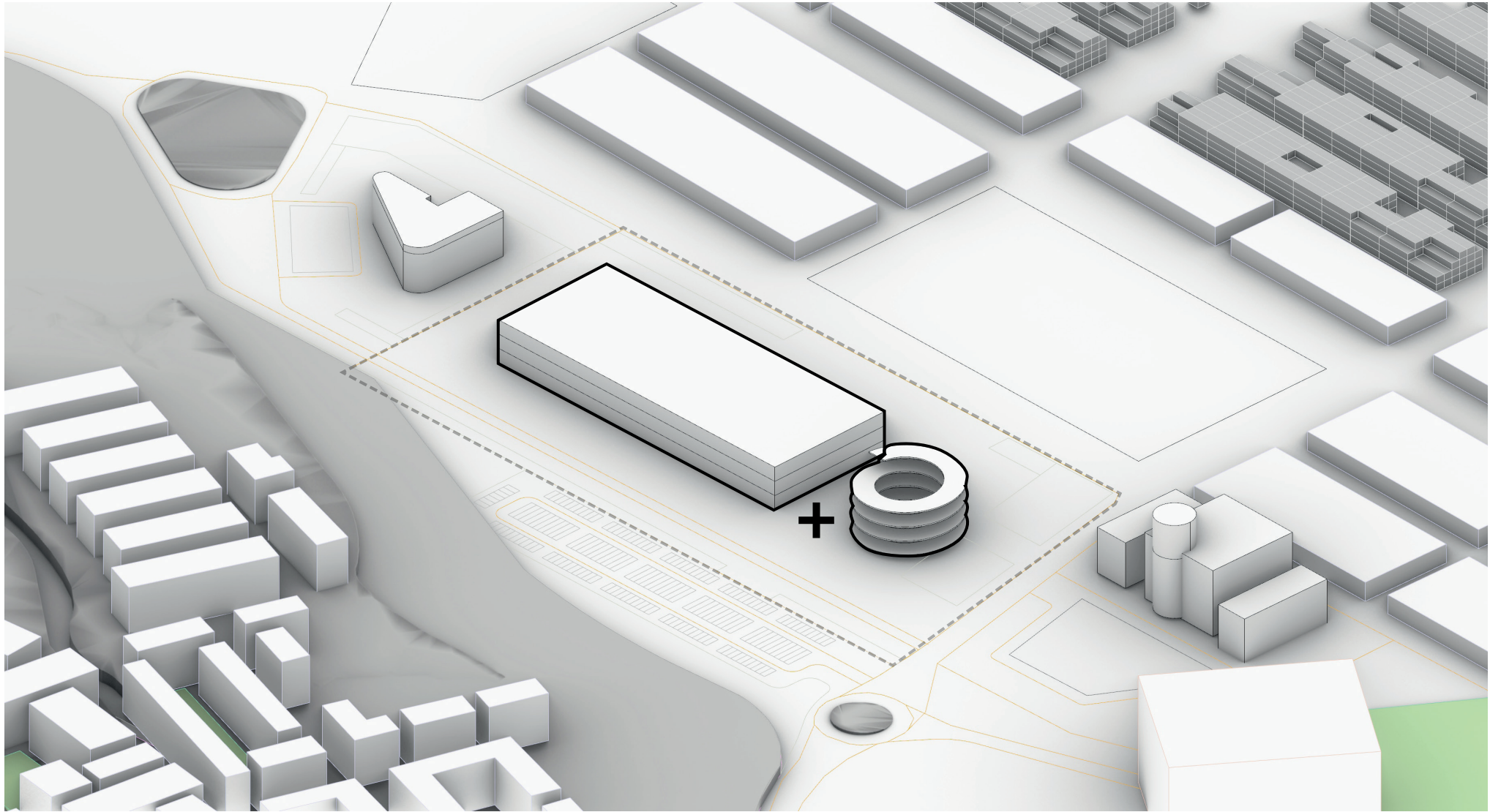
creative fashion office



DESIGN RESEARCH

design research

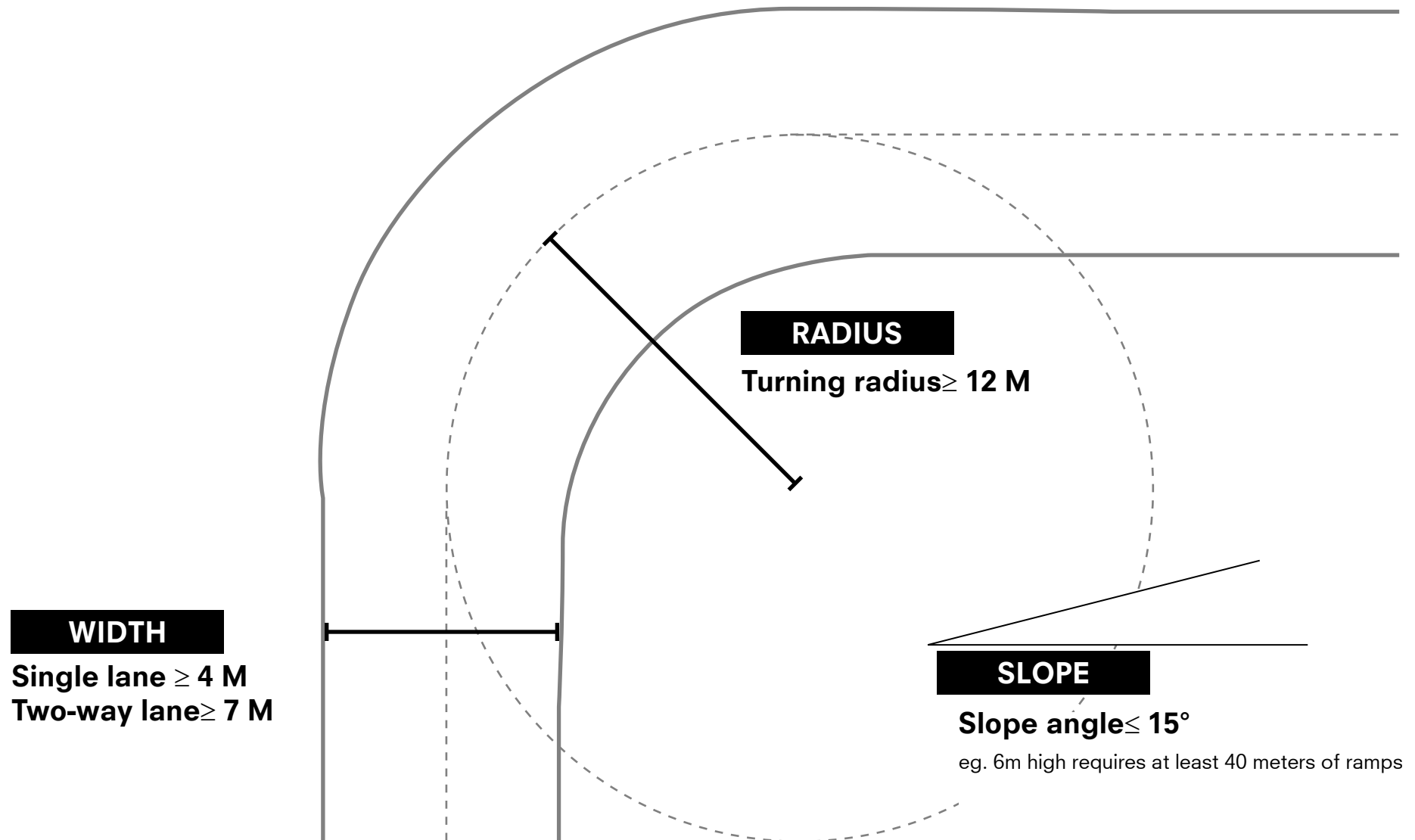
RAMP + PARKING SPACE





design research

RAMP DESIGN



design research

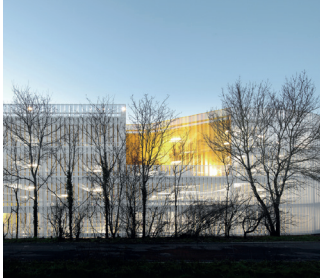
RAMP LAYOUT

**Swirling Car Park for RAI
/Amsterdam**



Parking space: 1000 cars
Area: 28 200 SQM
Length: 75 m

**Parking and Intermodal
Station/ Bouguenais**



Parking space: 782 cars
Area: 25 000 SQM
Length: 150 m

**IMEC/KUL Parking Building
/Leuven**



Parking space: 740 cars
Area: 23 600 SQM
Length: 140 m

**Preston Bus Station
/Lancashire, England**



**Parking space:
1100 cars and 80 buses**
Area: 32 300 SQM
Length: 170 m

**Veranda Car Park
/Rotterdam**



Parking space: 630 cars
Area: 20 000 SQM
Length: 50 m

**1111 Lincoln Road
/Miami**



Parking space: 300 cars
Area: 22 500 SQM
Length: 80 m

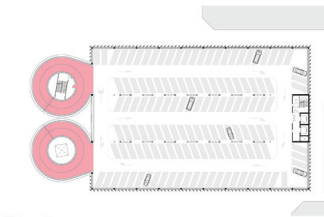
design research

RAMP LAYOUT

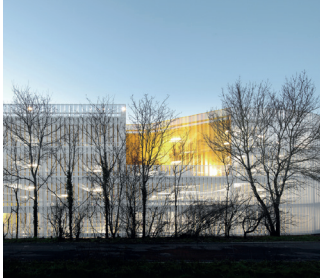
Swirling Car Park for RAI /Amsterdam



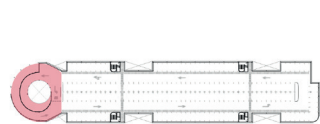
Parking space: 1000 cars
Area: 28 200 SQM
Length: 75 m



Parking and Intermodal Station/ Bouguenais



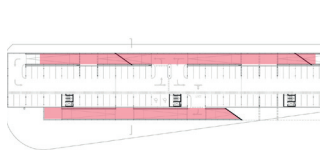
Parking space: 782 cars
Area: 25 000 SQM
Length: 150 m



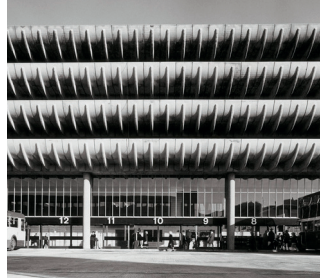
IMEC/KUL Parking Building /Leuven



Parking space: 740 cars
Area: 23 600 SQM
Length: 140 m



Preston Bus Station /Lancashire, England



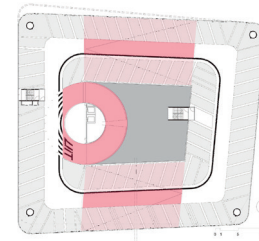
Parking space: 1100 cars and 80 buses
Area: 32 300 SQM
Length: 170 m



Veranda Car Park /Rotterdam



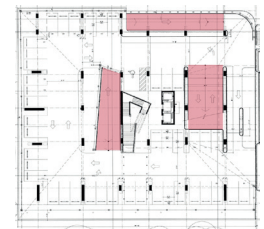
Parking space: 630 cars
Area: 20 000 SQM
Length: 50 m



1111 Lincoln Road /Miami



Parking space: 300 cars
Area: 22 500 SQM
Length: 80 m

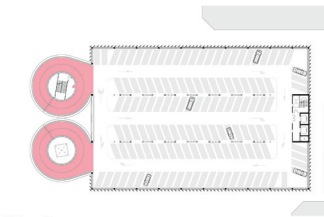


TYPES

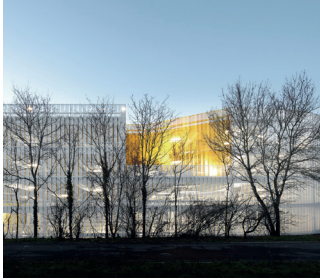
Swirling Car Park for RAI /Amsterdam



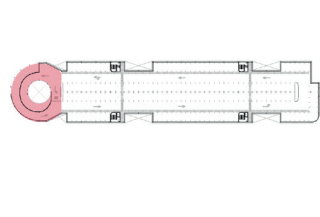
Parking space: 1000 cars
Area: 28 200 SQM
Length: 75 m



Parking and Intermodal Station/ Bouguenais



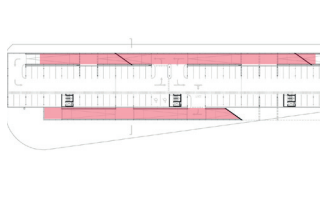
Parking space: 782 cars
Area: 25 000 SQM
Length: 150 m



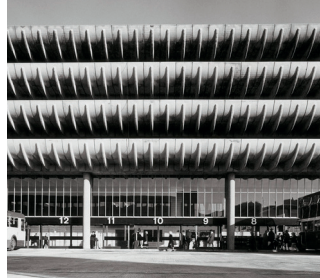
IMEC/KUL Parking Building /Leuven



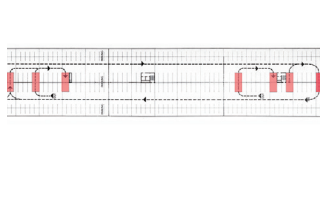
Parking space: 740 cars
Area: 23 600 SQM
Length: 140 m



Preston Bus Station /Lancashire, England



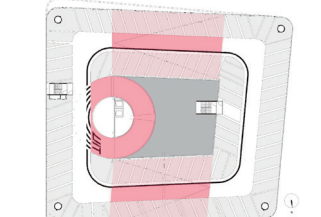
Parking space: 1100 cars and 80 buses
Area: 32 300 SQM
Length: 170 m



Veranda Car Park /Rotterdam



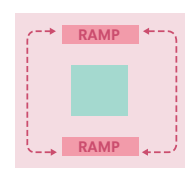
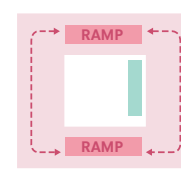
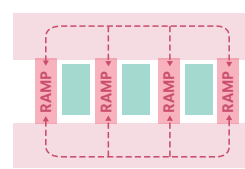
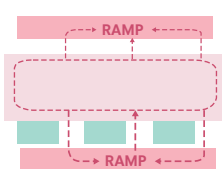
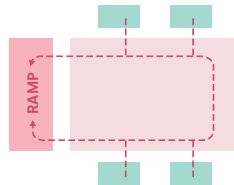
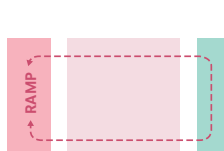
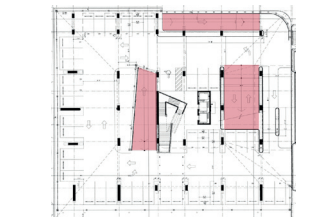
Parking space: 630 cars
Area: 20 000 SQM
Length: 50 m



1111 Lincoln Road /Miami

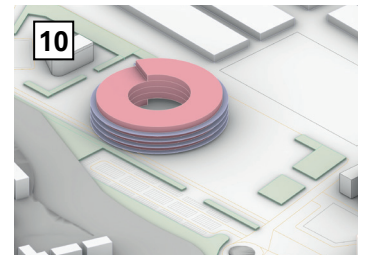
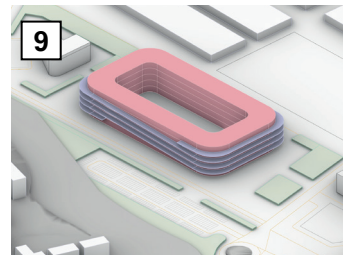
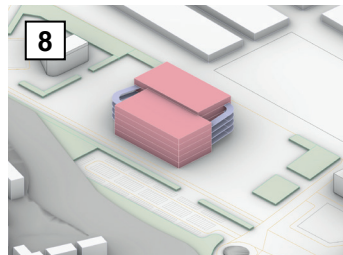
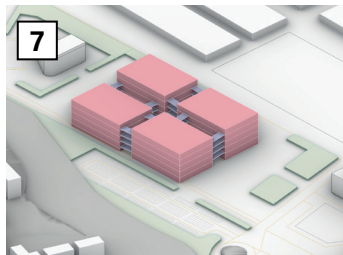
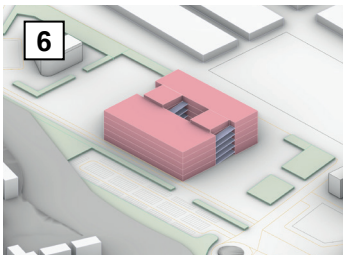
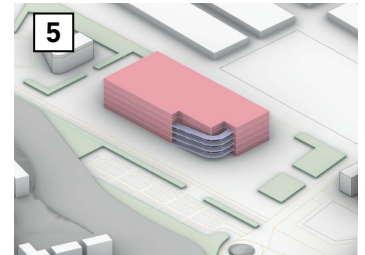
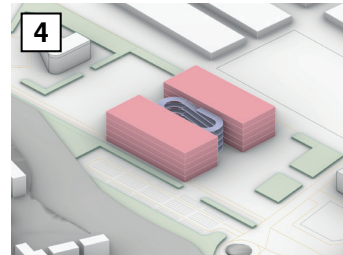
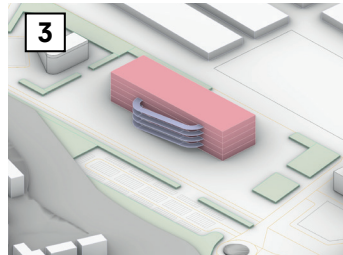
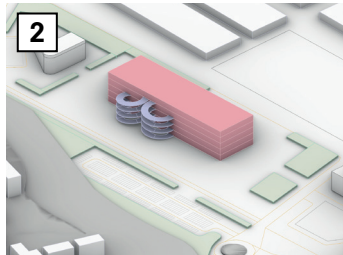
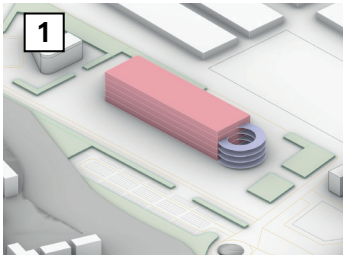
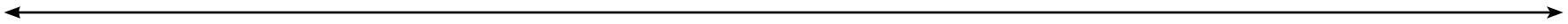
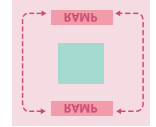
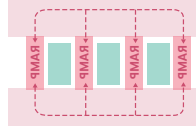


Parking space: 300 cars
Area: 22 500 SQM
Length: 80 m



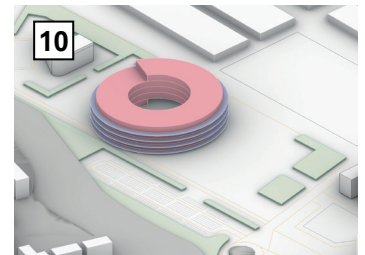
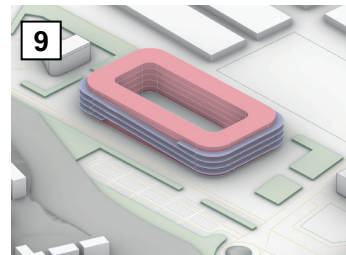
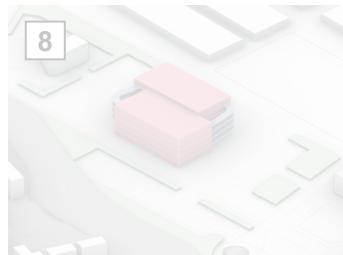
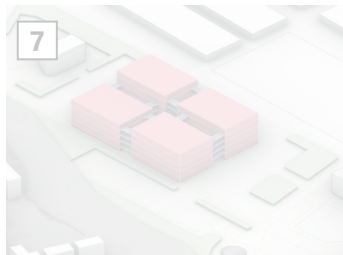
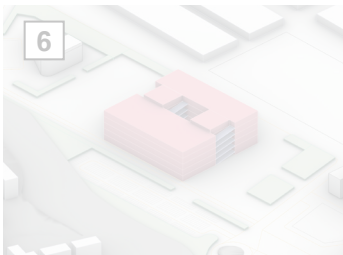
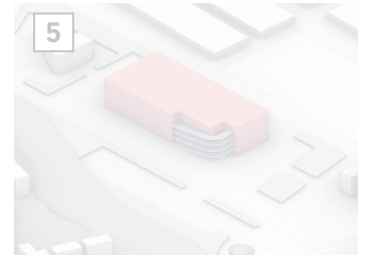
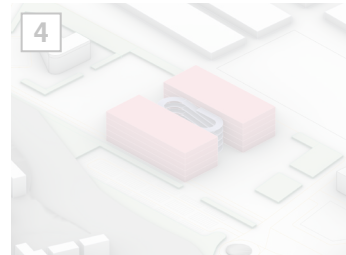
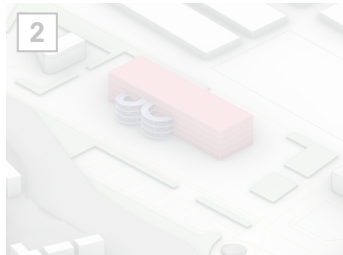
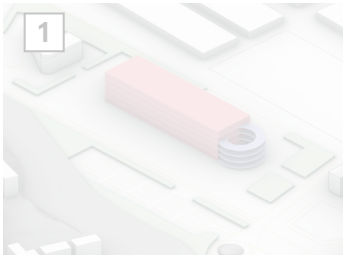
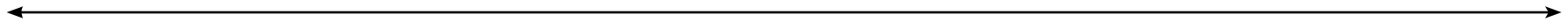
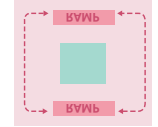
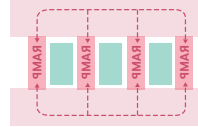
design research

COMPARISON



design research

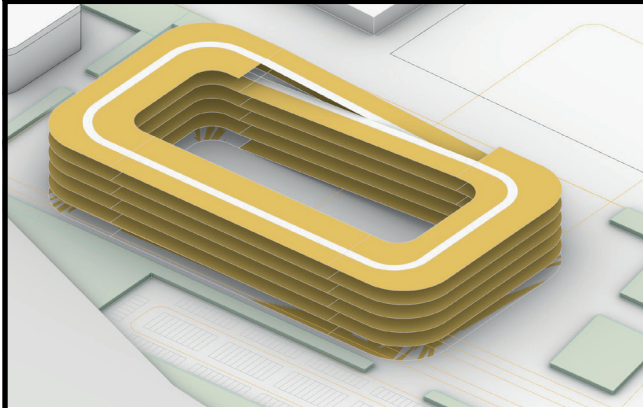
COMPARISON



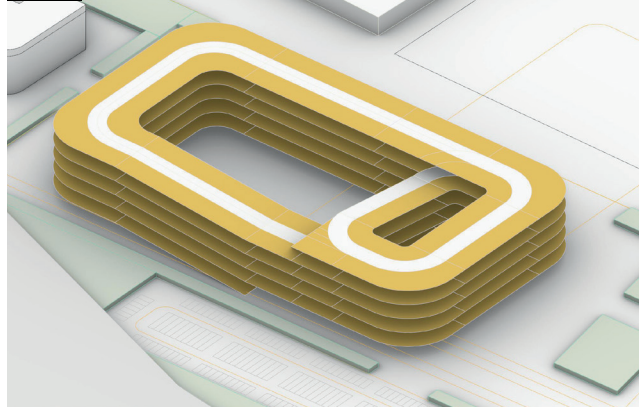
design research

MASSING RESEARCH

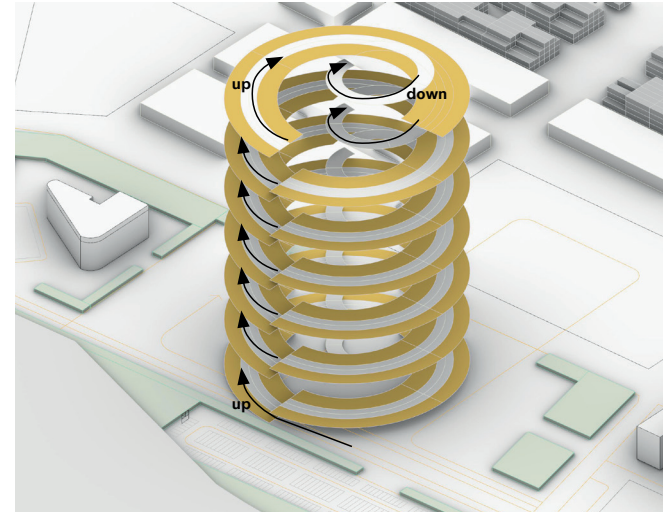
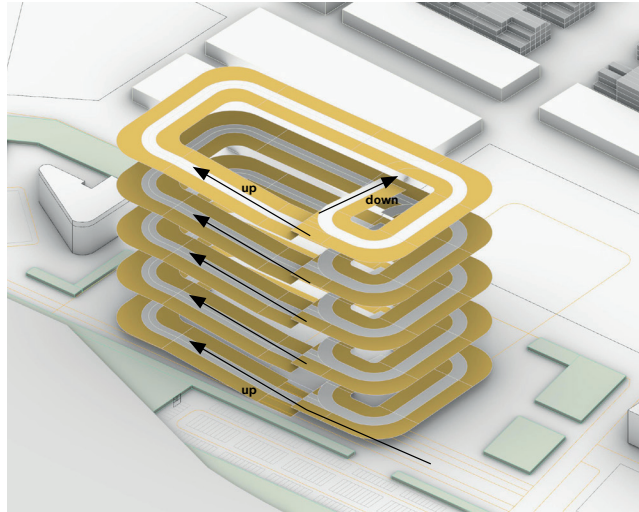
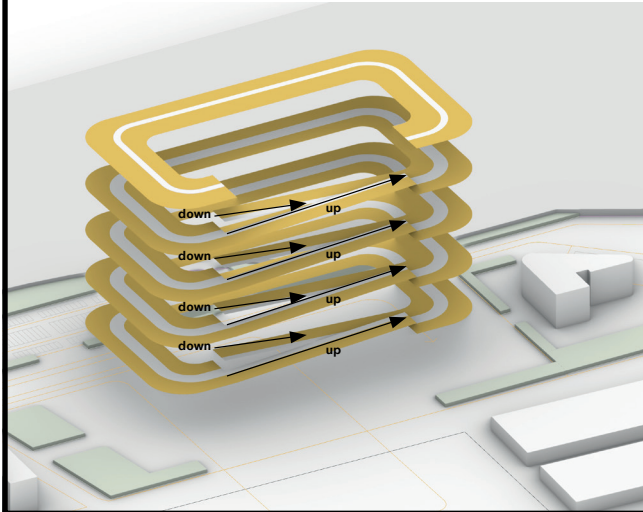
01

