AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

smart resilient **cities**

ASTANA‘S URBAN TRANSFORMATION TOWARDS A GREEN ECONOMY HUB

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FROM EXPO TO A SHOW CASE CITY FOR CENTRAL ASIA & THE WORLD

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THE APPROACH: SMART

Urban Management

Urban Planning

Implementation Dimensions

Goal

Smart Urban Management

Smart Astana

Smart Spatial Planning

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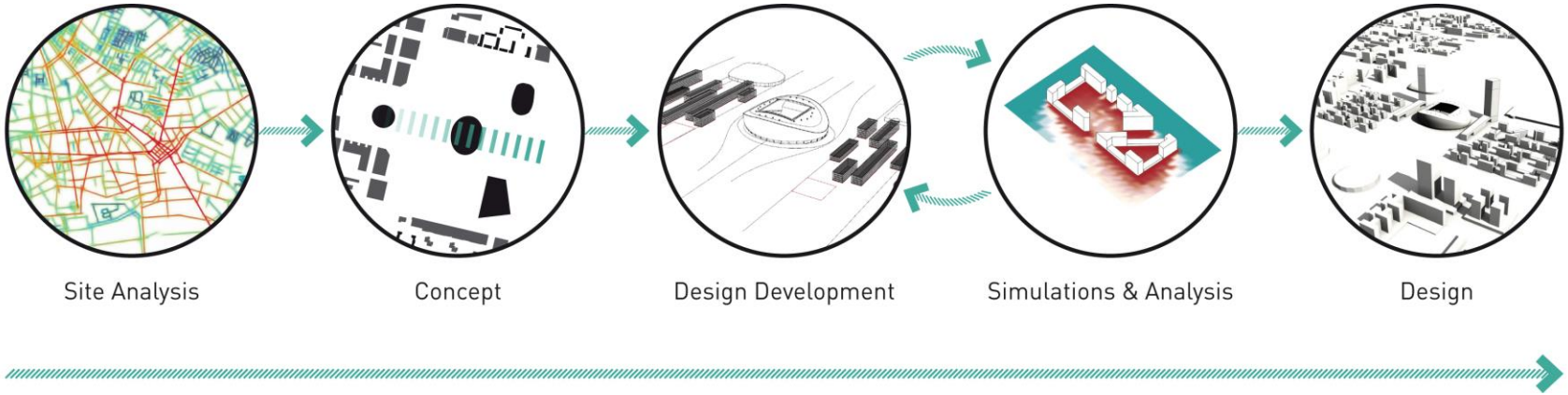
THE APPROACH



KEY PARAMETERS

LANDUSE MIX

aiming a landuse mix that activates the open spaces during the whole year

ECONOMIC ASPECTS

creating valuable spaces that pay them self back in long-term

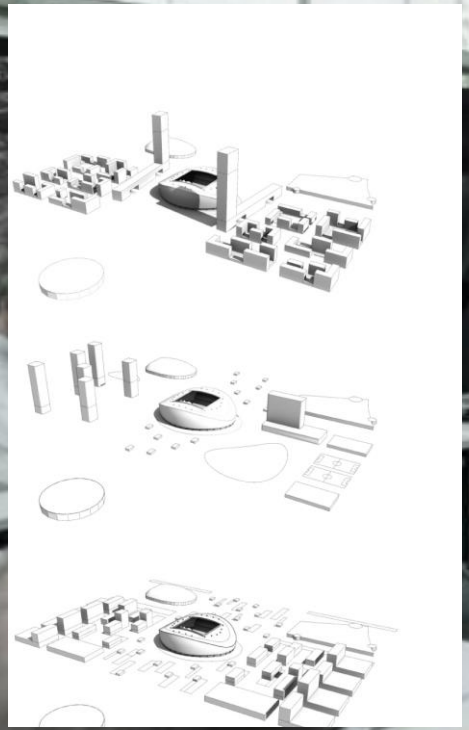
ENERGY PERFORMANCE

considering the environmental influences to develop an intelligent design

TRAFFIC FLOW

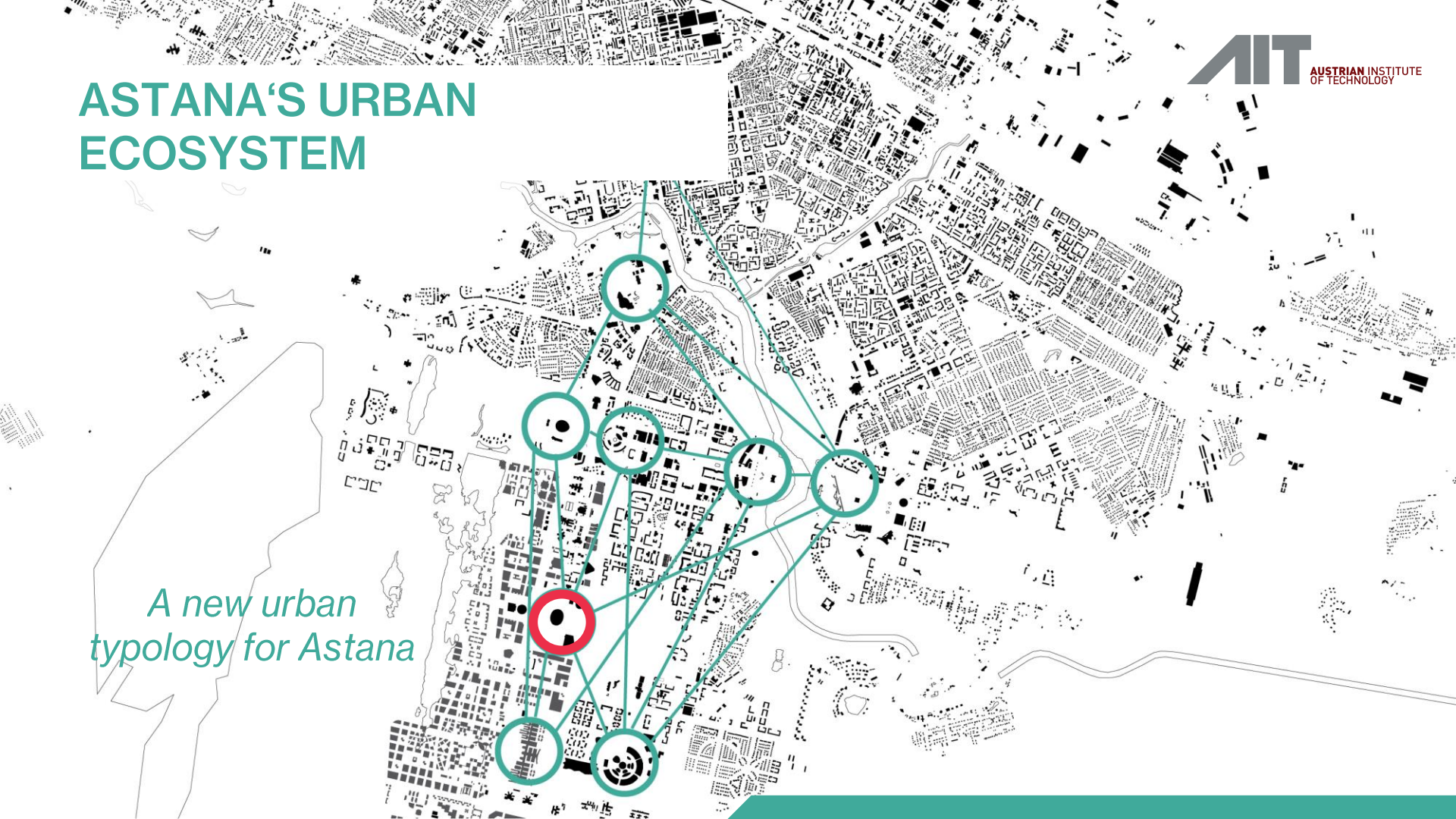
structuring the car, bike and pedestrian flows on site

WORKING WITH SMART SCENARIOS



ASTANA‘S URBAN ECOSYSTEM

A new urban typology for Astana



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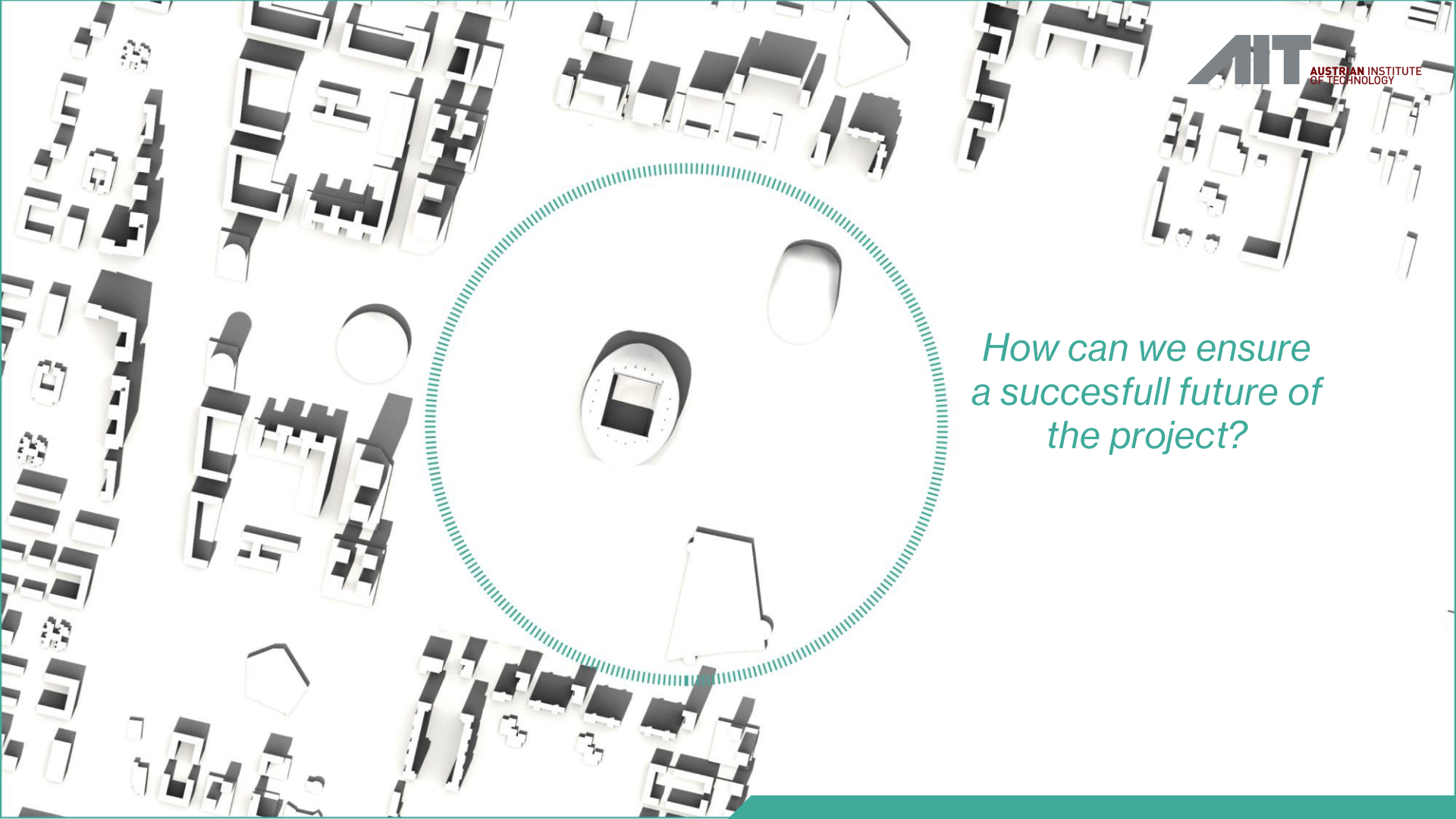

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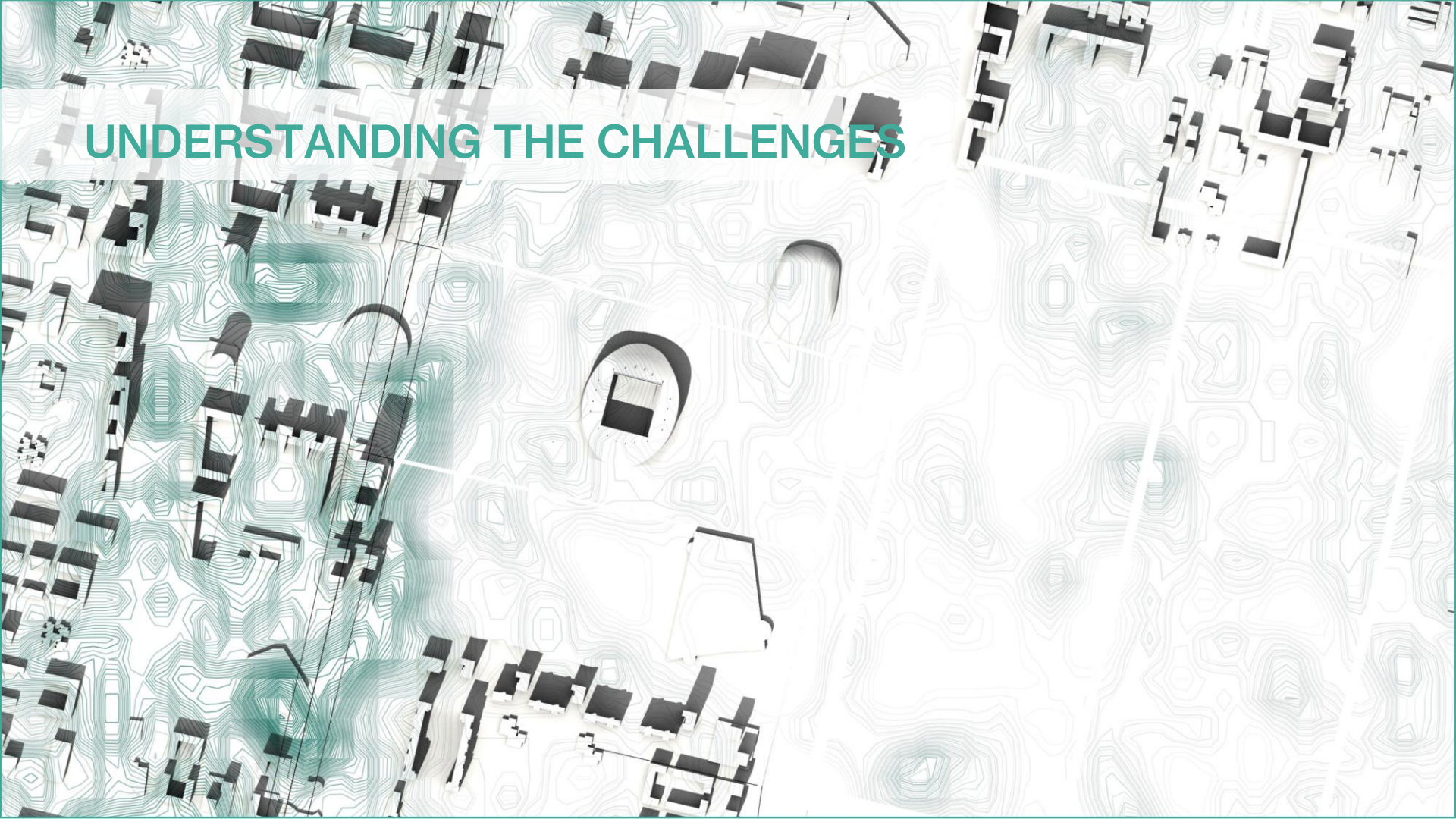
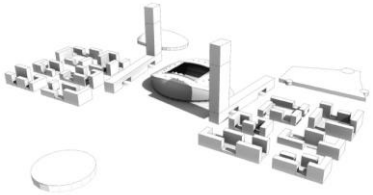
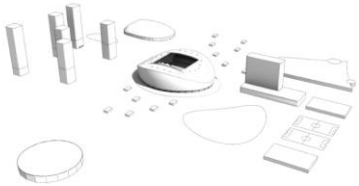
How can we ensure a succesfull future of the project?

