nextstation
PARIS 2007

6 & 7 décembre 2007

2ÈME CONFÉRENCE INTERNATIONALE
SUR LES GARES FERROVIAIRES

Next Station

2ème conférence internationale sur les gares ferroviaires

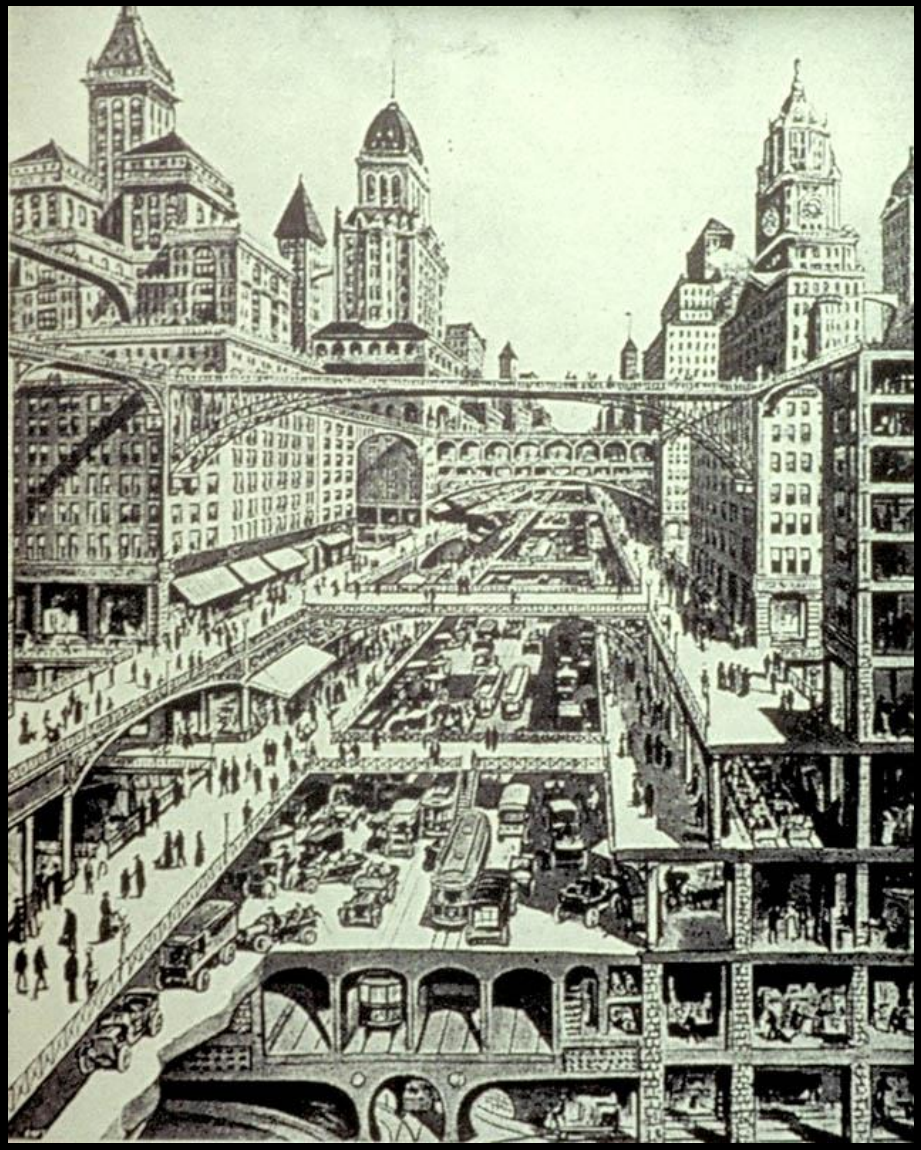
AREP

QU'EST-CE QU'UNE GARE DURABLE ?

UIC

7 décembre 2007

1. La gare, lieu d’ intermodalité, est par construction un maillon-clef de la ville durable

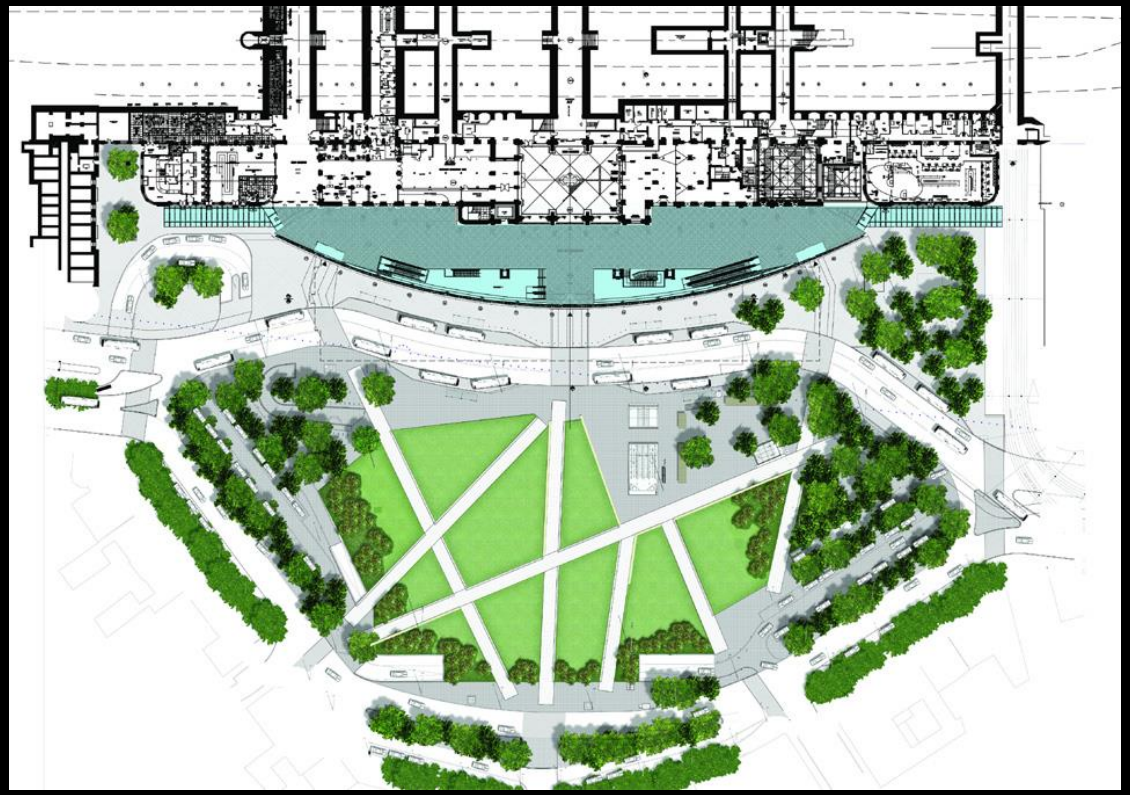



EXIT 51D
Madison St
500 FEET
WEST
90
94


GARE DE LA PLAINE STADE

Le piéton c'est tout le monde.



Strasbourg

Intermodality :

- High speed train TGV of the east international transport network

- TGV of the national transport network

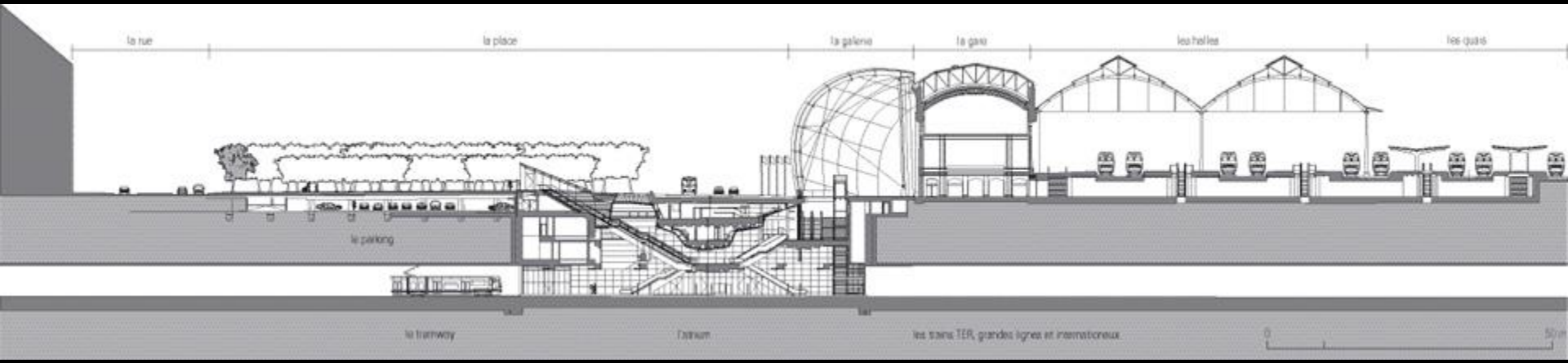
- Express train lines of the interregional transport network