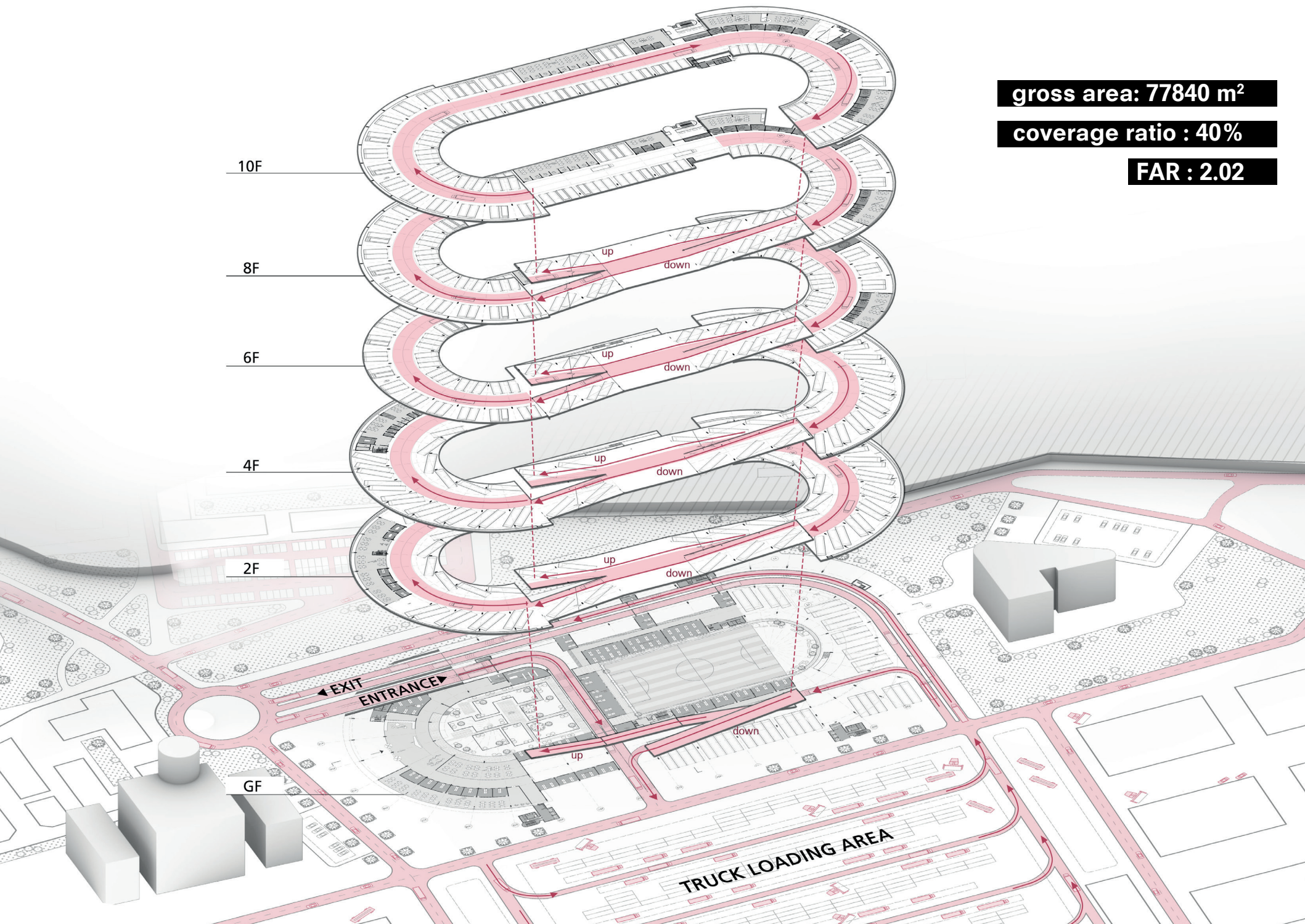


02



03





gross area: 77840 m²

coverage ratio : 40%

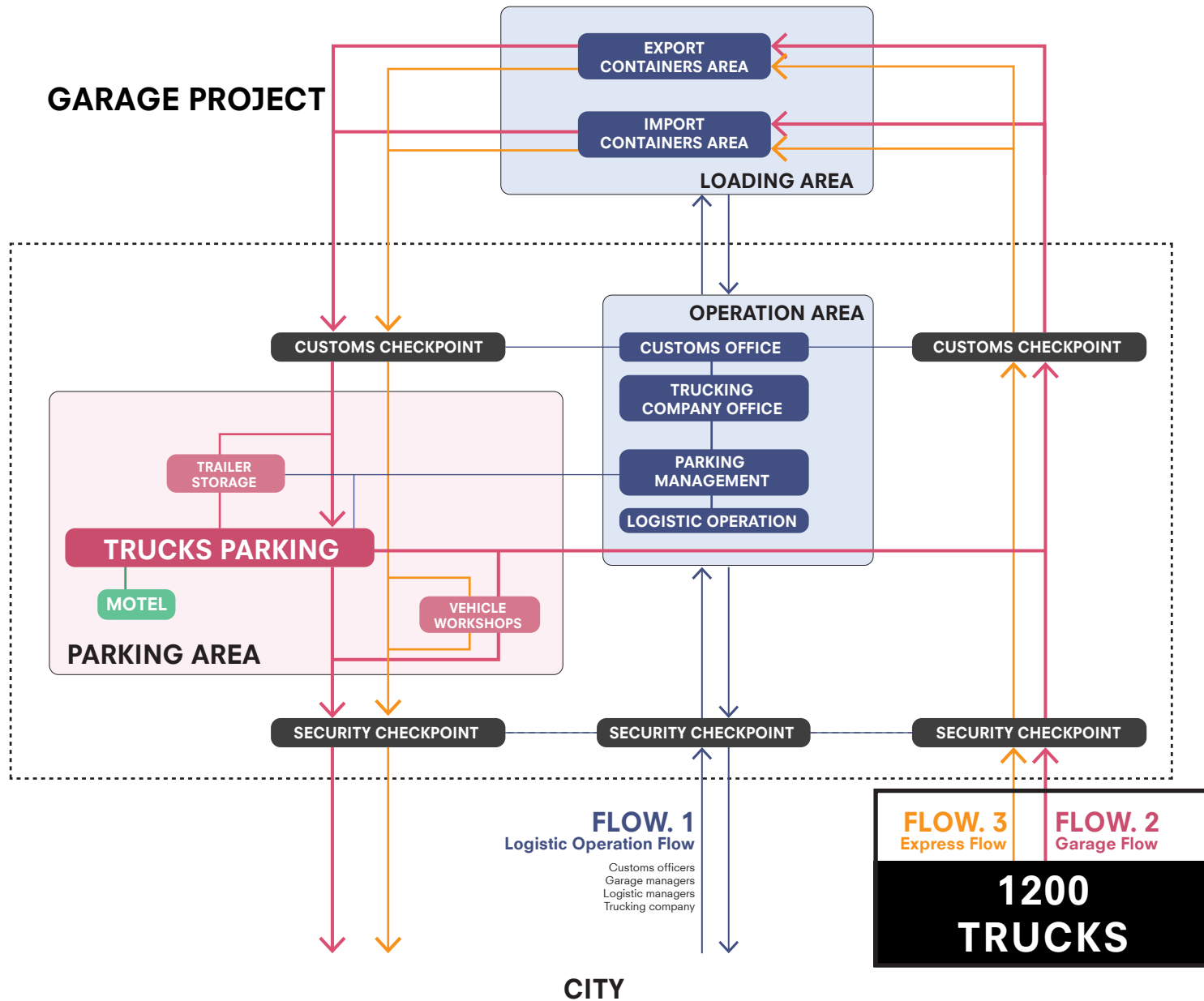
FAR : 2.02

design research

CAPACITY

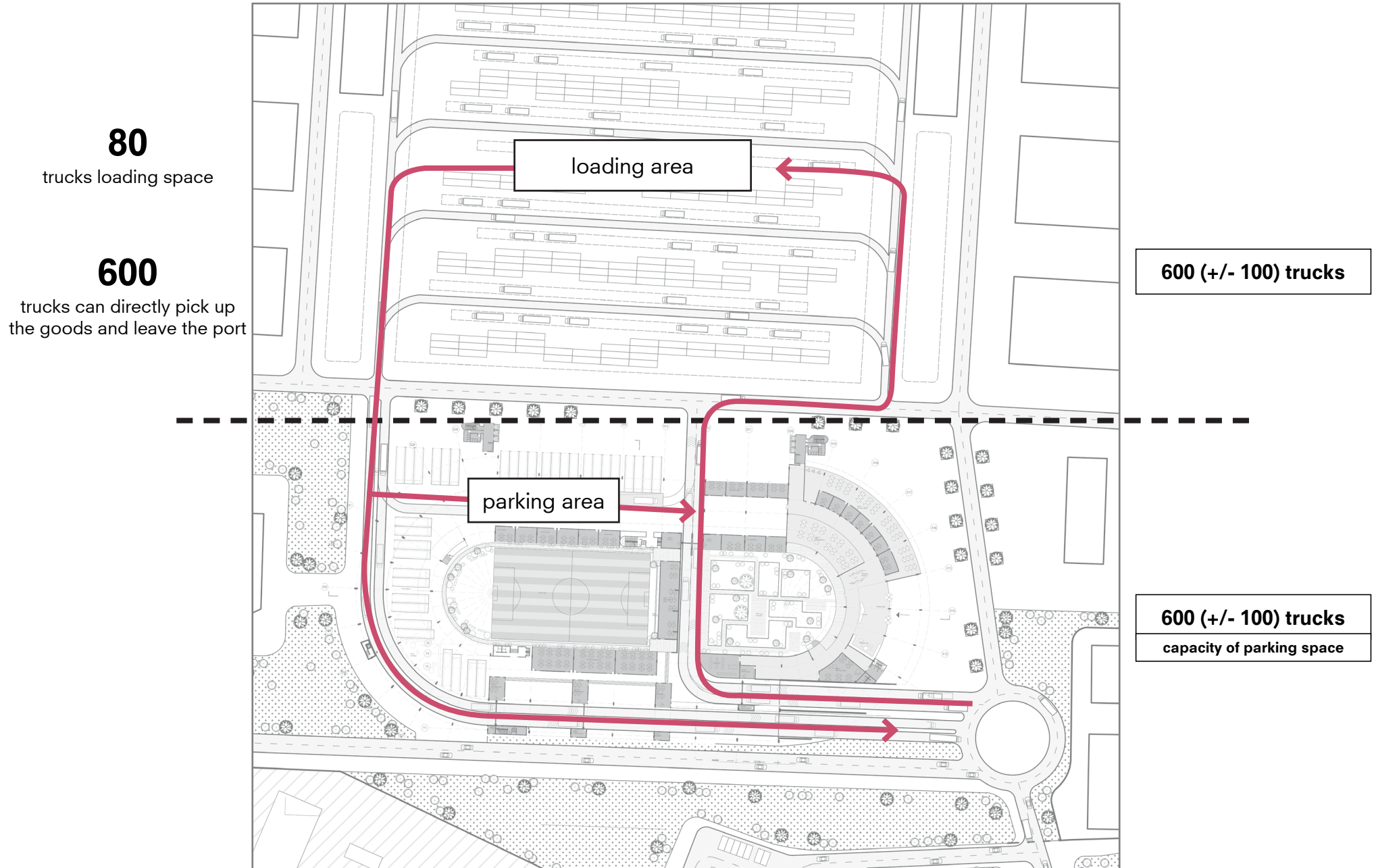
PORT

GARAGE PROJECT



design research

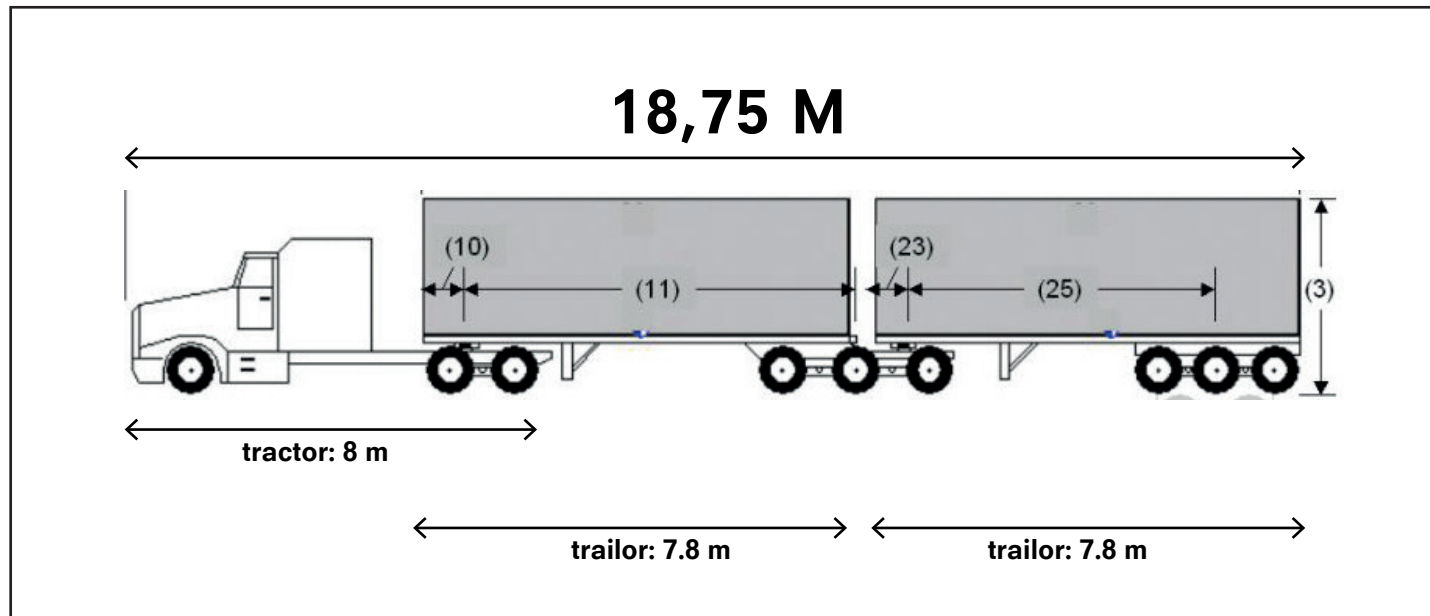
WEEKLY VOLUME



design research

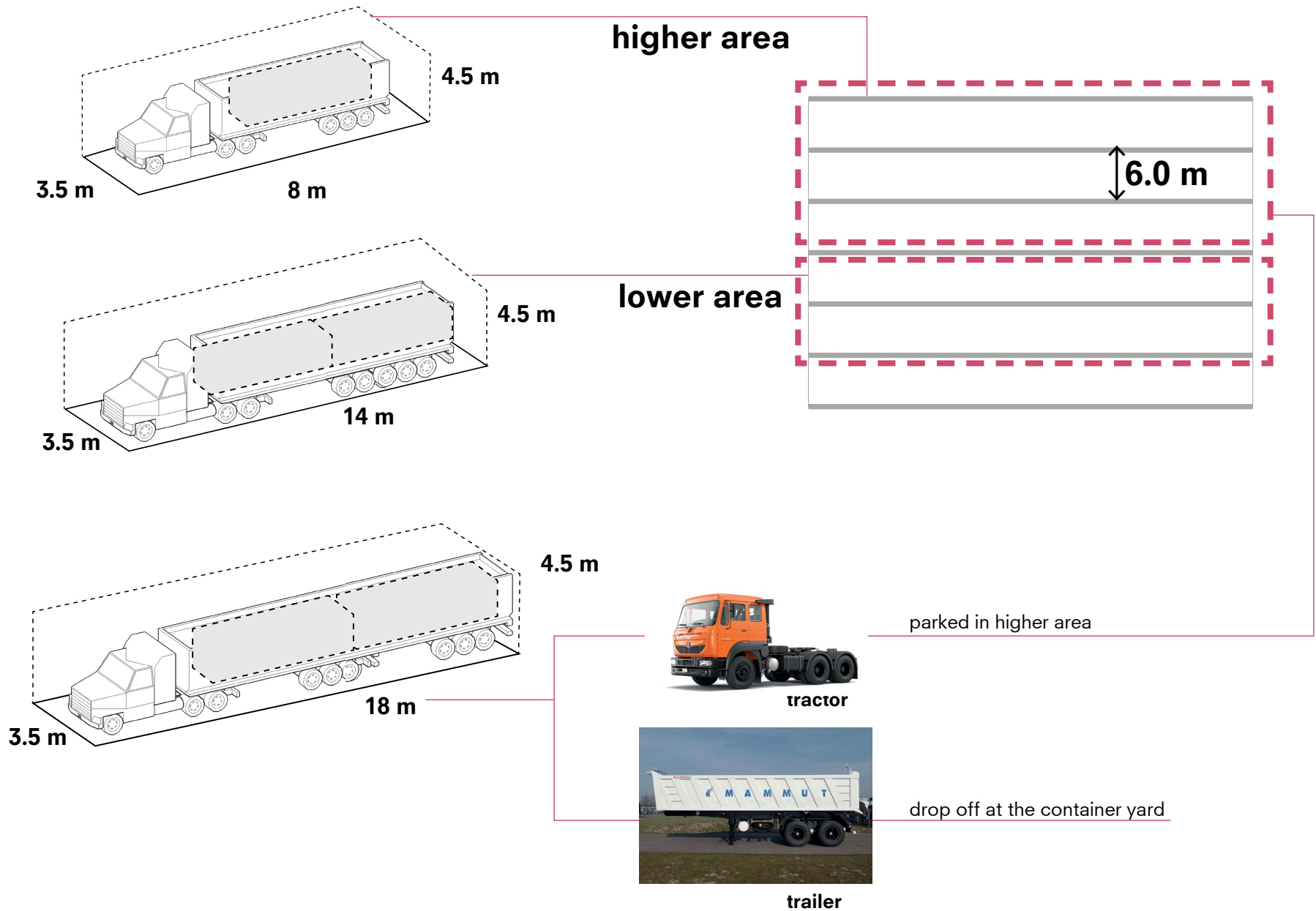
PARKING LIMIT

Lebanese government limits truck tonnage within **45 tons**

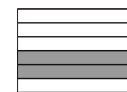
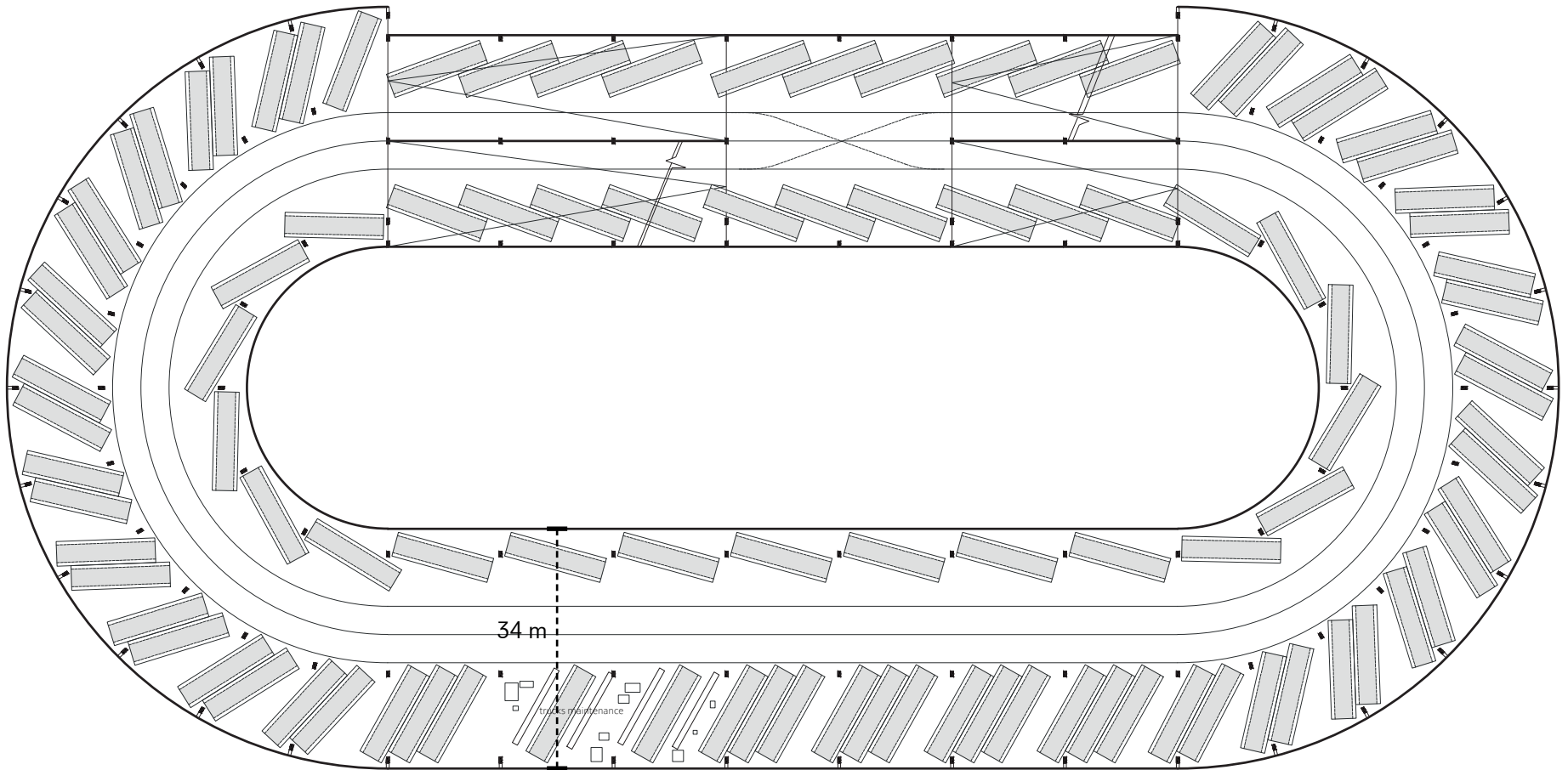


local regulation

PARKING MANEUVERING



PARKING MANEUVERING

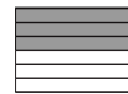
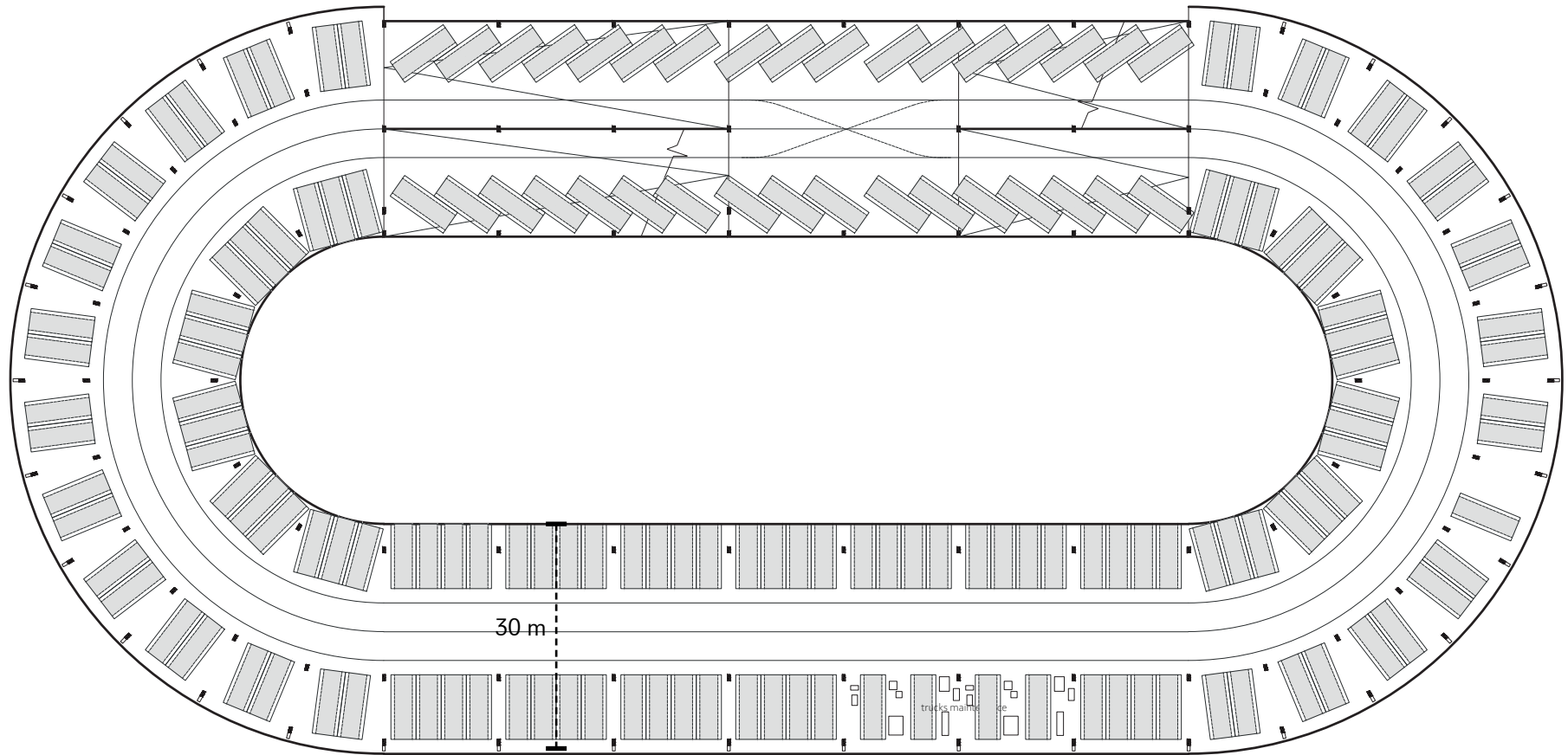