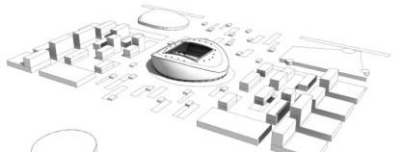
UNDERSTANDING THE CHALLENGES



SPORTS CITY: THREE SCENARIOS







- Designed by performance parametrs
- Not a final design
- Base for informed decision-making
- Base for negotiations between city & investors

- Outcome
  - KPI-based benchmark for investors
  - KPI-based benchmark for design competition
  - Base for legal zoning plans

‚Designed by performance‘

SCENARIO 1

The green vein

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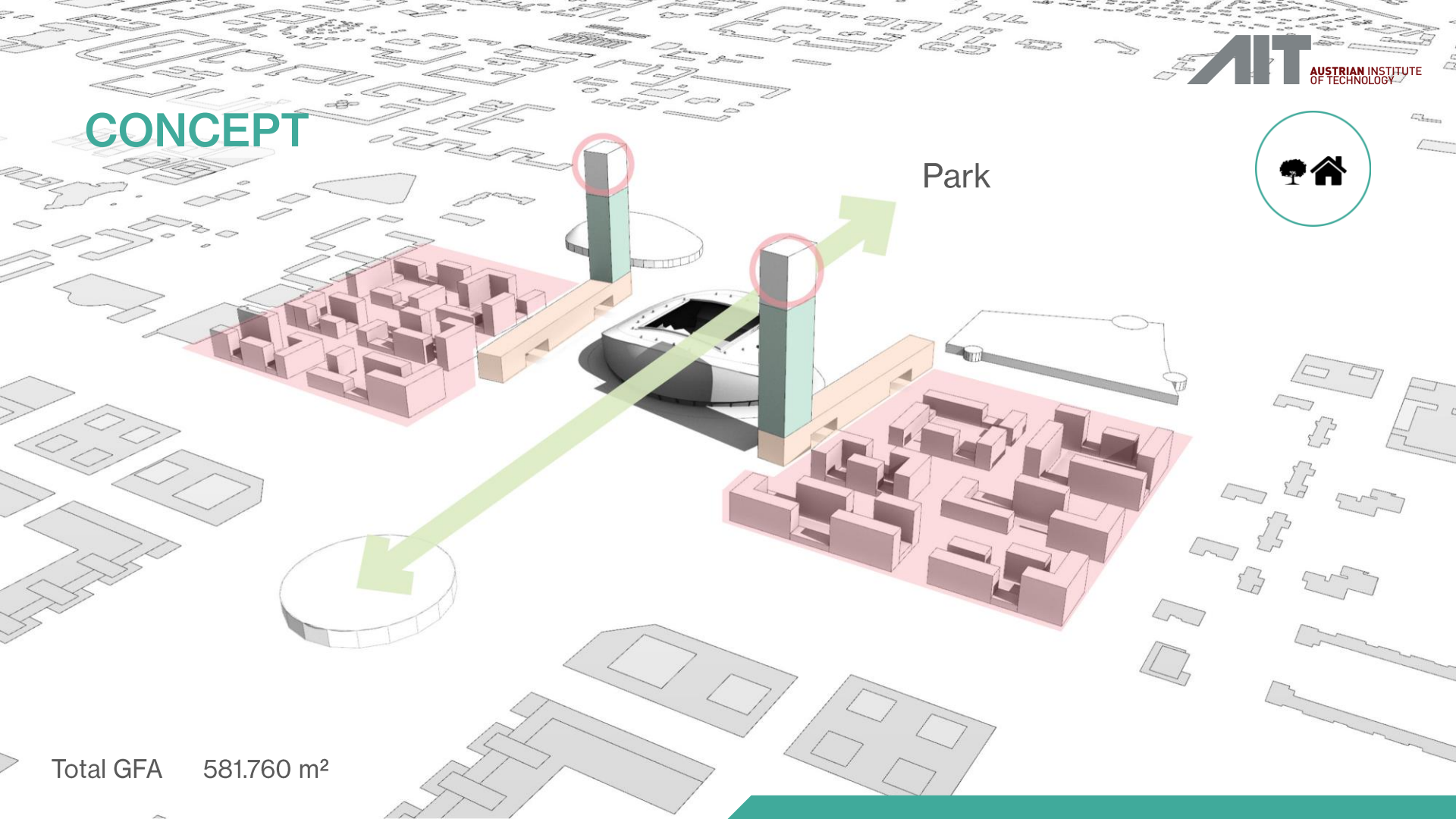
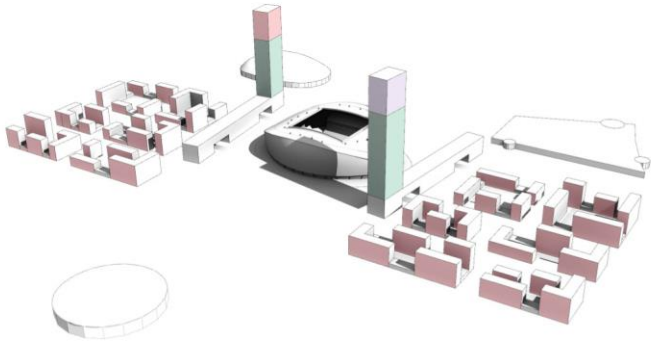
CONCEPT



Total GFA 581.760 m²

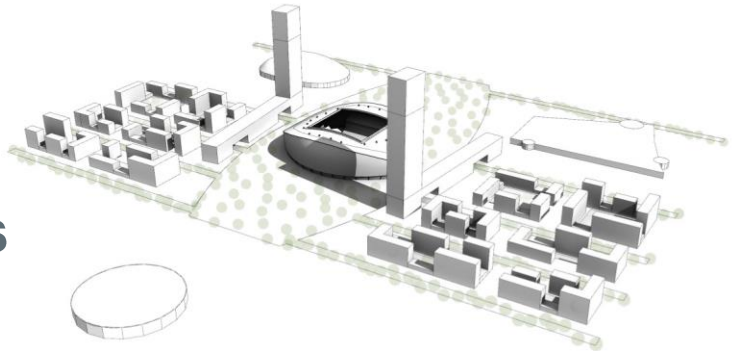
USAGE MIX & PERFORMANCE

377.194 m²
10.000
residents



21.600 m²
700 guests

98.550 m²
6.500 workspaces



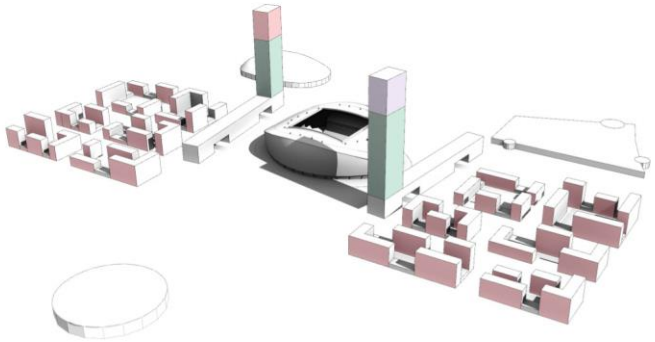
6,2 km of streets
$18.6 millions of
construction