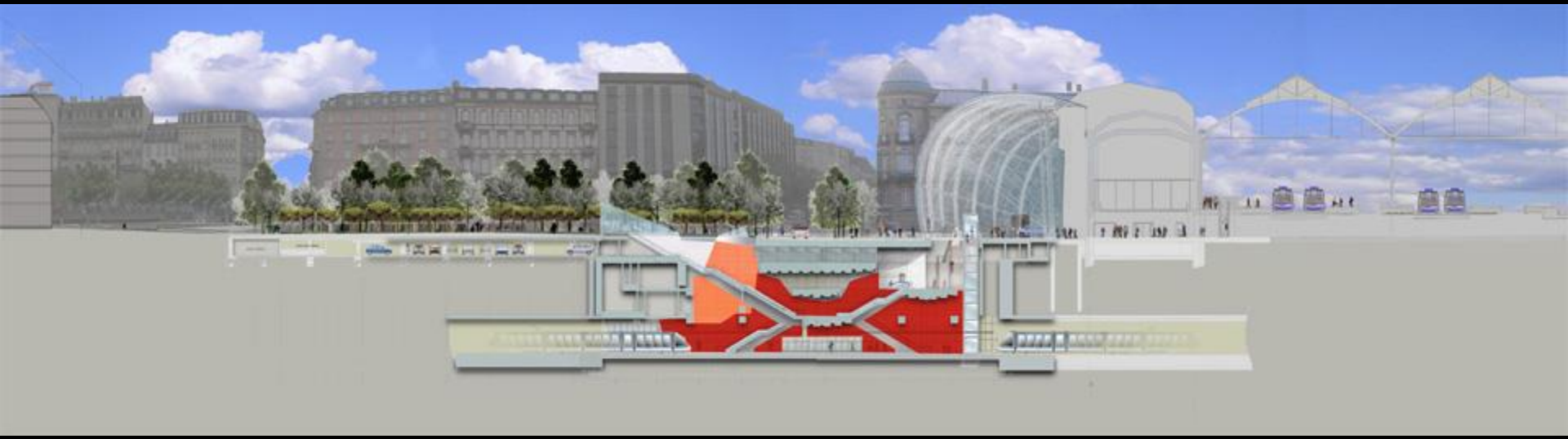
- Light rail network

- City bus network

- Taxis

- Individual cars





A glass structure to shelter passengers moving between the light rail system, car parks and the train station

Shanghai

A « connection zéro » station

Its round shape offers considerable operating fluidity : smooth traffic flows shortest walking distance

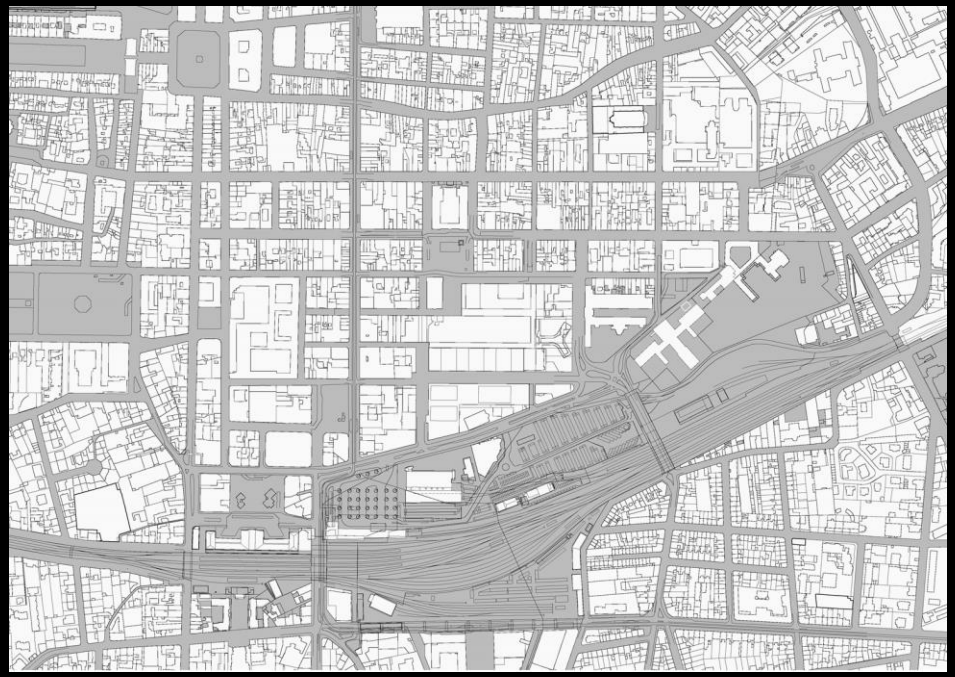
The intermodal locus is clearly defined in the shape of a perfect circle approached by coasting around its perimeter

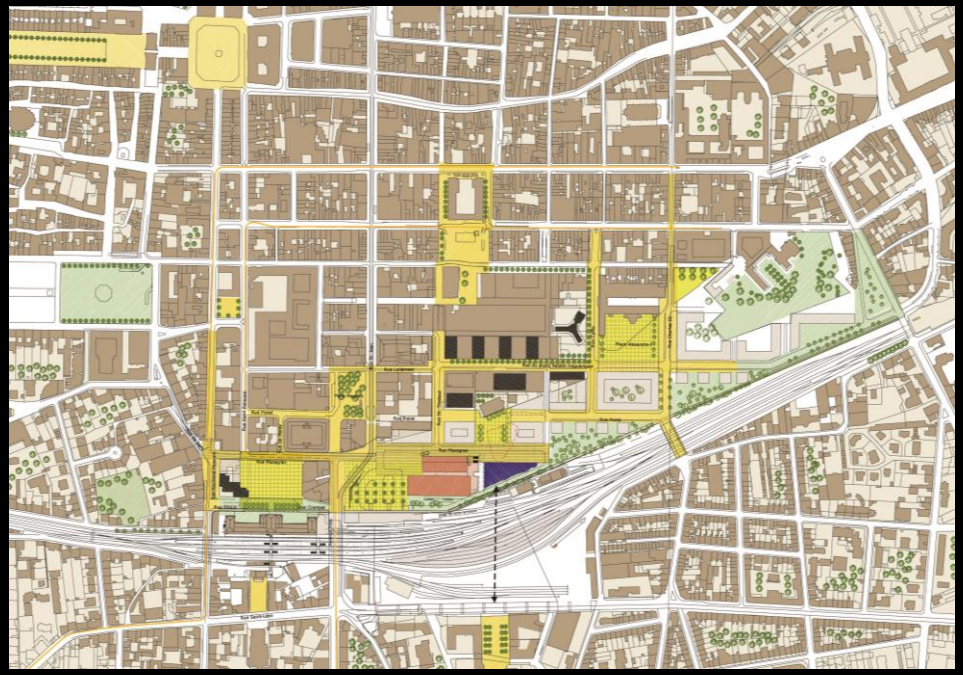
2. La densité urbaine autour des gares participe à l'élaboration d' une ville durable


Centre Georges Pompidou
LE TEMPS DES GARES

Lille

AREP





Nancy


Pékin


西环广场
8808665

3. Pour être durable, la gare doit être adaptable, facilement évolutive


SOLDES
FOOT MAX

Marseille Saint-Charles

All ticket counters of the different network, services and shops are located inside the new hall of 140x40m

Shanghai

The slight difference in level between service and waiting areas creates a large amphitheatre

The entire space is visible, functions and itineraries are immediatly intelligible from set-down to access to trains

4. La mise en place de cet espace capable s’inscrit dans la continuité de l’ histoire du lieu

AREP

Paris Gare du Nord

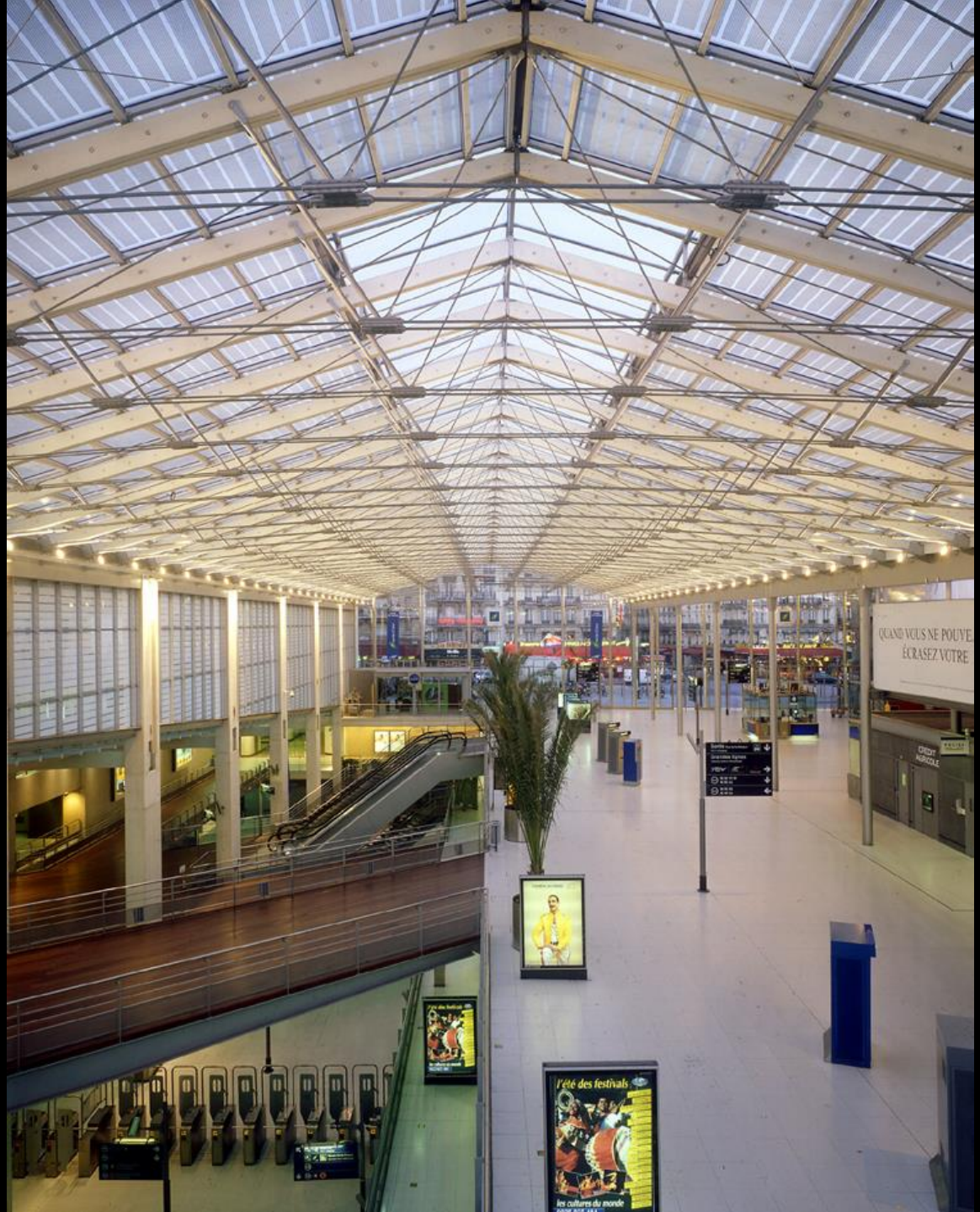
A complex exchange hub :