Prototype for 2/4 floor



parking space: 100
big trucks, angled parking

PARKING MANEUVERING



Prototype for 6/8/10 floor

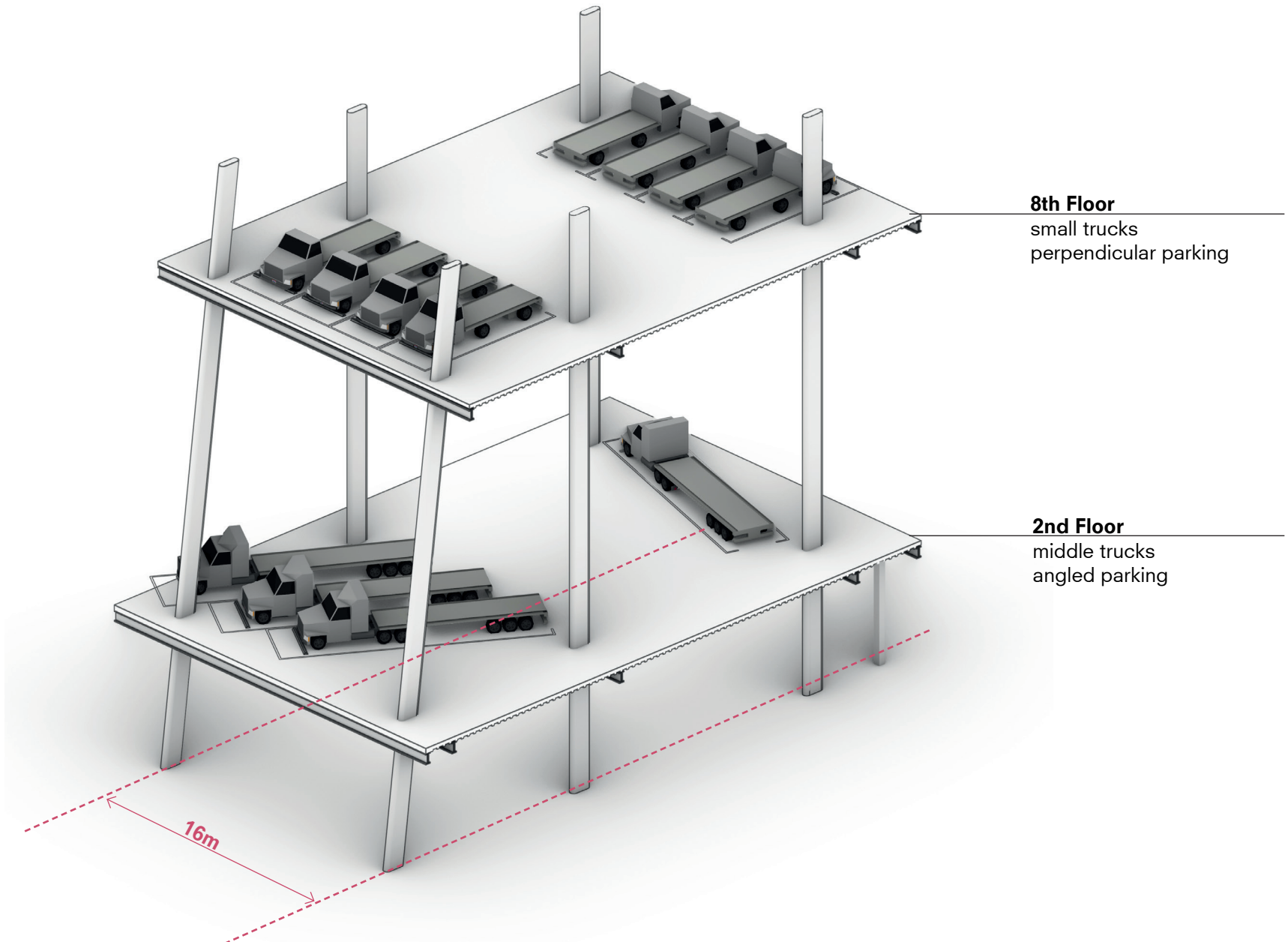


parking space: 160

small trucks, perpendicular parking

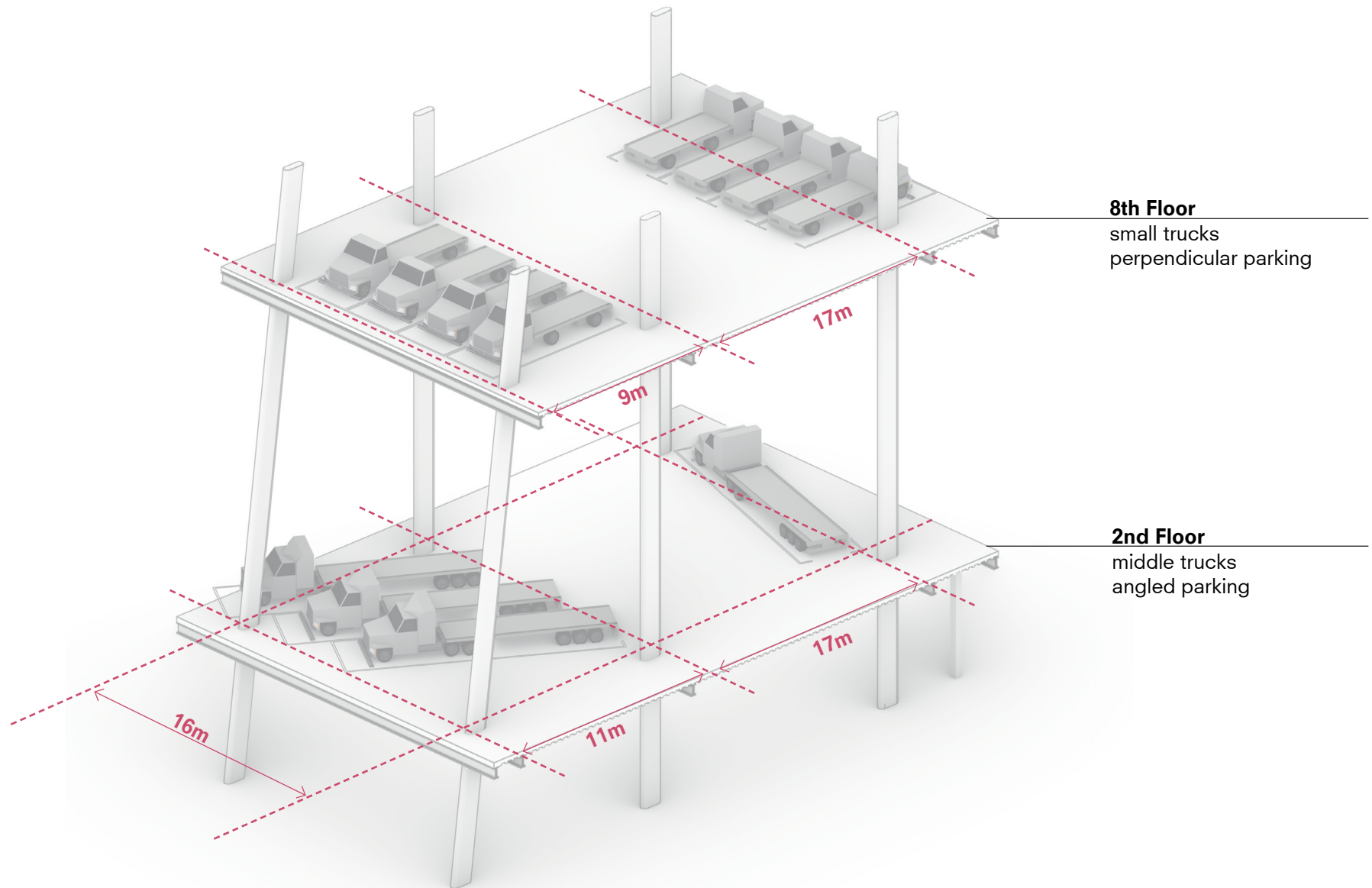
design research

PARKING UNIT

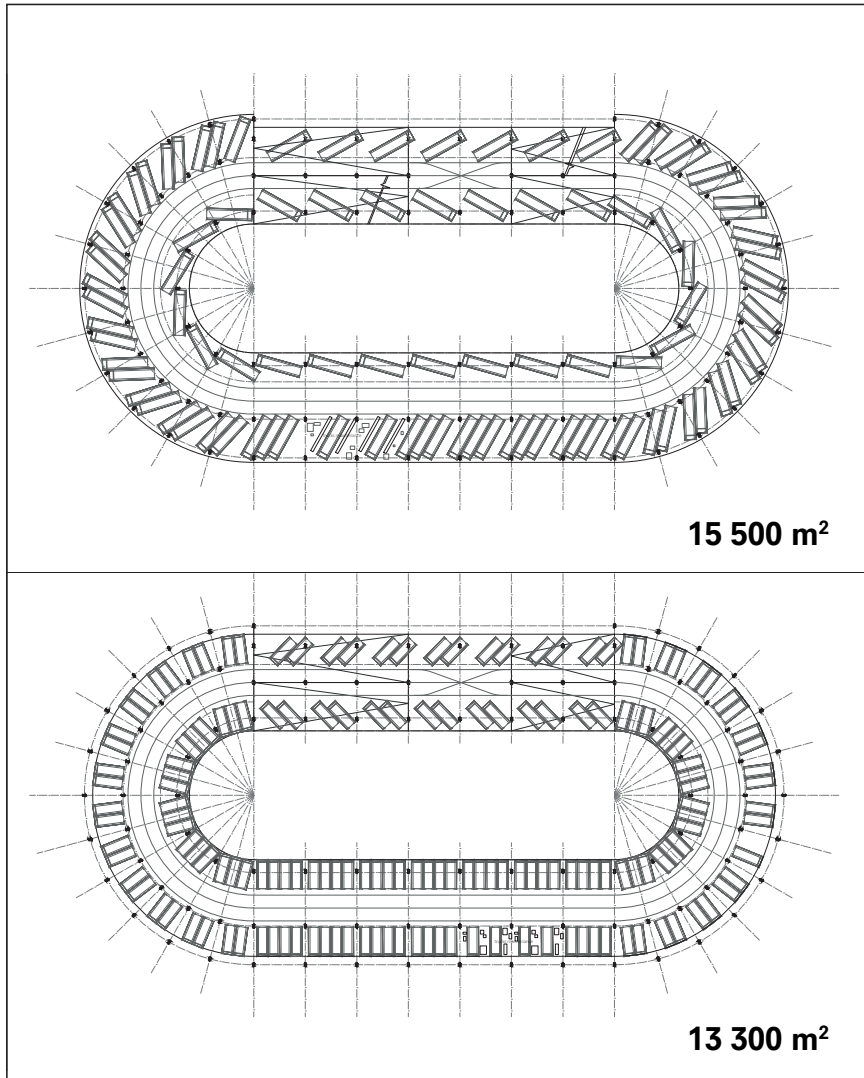


design research

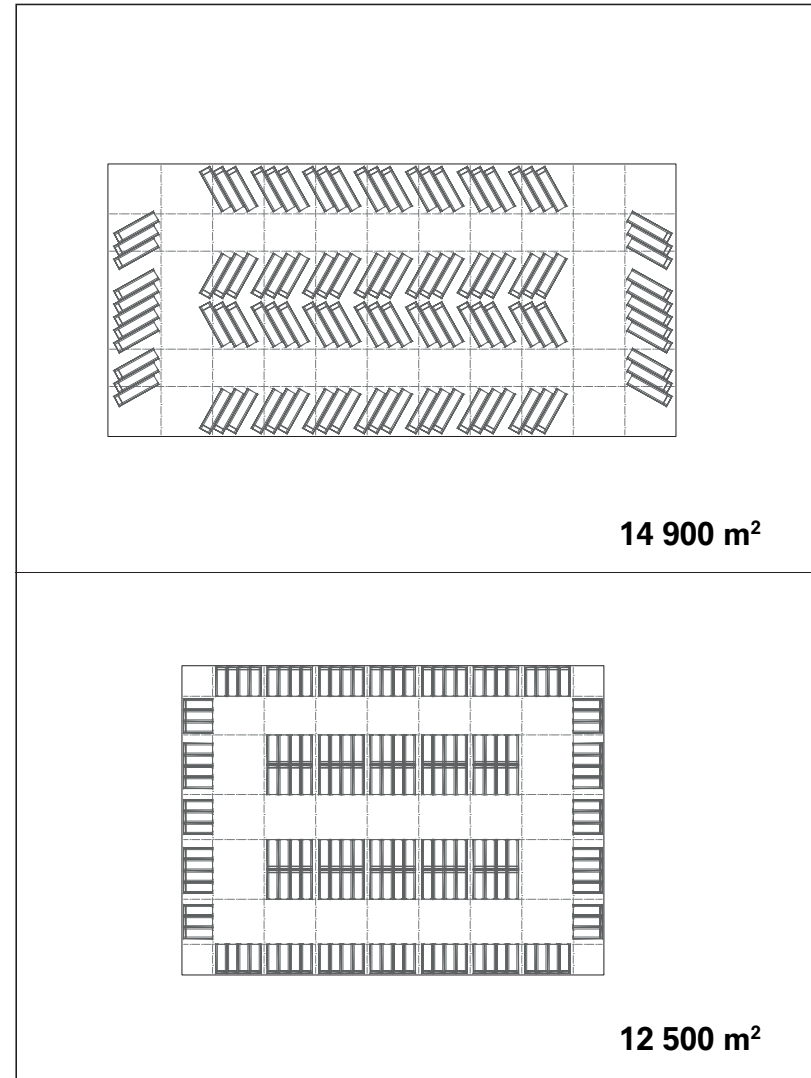
PARKING UNIT



MANEUVERING COMPARISON



project pattern

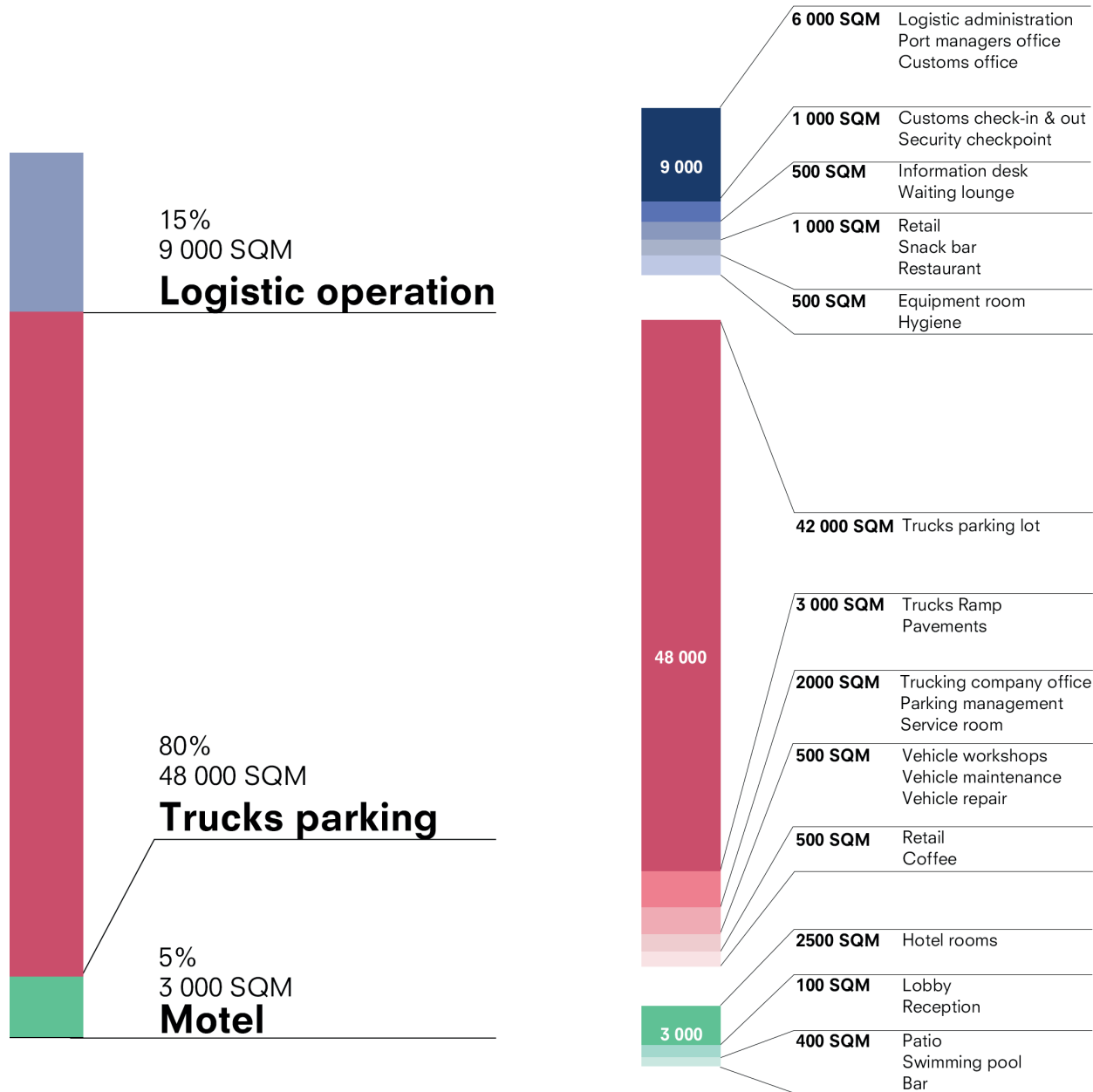


normal pattern

ORGANIZATION

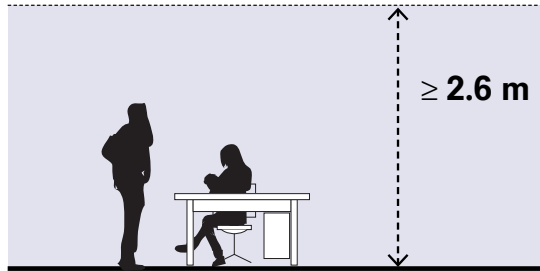


organization PROGRAM

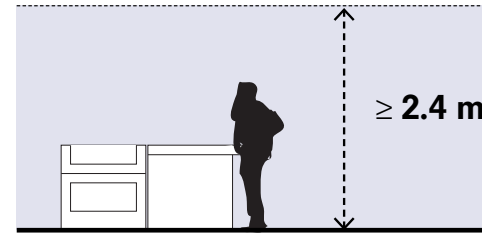


organization

SPACE COMBINE

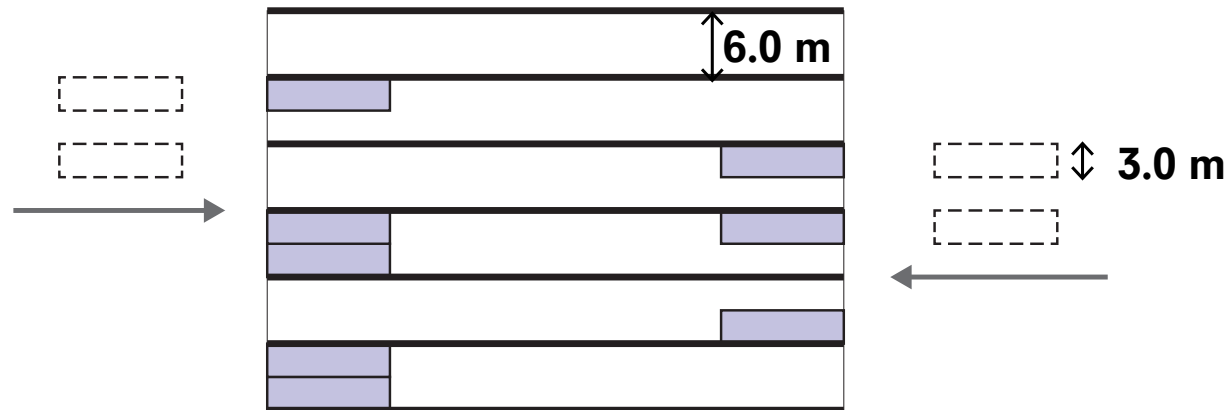


office space



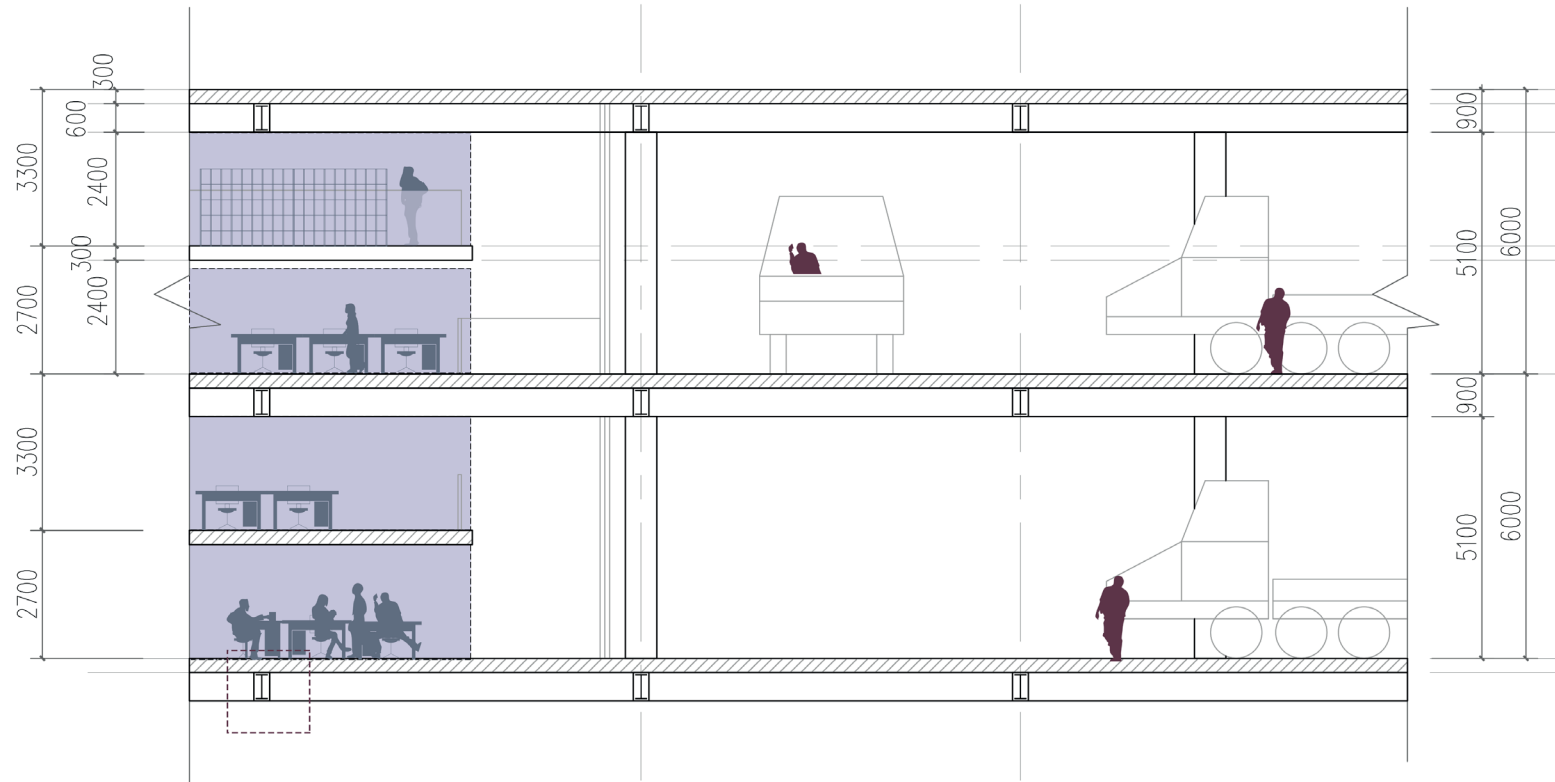
motel space

FLOOR HEIGHT : 3 M



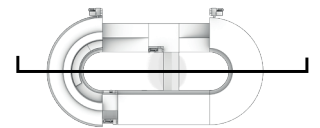
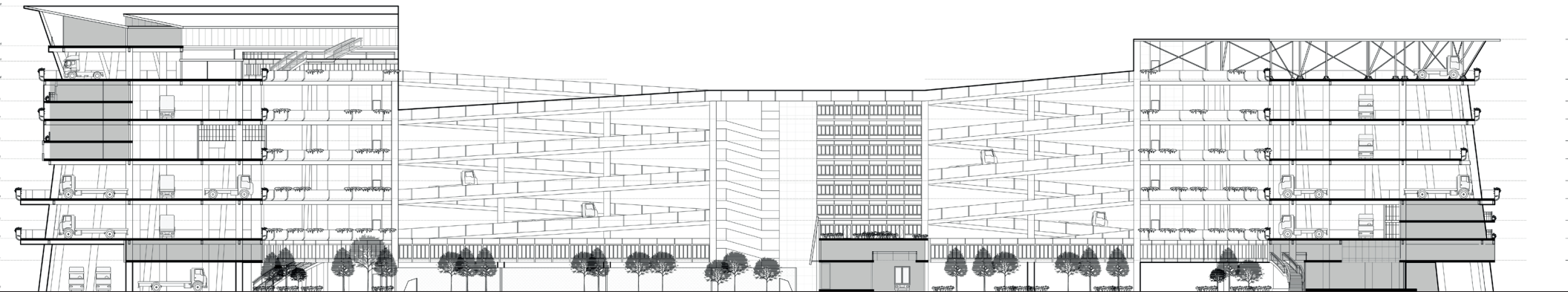
organization





SECTION UNIT



organization

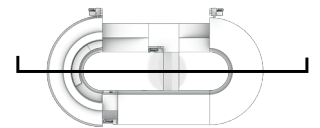
FUNCTION LAYOUT







-  trucks parking
-  parking management
-  logistic operation
-  motel

organization

LOGISTIC OPERATION

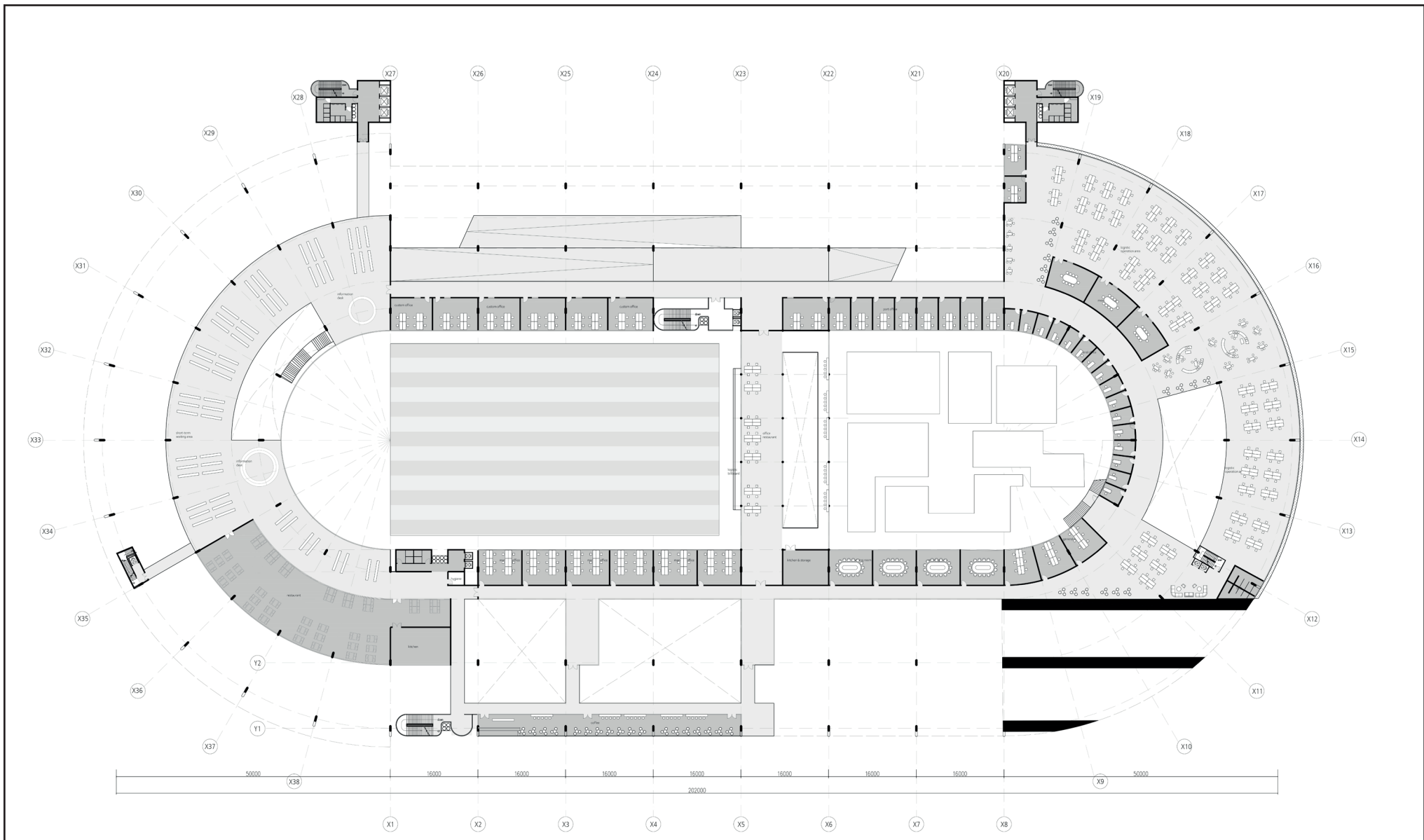


-  trucks parking
-  parking management
-  logistic operation
-  motel



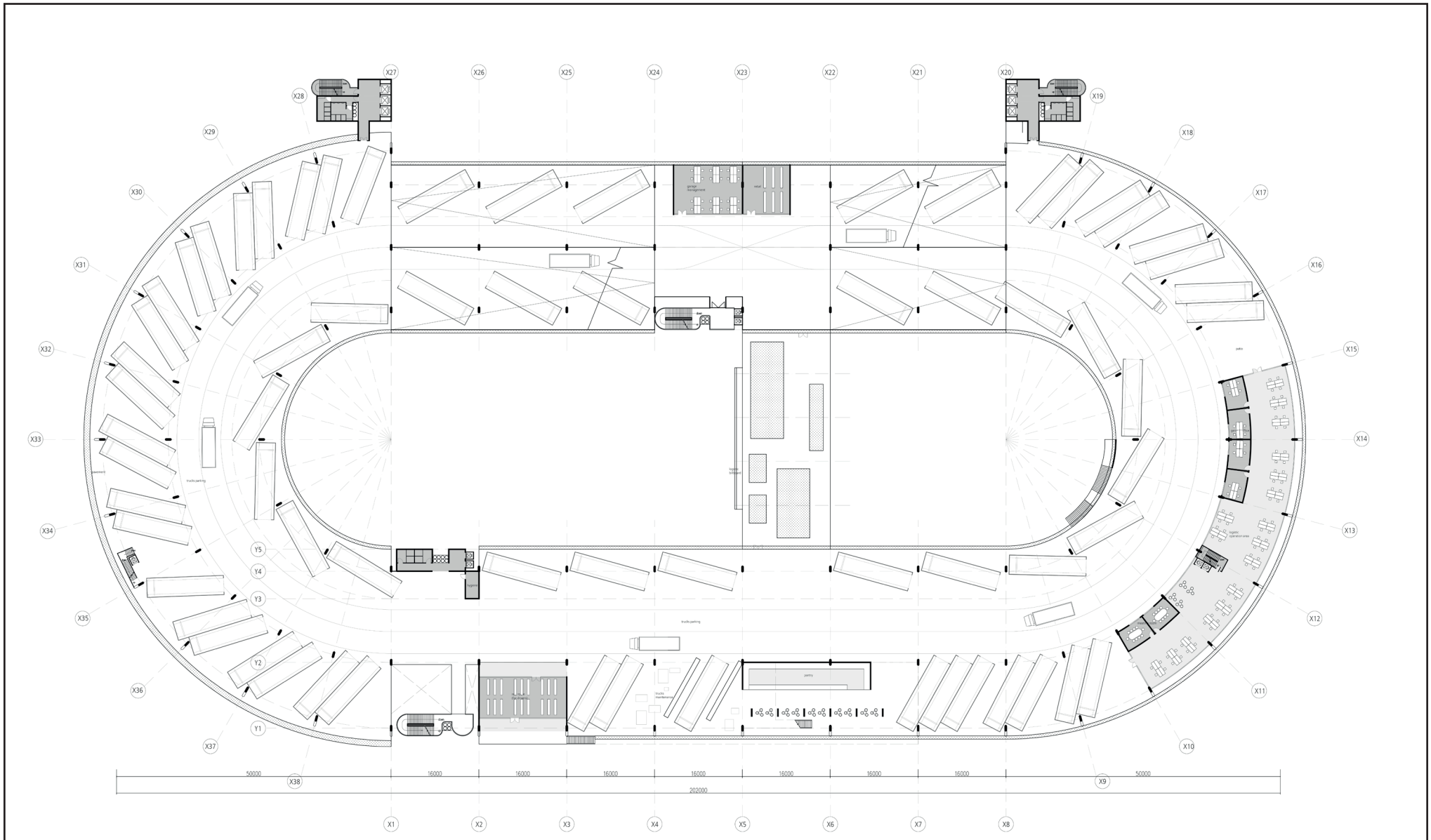
organization

1ST FLOOR PLAN

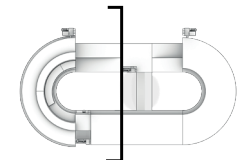
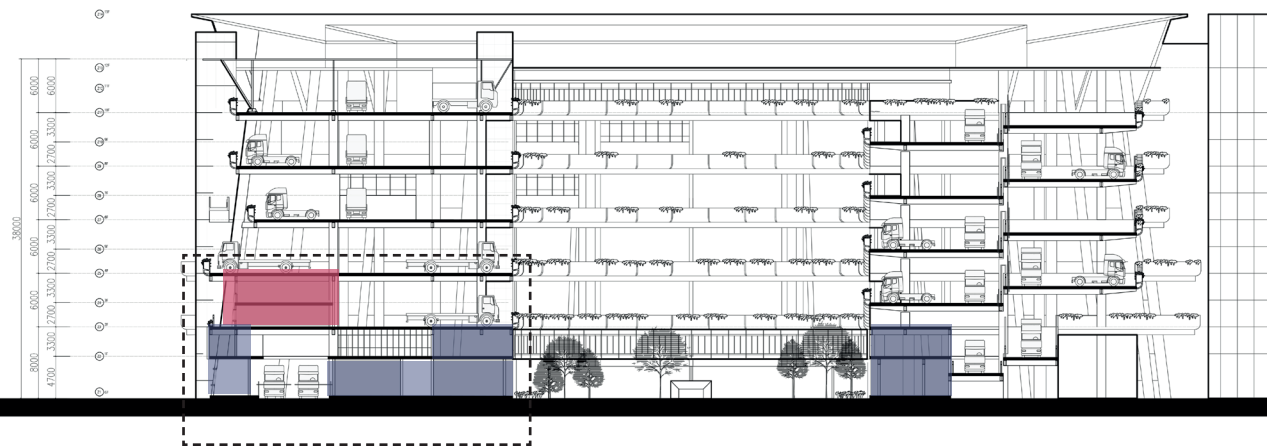