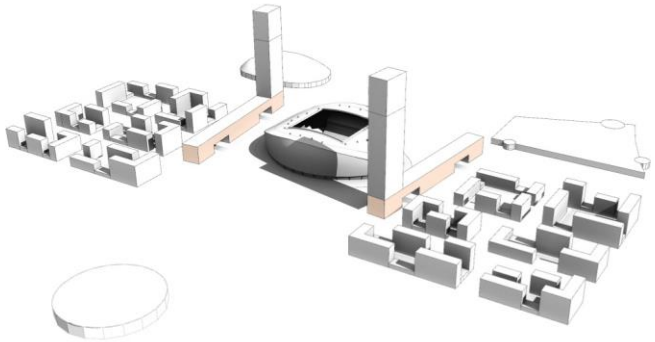
272.989 m²
15 m² park / daily user

USAGE MIX & PERFORMANCE

17.200 users

within 500 m radius
on no-match days

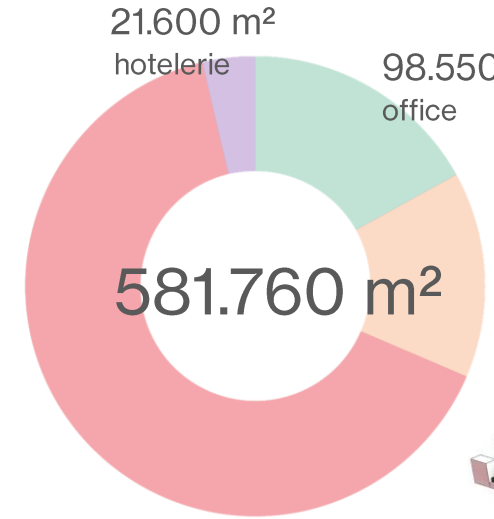




84.415 m²

200 Shops, Bars & Restaurants, ...

ECONOMIC PERFORMANCE

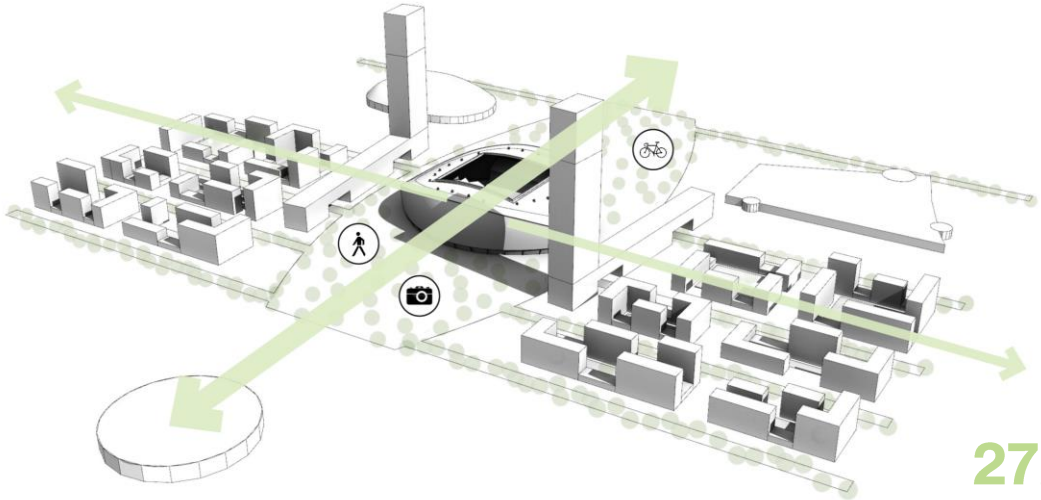


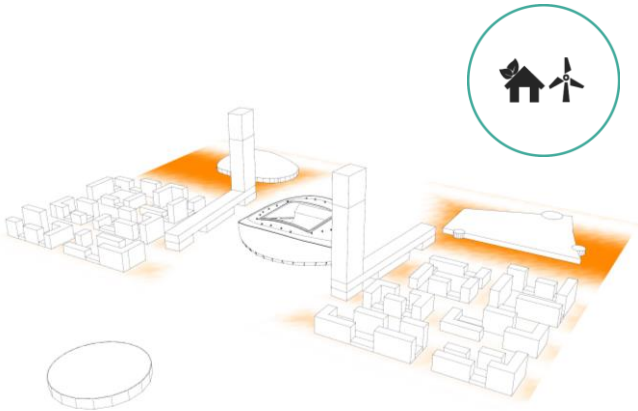
581.760 m² GFA

440.010 m² low-rise
141.750 m² high-rise

~$970 million construction costs

MICROCLIMATE PERFORMANCE: TREE PLACEMENT



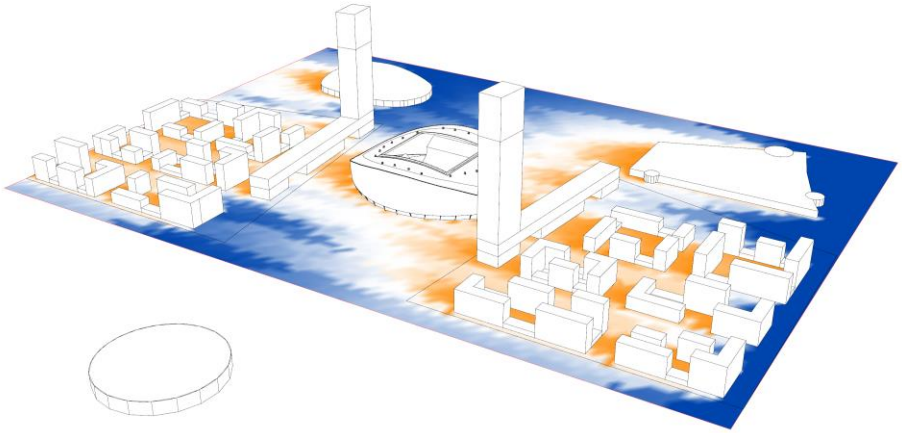


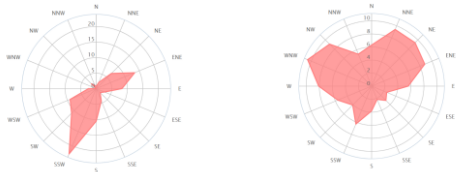
272.989 m²

+ green‘s effect on the microclimate
+ benefit for daily users

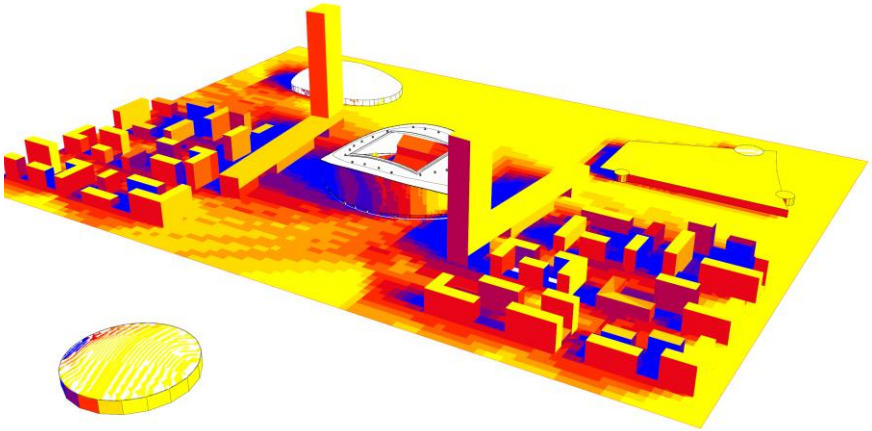
ENERGY PERFORMANCE

wind loads





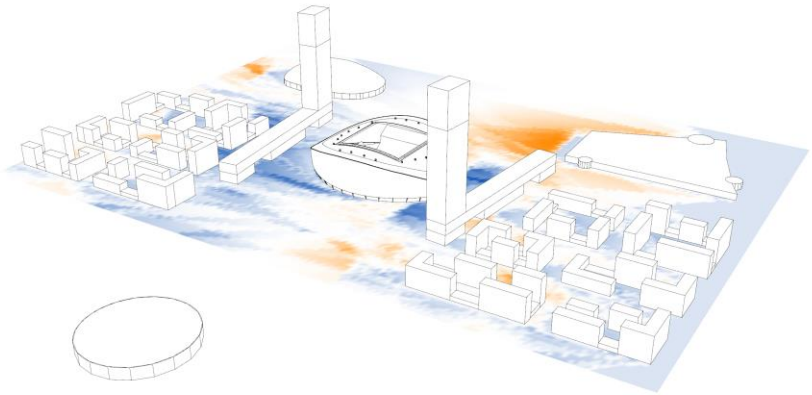
solar intake

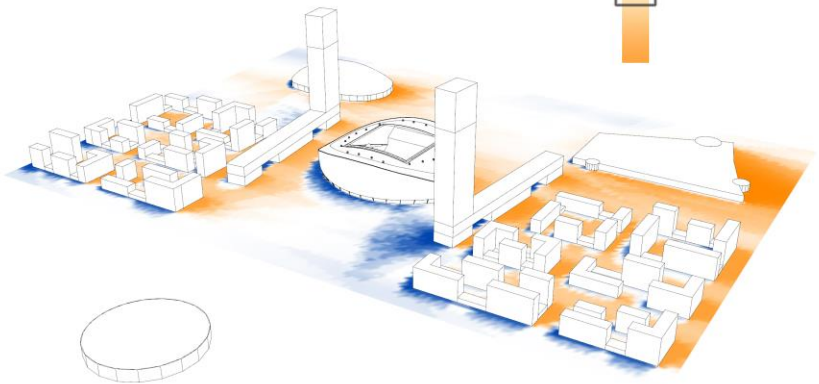


40 000 000 kWh/a

68 kWh/m²a

PEDESTRIAN COMFORT





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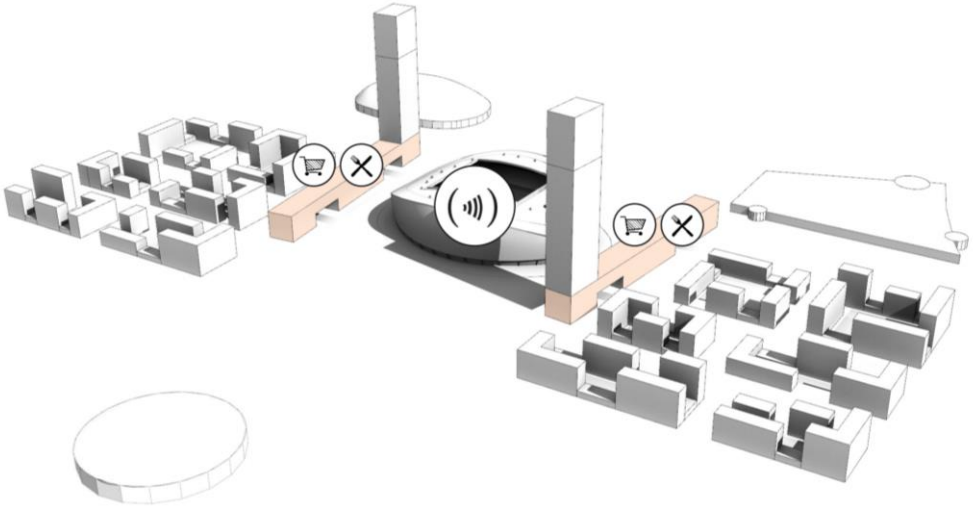
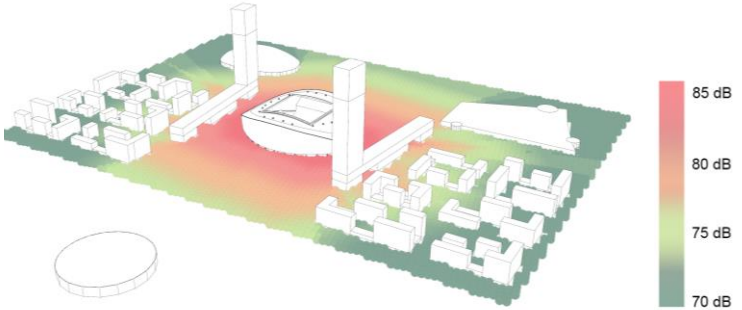
NOISE PERFORMANCE





84.415 m²

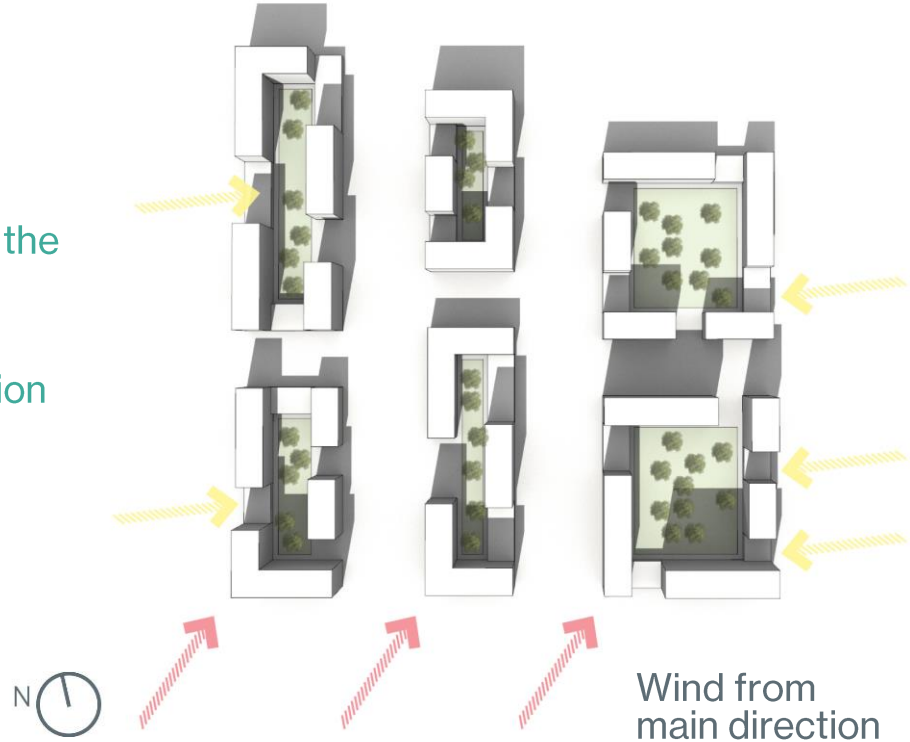
+ commercial performs as noise separation between residential zone and stadium

+ benefitial space to rent out

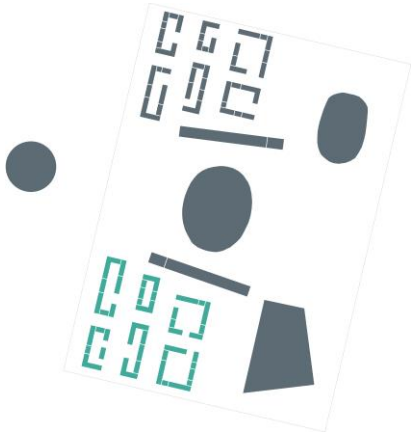
ENERGY & QUALITY

+ high life quality
green inside & outside the courtyard

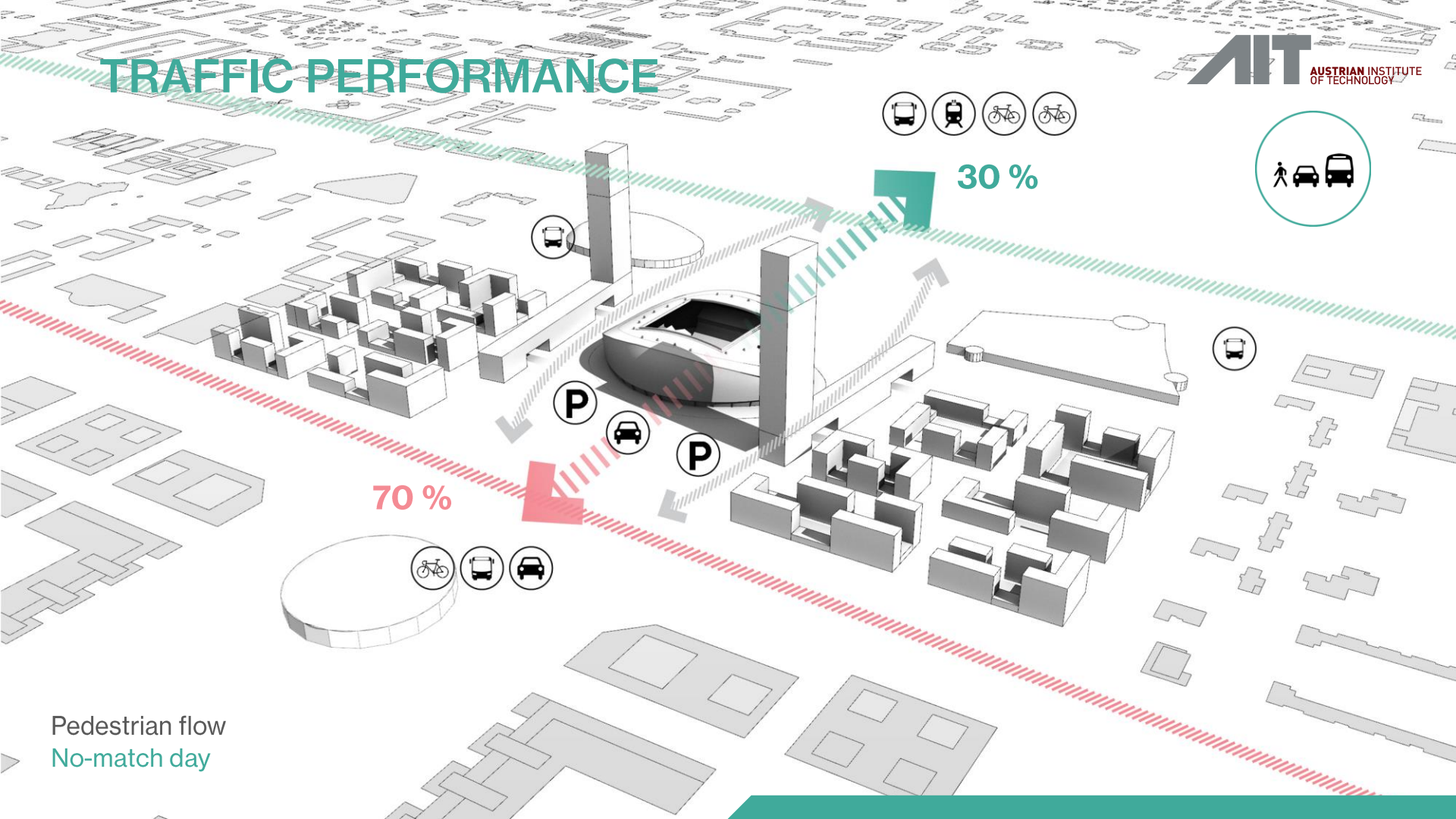
+ podium zones serve parking & communication