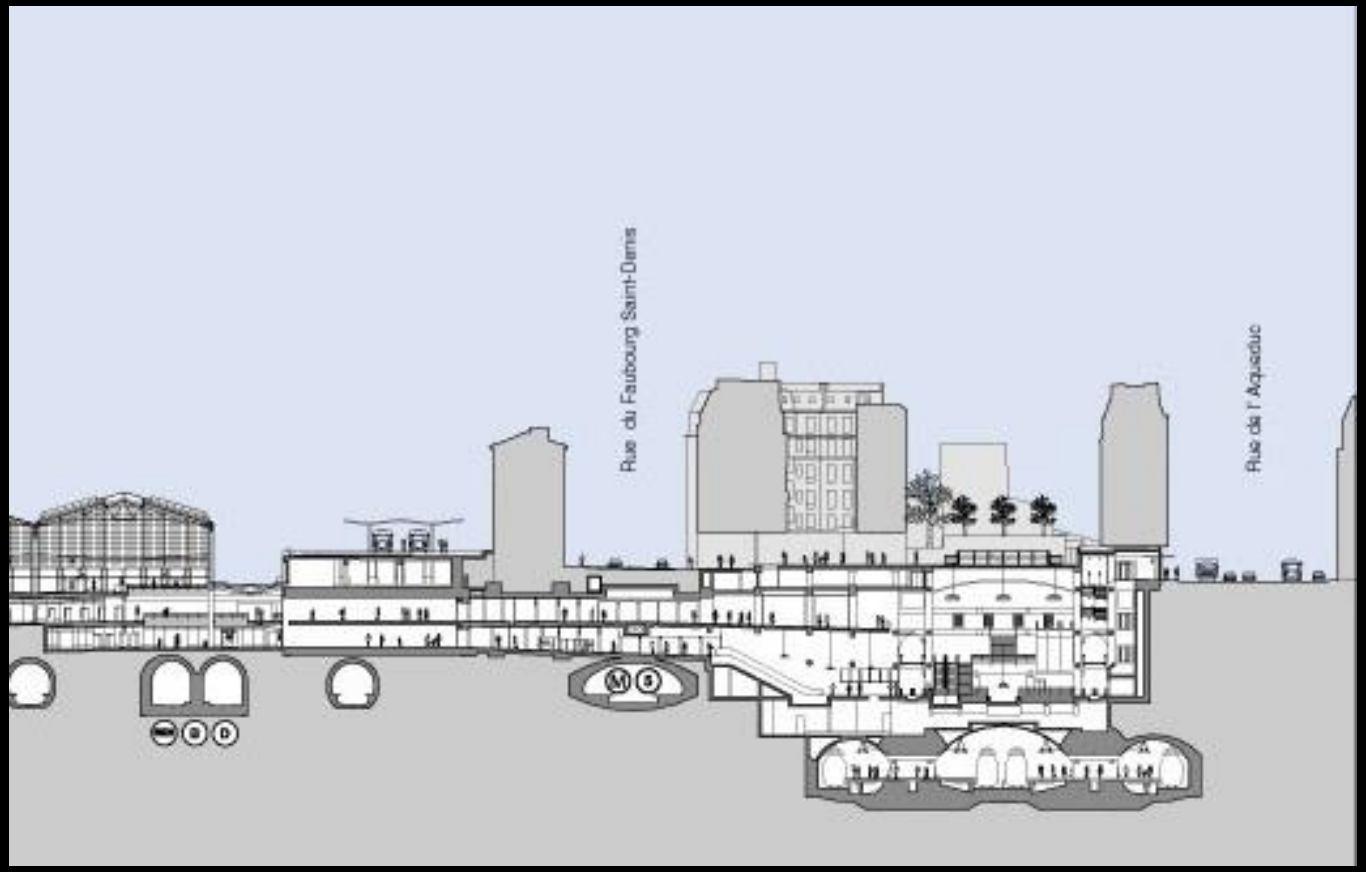
- 4 subway lines of the parisian transport network
- The new parisian subway line 13
- 2 regional express lines
- The new regional express line E
- The high speed train TGV of the national transport network
- The new TGV Eurostar connected to London

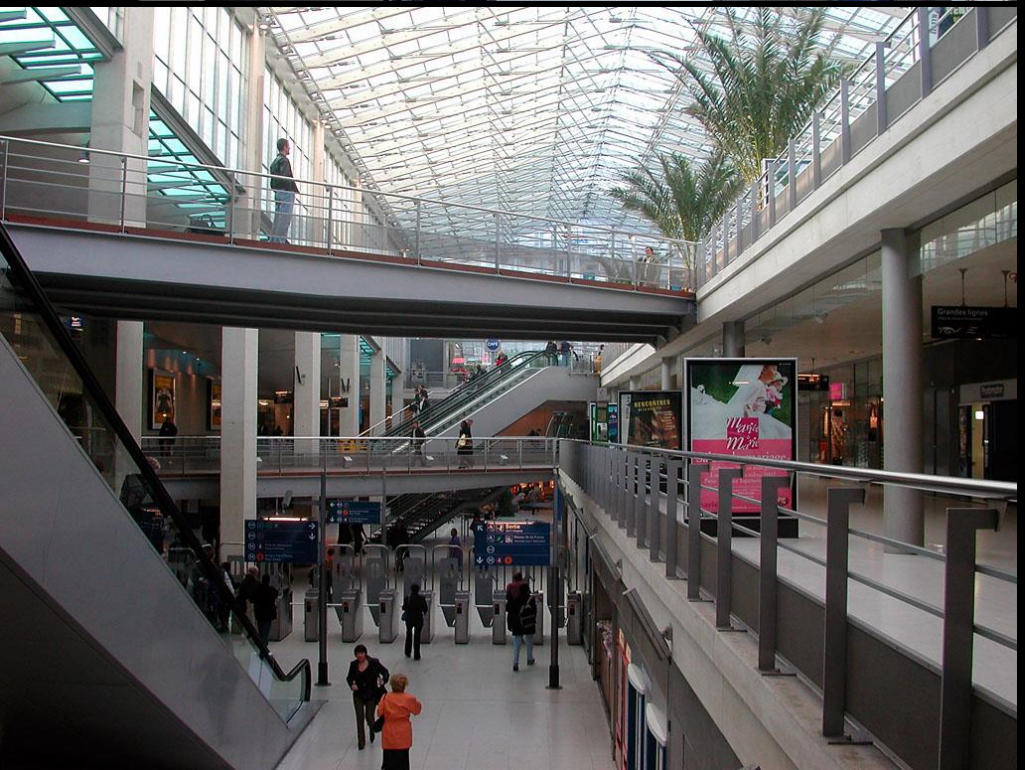
A listed building


CHEMIN DE FER DU NORD
CAFE

The transparancy of the double hall provides a visual continuity with the street creating clearly identifiable spaces