organization

2ND FLOOR PLAN



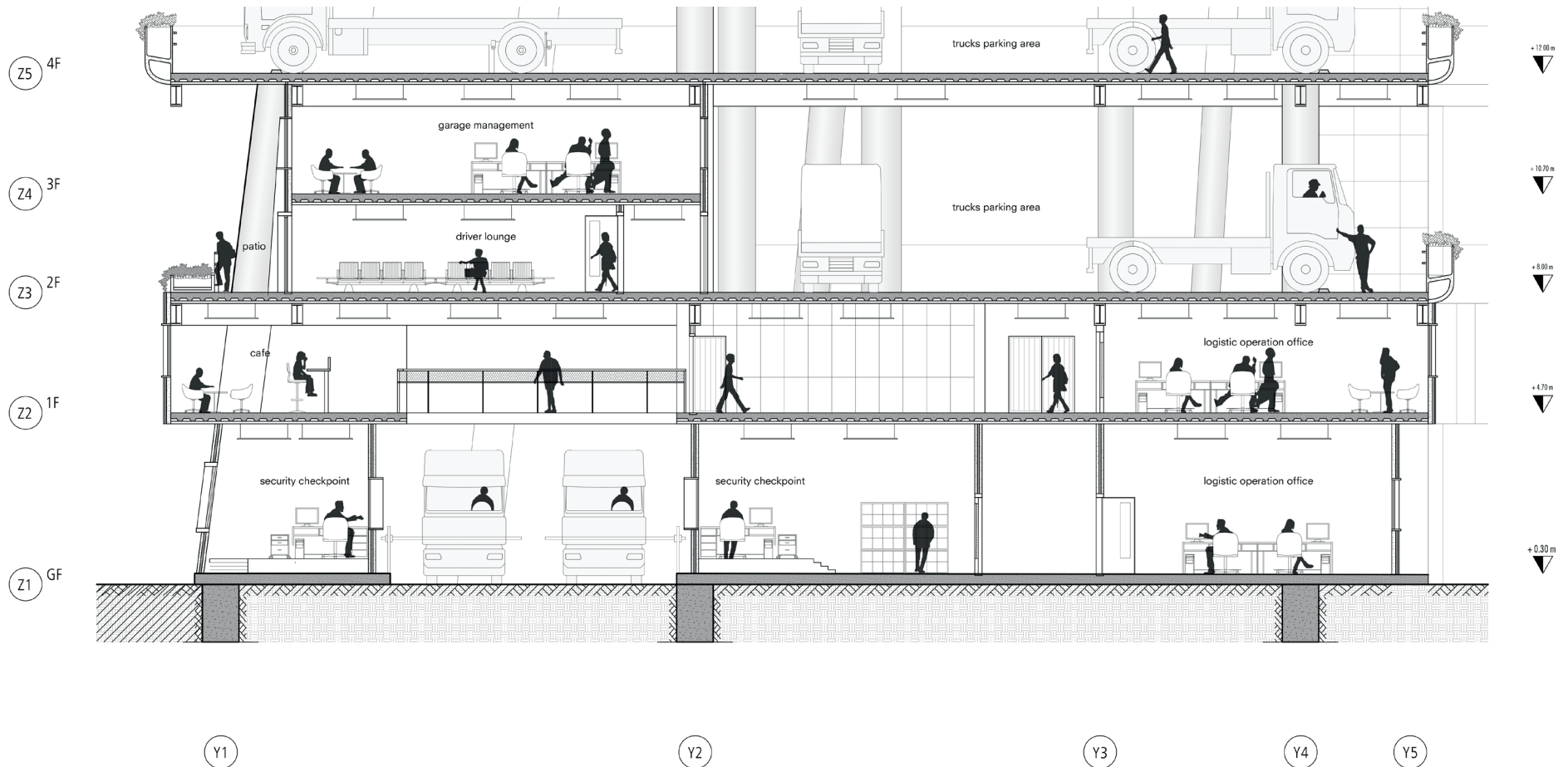
organization CROSS SECTION



- trucks parking
- parking management
- logistic operation
- motel

organization

INTERIOR FRAGMENT

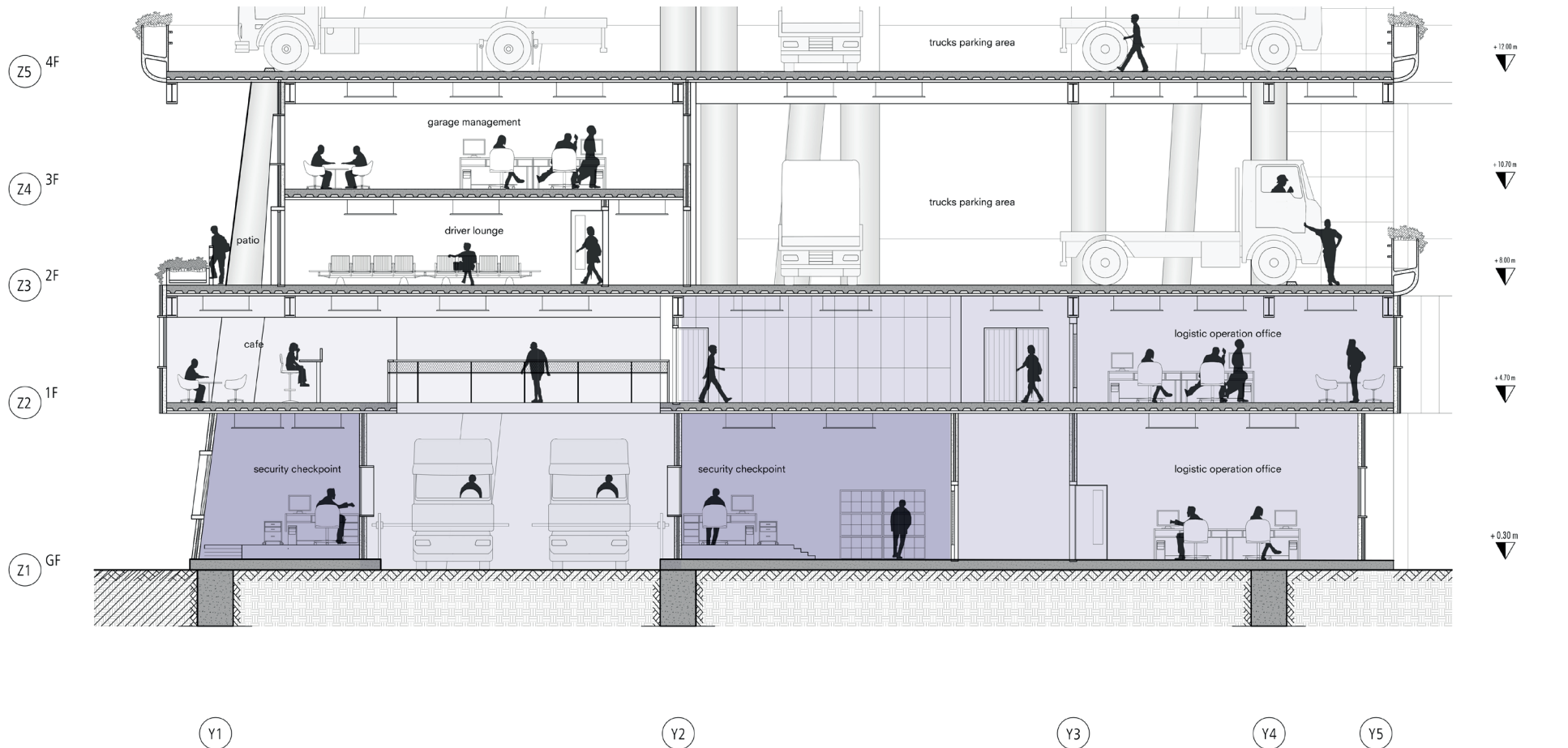


- trucks parking
- parking management
- logistic operation



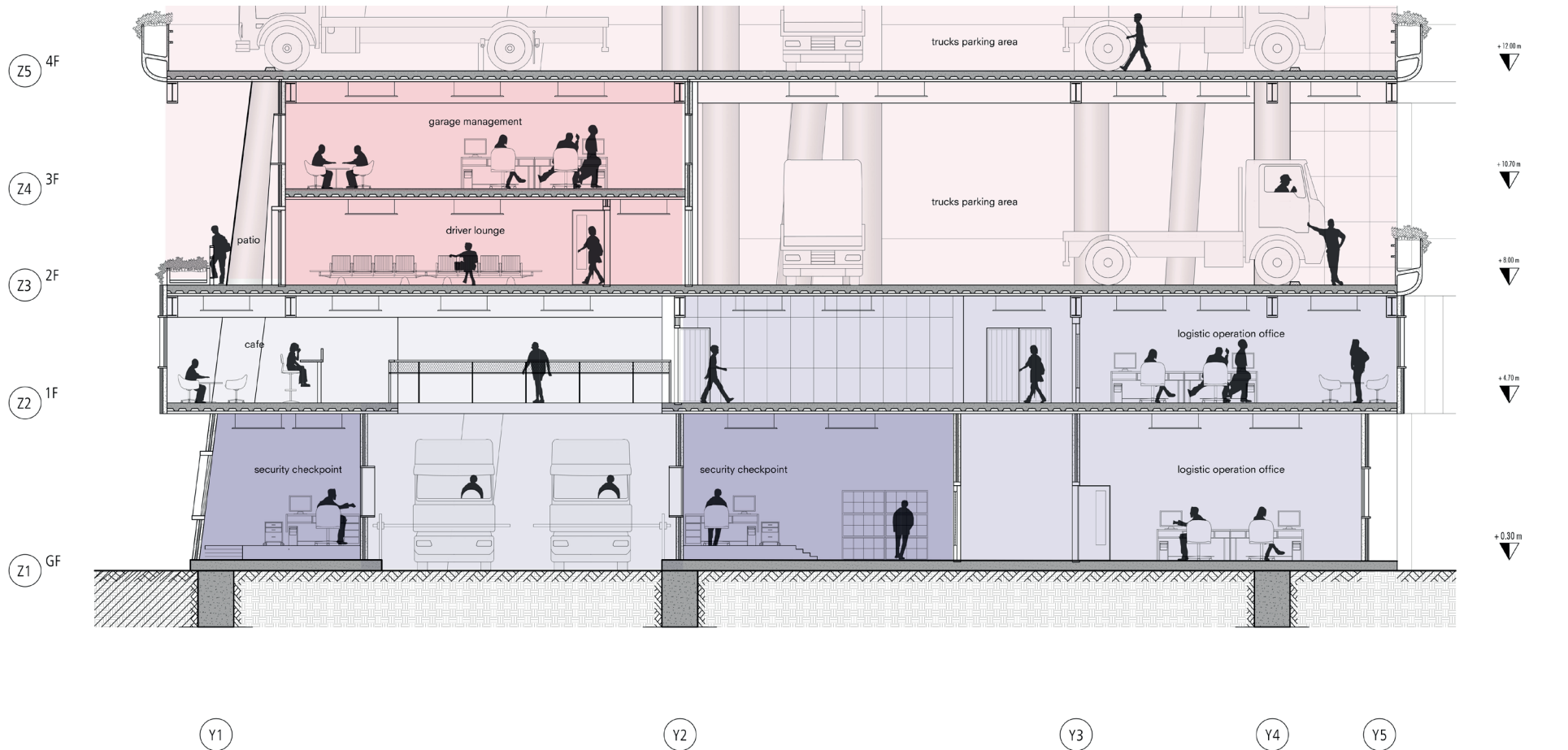
organization

INTERIOR FRAGMENT



organization

INTERIOR FRAGMENT







- trucks parking
- parking management
- logistic operation



organization

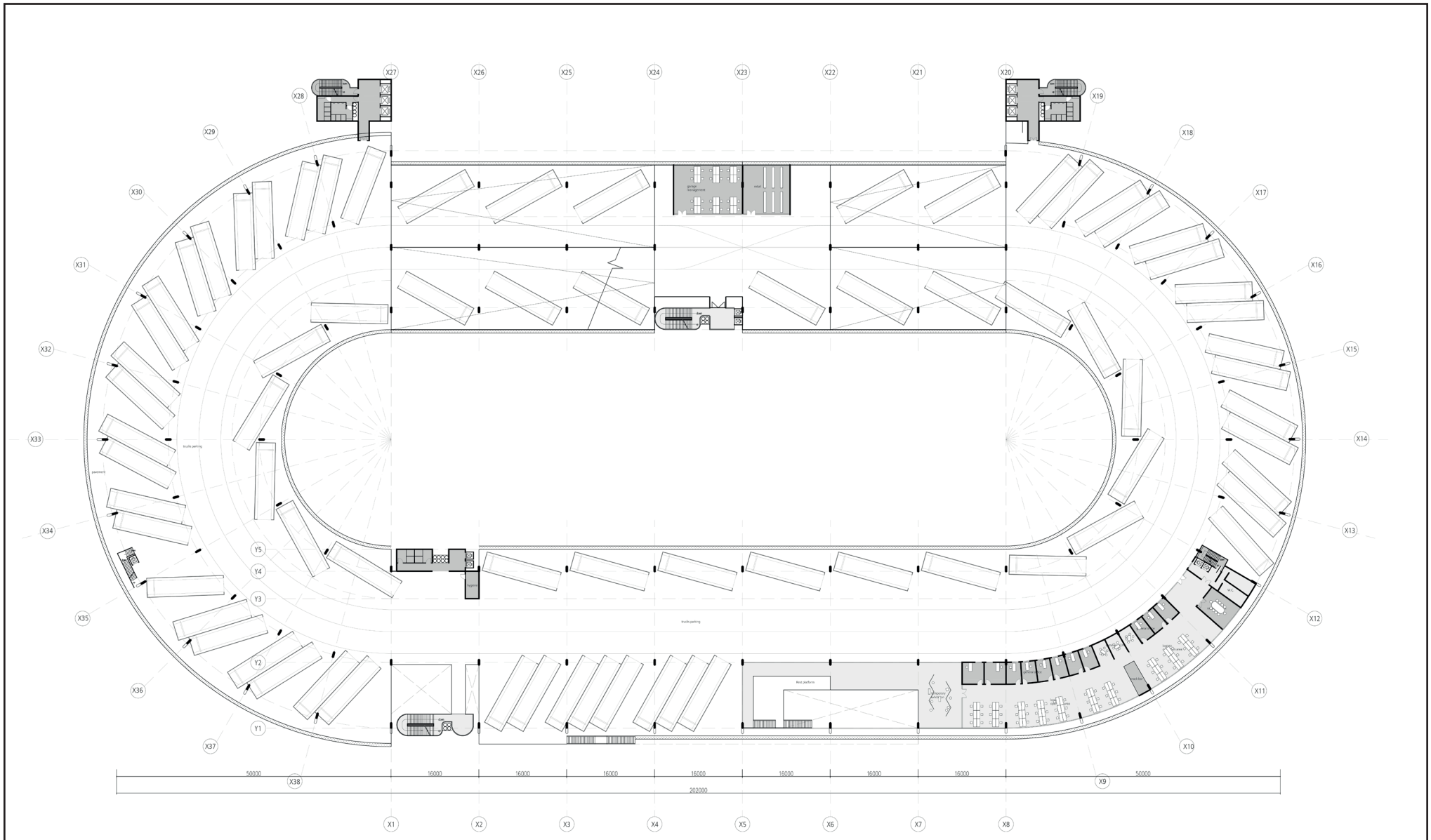
PARKING MANAGEMENT



-  trucks parking
-  parking management
-  logistic operation
-  motel

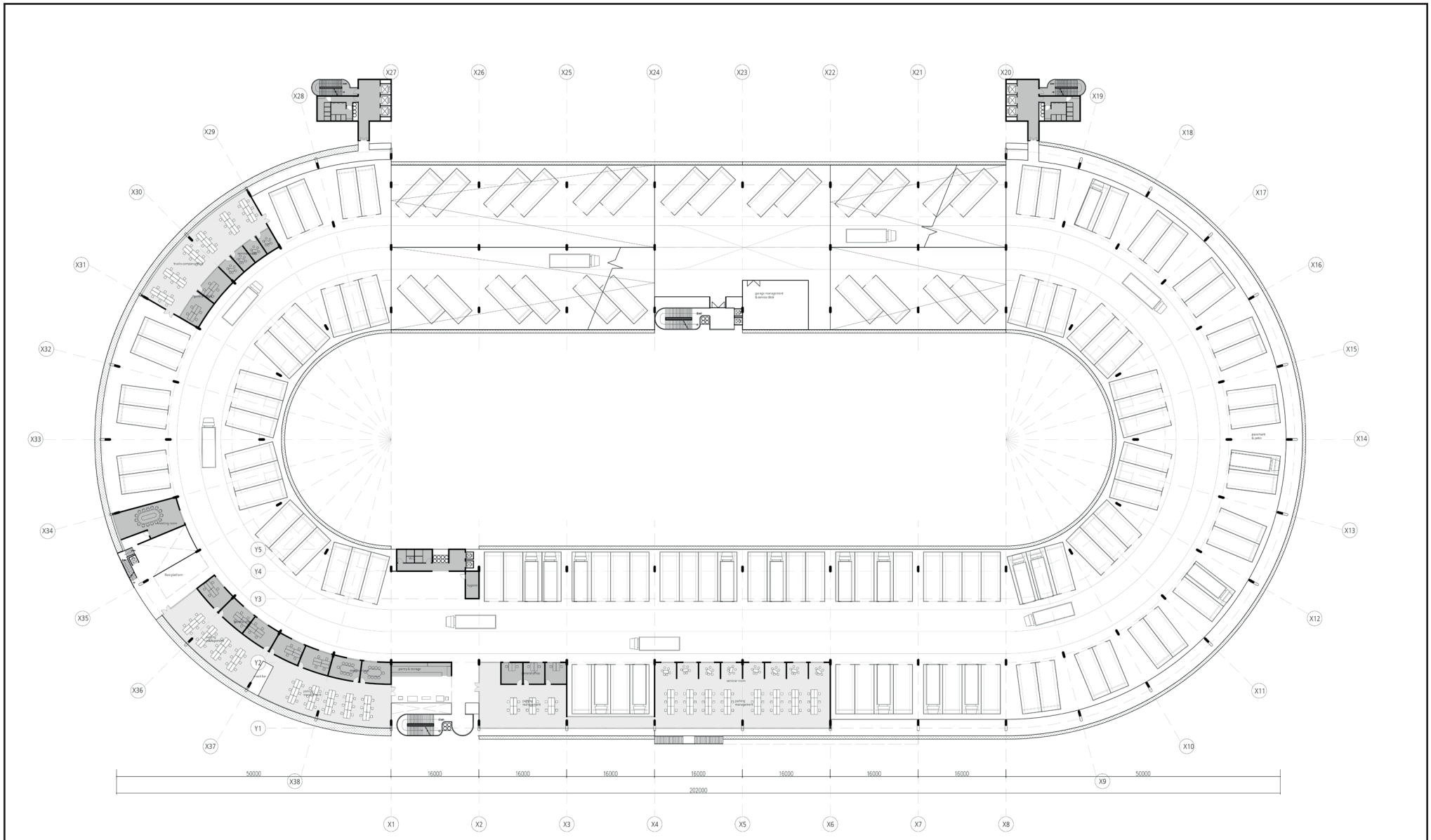
organization

4TH FLOOR PLAN

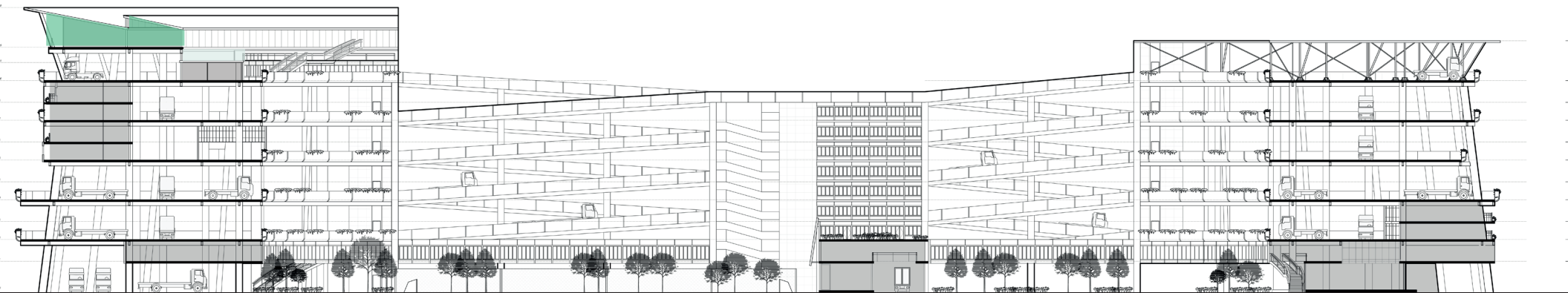


organization

6TH FLOOR PLAN



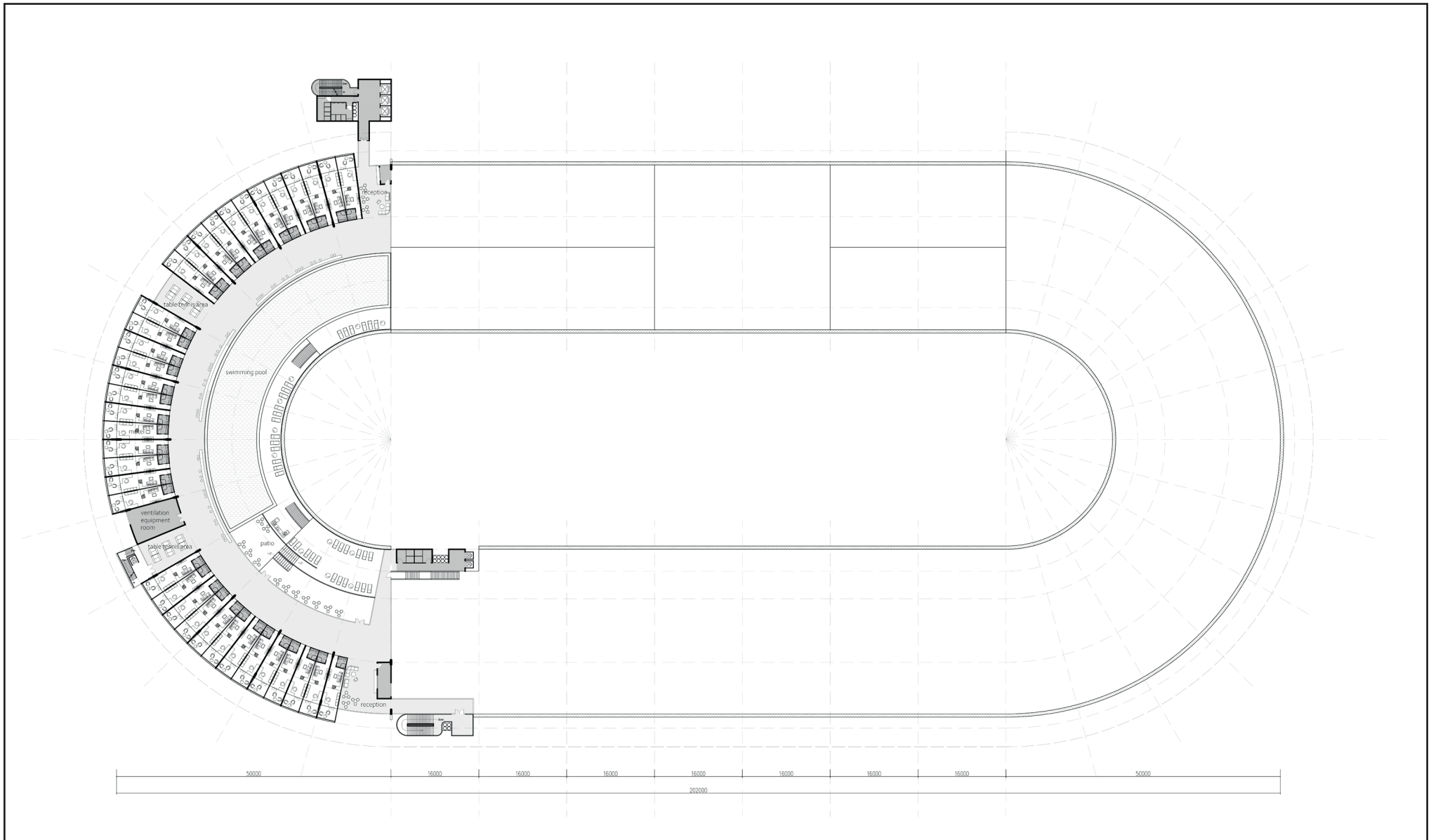
organization MOTEL



- trucks parking
- parking management
- logistic operation
- motel

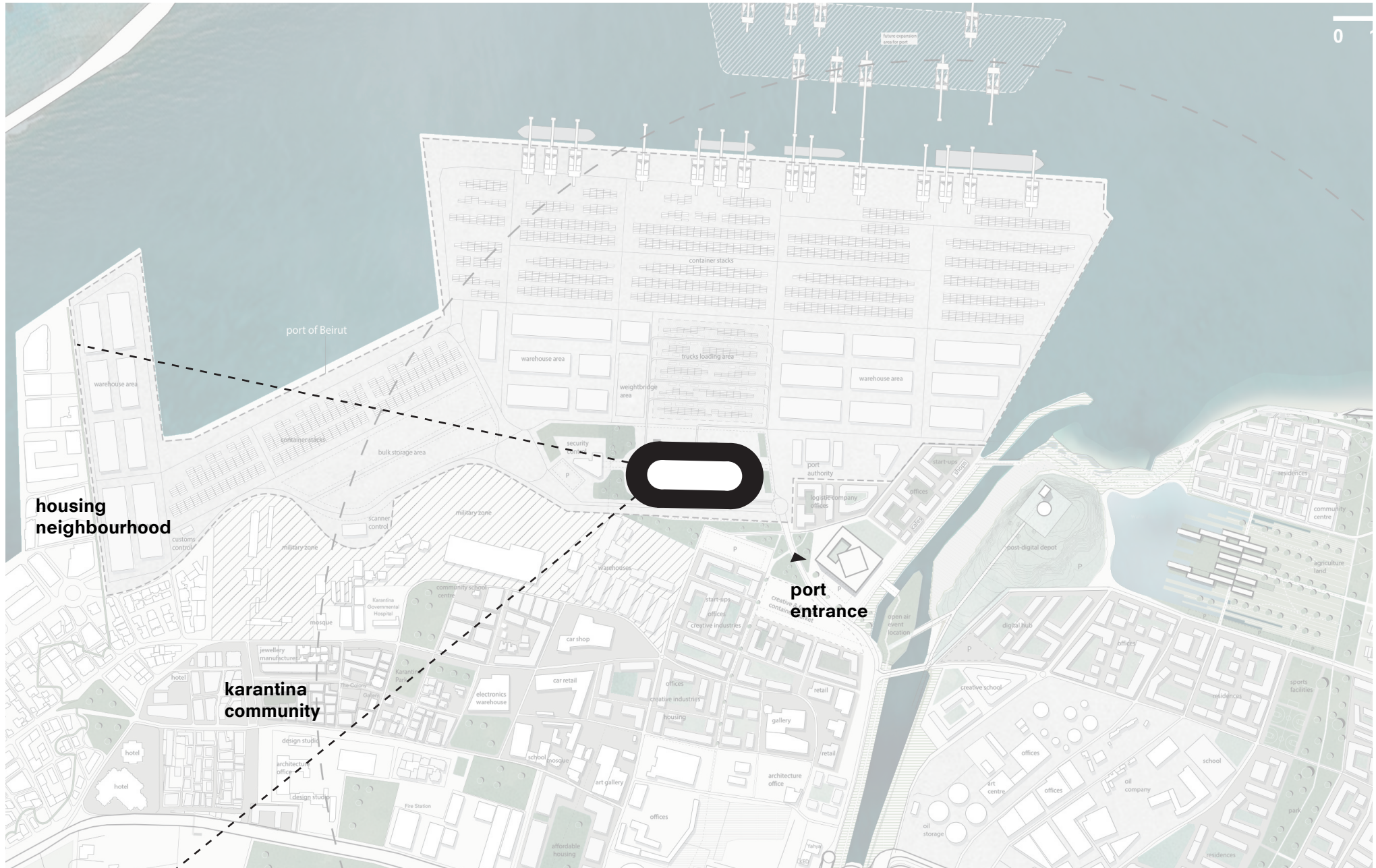
organization

11TH FLOOR PLAN



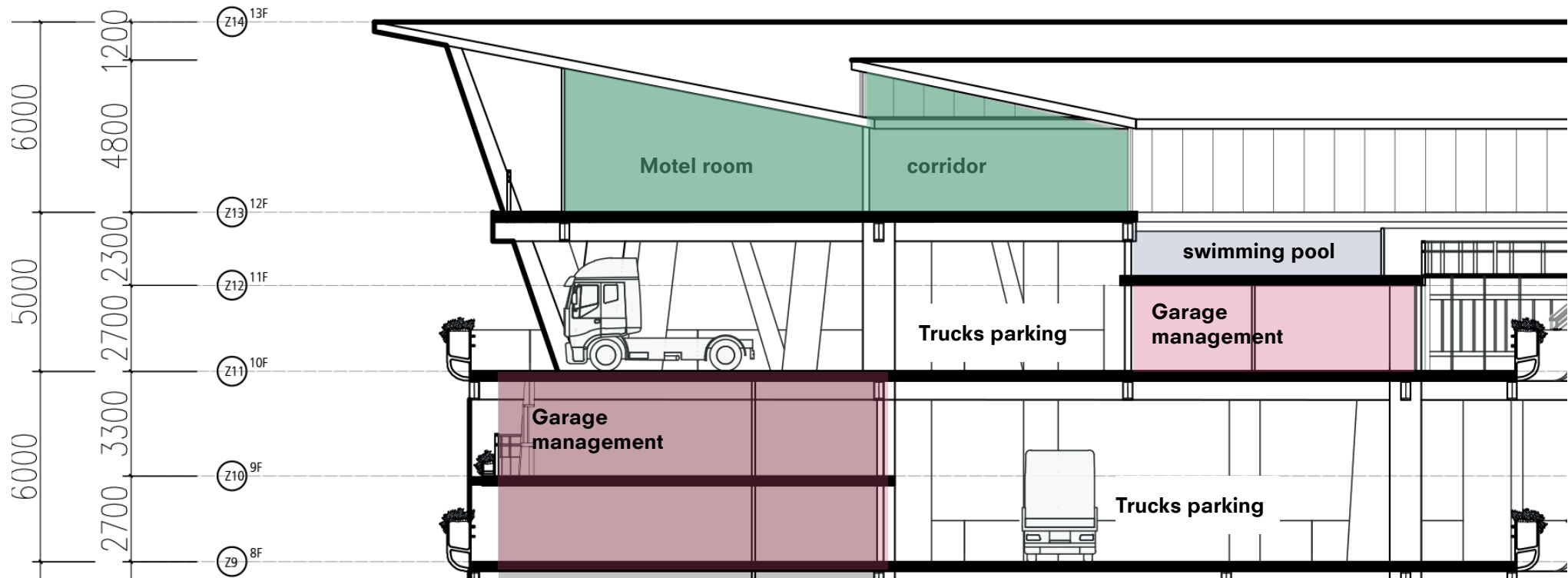
organization

ORIENTATION



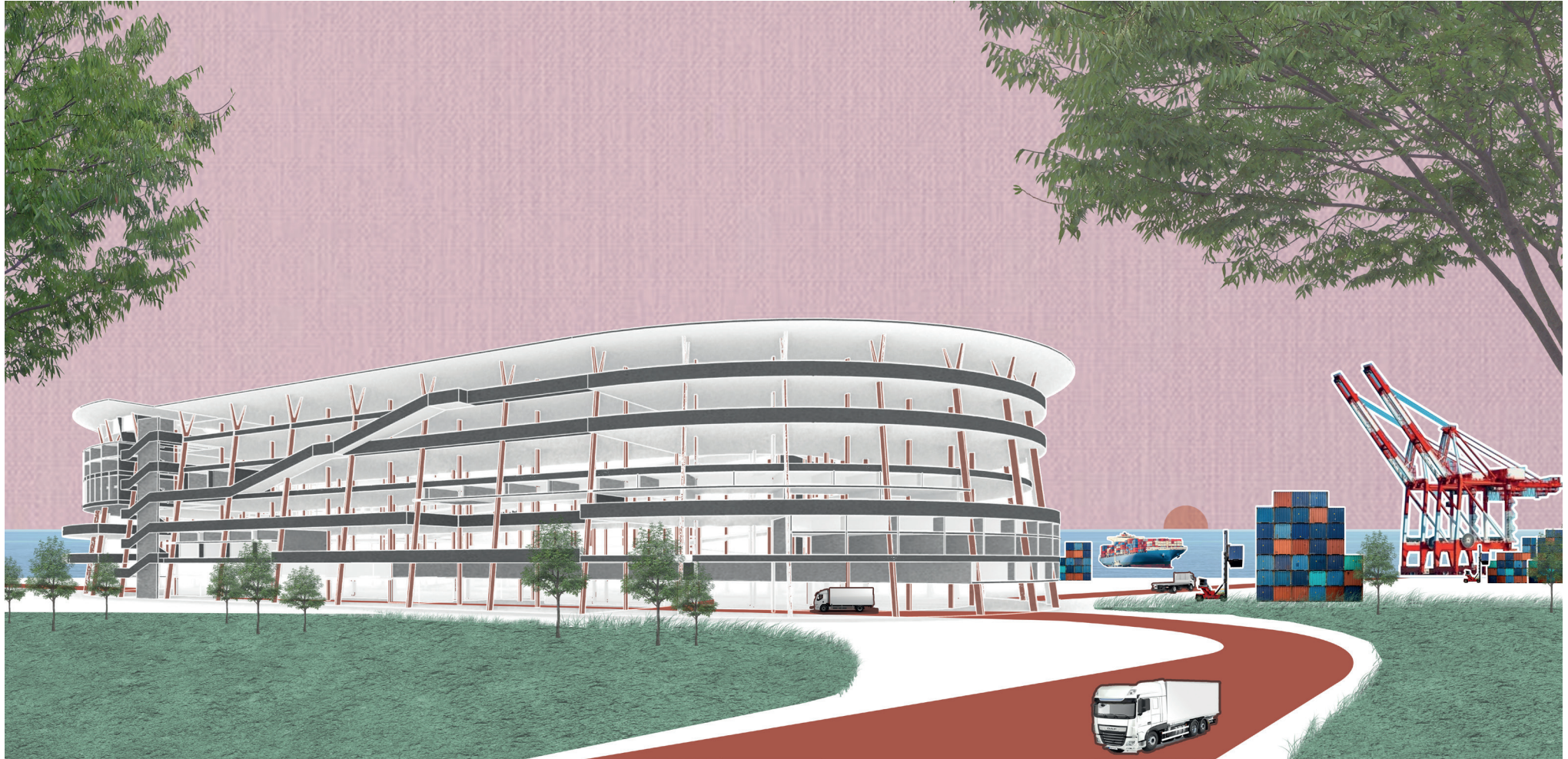
organization

MOTEL SPACE



FACADE DESIGN

facade design
VISION



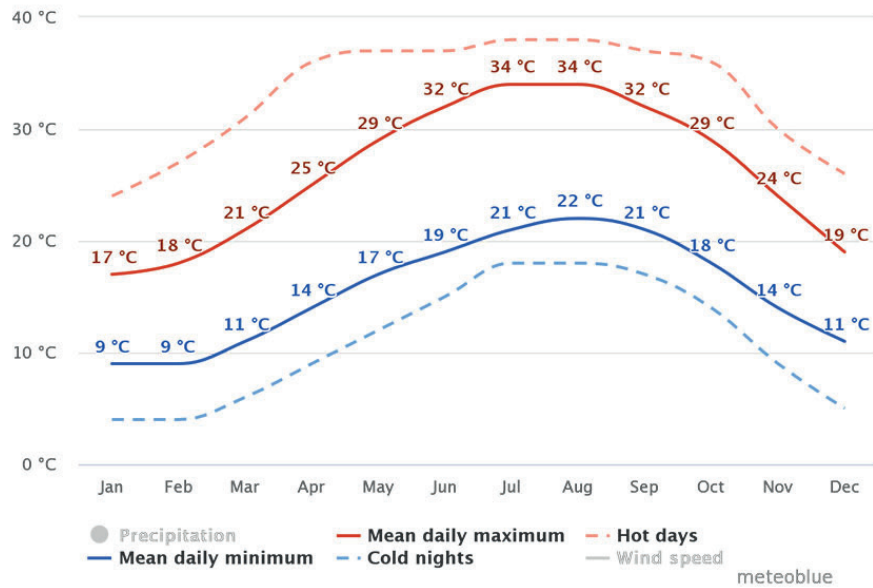
facade design

FACTORS

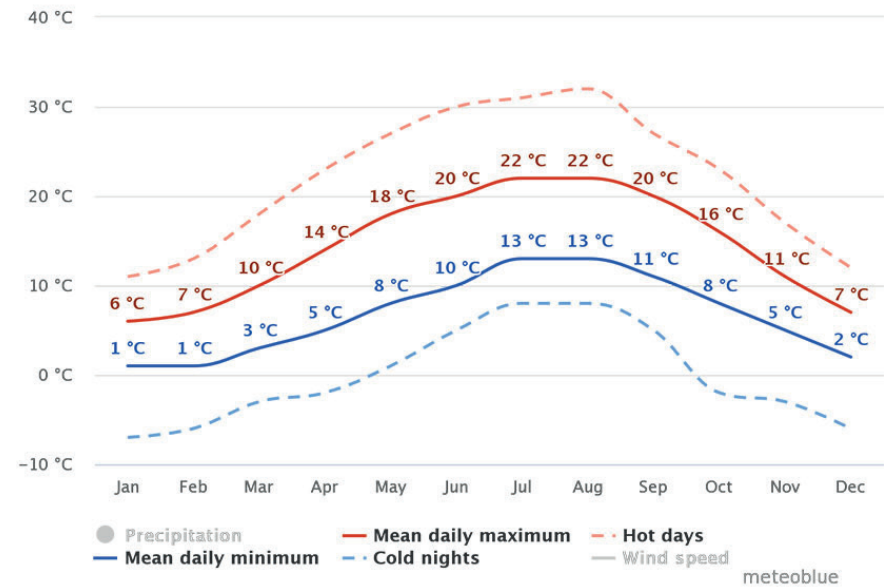


climate response

TEMPERATURE



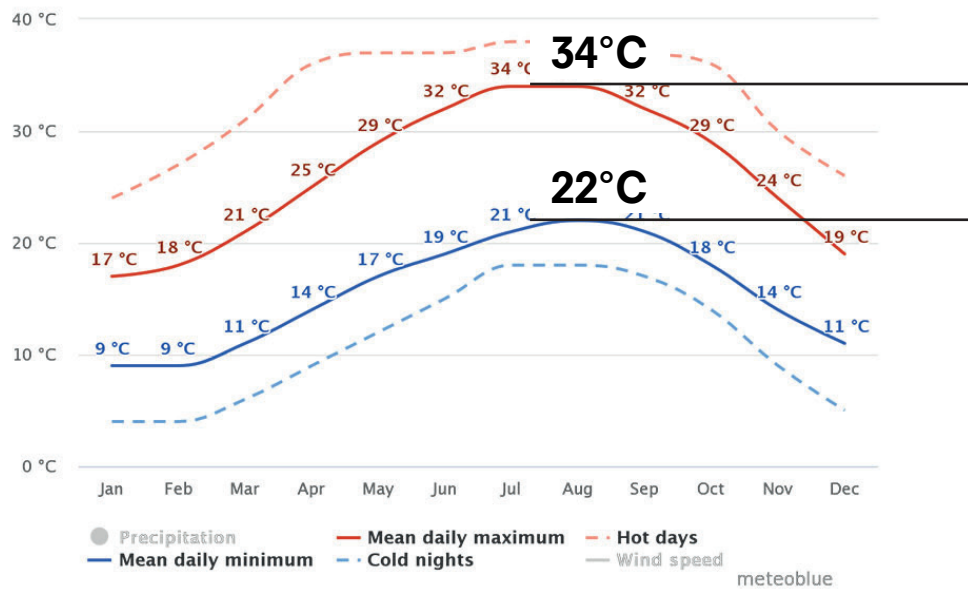
BEIRUT



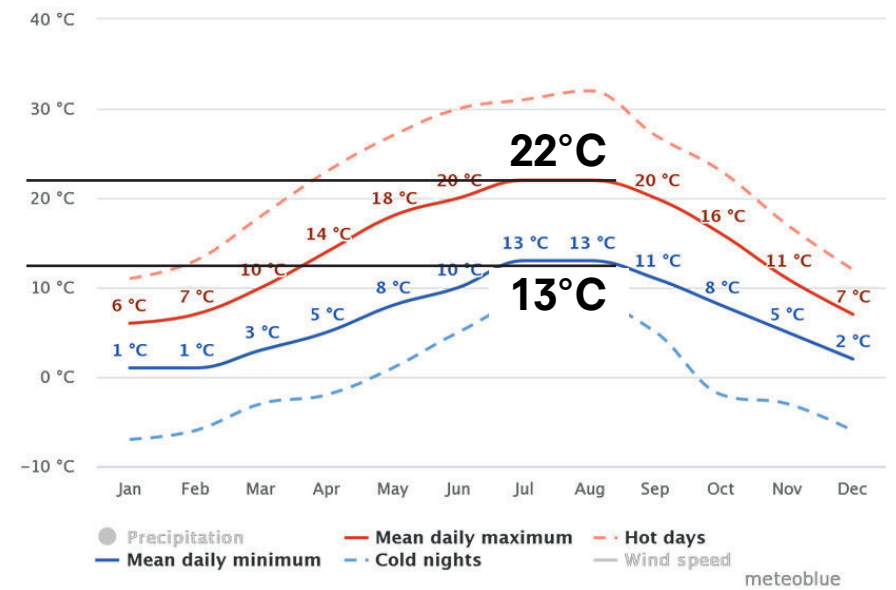
DELFT

climate response

TEMPERATURE

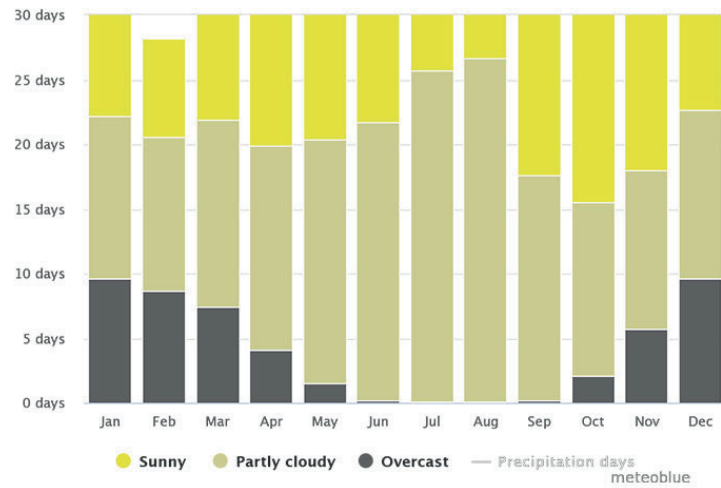


BEIRUT

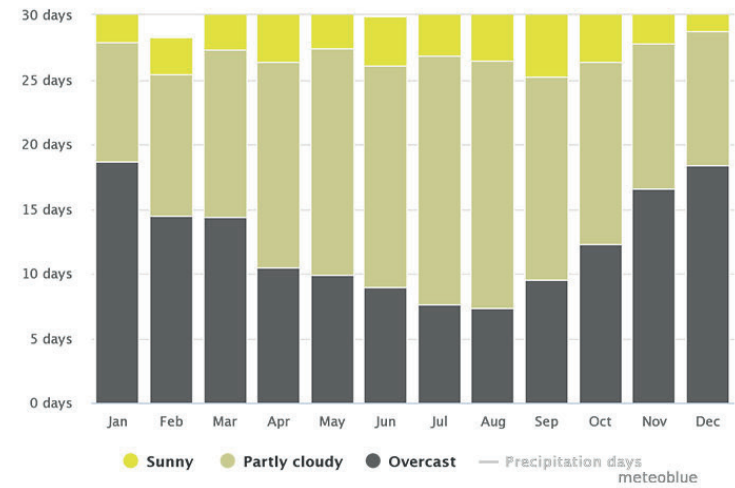


DELFT

climate response WEATHER