Flats allow sun lightning from east and west

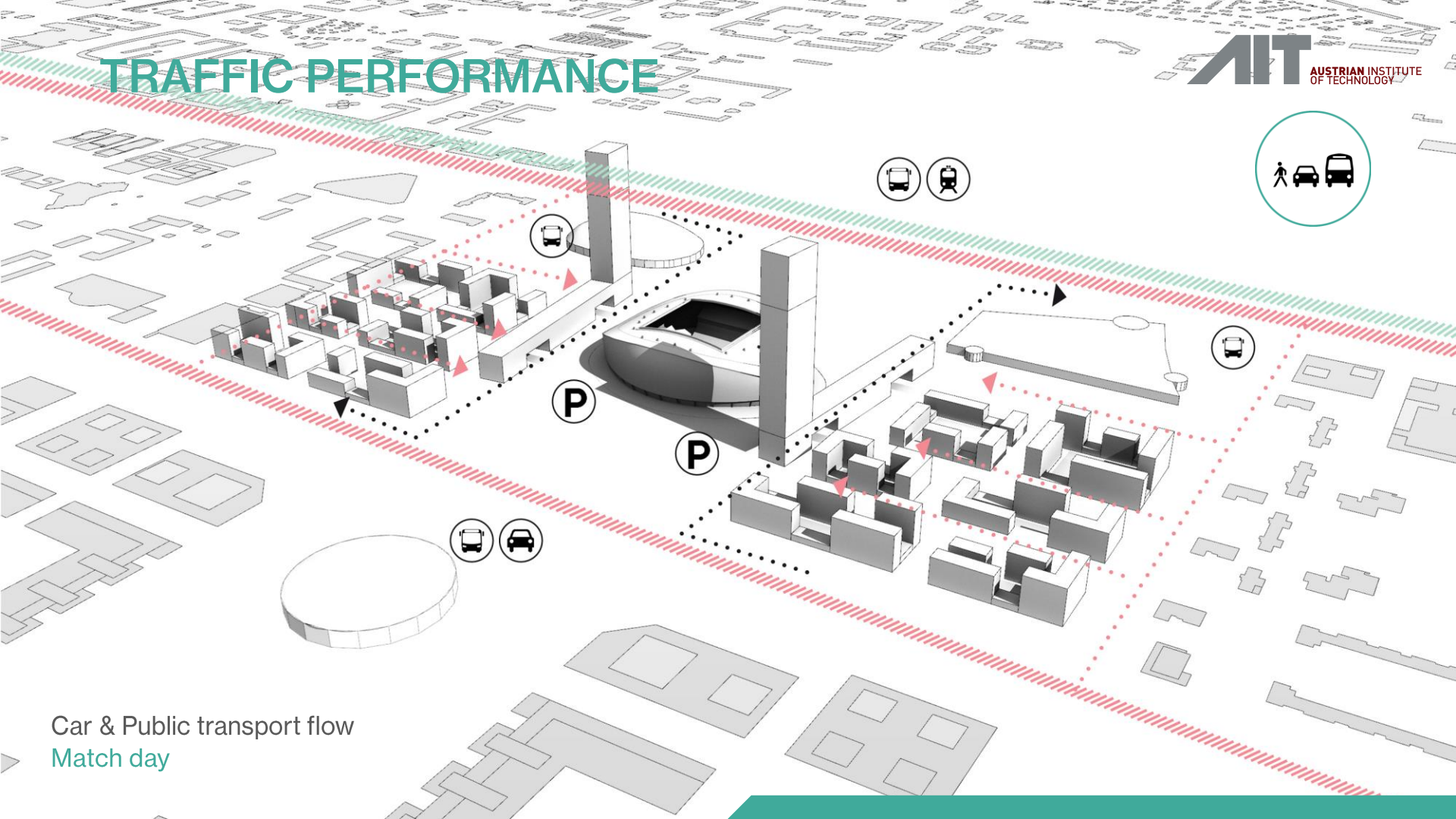


TRAFFIC PERFORMANCE



Pedestrian flow
No-match day

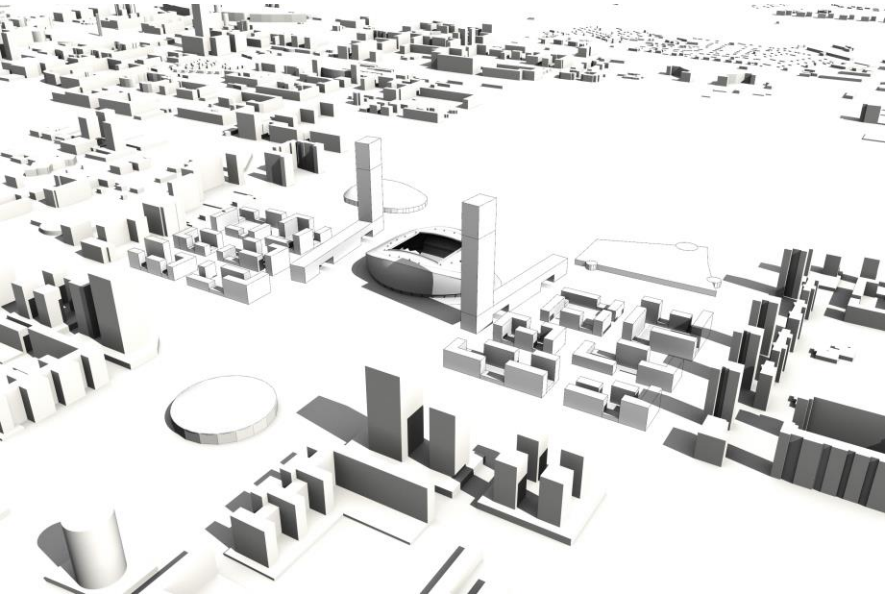
TRAFFIC PERFORMANCE



Car & Public transport flow

Match day

THE GREEN VEIN



Total GFA	**581.760 m²**
Office	98.550 m²
Commercial	84.415 m²
Residential	377.194 m²
Hotel	21.600 m²

Scenario character
Creating a park for the residents, the stadium guests, the daily users and parking pacilities beneath.

Landuse-Mix
Splitting private and public funtions by placing a commercial building in between.

Economic Aspects
By renting out the appartments and offices the park will be financed and creates a high pedestrian comfort.

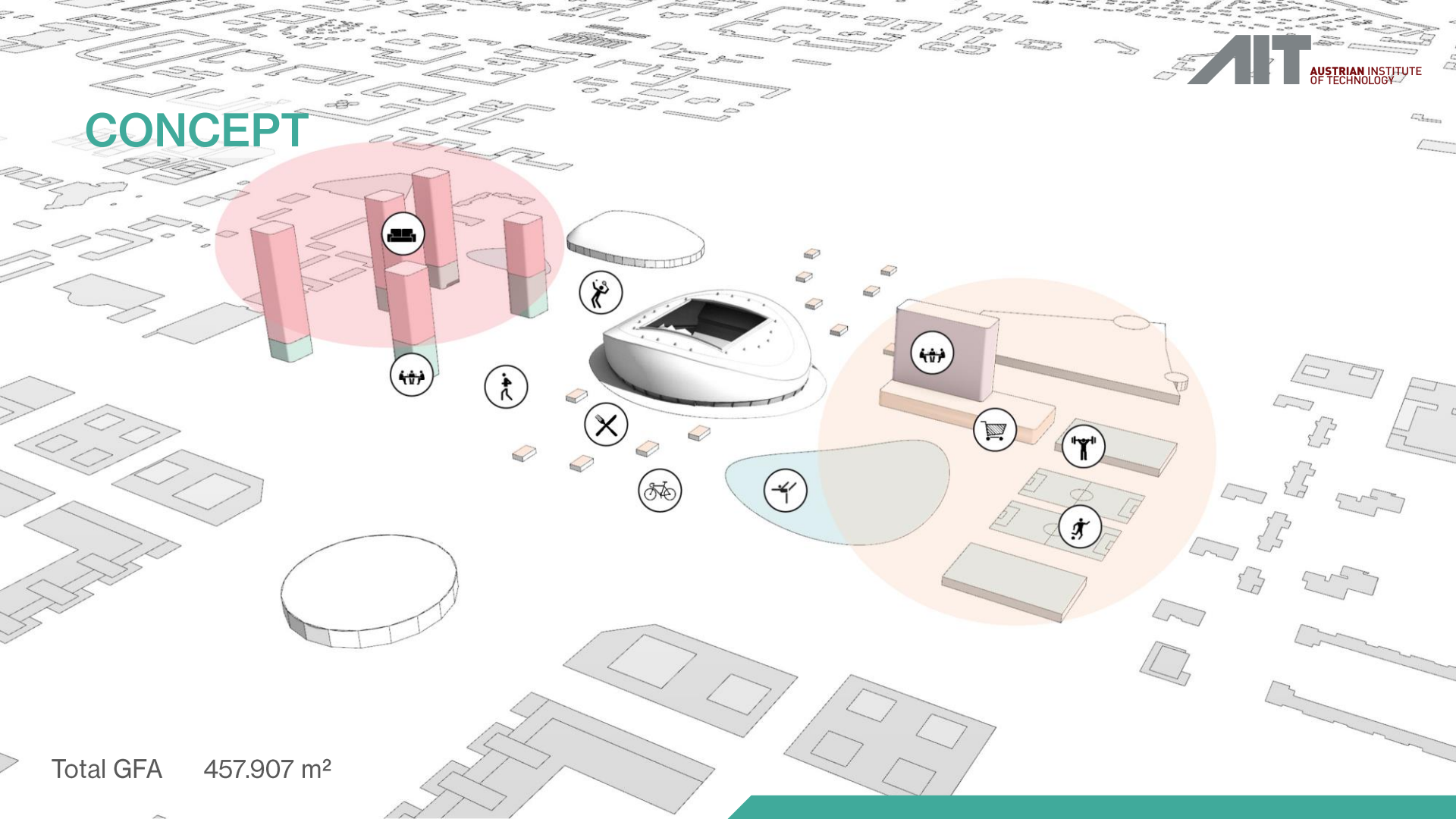
Energy Concept
Developing a valueable, energyconsciouss, low-rise neighbourhood.

Traffic Flow
Control the pedestrian flow and organise the public and car flow.

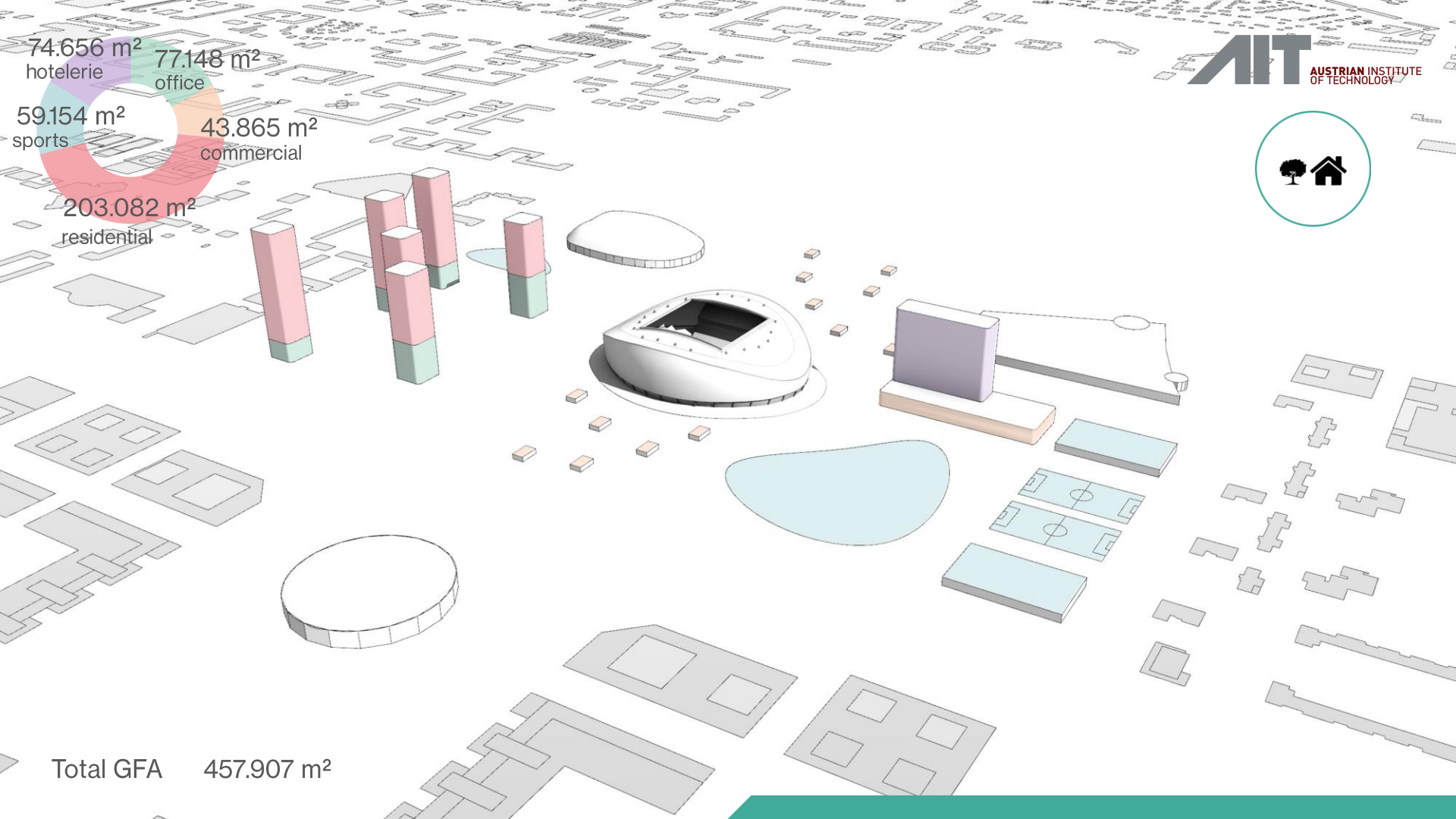
SCENARIO 2

Astana Sports City 4 all

CONCEPT



Total GFA 457.907 m²

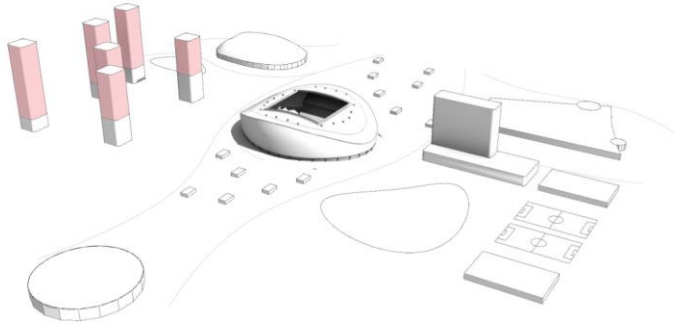

74.656 m²
hotelerie
77.148 m²
office
59.154 m²
sports
43.865 m²
commercial
203.082 m²
residential
Total GFA 457.907 m²