QUAND VOUS NE POUVE
ÉCRASEZ VOTRE
l'été des festivals
les cultures du monde


Rue du Faubourg Saint-Denis
Rue de l' Aqueduc

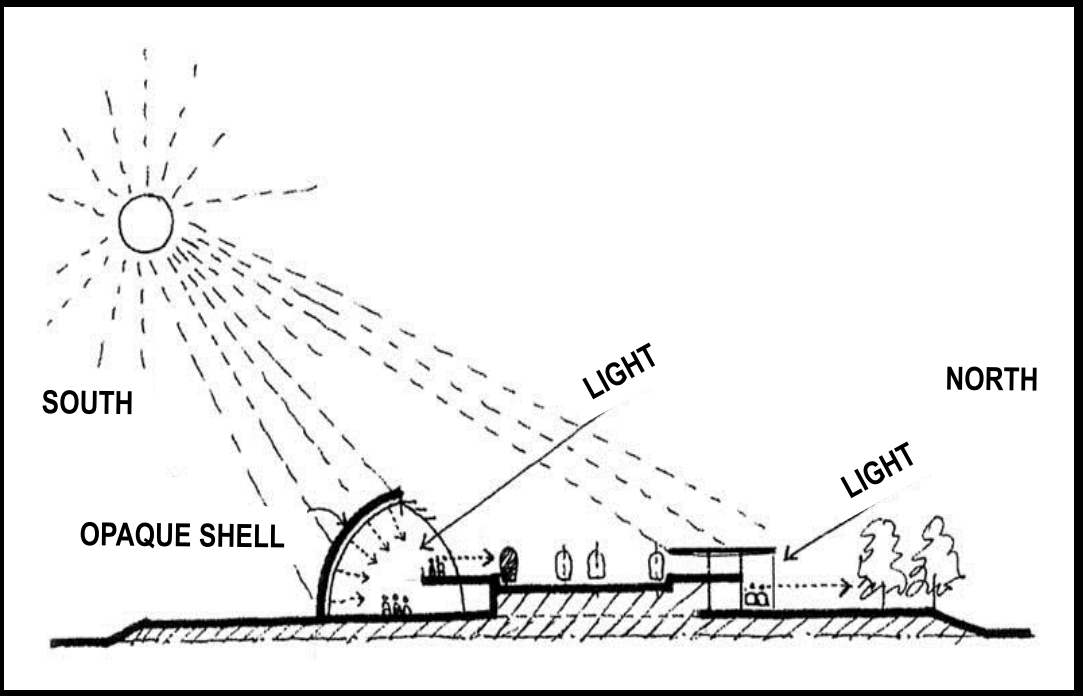


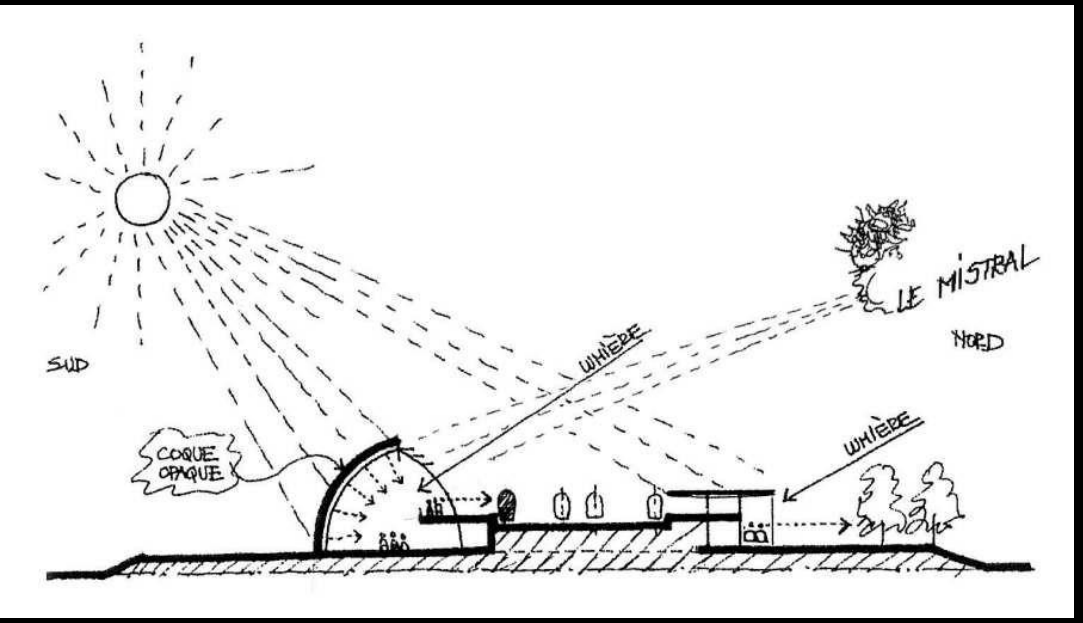
Passengers access the various modes of transport by vertical and horizontal connections between the five superimposed levels.The hall gives a clear impression of the overall space and flow schemes.

5. Un confort environnemental respectueux des ressources naturelles

The waiting area of the Departure Pavilion borders the platform all the way along to protect passengers against the heat and the wind.

Avignon-TGV





Protection against the Sun :

- A high insulated opaque shell on the south side of the Departure Pavilion

- Eaves for shading the Arrivals Pavilion

Protection against the main wind from the North :

- At the platform level, the waiting mezzanine is protected from wind by a light glass shell.

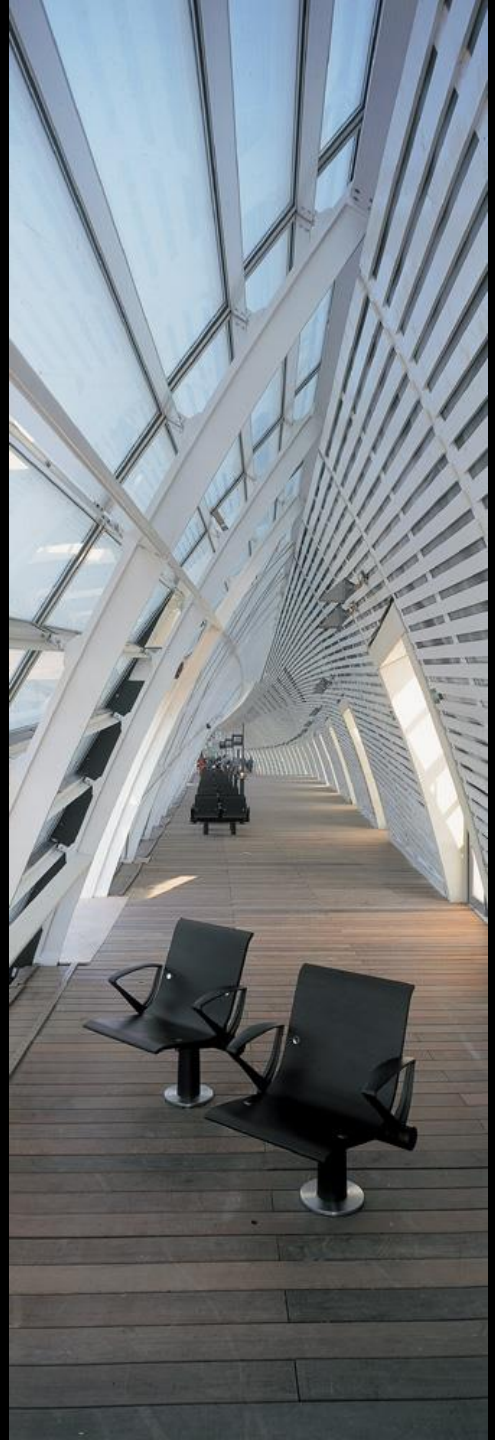
The Visual comfort :

- The glazed façades are oriented to the north for smooth natural light and avoiding glare.

Gare d'Avignon TGV

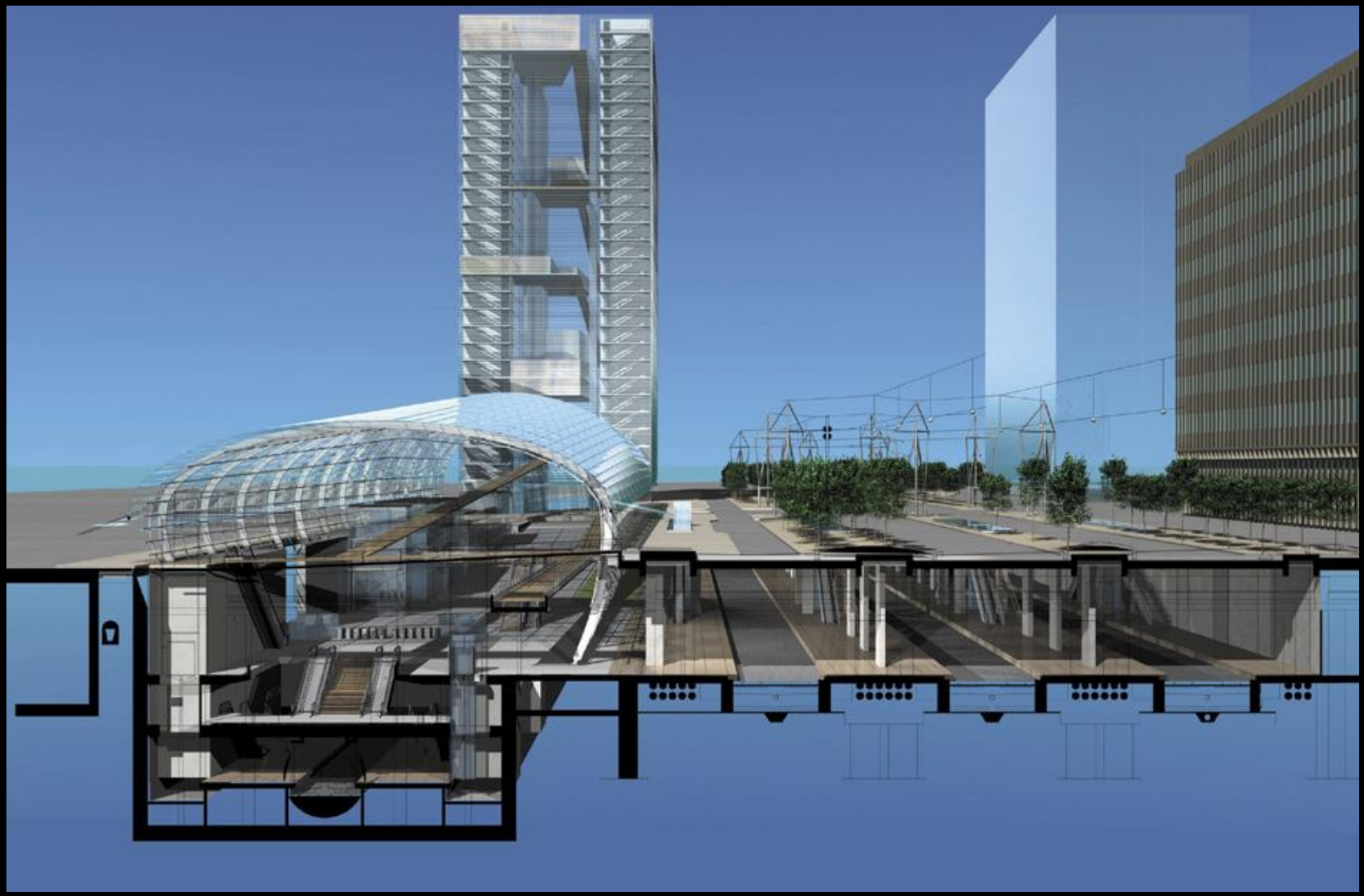
Active system :
- under floor heating or cooling on the mezzanine
- Jet diffusion of the treated air