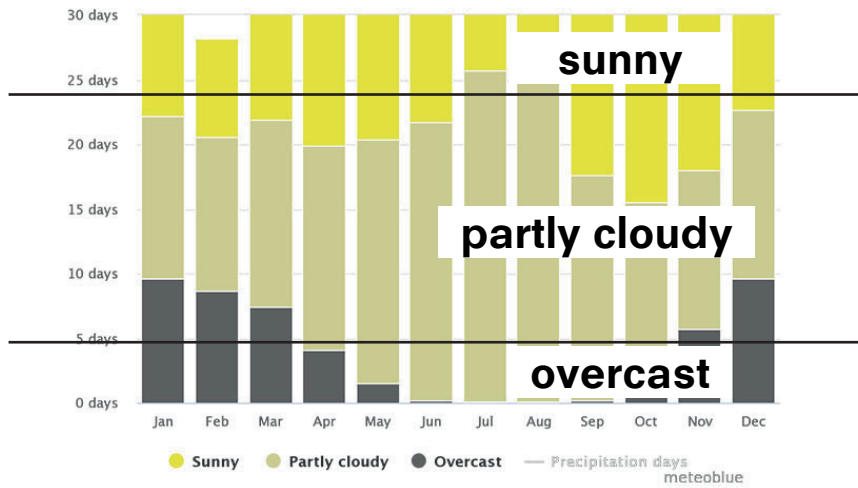


BEIRUT

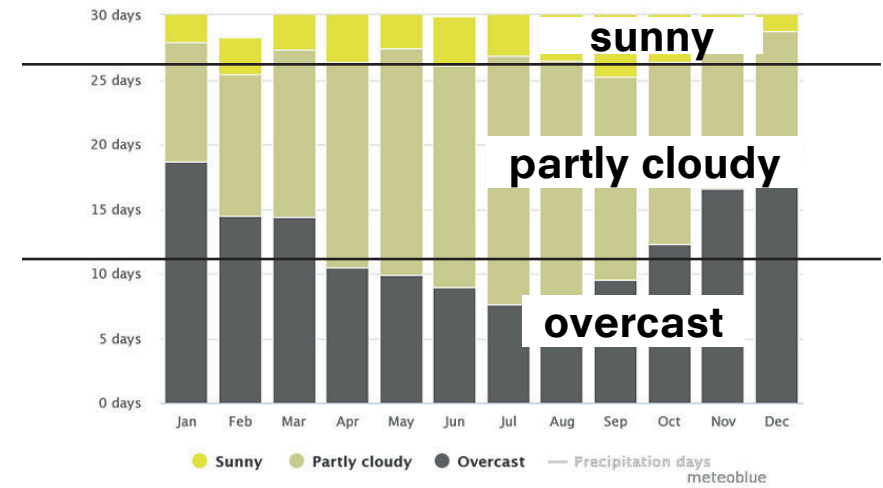


DELFT

climate response WEATHER



BEIRUT



DELFT

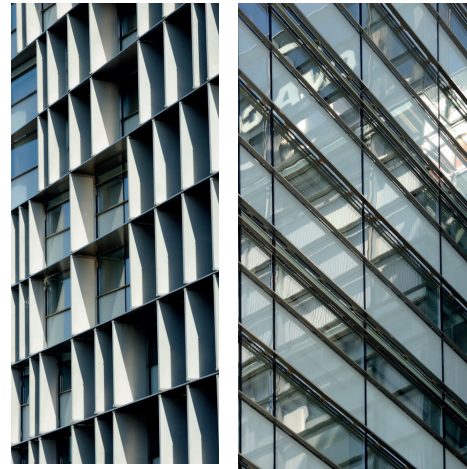
LOCAL PROJECTS

**Arabic Studies Centre
KOURA, LEBANON**



vertical shading

**CMA-CGM Headquarters
BEIRUT, LEBANON**



vertical + horizontal shading

CLIMATE REQUIREMENT

1. Ensure ventilation

2. Heat insulation and facade shading:

hot in summer;
partly block the direct sunlight

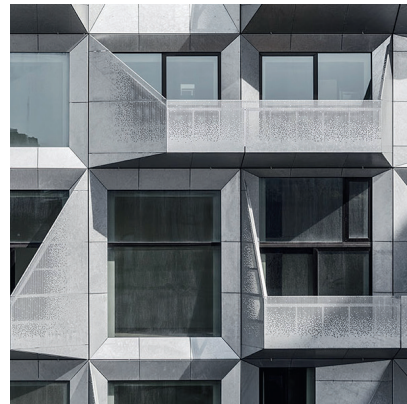
PORT CHARACTERISTIC



context response

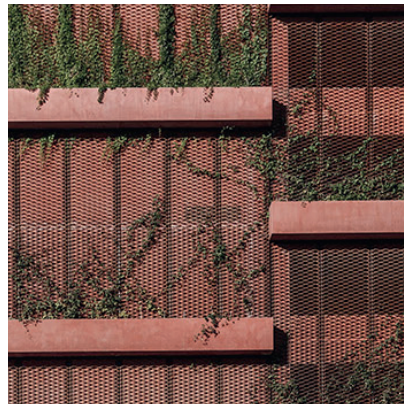
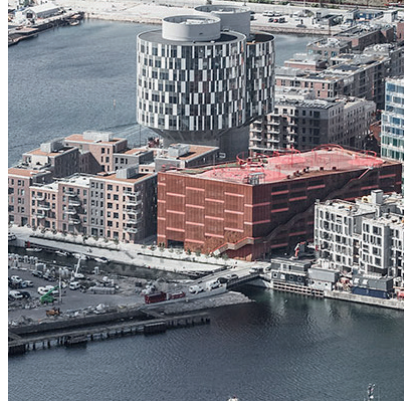
PORT PROJECTS

COBE
The Silo



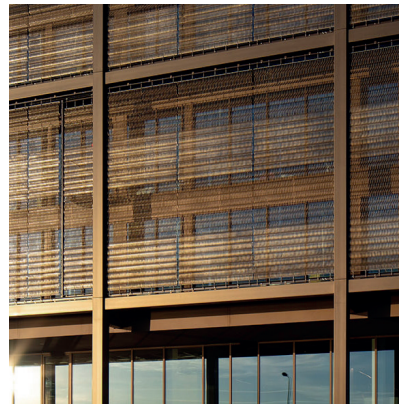
galvanized steel

JAJA Architect
Parl n'Play



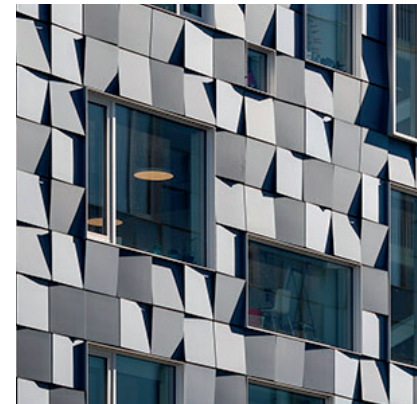
corroded steel plate

atelier d'architecture King Kong
Dock G6 Hotel



metal mesh

C.F. Møller Architects
Copenhagen International School



solar panels

context response

TRUCK WAREHOUSE



context response

PARKING BUILDING

Keith Ingham; Charles Wilson
Preston Bus Station



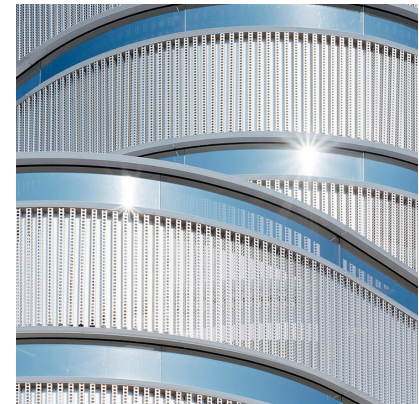
Stéphane Beel Architects
Parking Building IMEC / KUL



Herzog & de Meuron
1111 Lincoln Road

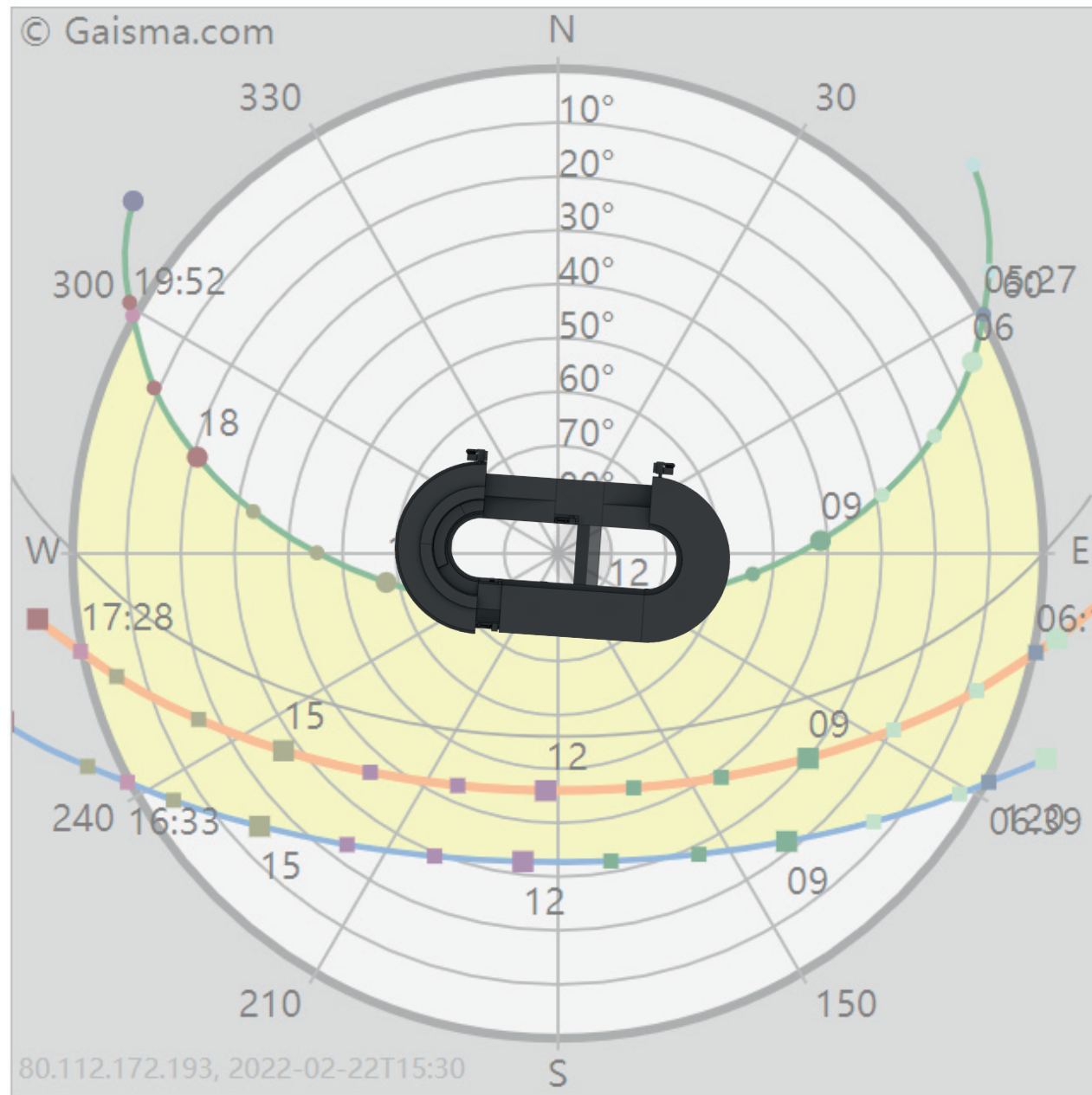


Paul de Ruiter architects
Veranda Car Park



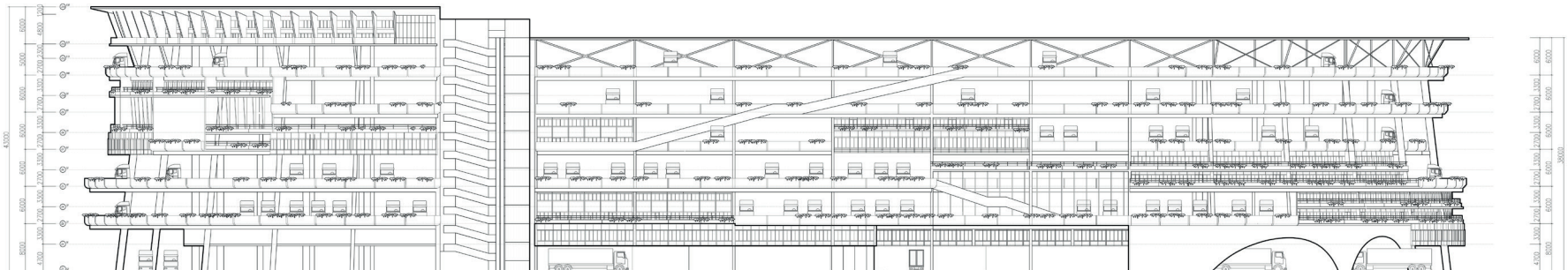
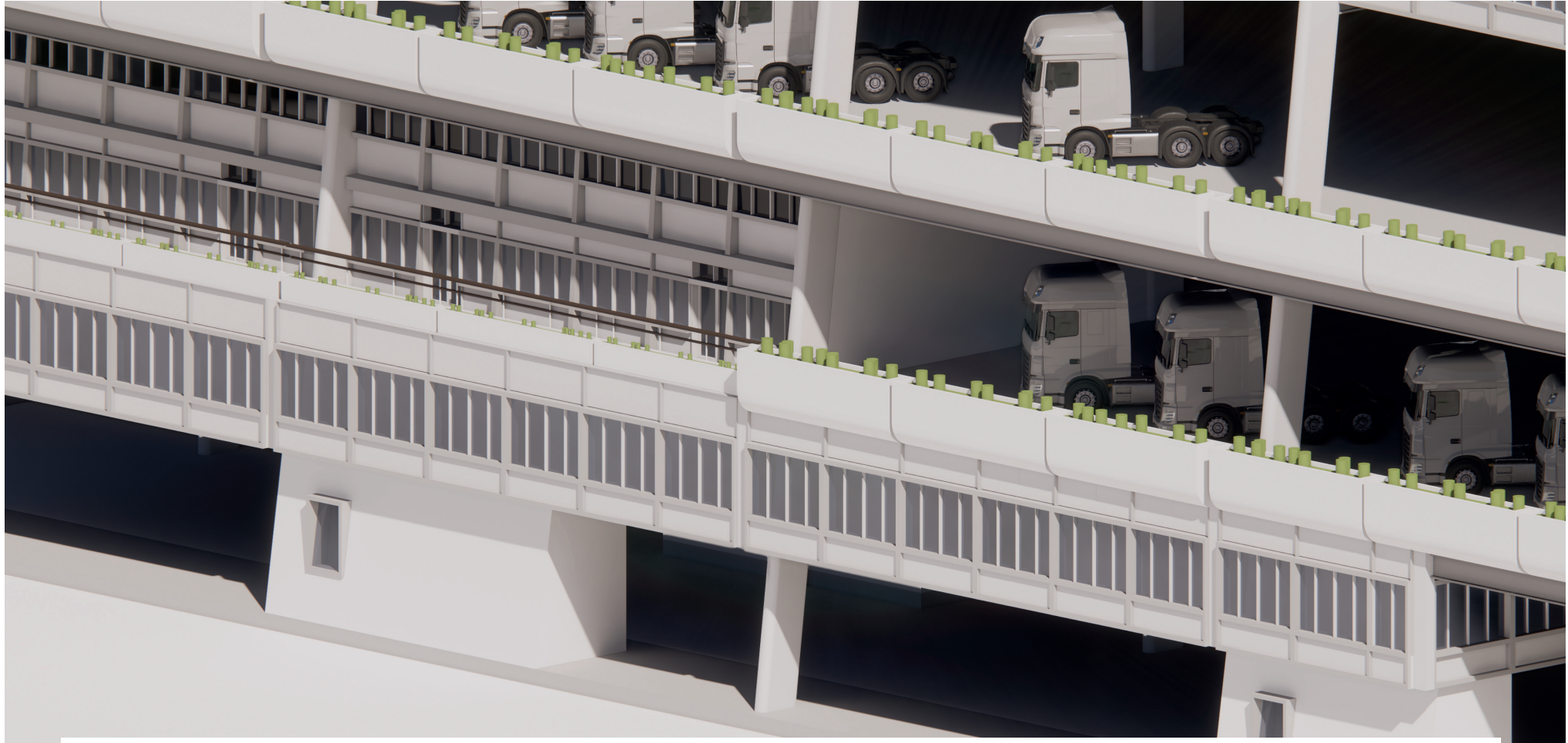


SUN PATH DIAGRAM



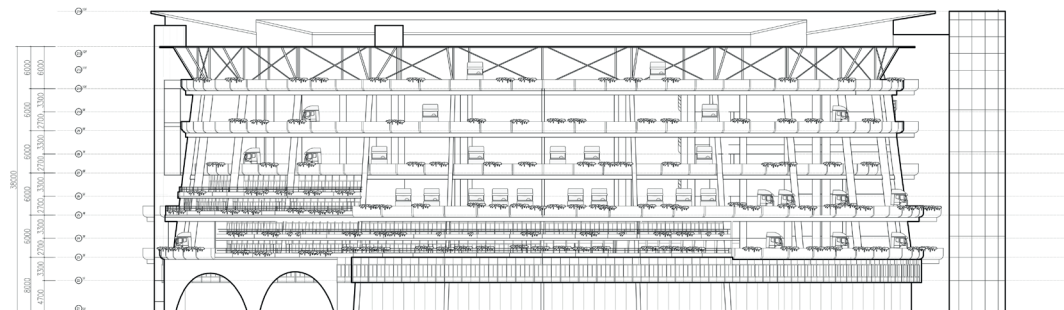
facade design

SOUTH FACADE



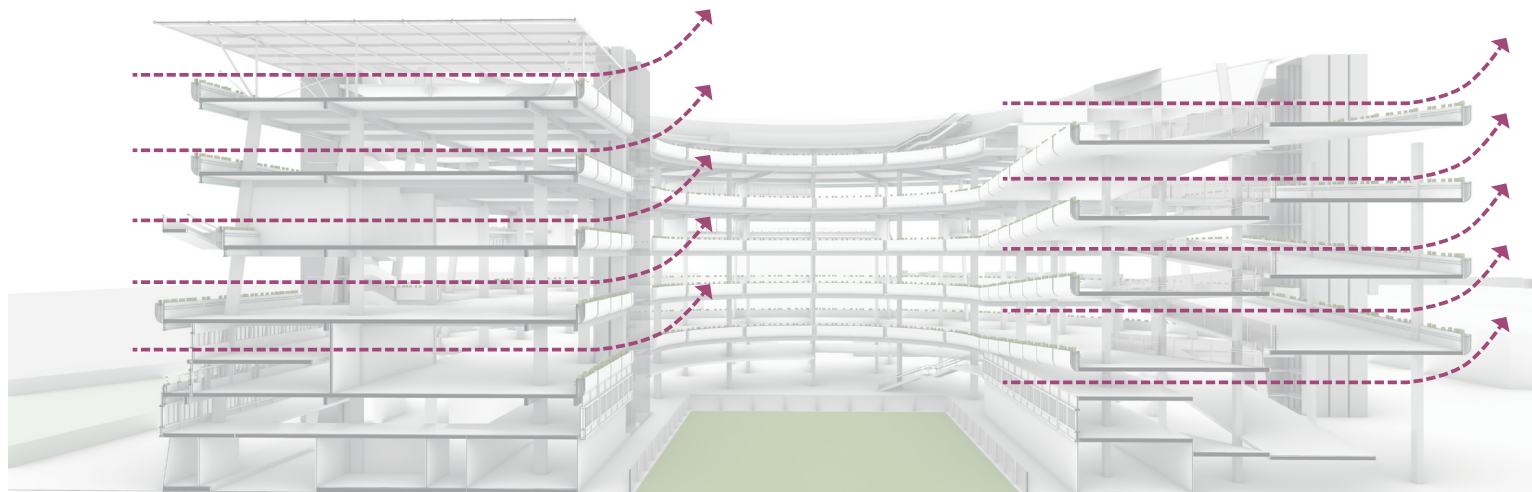
facade design

WEST/EAST FACADE



facade design

VENTILATION





READY TO PICK:

NO.	FIELD.
00144	zone A

WAITING LIST

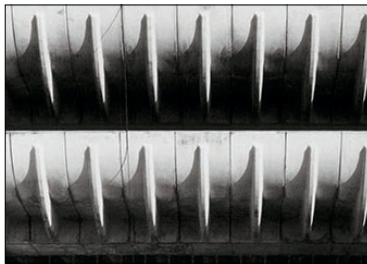
NO.	TIME
00145	2 HOURS
00146	2 HOURS
00147	2 HOURS
00148	3 HOURS
00149	3 HOURS
00150	3 HOURS

facade design

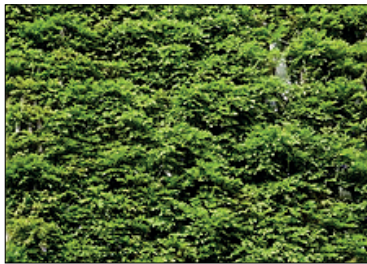
FRAGMENT



solar panel roof



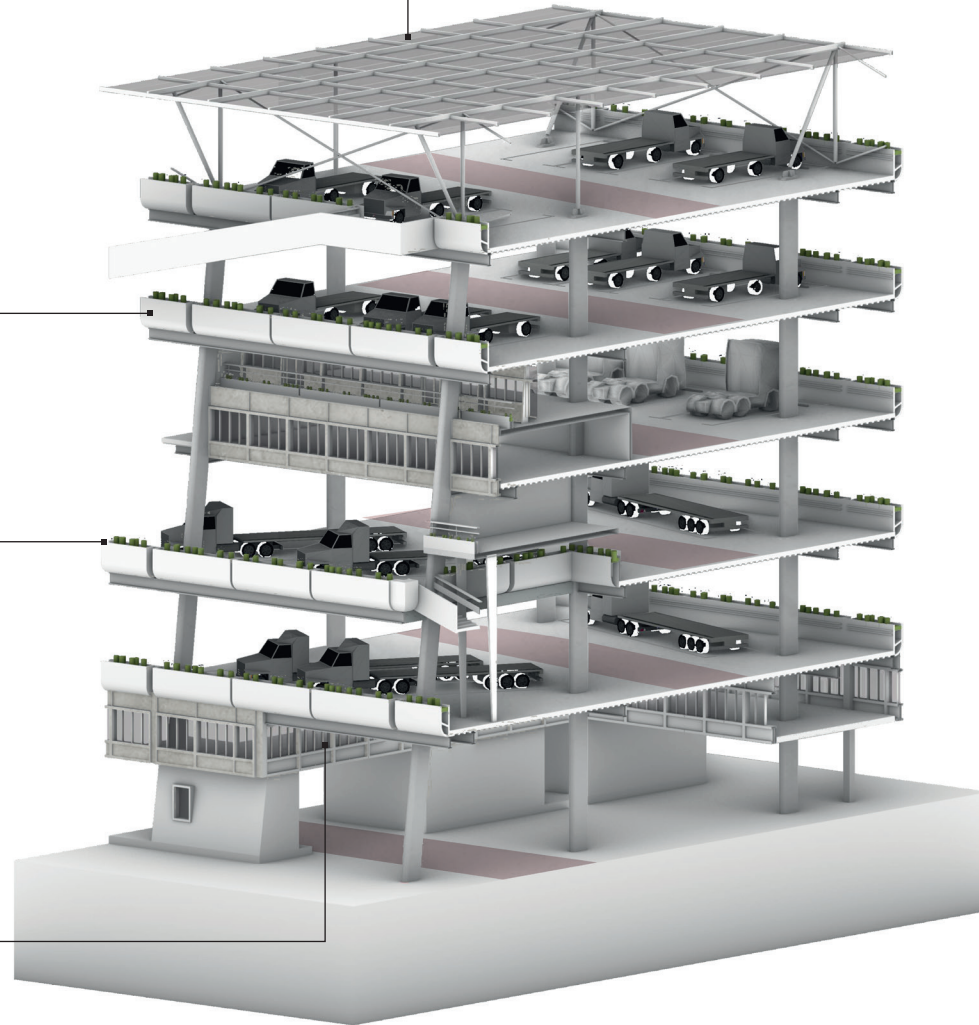
curved concrete guardrail



anti-pollution plant

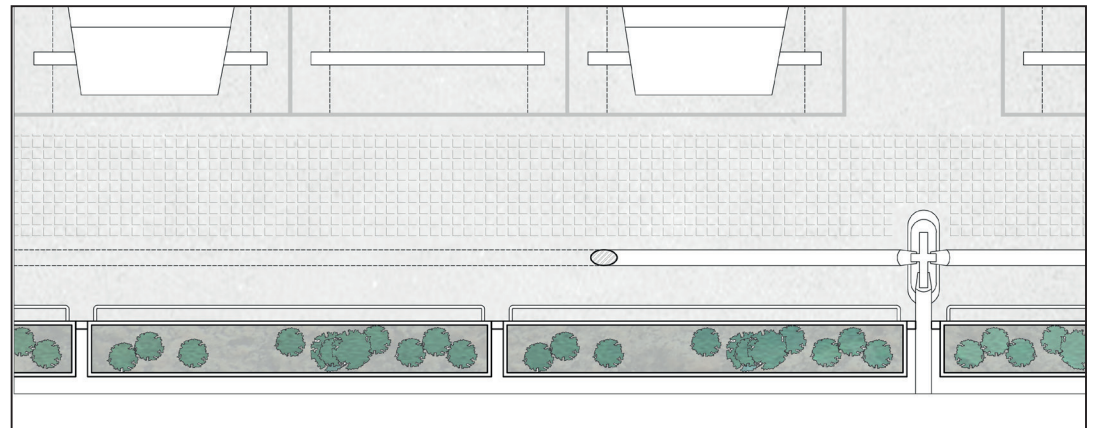
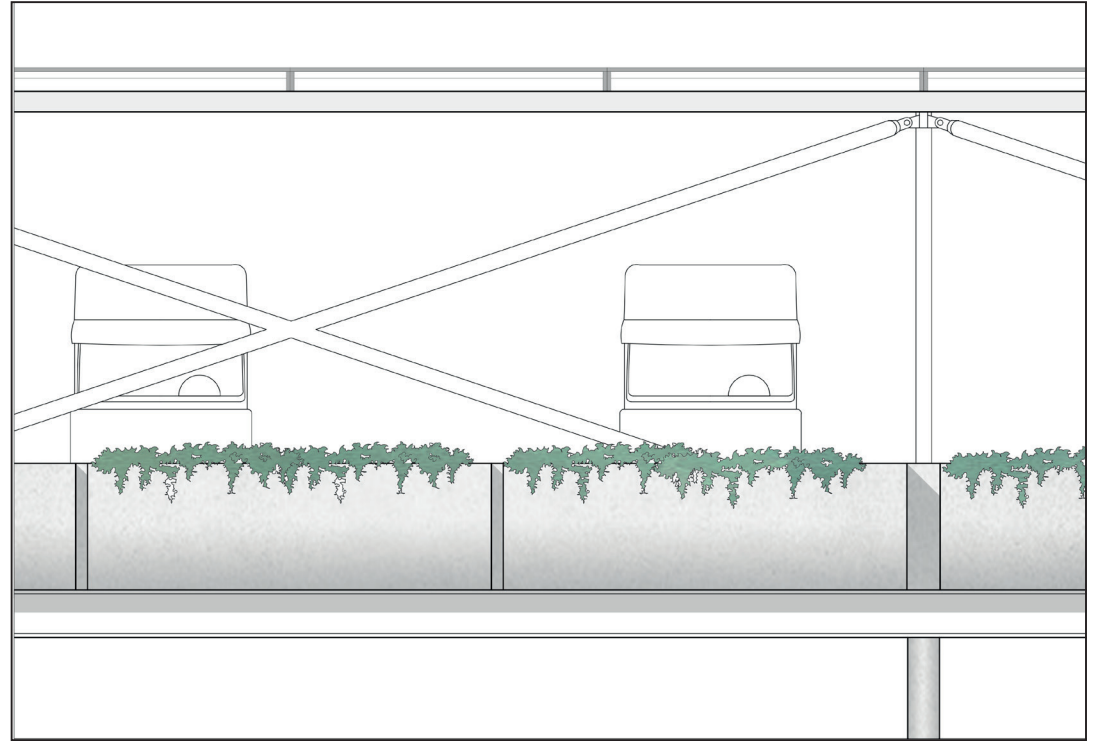
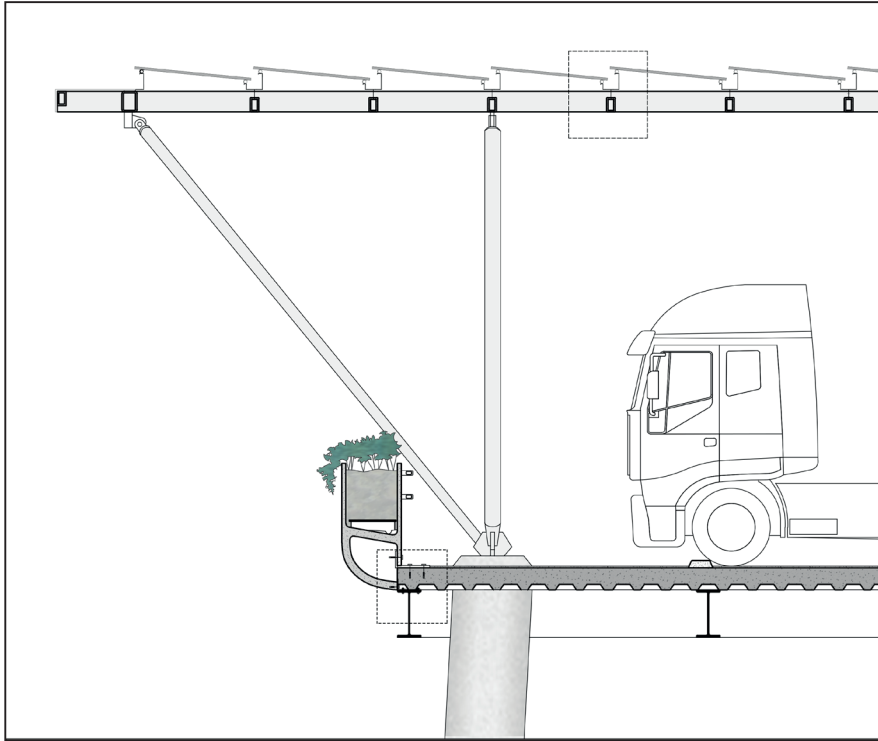


prefabricated concrete panel



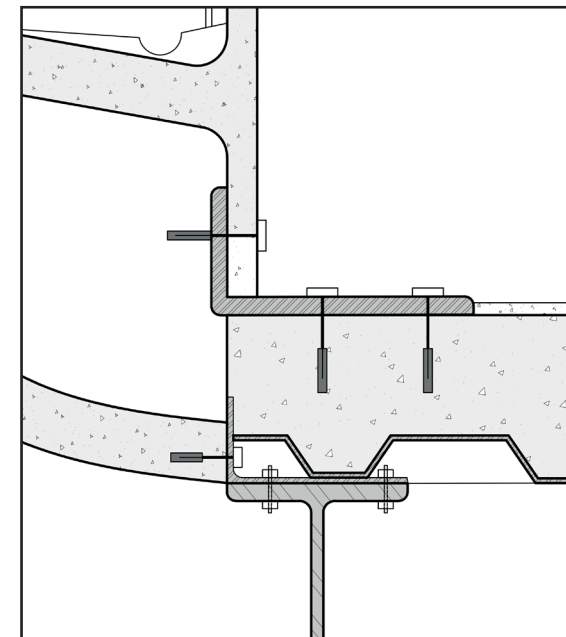
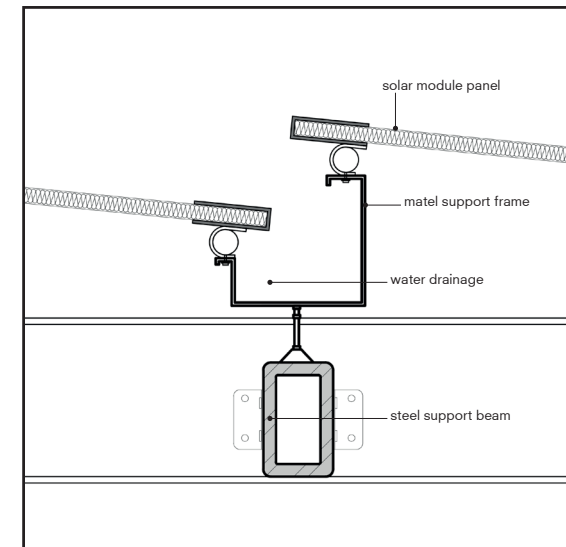
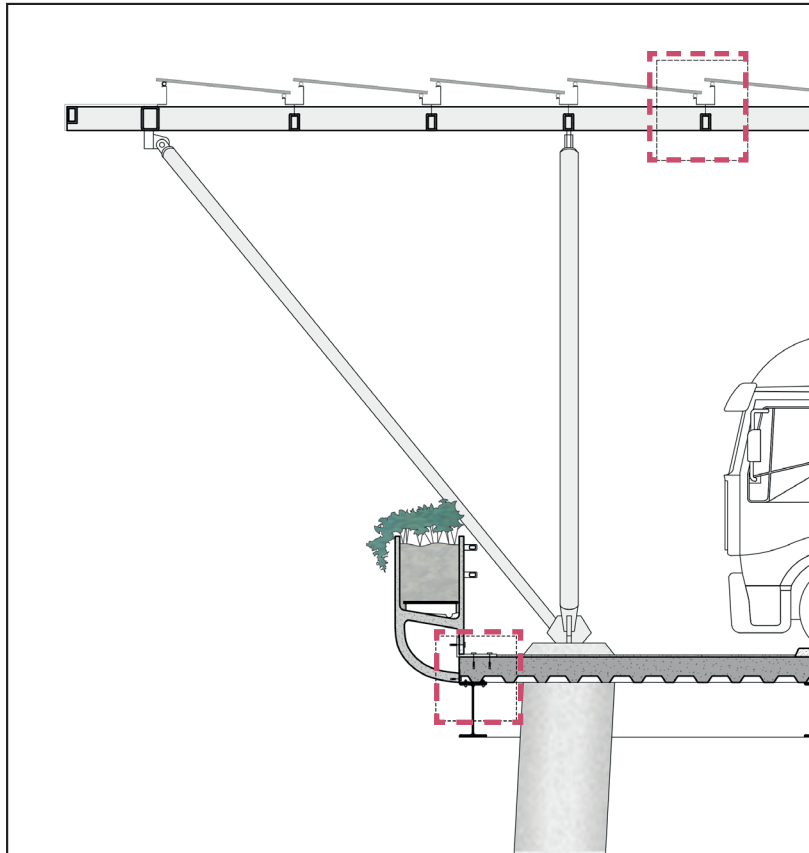
facade design

ROOF TOP DETAIL



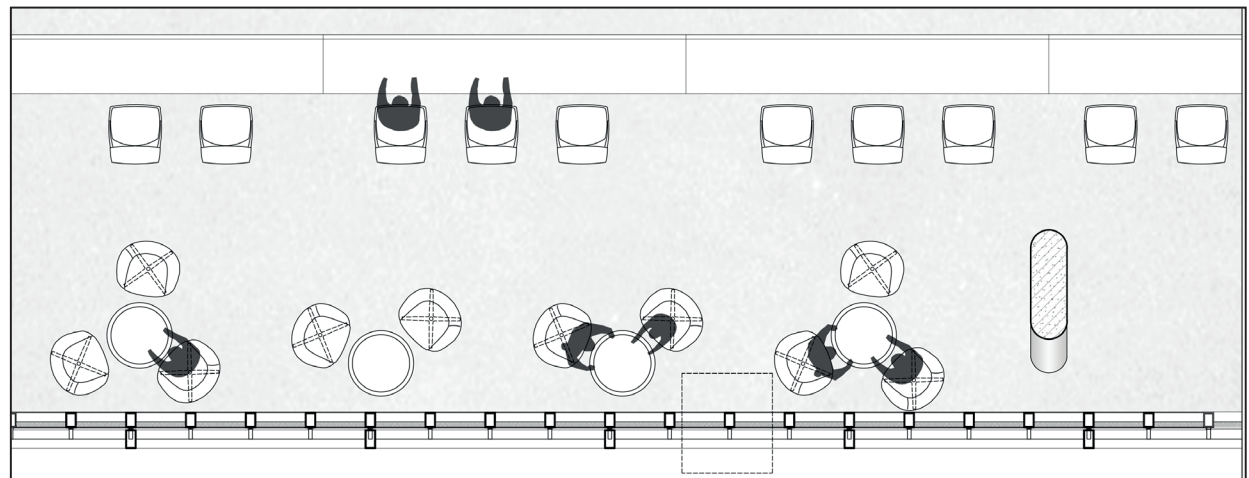
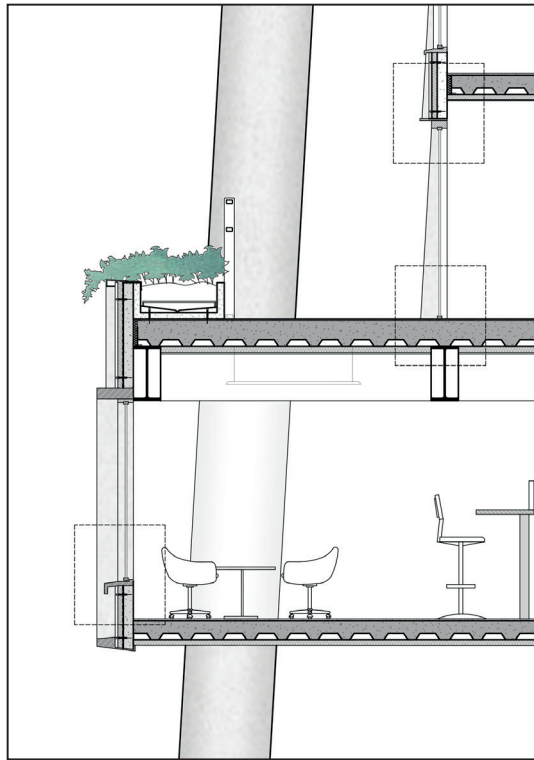
facade design

ROOF TOP DETAIL



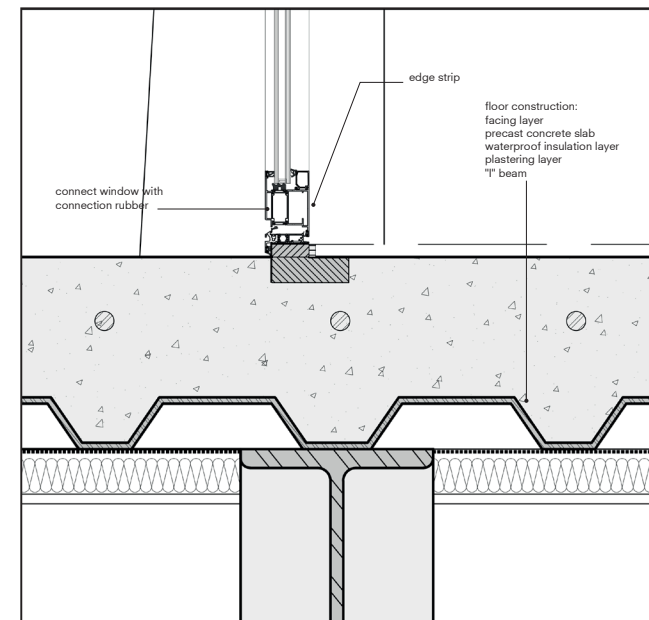
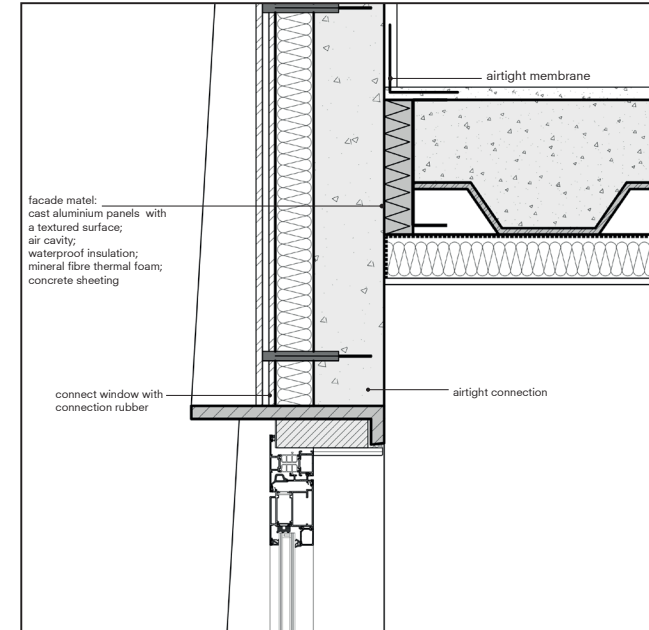
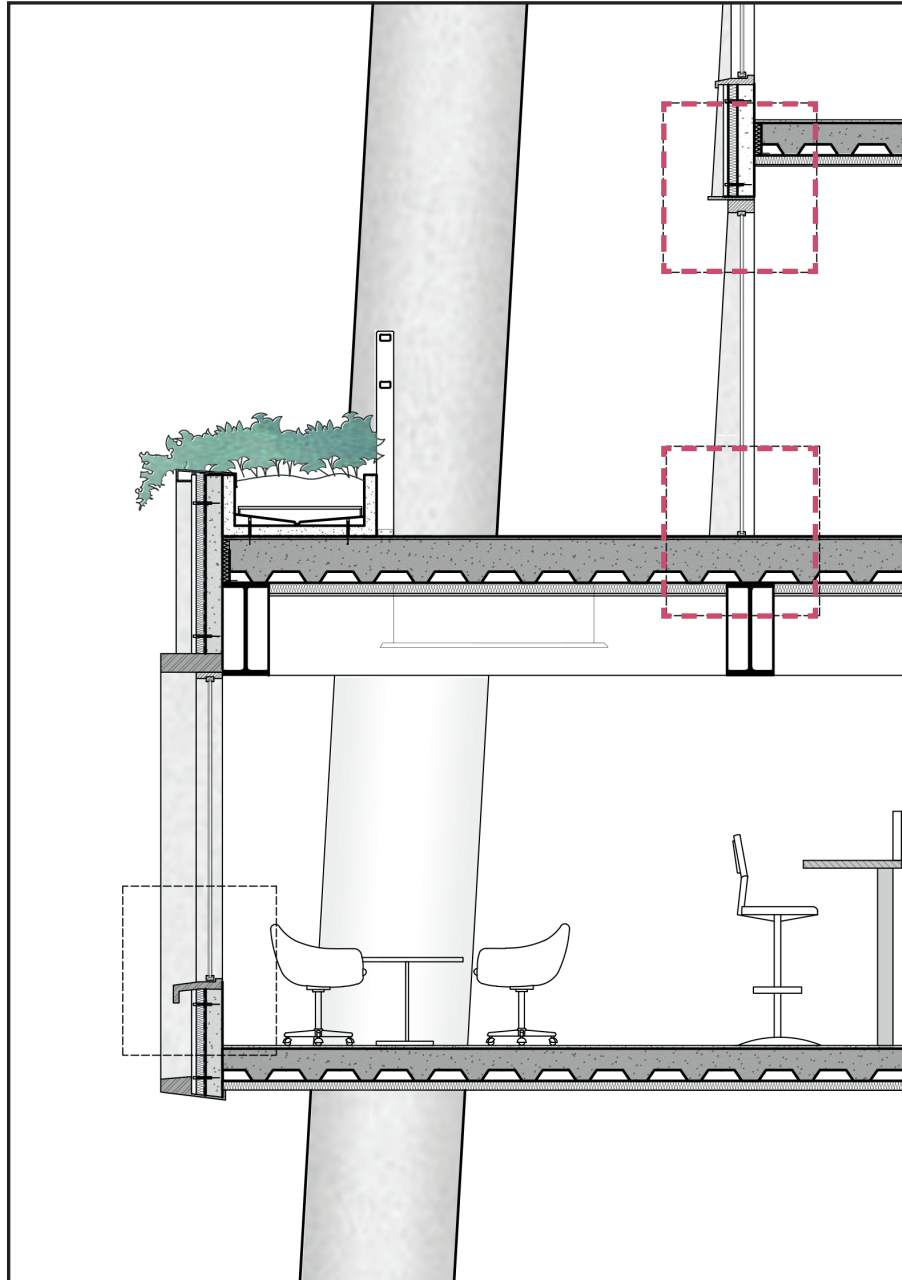
facade design

OFFICE FACADE DETAIL

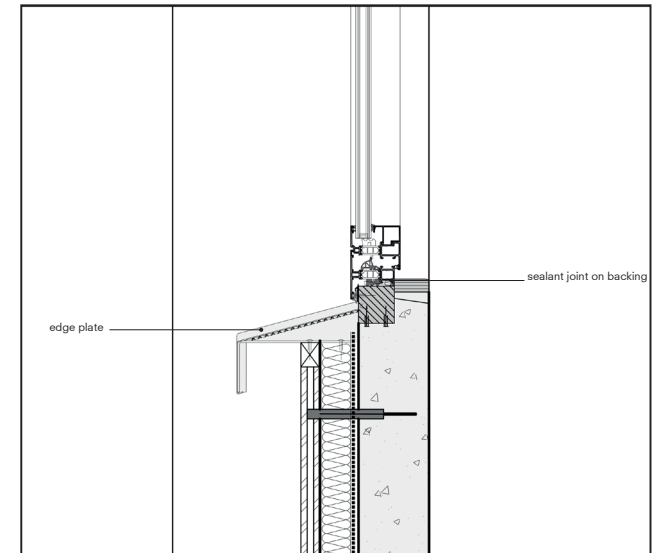
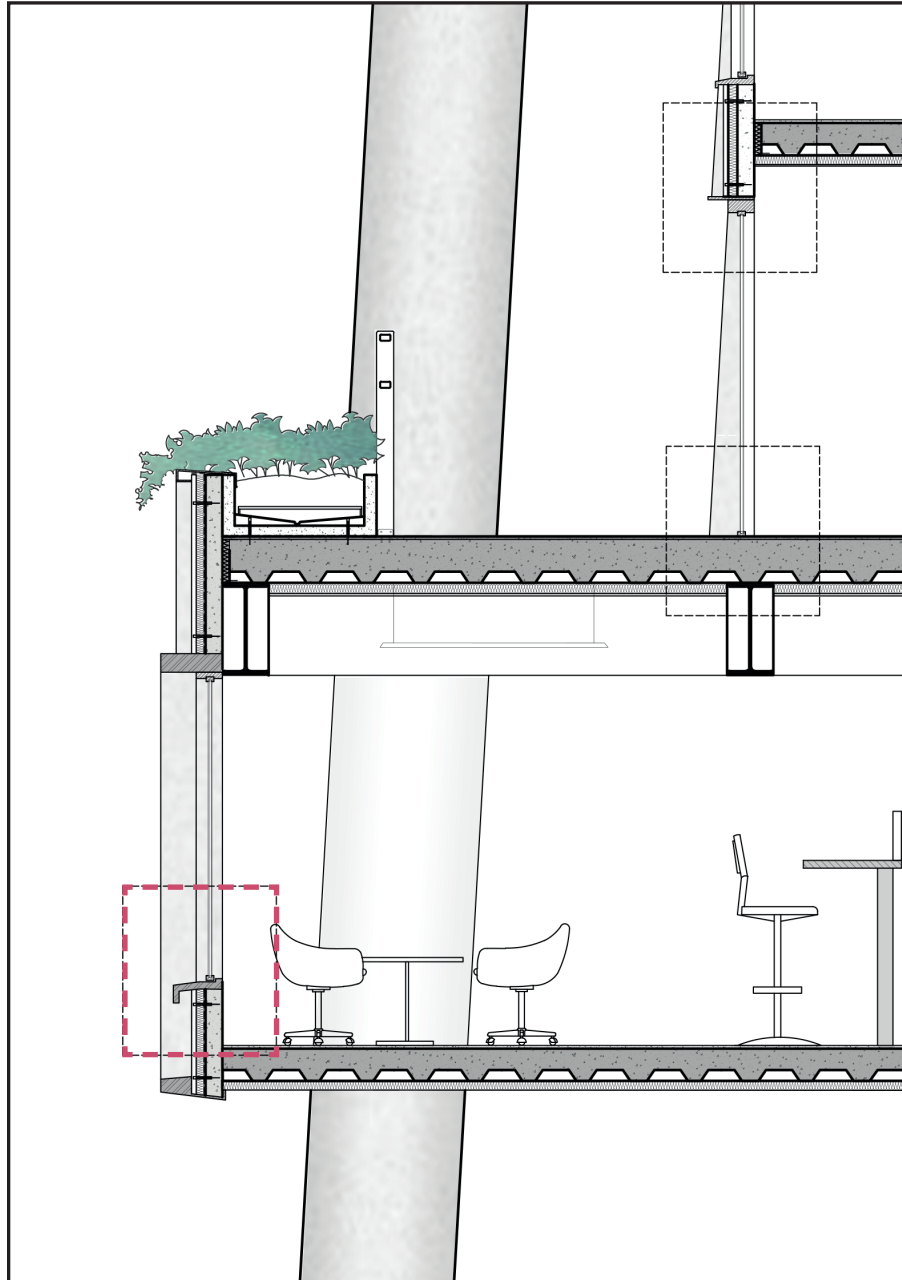


facade design

OFFICE FACADE DETAIL

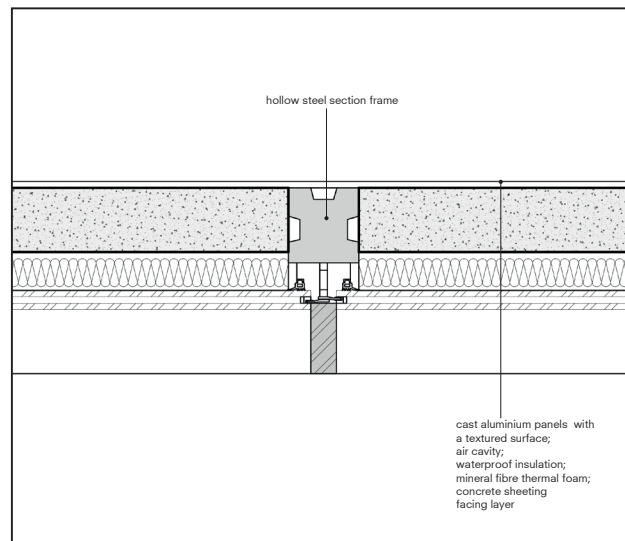
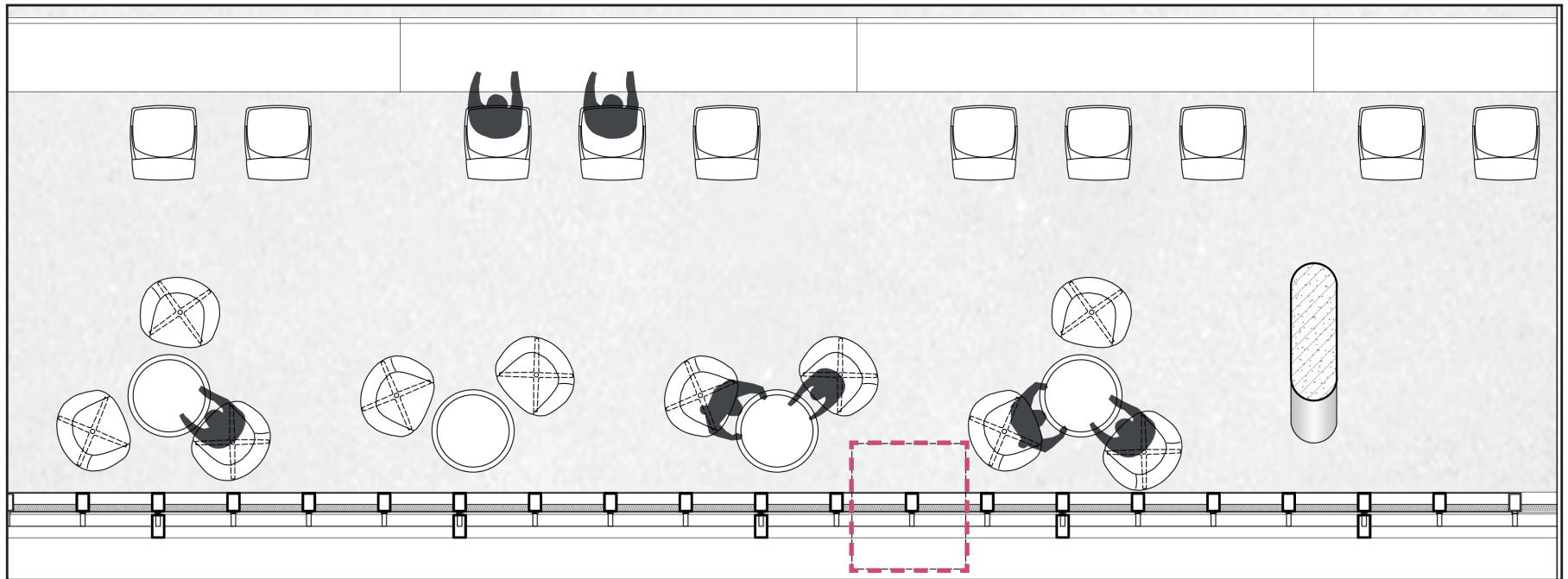