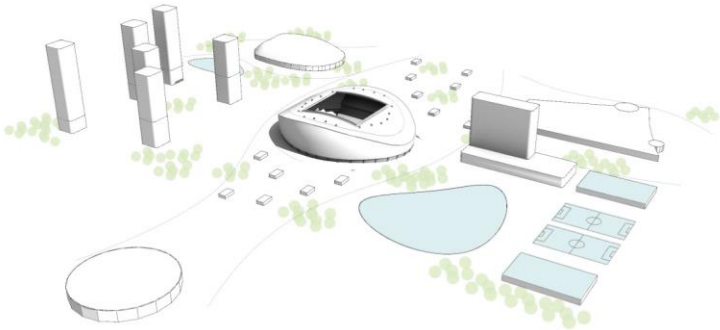
USAGE MIX & PERFORMANCE

203.082 m²

10.000

residents





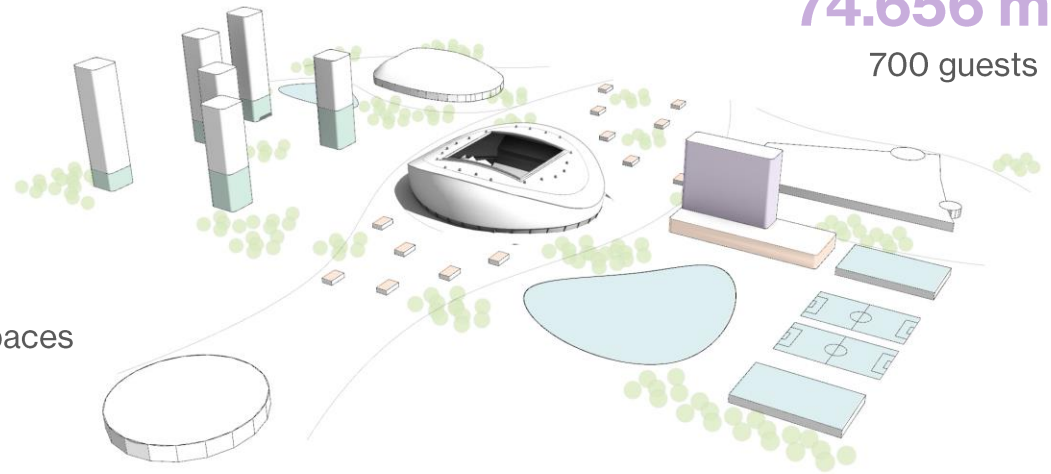
+ indoor/outdoor sports facilities

+ public park

USAGE MIX & PERFORMANCE

74.656 m²

700 guests



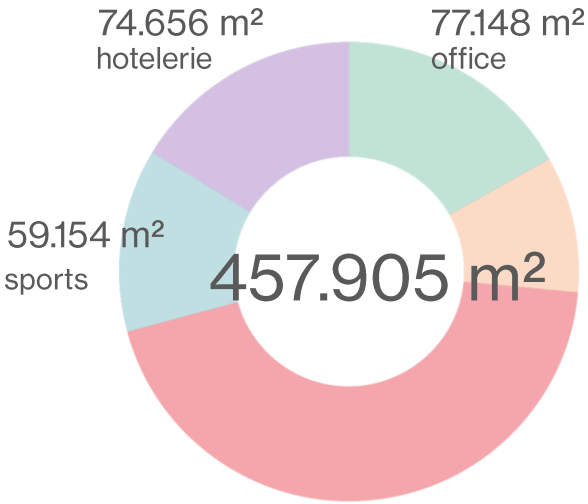
77.148 m²

5.000 workspaces

4,1 km of streets

$12.3 millions of construction

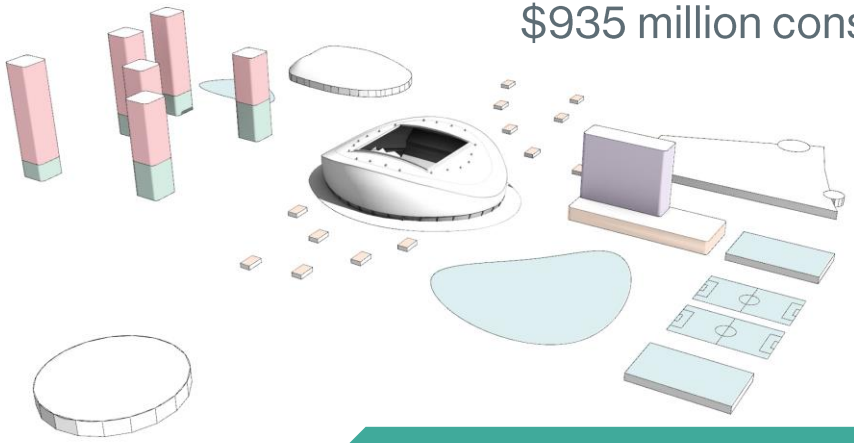
ECONOMIC PERFORMANCE



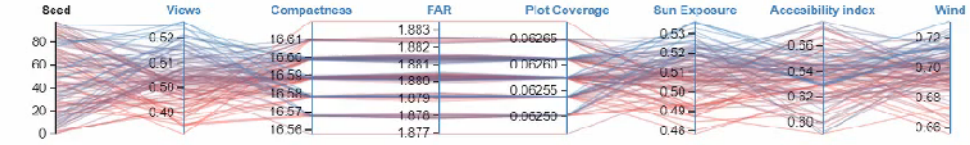
457.905 m² GFA

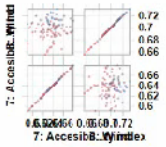
103.019 m² low-rise
354.887 m² high-rise