The waiting mezzanine offers thermal and lighting comfort.

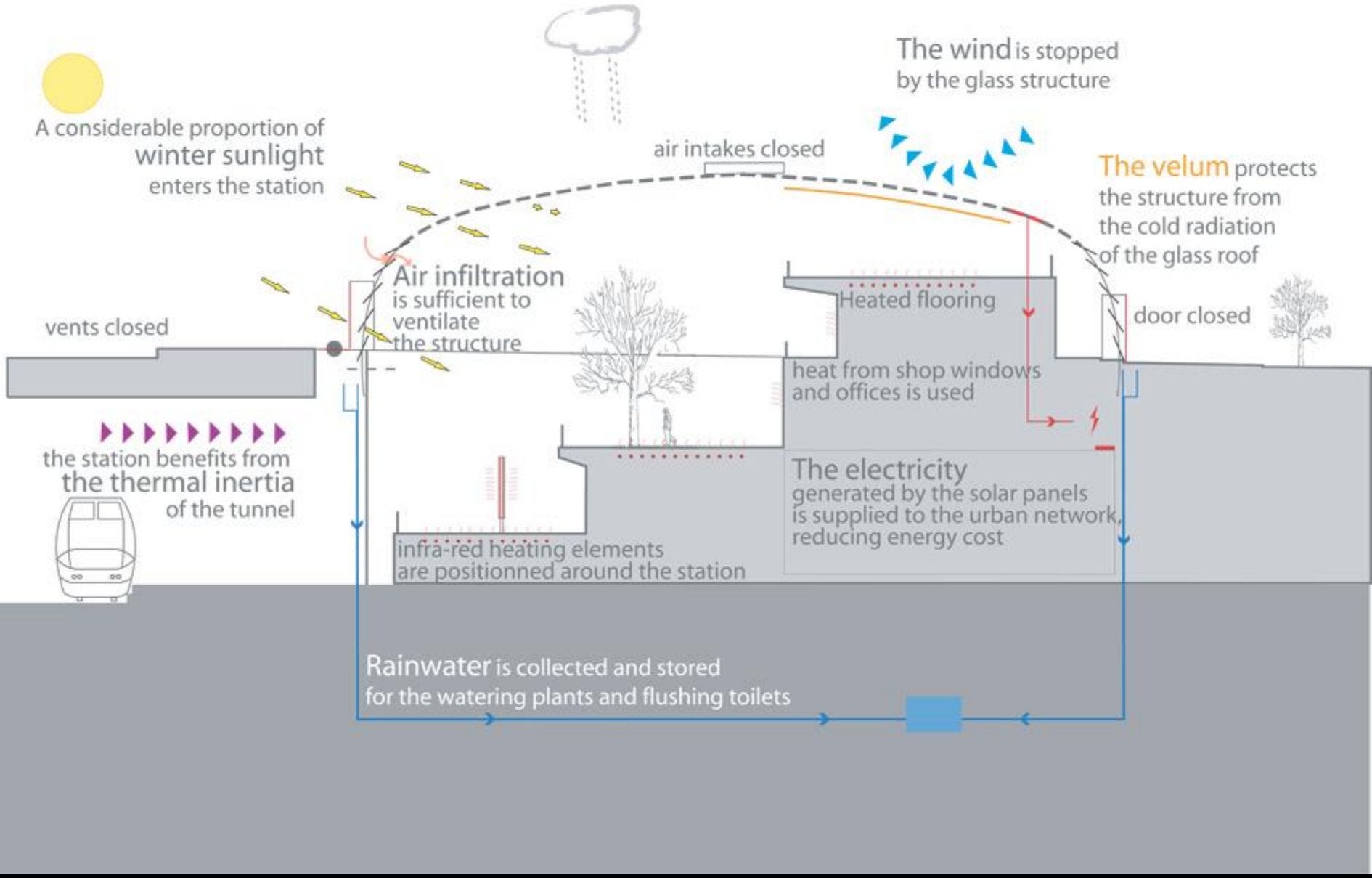


The upper glazing shell is silk screen printed to filter the light

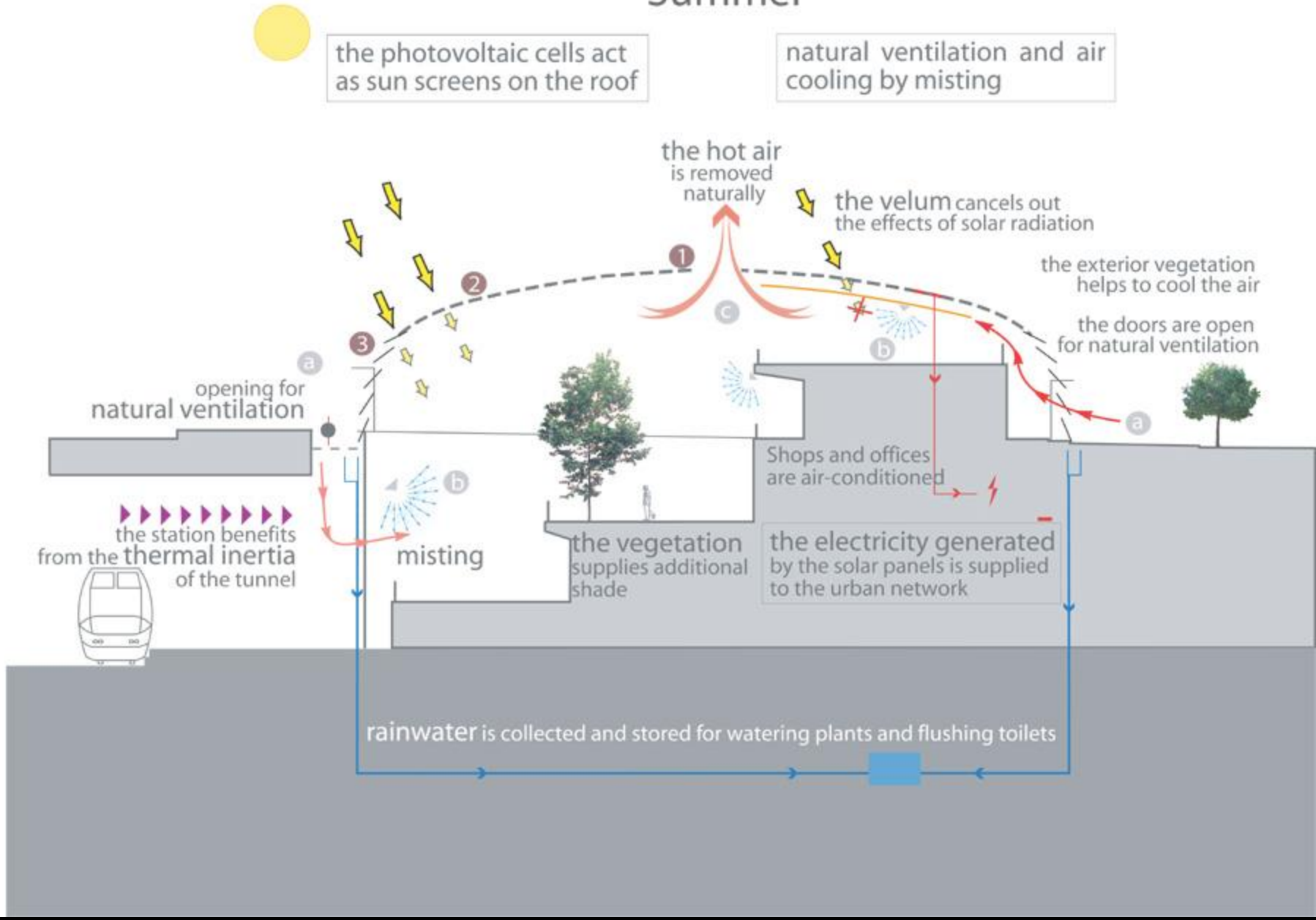
Turin Porta Suza



Winter

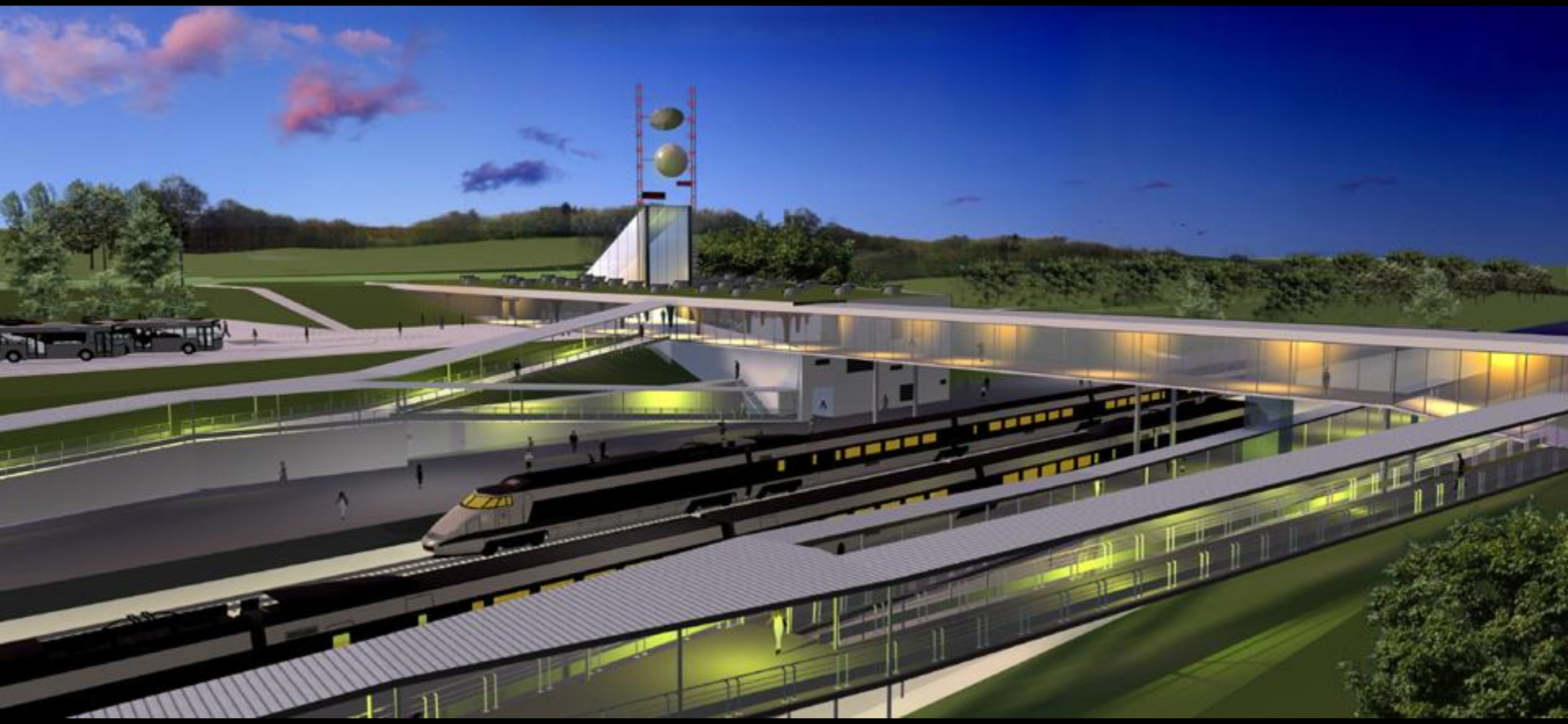

A considerable proportion of
winter sunlight
enters the station
The wind is stopped
by the glass structure
air intakes closed
The velum protects
the structure from
the cold radiation
of the glass roof
Air infiltration
is sufficient to
ventilate
the structure
vents closed
Heated flooring
door closed
heat from shop windows
and offices is used
the station benefits from
the thermal inertia
of the tunnel
The electricity
generated by the solar panels
is supplied to the urban network,
reducing energy cost