OFFICE FACADE DETAIL



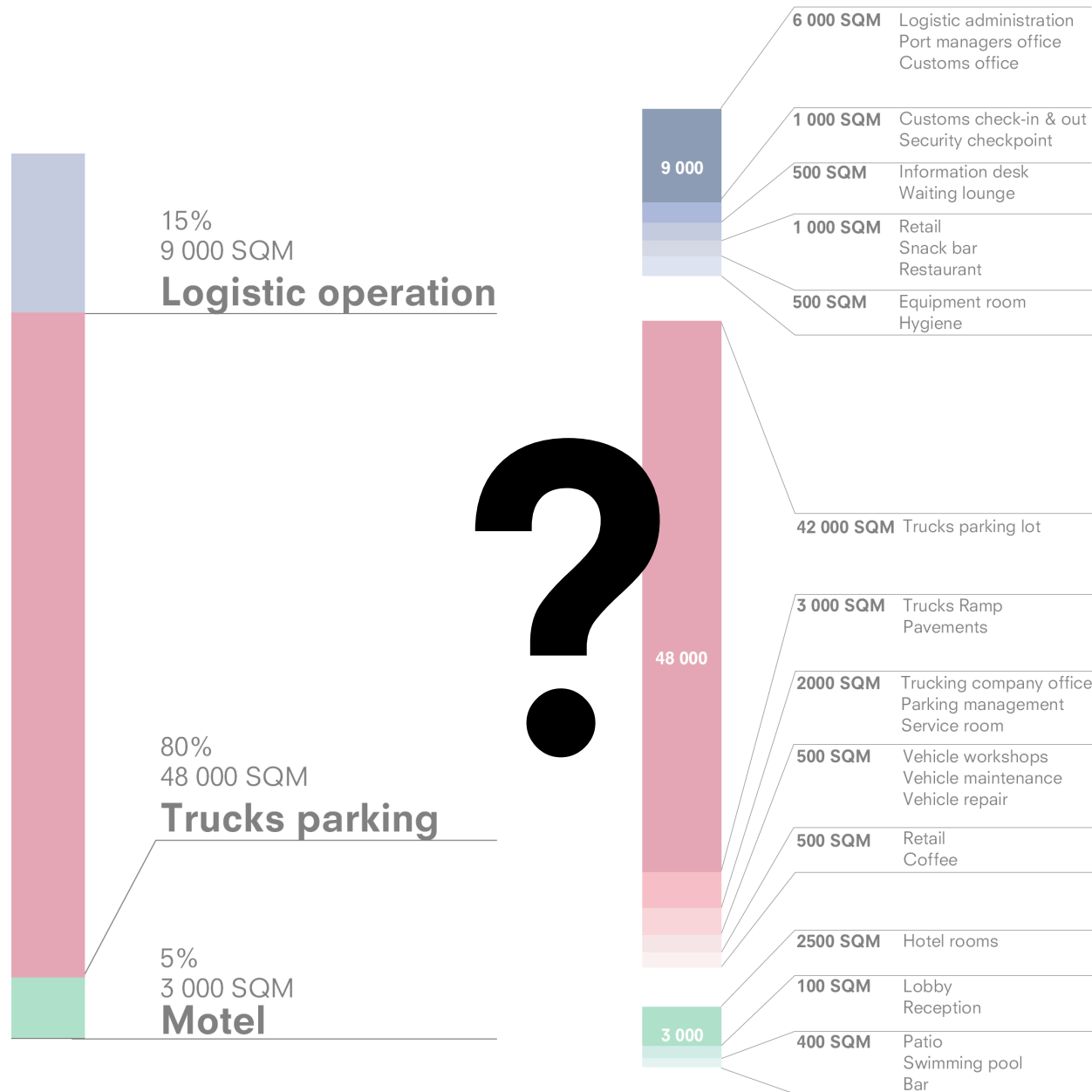
facade design

OFFICE FACADE DETAIL



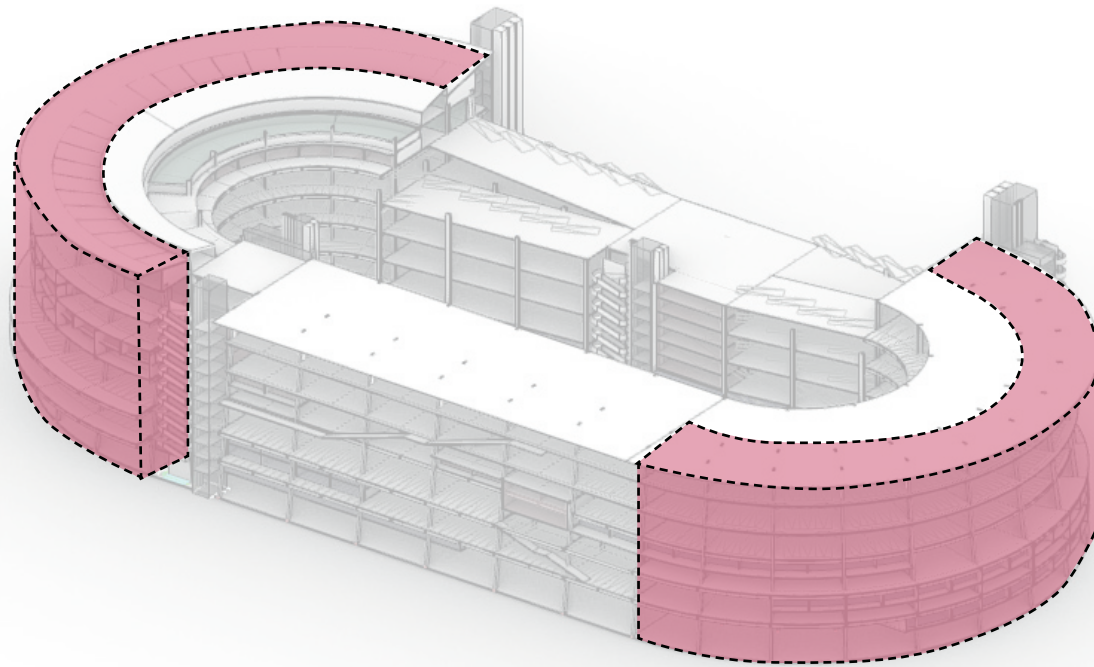
CHANGABLE USE

changable use CHANGES?