$935 million construction costs

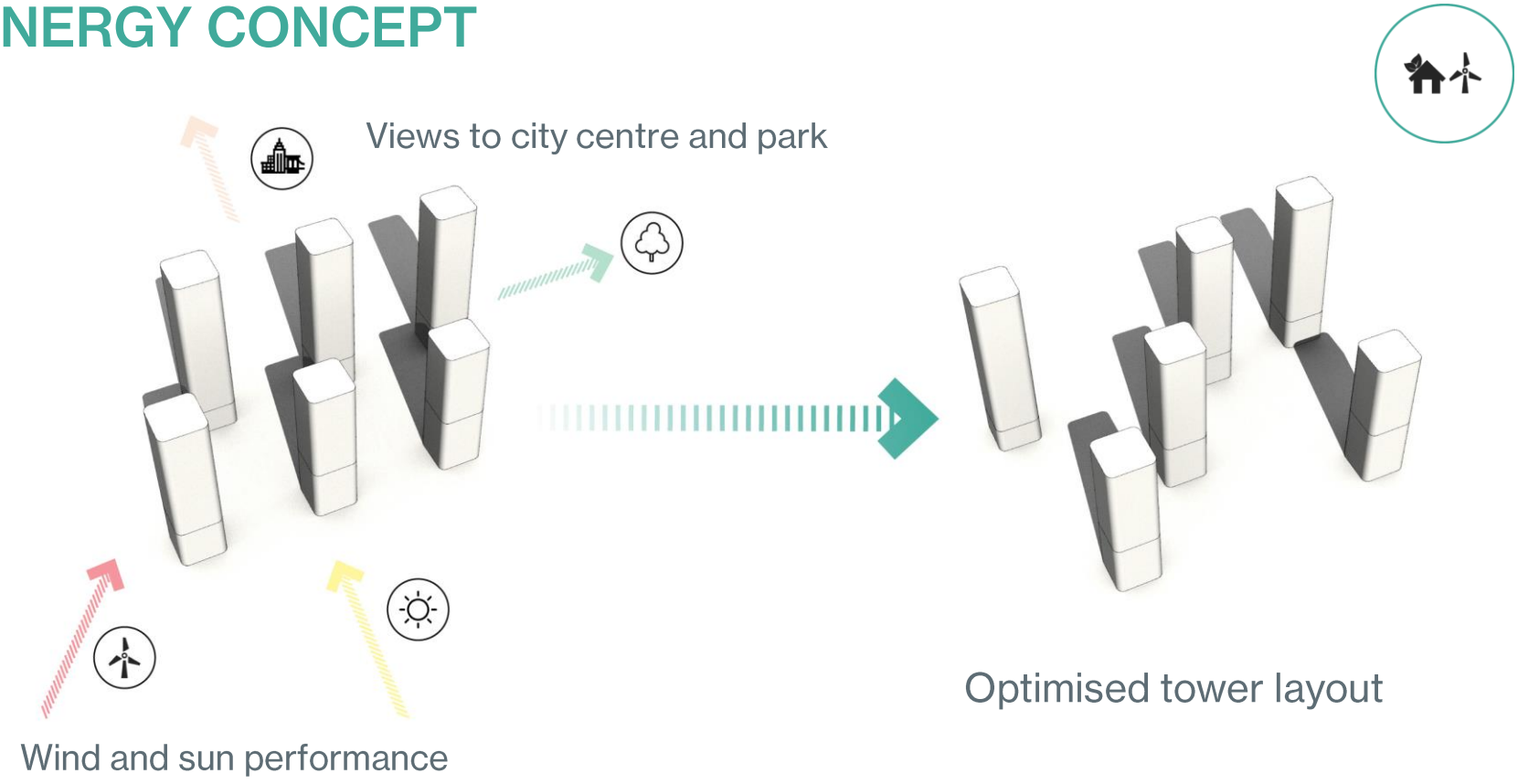


ENERGY CONCEPT



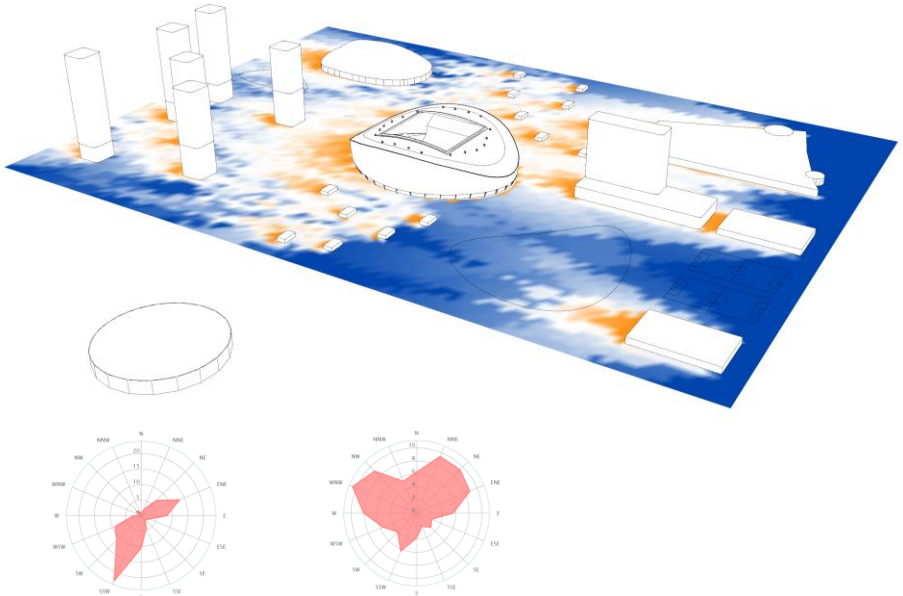


ENERGY CONCEPT

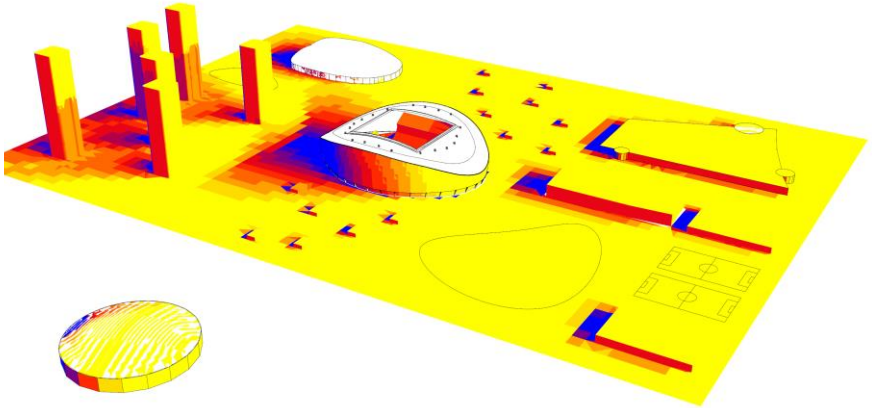


ENERGY PERFORMANCE

wind loads



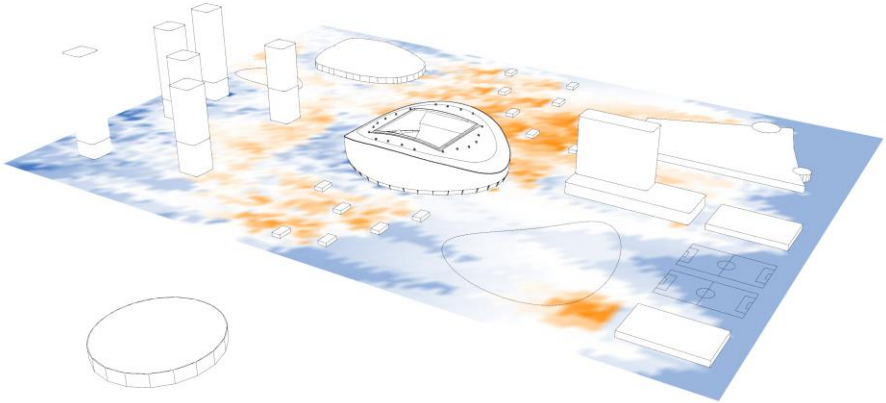
solar intake

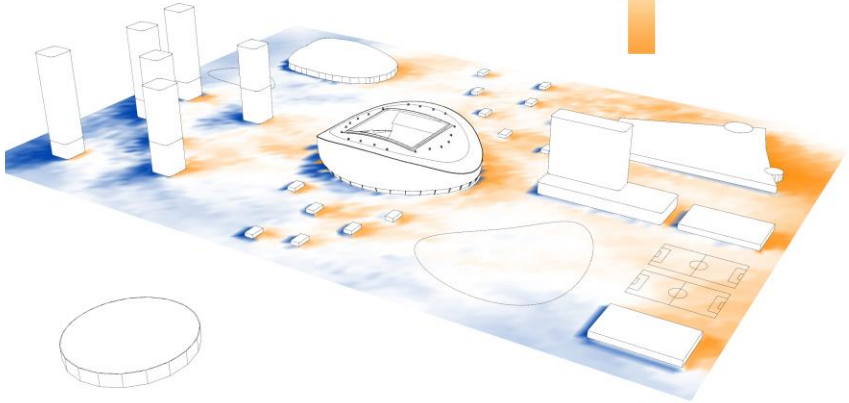


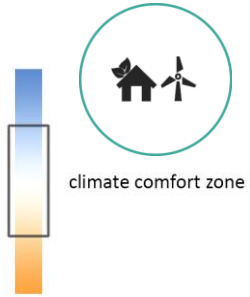
29 000 000 kWh/a

65 kWh/m²a

PEDESTRIAN COMFORT







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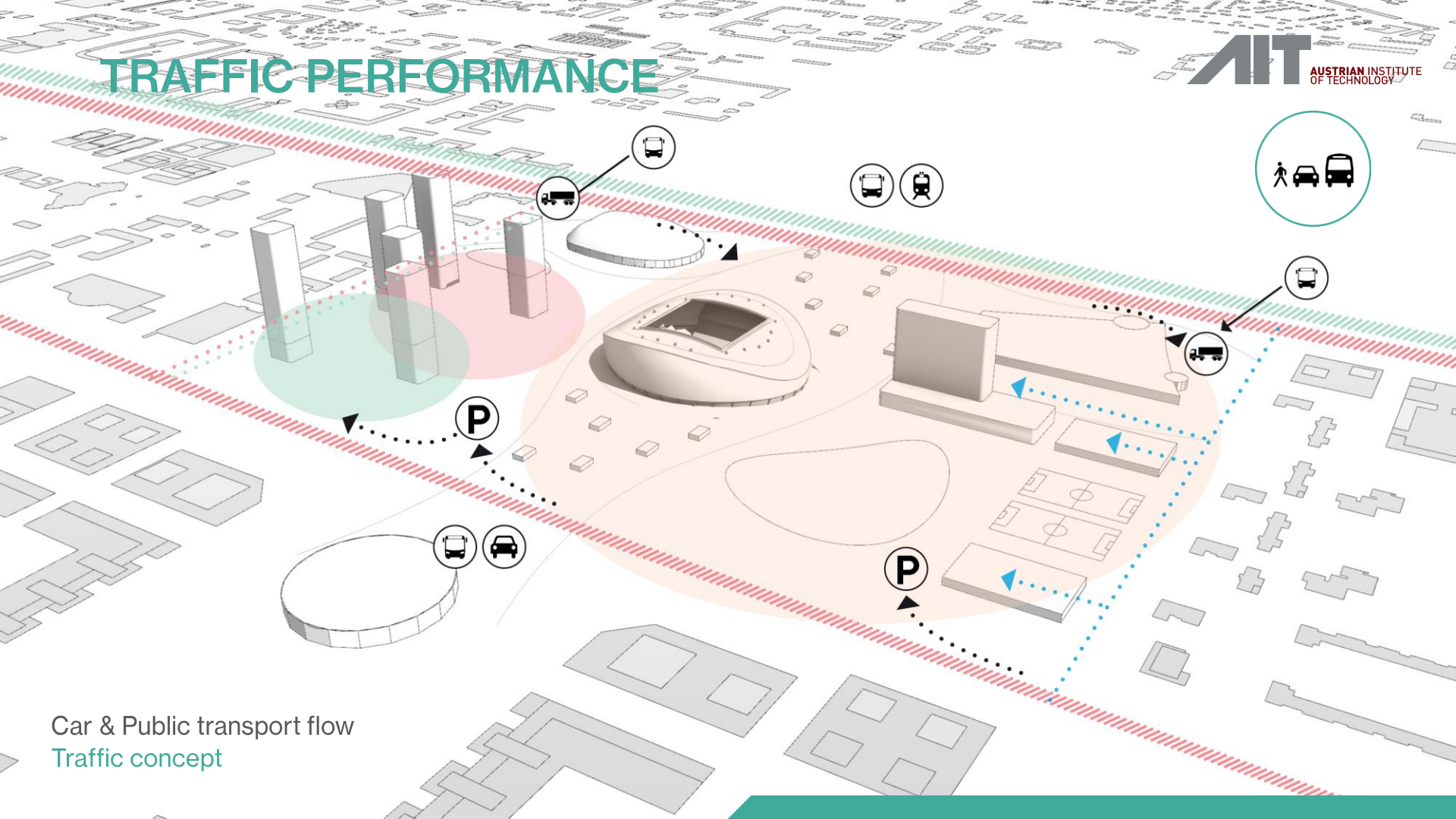
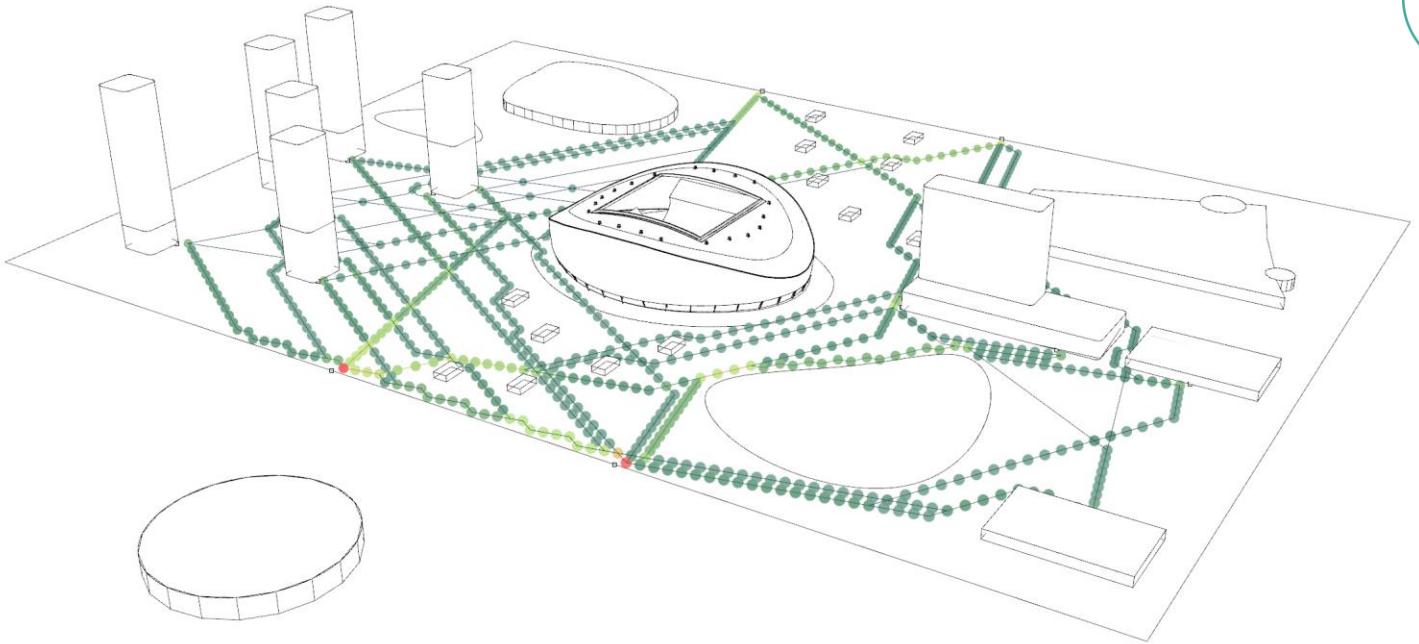
TRAFFIC PERFORMANCE



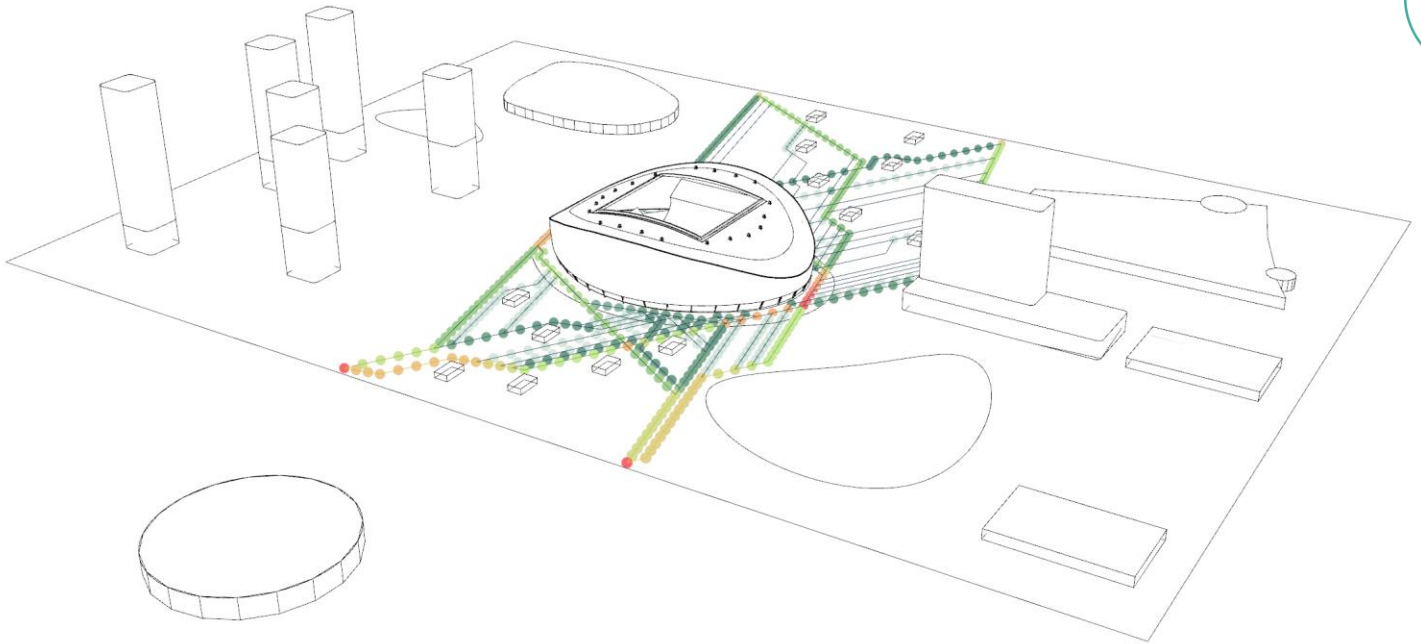
Car & Public transport flow

Traffic concept



Pedestrian flow

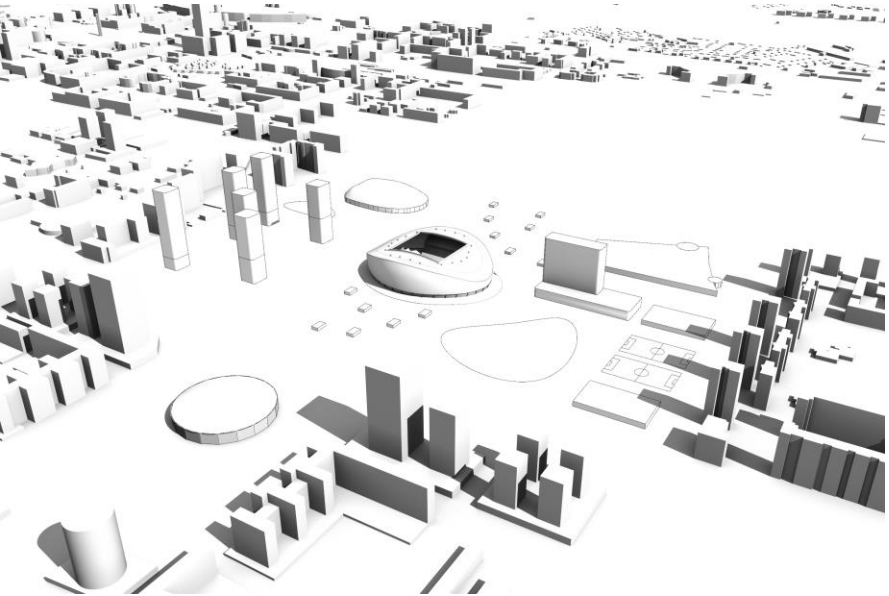
No-match day



Pedestrian flow

Match day

SPORTS CITY ASTANA 4 ALL



Total GFA	**457.907 m²**
Office	77.148 m²
Commercial	43.865 m²
Residential	203.082 m²
Sports	59.154 m²
Hotel	74.656 m²

Scenario character

Landuse-Mix
High-rise office and residential towers are placed on the cityside. Sports facilities, hotel and commerical on the south side.