infra-red heating elements
are positionned around the station
Rainwater is collected and stored
for the watering plants and flushing toilets

Summer

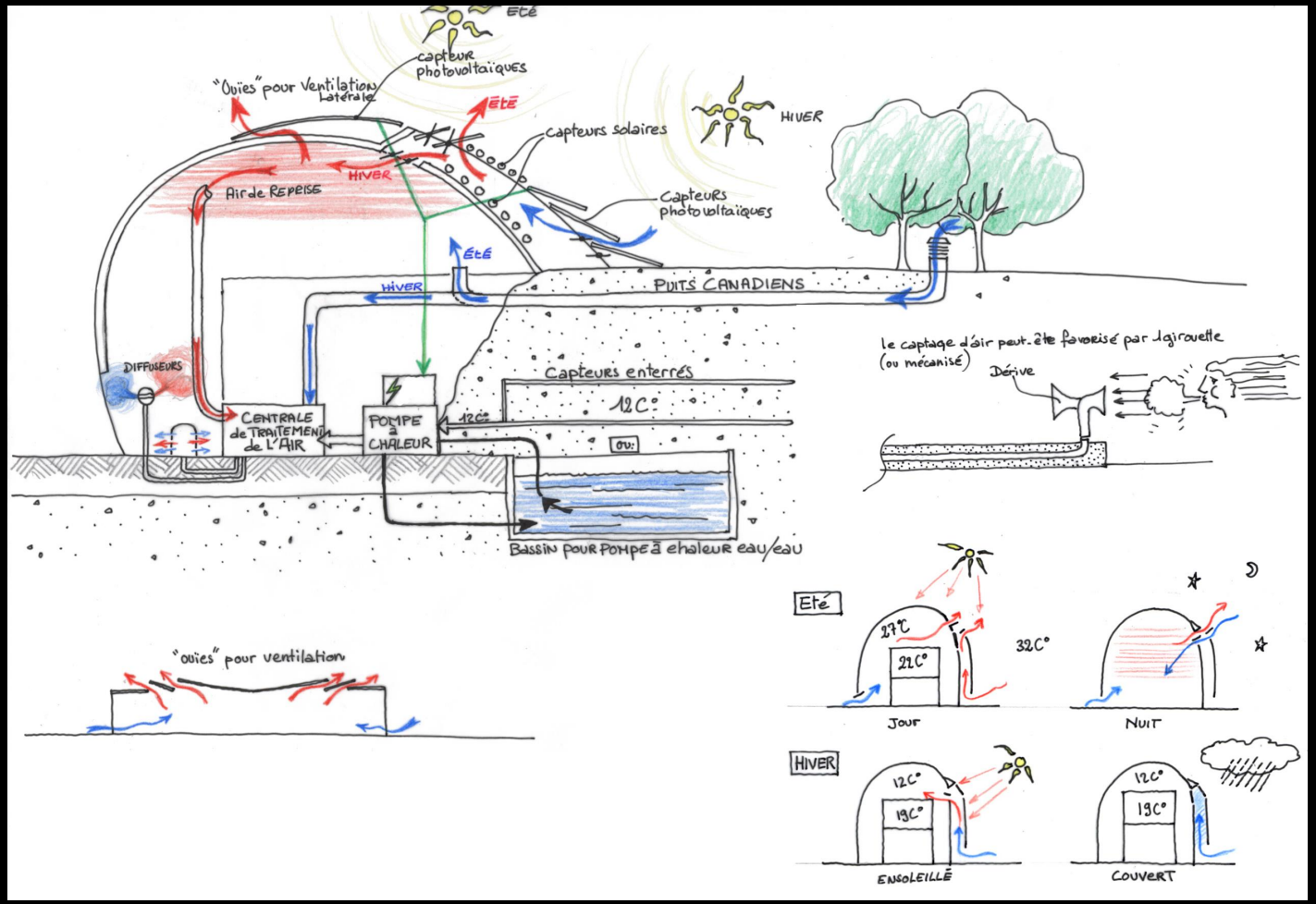

the photovoltaic cells act as sun screens on the roof
natural ventilation and air cooling by misting
the hot air is removed naturally
the velum cancels out the effects of solar radiation
the exterior vegetation helps to cool the air
the doors are open for natural ventilation
opening for natural ventilation
Shops and offices are air-conditioned
the station benefits from the thermal inertia of the tunnel
misting
the vegetation supplies additional shade
the electricity generated by the solar panels is supplied to the urban network
rainwater is collected and stored for watering plants and flushing toilets