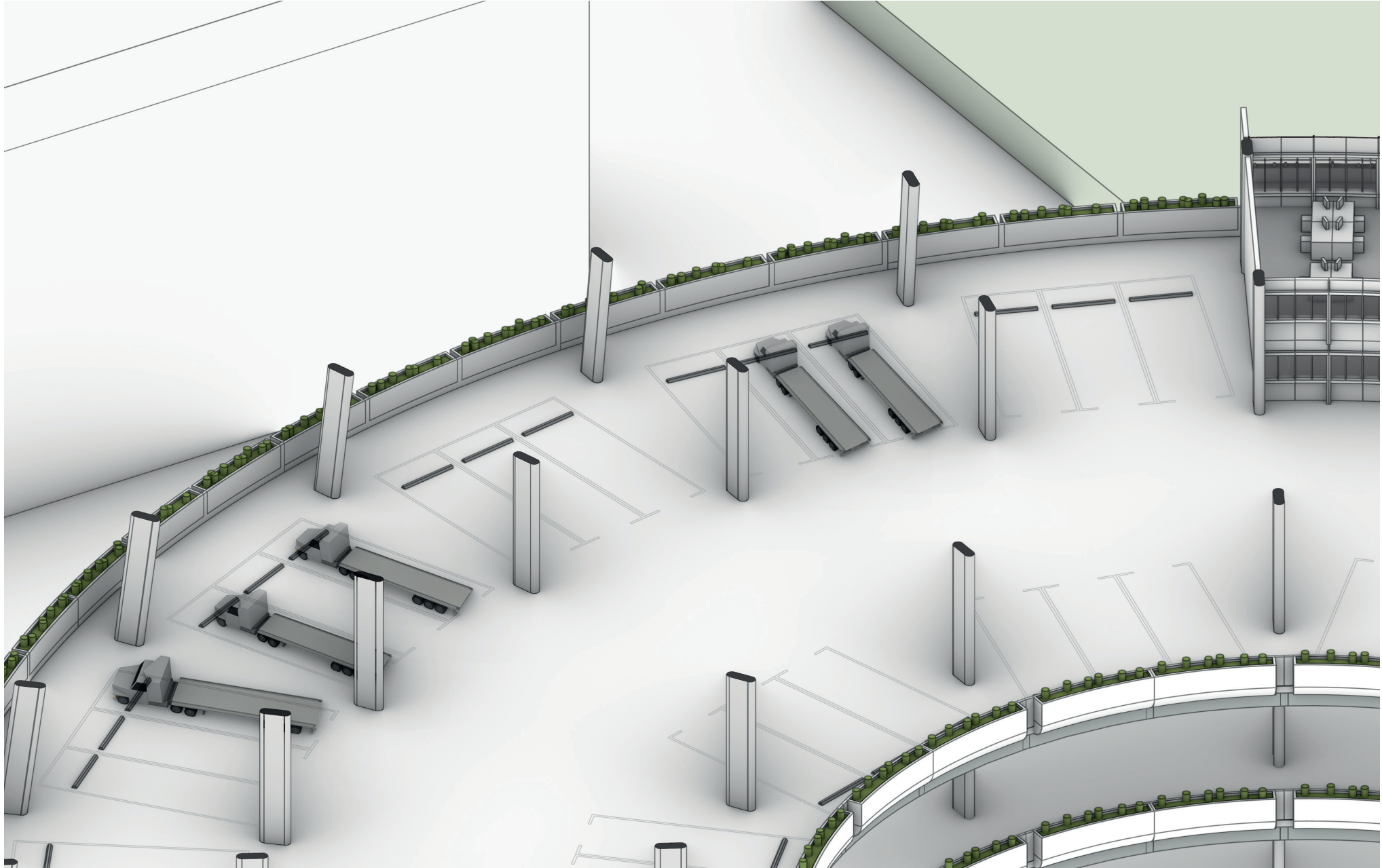
changable use

CHANGEABLE USE ZONE



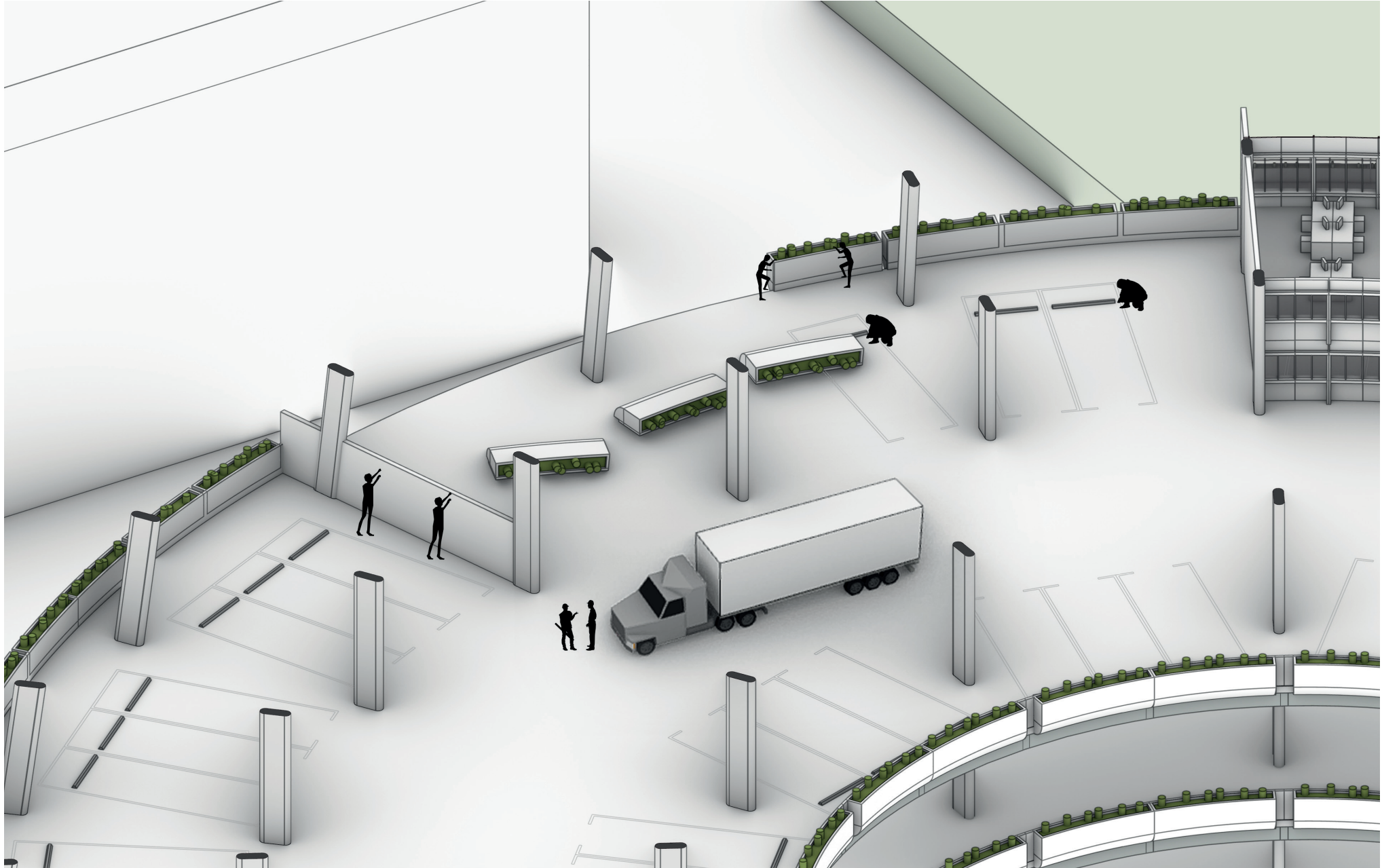
changable use

CURRENT FUNCTION



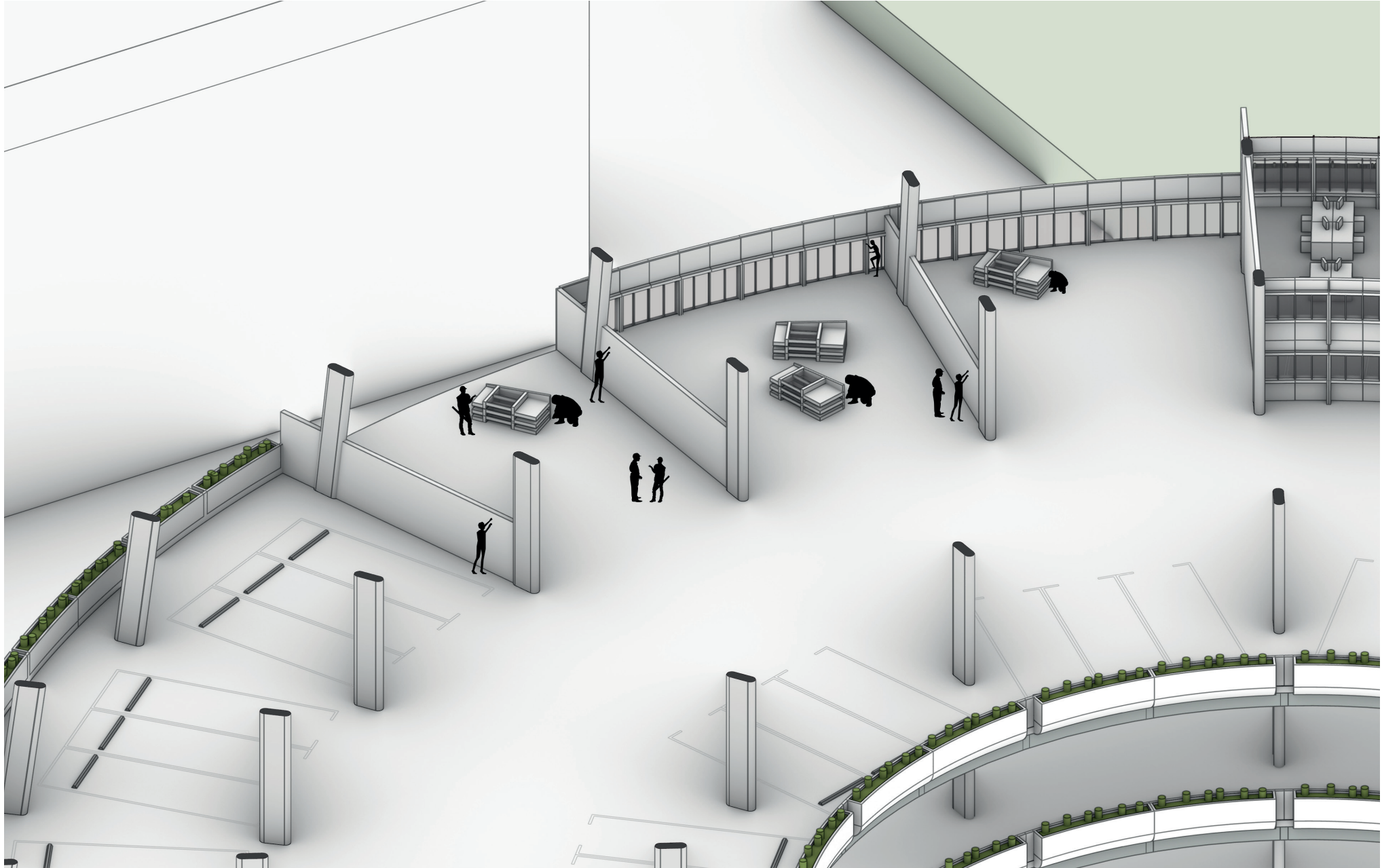
changable use

PARTLY DEMOLITION



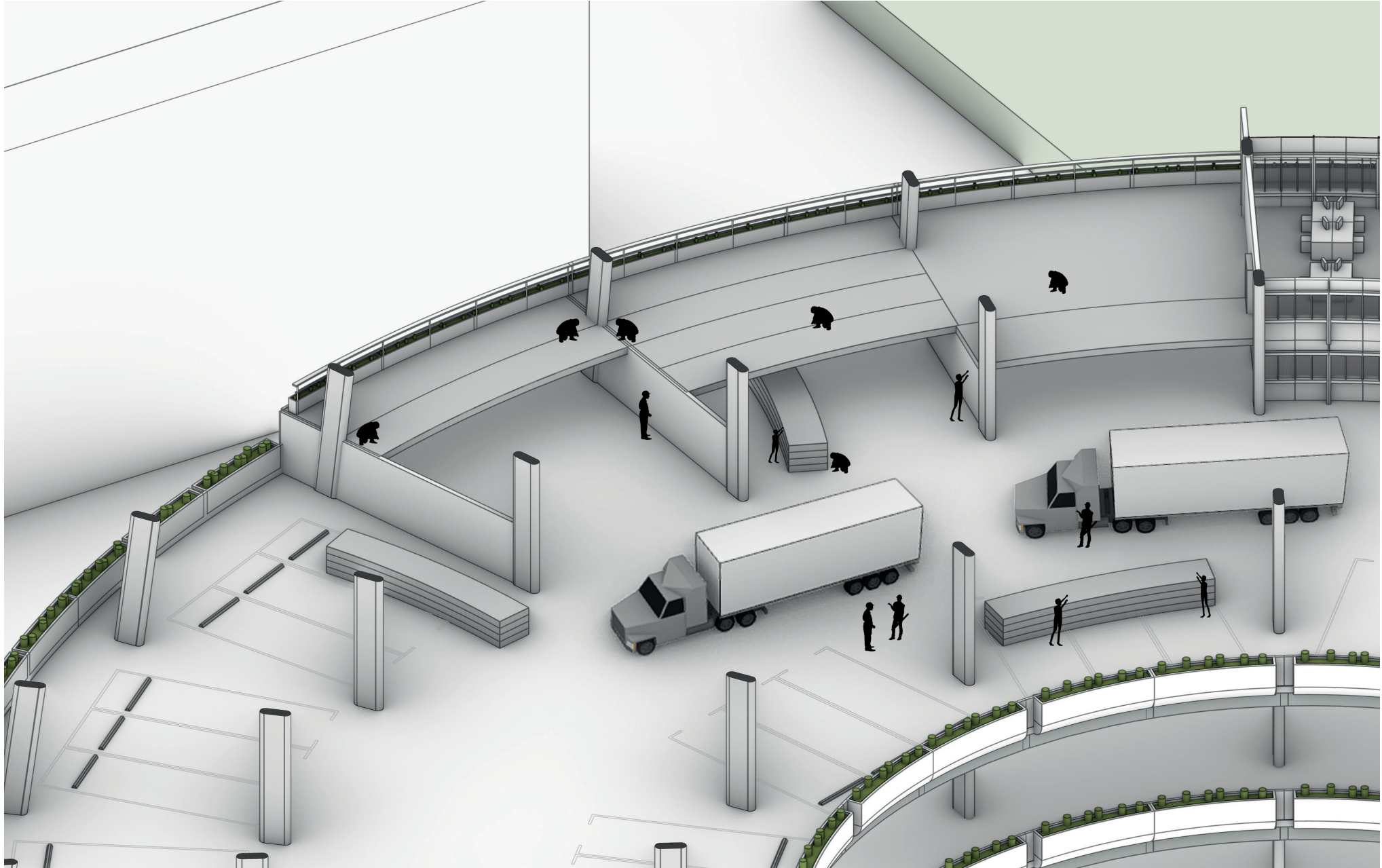
changable use

WALL CONSTRUCTION



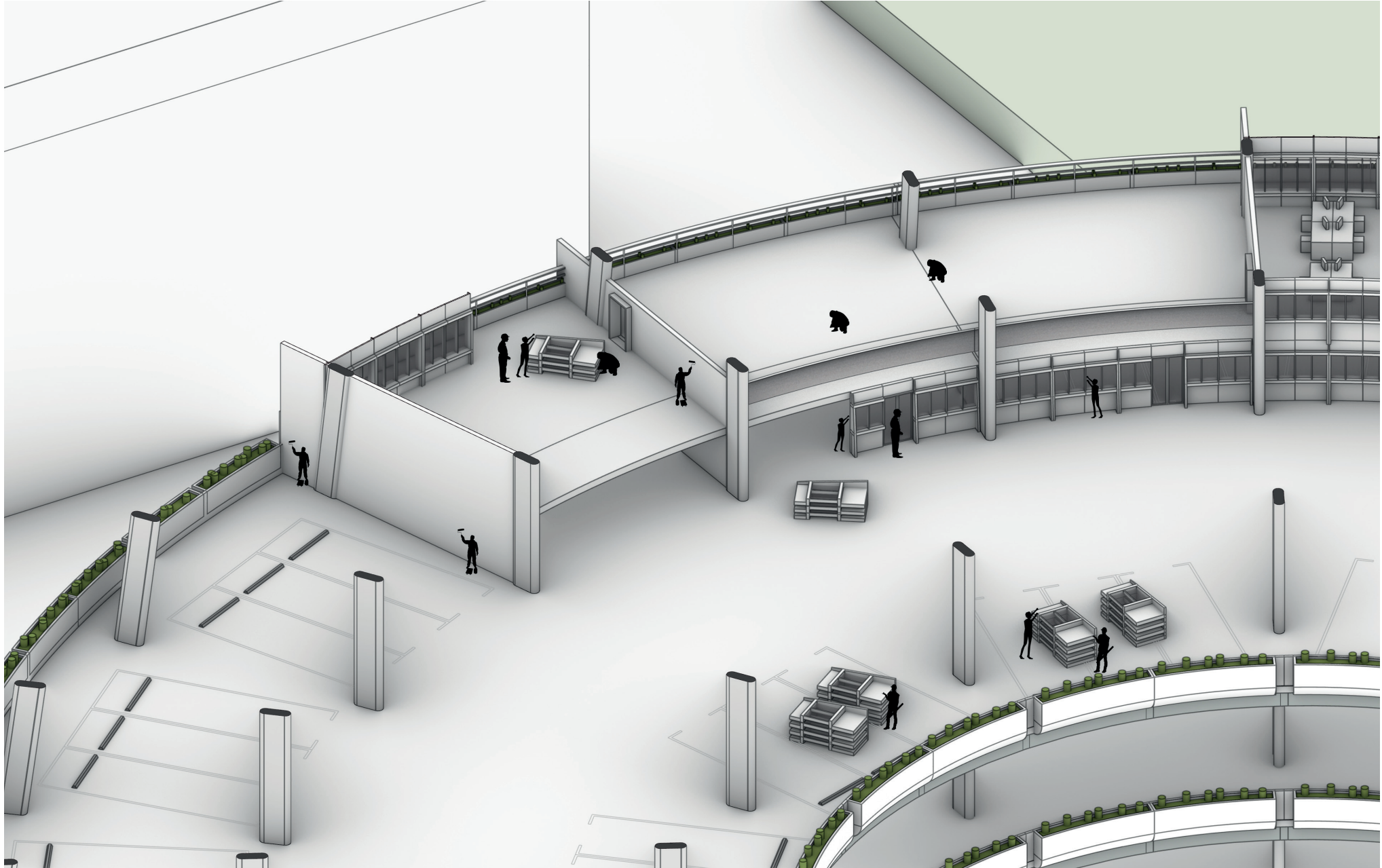
changable use

FLOOR CONSTRUCTION



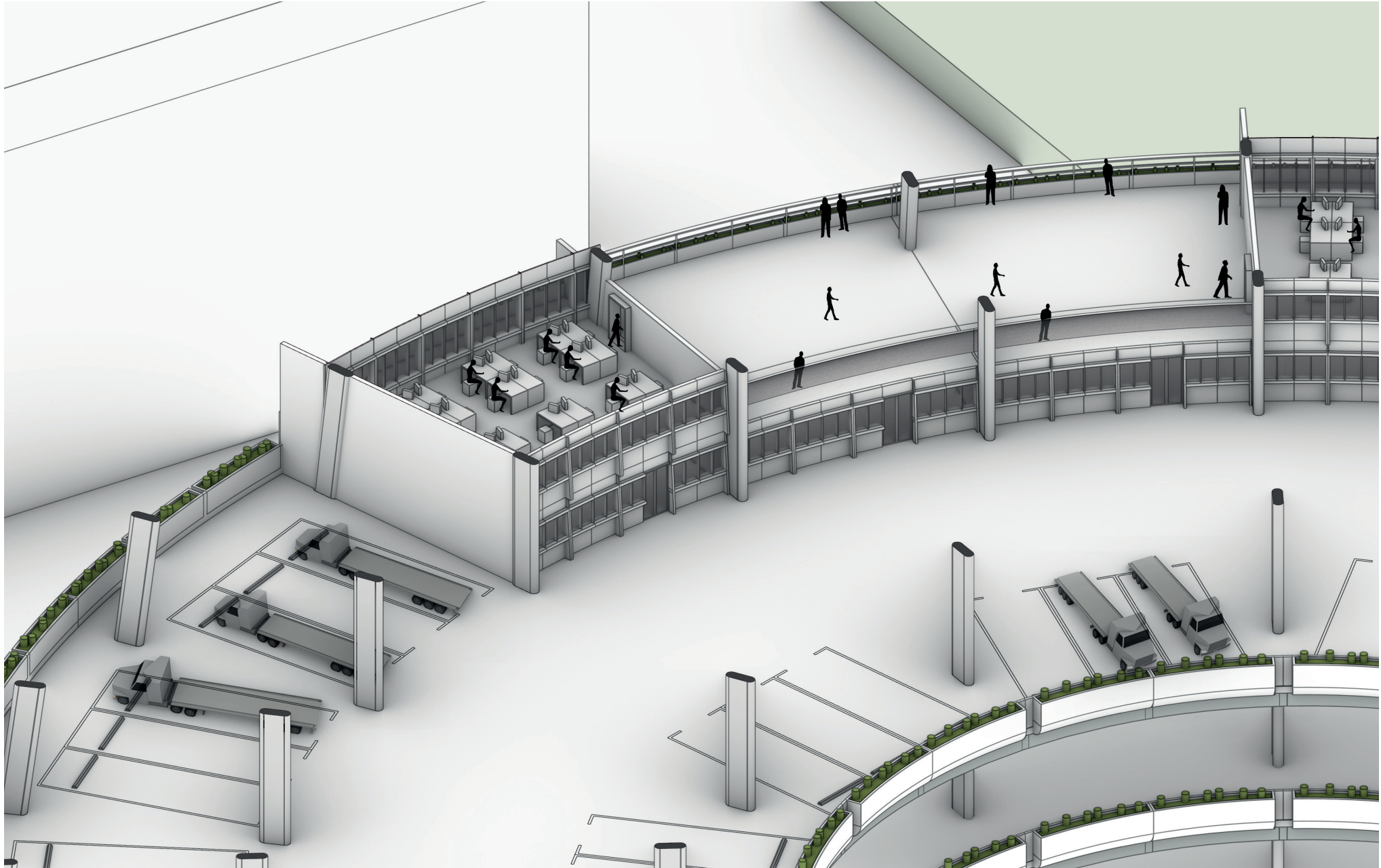
changable use

INTERIOR FACADE

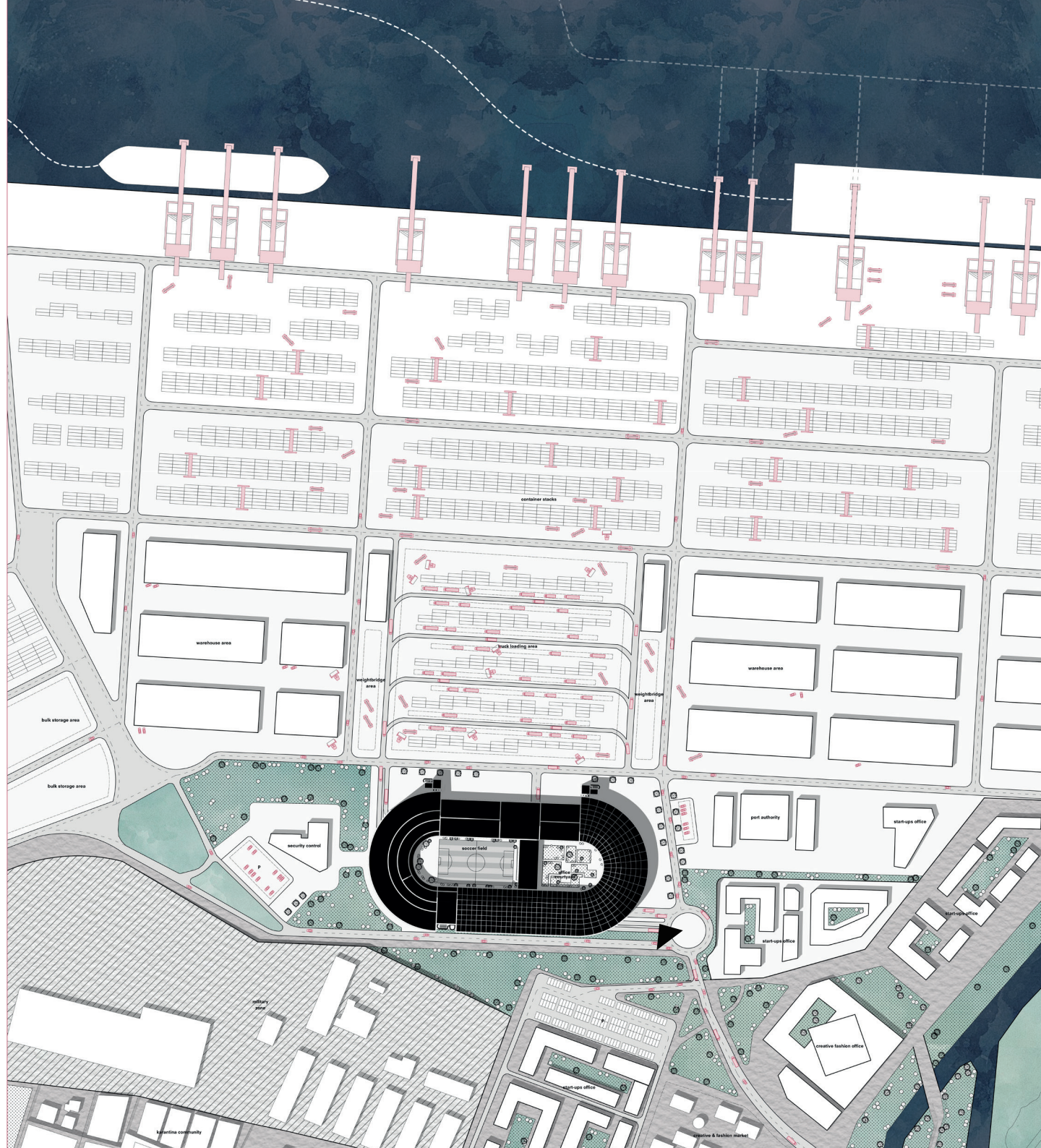


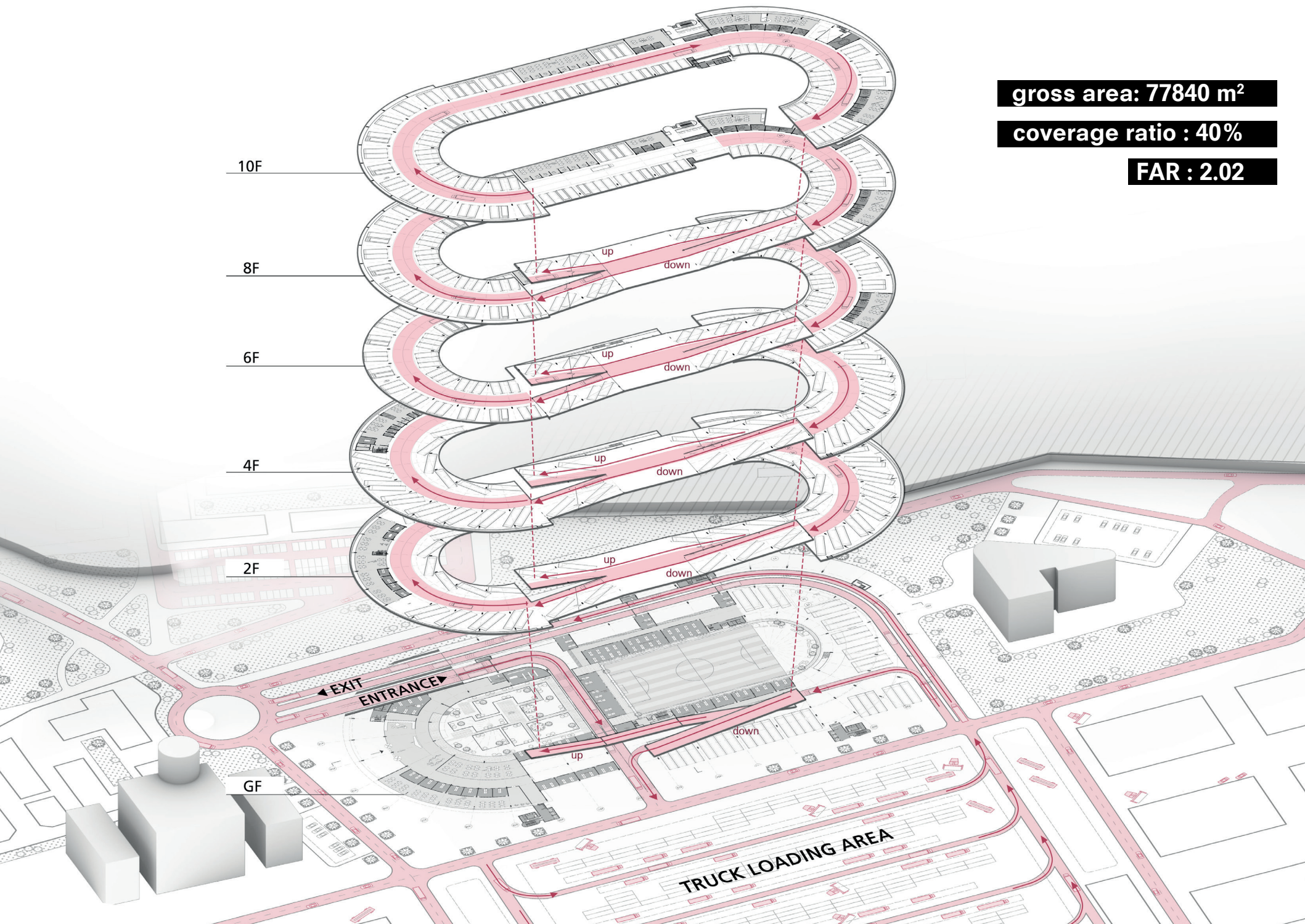
changable use

COMPLETED



PROJECT TOUR





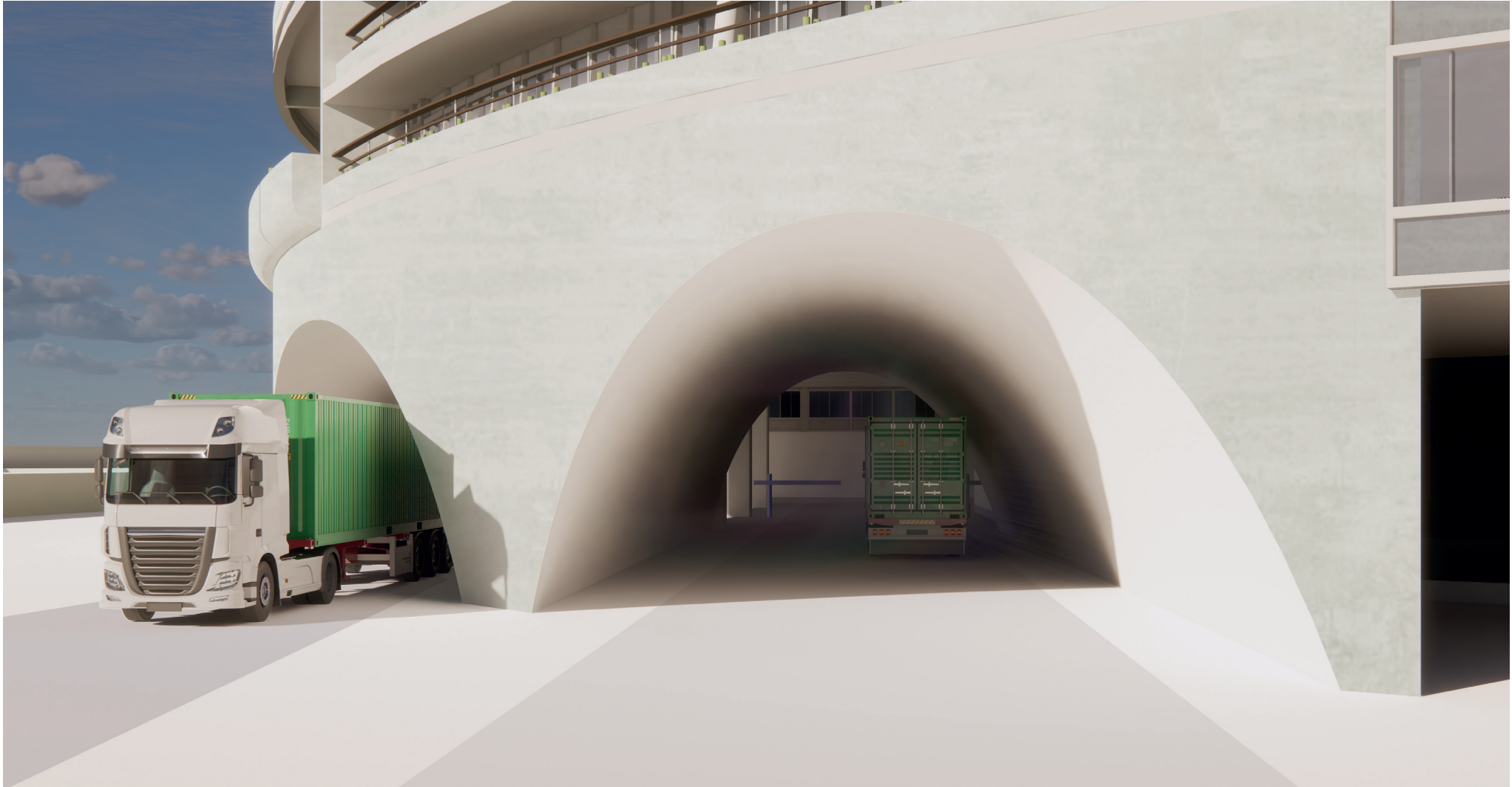
gross area: 77840 m²

coverage ratio : 40%

FAR : 2.02

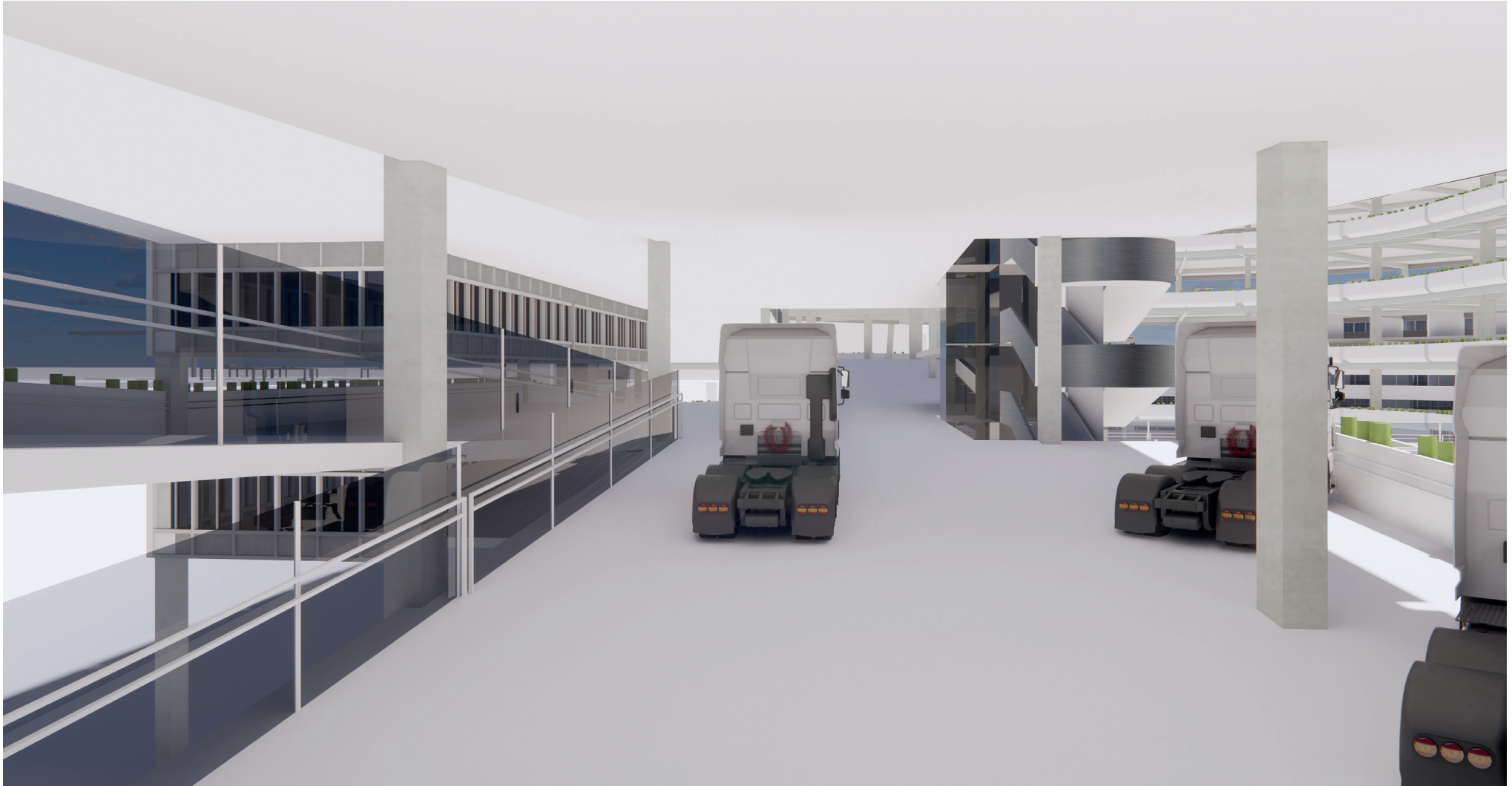
project tour

TRUCK ENTRANCE



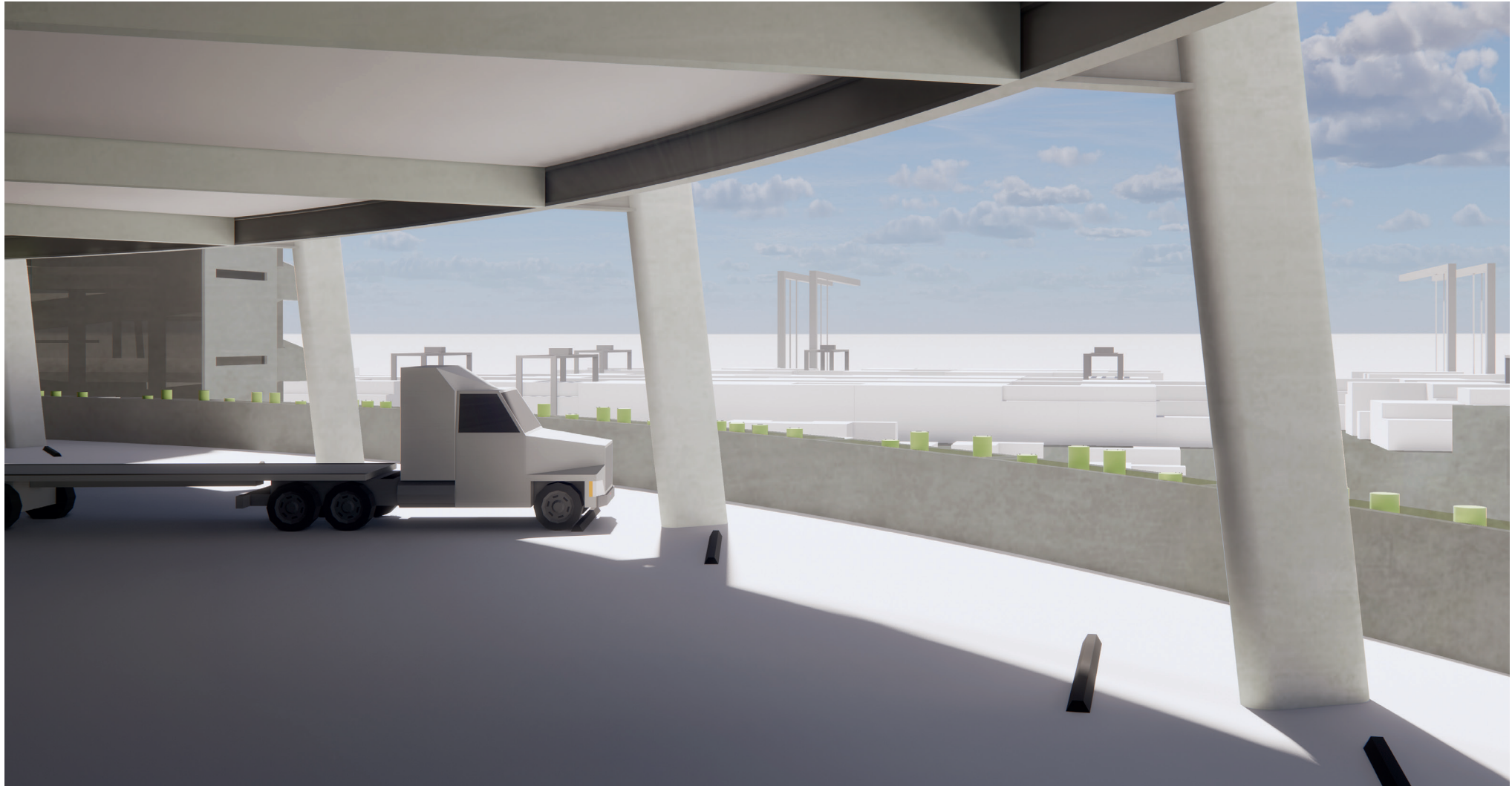
project tour

RAMP SPACE



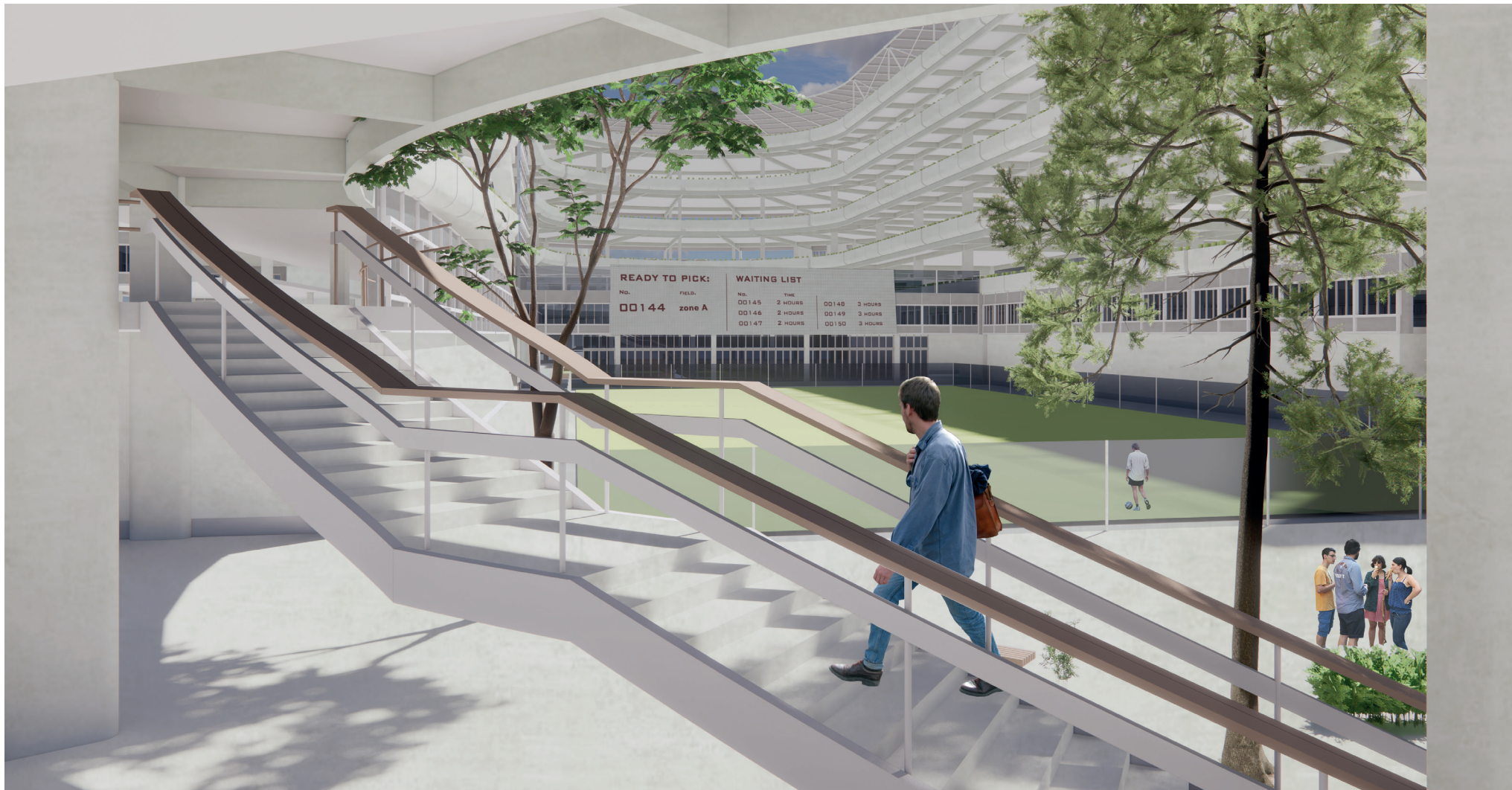
project tour

PARKING SPACE



project tour

COURTYARD



project tour

REST LOUNGE

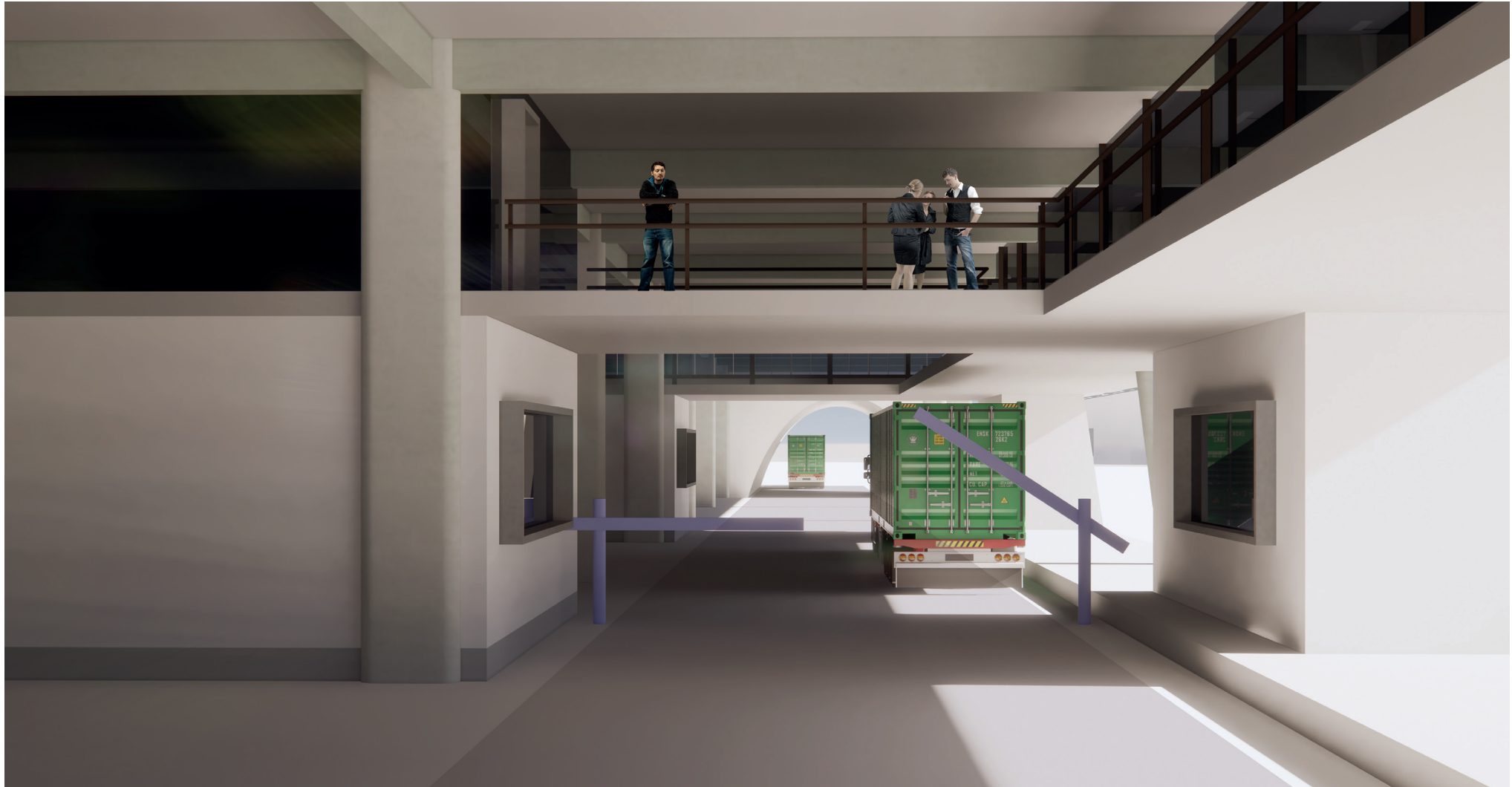


project tour
MOTEL



project tour

EXIT





READY TO PICK:

NO.	FIELD:
00144	zone A

WAITING LIST

NO.	TIME
00145	2 HOURS
00146	2 HOURS
00147	2 HOURS
00148	3 HOURS
00149	3 HOURS
00150	3 HOURS





THANK YOU!