Economic Aspects
The towers are more cost-intensive, but this concept allows to create open parking within the site keeping the GFA.

Energy Concept
The placement of the towers is optimised to sun, wind and views.

Traffic Flow
Creating a multifunctional park including outdoor sports facilities.

SCENARIO 3

Sports business district

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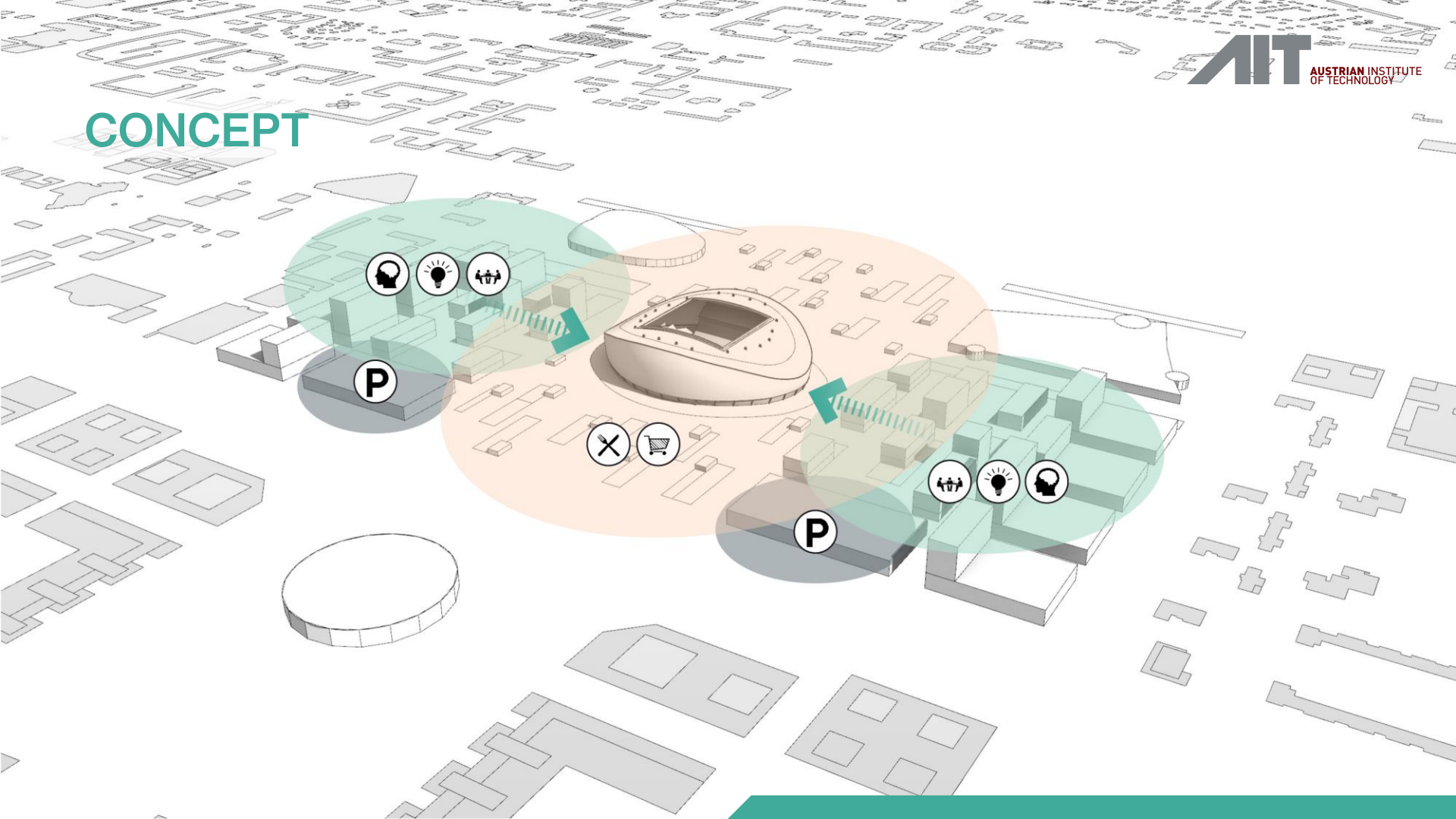
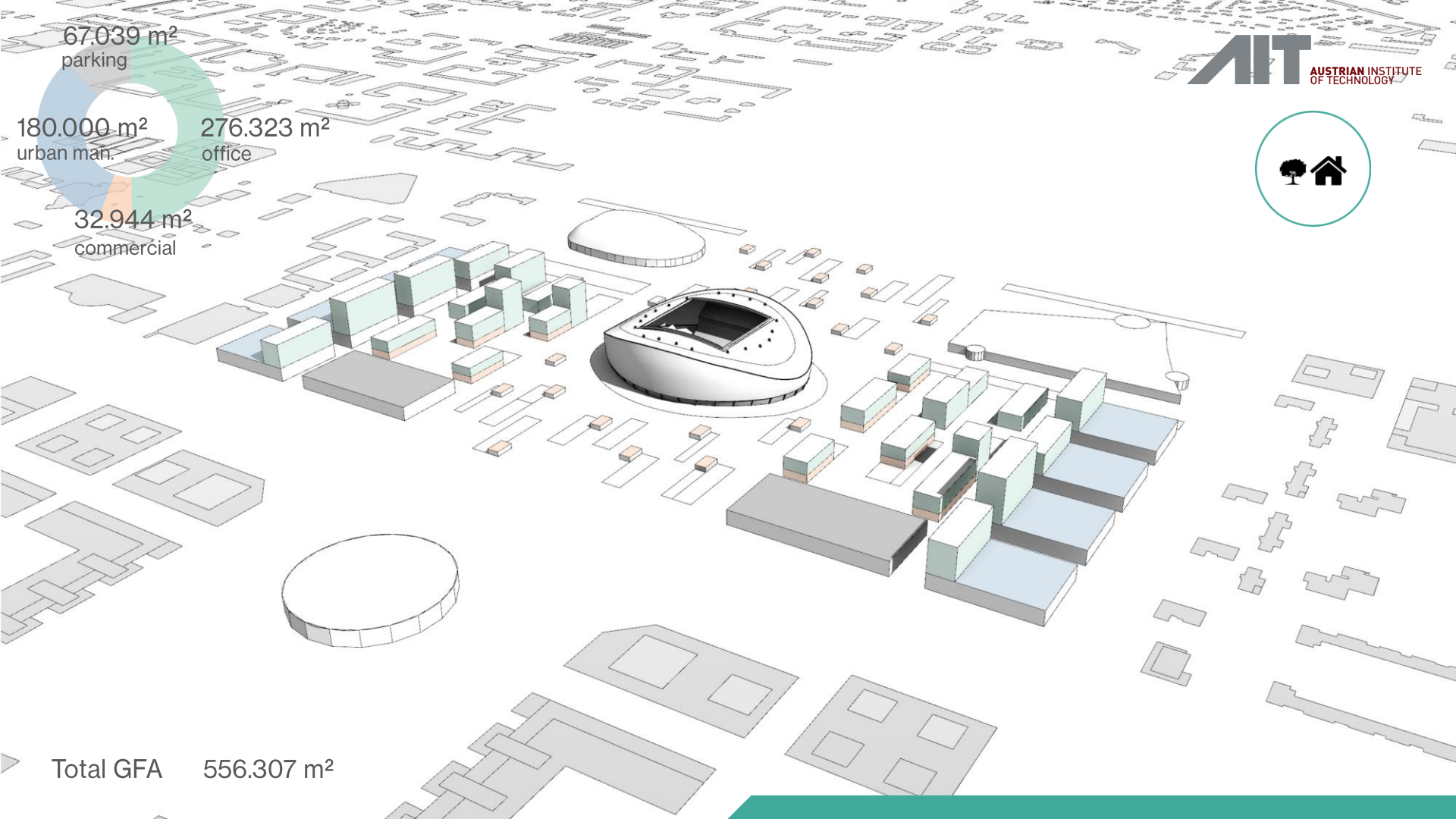
CONCEPT

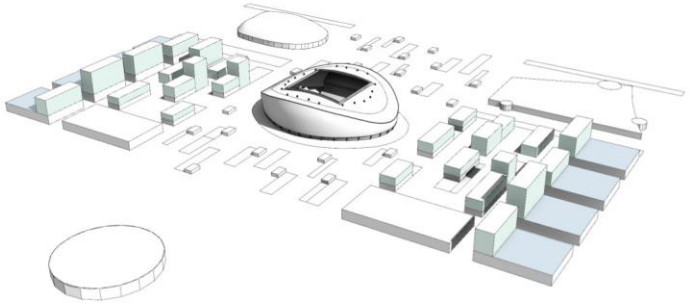



67.039 m²
parking
180.000 m²
urban man.
276.323 m²
office
32.944 m²
commercial
Total GFA 556.307 m²

USAGE MIX & PERFORMANCE

180.000 m²

Urban manufacturing

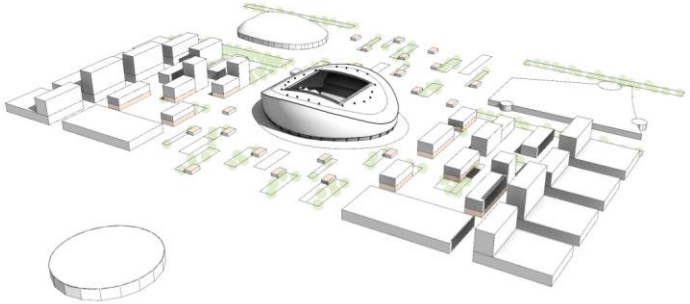


276.323 m²

18.000 workspaces

6,4 km of streets

$19.2 million of construction

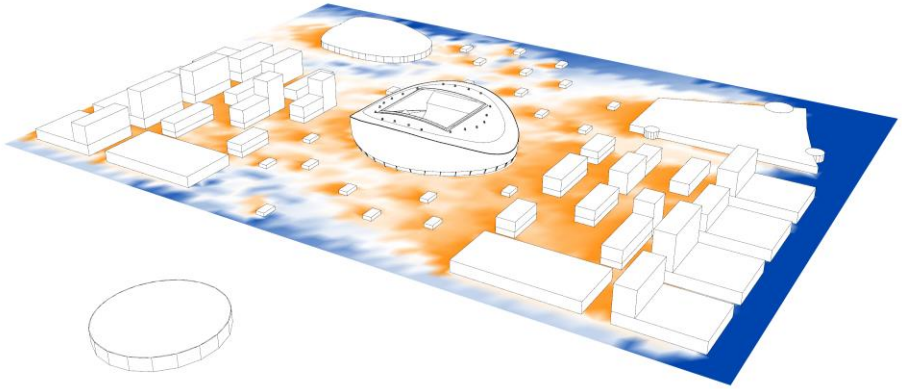


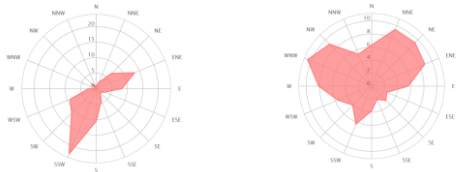
32.944 m²

Commercial, fitness, bars, restaurants, shops,...