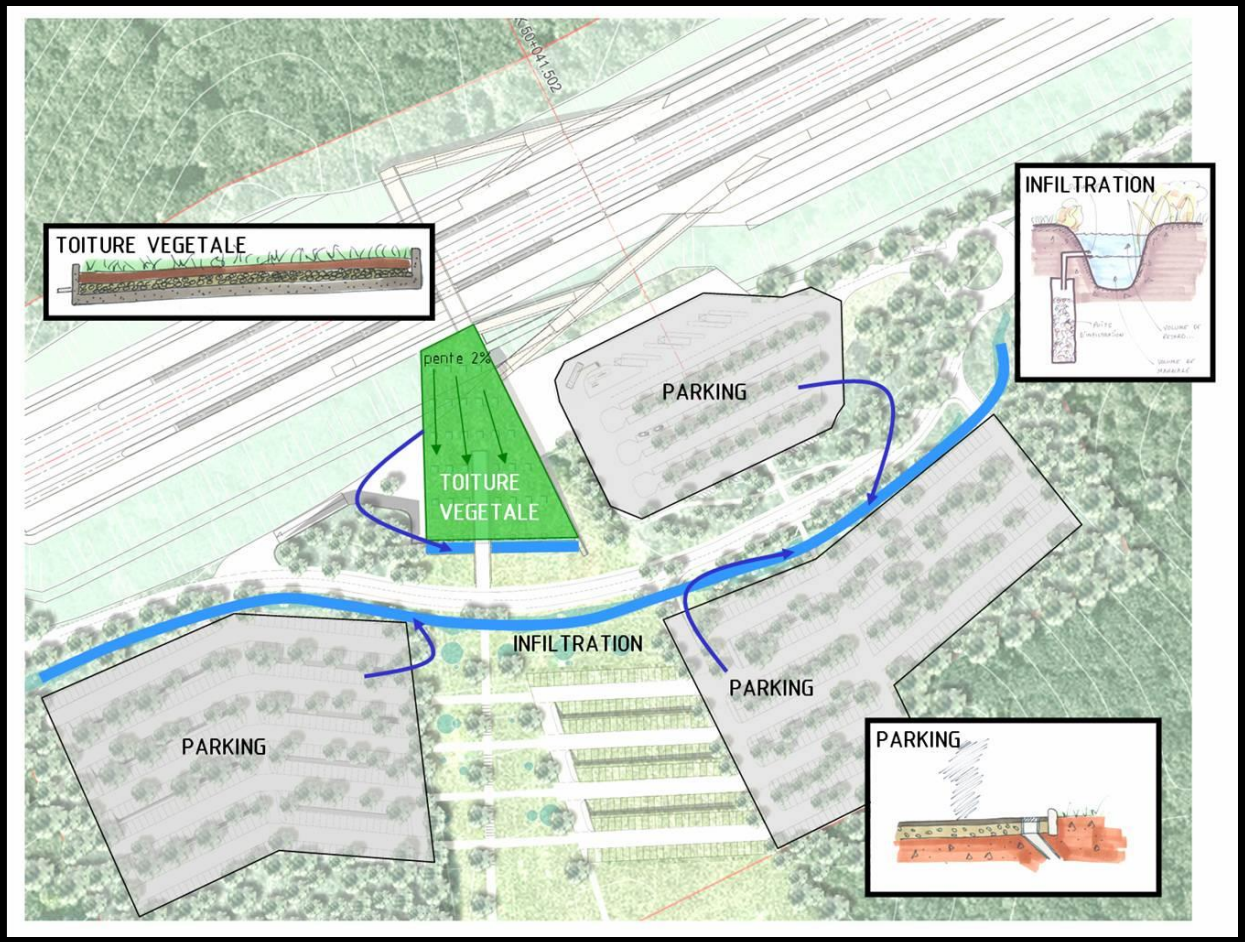
The glass structure contains 8000 m² of photovoltaïc double glazed panels.
To control solar gains, the side panels are transparent whereas the opacity of the PV panels increases towards the top.

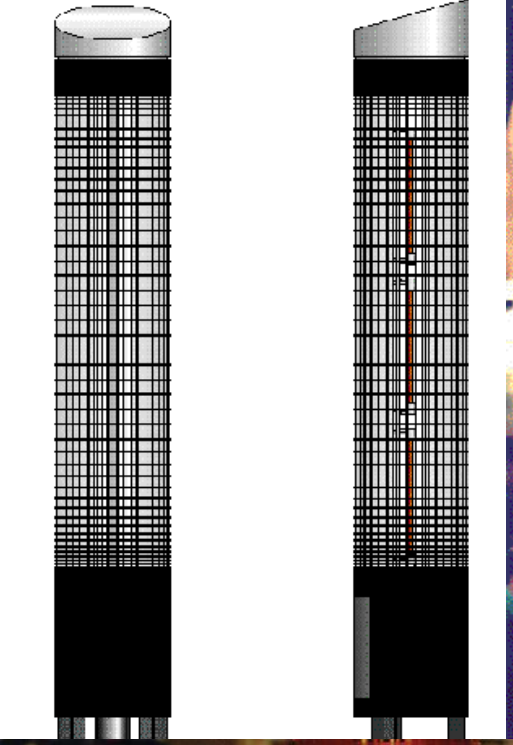
Besançon-TGV

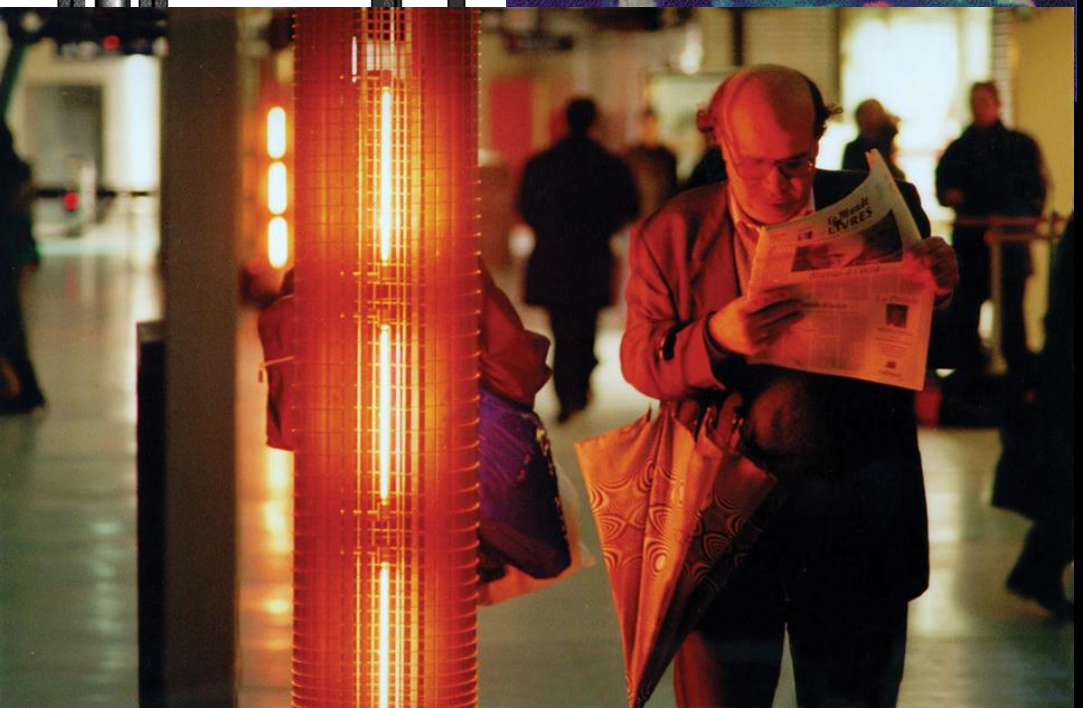



TGV


Eté
capteur photovoltaïques
"Ouïes" pour Ventilation Latérale
Eté
HIVER
capteurs solaires
HIVER
Air de REPRISE
Capteurs photovoltaïques
Eté
HIVER
PUITS CANADIENS
DIFFUSEURS
CENTRALE de TRAITEMENT de L'AIR
POMPE à CHALEUR
12C°
Capteurs enterrés
12C°
OU:
Bassin pour pompe à chaleur eau/eau
le captage d'air peut être favorisé par girouette (ou mécanisé)
Dérive
"ouïes" pour ventilation
Eté
27C
22C°
32C°
Jour
Nuit
HIVER
12C°
19C°
ENSOLEILLÉ
12C°
19C°
COUVERT