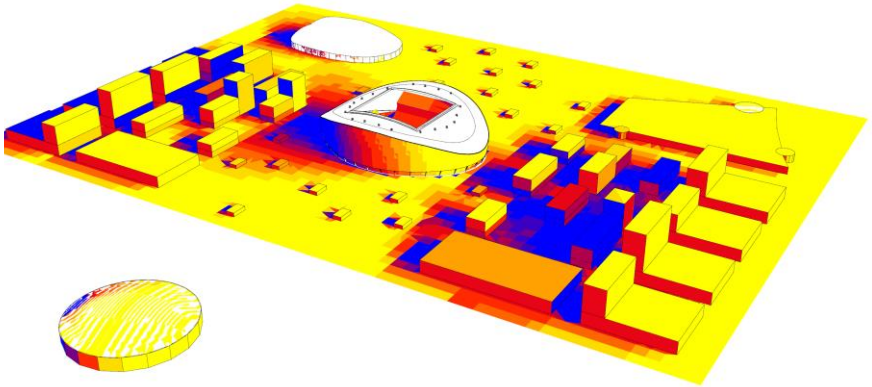
ENERGY PERFORMANCE

wind loads





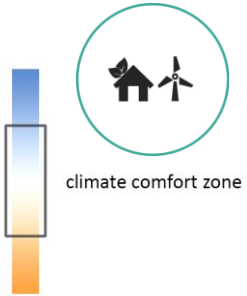
solar intake

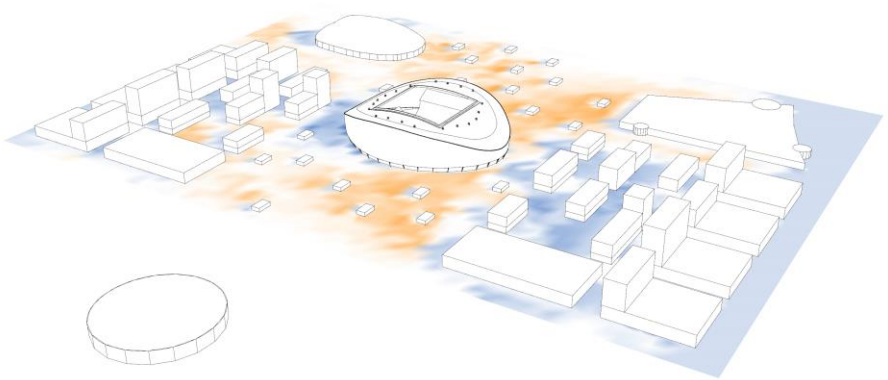


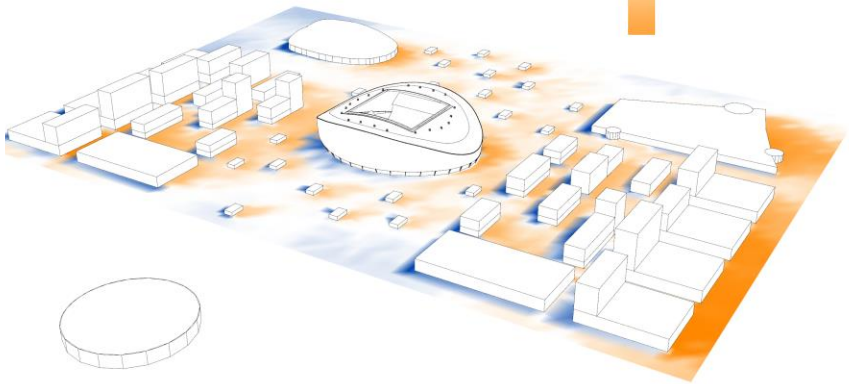
40 000 000 kWh/a

72 kWh/m²a

PEDESTRIAN COMFORT

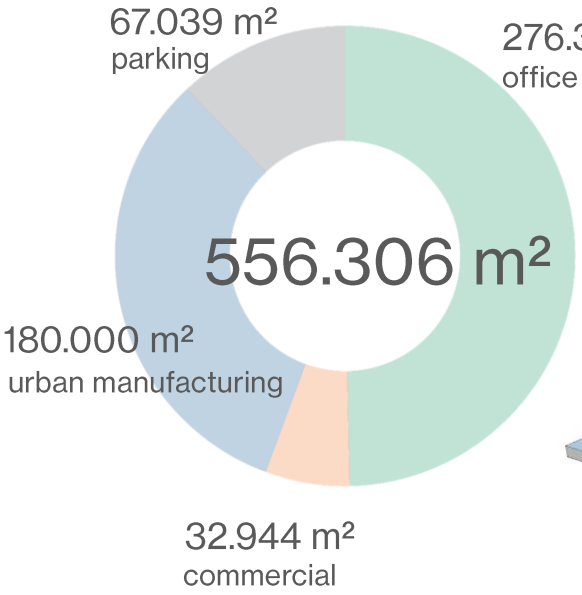






JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

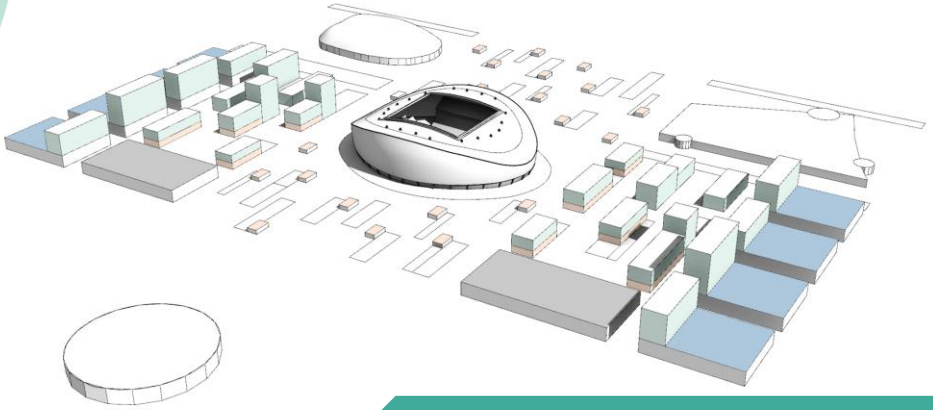
USAGE MIX & PERFORMANCE



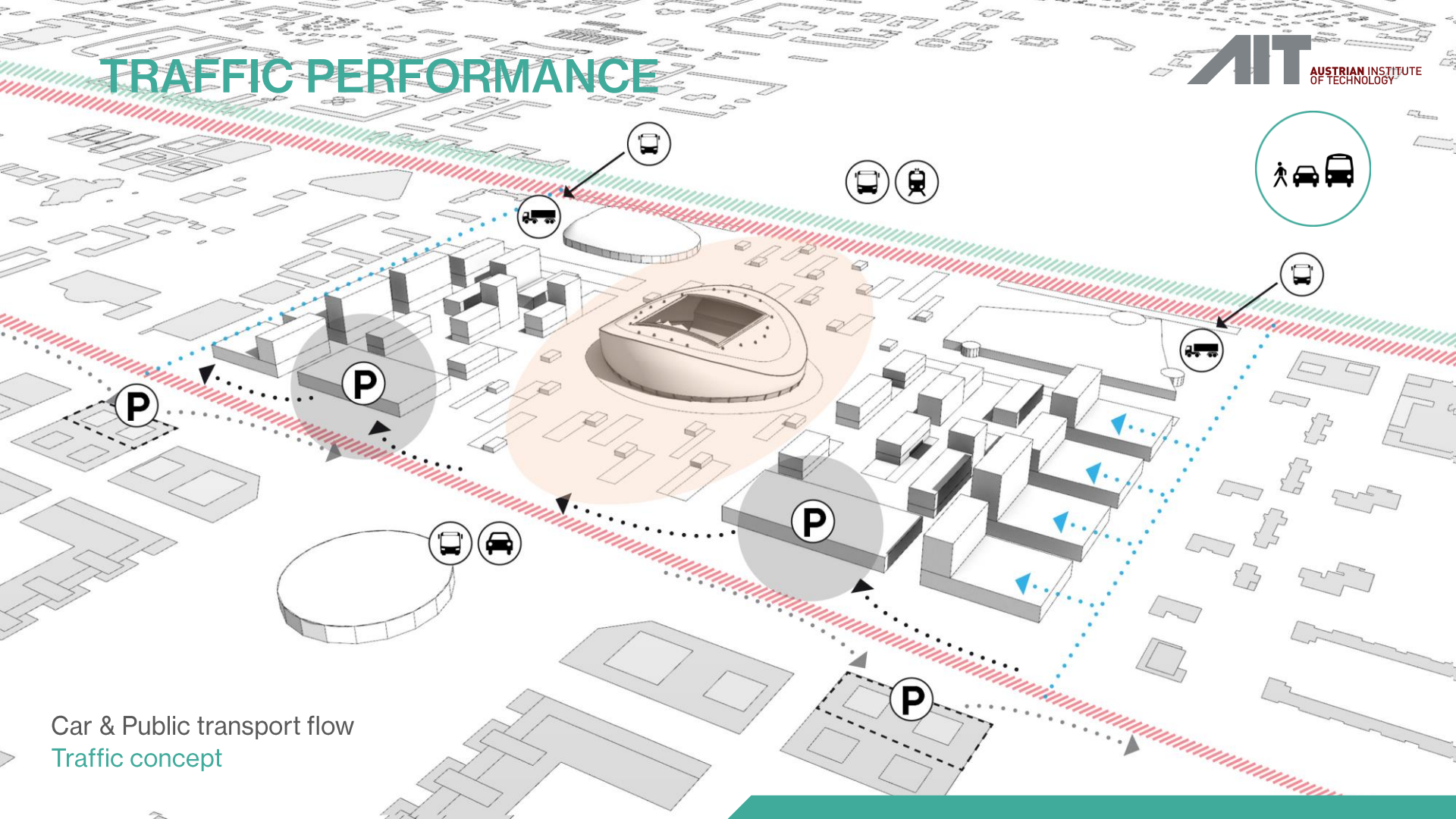
556.306 m² GFA

556.306 m² low-rise

$840 million construction costs



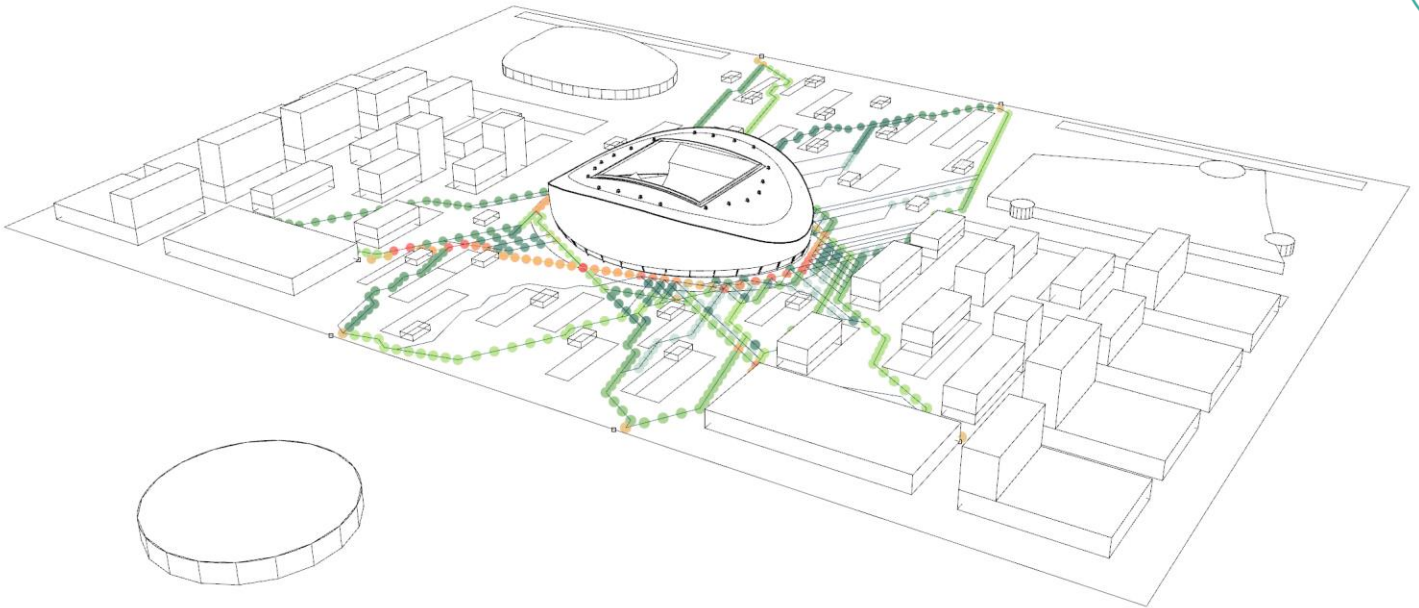
TRAFFIC PERFORMANCE



Car & Public transport flow

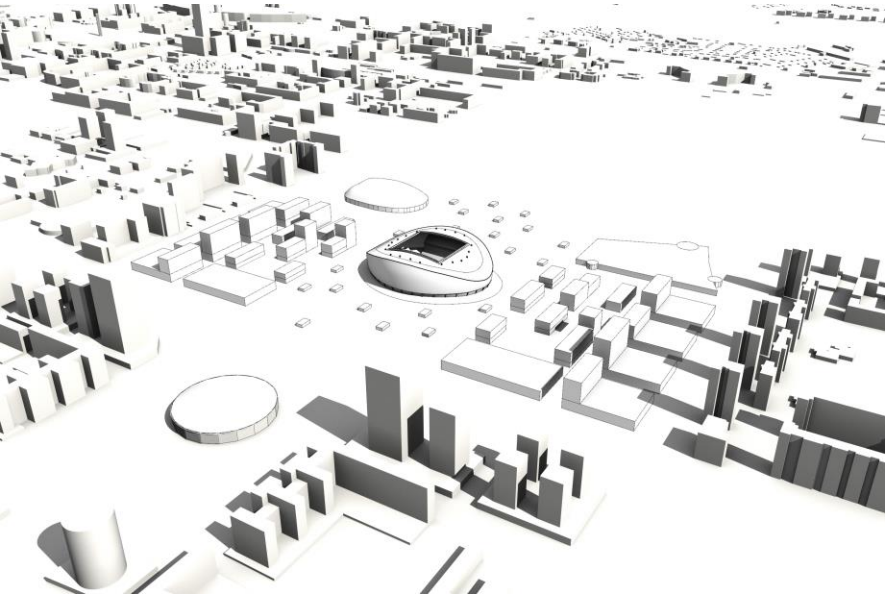
Traffic concept

PEOPLE FLOW



Pedestrian flow combined
Match day

BUSINESS SPORTS CITY



Total GFA	**556.307 m²**
Office	276.323 m²
Commercial	32.944 m²
Manufacturing	180.000 m²
Parking	67.039 m²

Scenario character

Landuse-Mix
This scenario is without residential use. It contains urban manufacturing, office, sports and commercial buildings.

Economic Aspects
Staying low-rise to keep the construction costs low.

Energy Concept
The buildings create comfortable spaces in between.

Traffic Flow
The parking houses activate the zones in front of the commercial buildings during Match and No-Match days.

BASE FOR DECISION-MAKING

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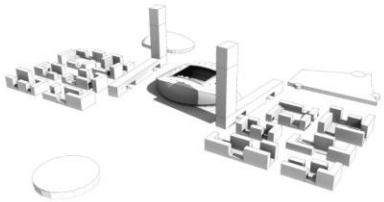
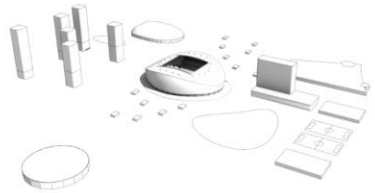
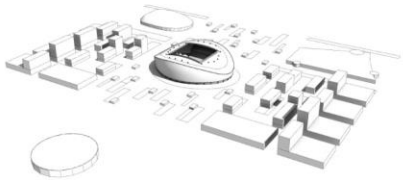
	Landuse-mix	Economical performance	Energy + climate performance	Traffic flow
	581.760 m² Residential + commercial focused	$970 million GFA $18.6 mio streets	68 kWh/m²a Pedestrian comfort: high	6.2 km streets level of service: medium
	457.907 m² Residential + hotel focused	$935 million GFA $12.3 mio streets	65 kWh/m²a Pedestrian comfort: medium	4.1 km streets level of service: low
	556.306 m² Office + manufacturing focused	$840 mio GFA $19.2 mio streets	72 kWh/m²a Pedestrian comfort: medium	6.4 km streets level of service: high

AIT‘S EXPERTISE FOR ASTANA‘S TRANSFORMATION

- Review and advise on current urban planning and management topics in Astana:
- Deployment of cutting-edge big data based tools to advise Astana‘s decision-making process
  - *Urban Planning Benchmarking e.g. Sports City & Train station*
  - *Masterplan & Agglomeration Plan*

Driving urban innovation with **YOU**

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