TOITURE VEGETALE
INFILTRATION
pente 2%
TOITURE VEGETALE
PARKING
INFILTRATION
PARKING
PARKING
PARKING

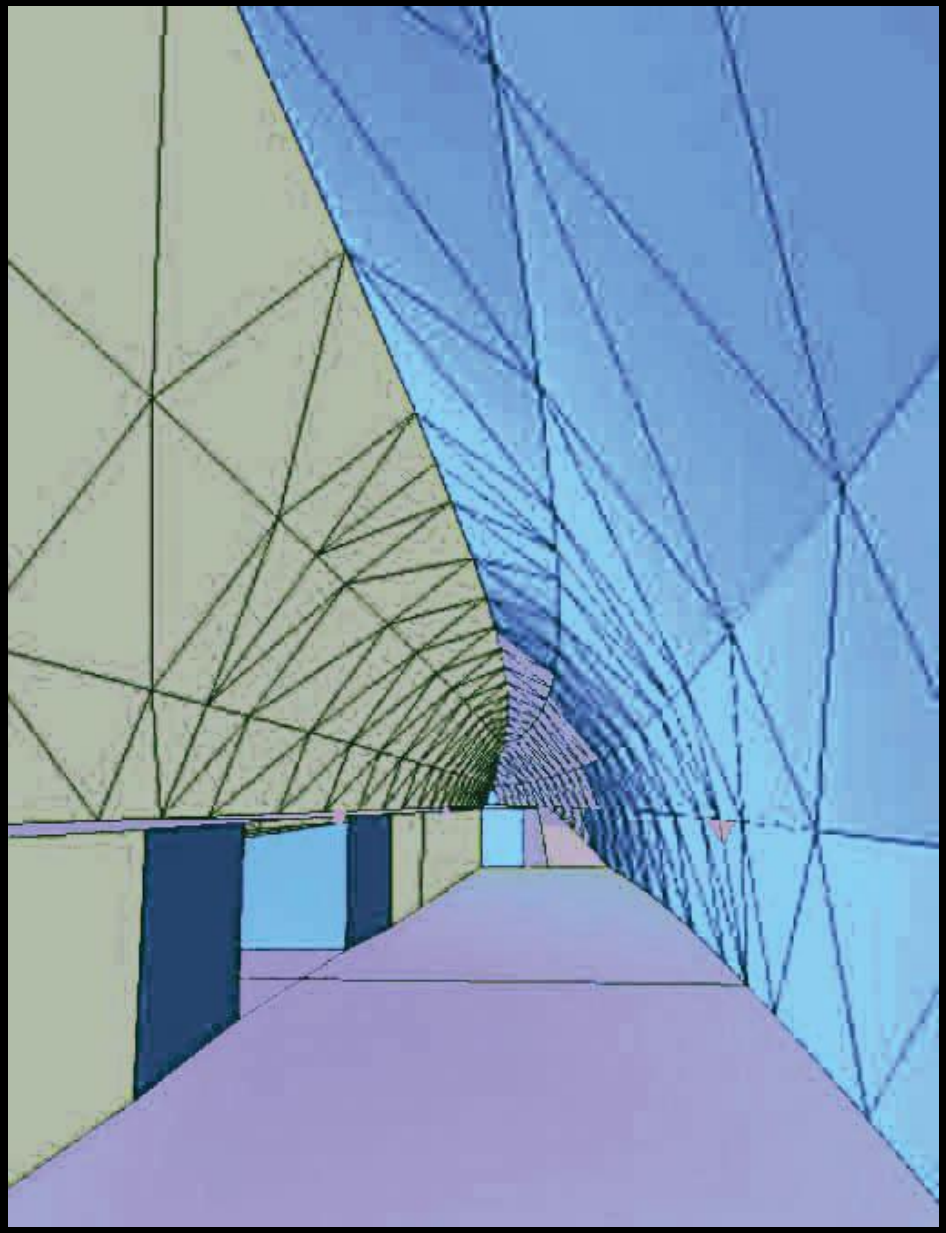




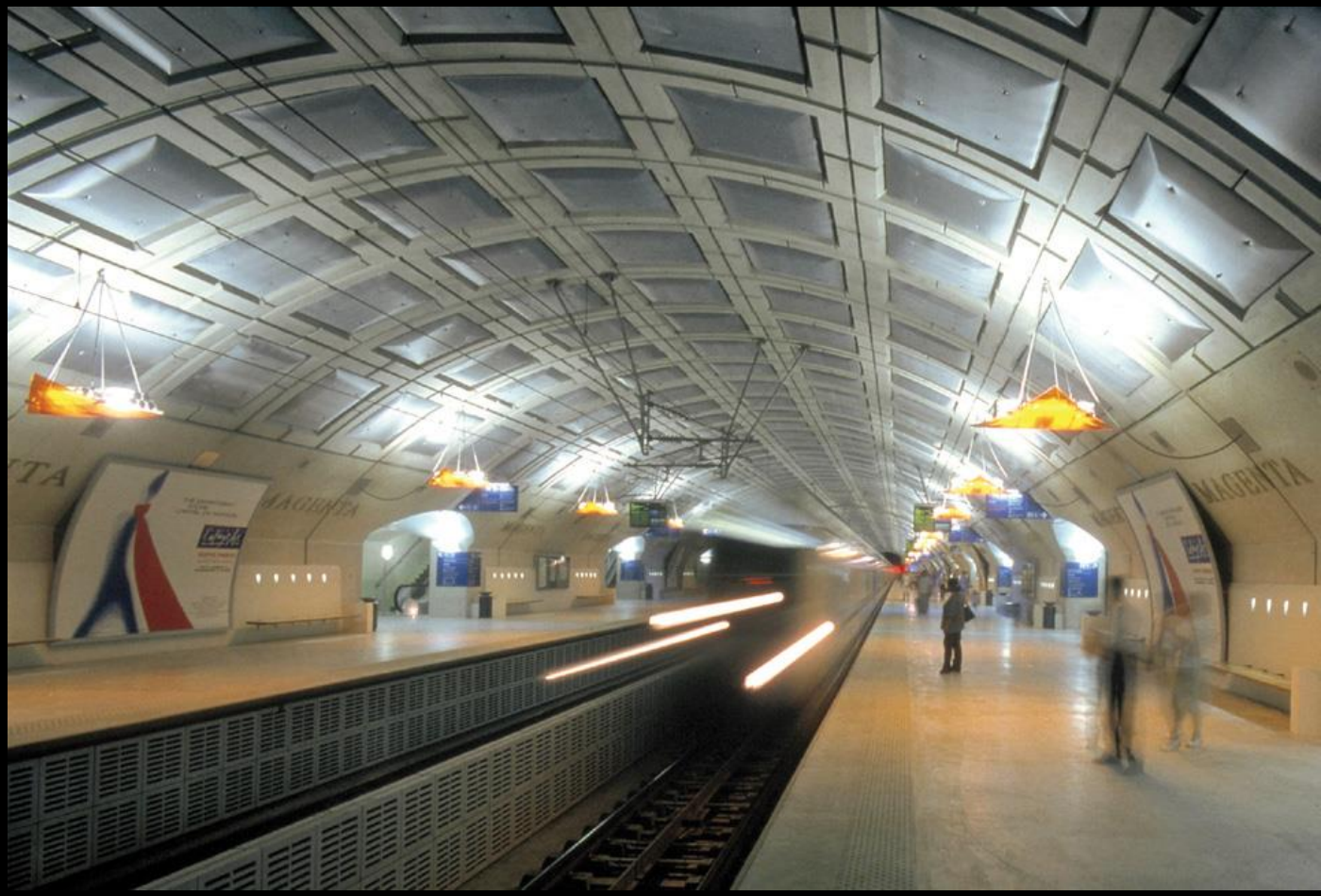
Brasero, infrared heater
Lille Europe station, France.

Direct evaporative Cooling system - Marseille Saint-Charles station, France.

Heating system integrated into the glazing – Paris-Nord station



Acoustic modeling with the software Cattacoustic software –
Avignon station, France.



The sound absorptive panels used in the Magenta RER E station, Paris, France and Valence TGV

Sound absorptive under layer
- Avignon station, France.

Acoustic thresholds are used to clearly identify the transportation mode in the hub exchange - Magenta RER E station, Paris, France.

Gare Meuse-TGV

Fir for the structure, fir and oak for facades and jambs, oak and larch for shingles – Eco-friendly wood treatment by steam-pressure autoclave.


INFORMATION

Marseille Saint-Charles

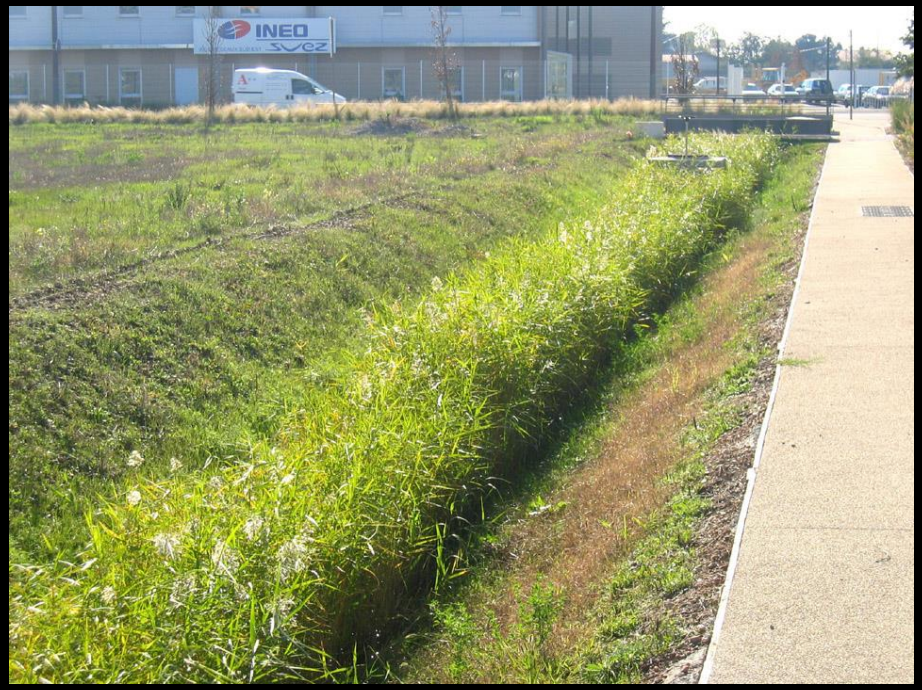
Local stone and
innovative technique :
The pre-stressed pillars

AREP

6. Une exigence de qualité environnementale renforcée par le développement des écoquartiers…

Rovaltain

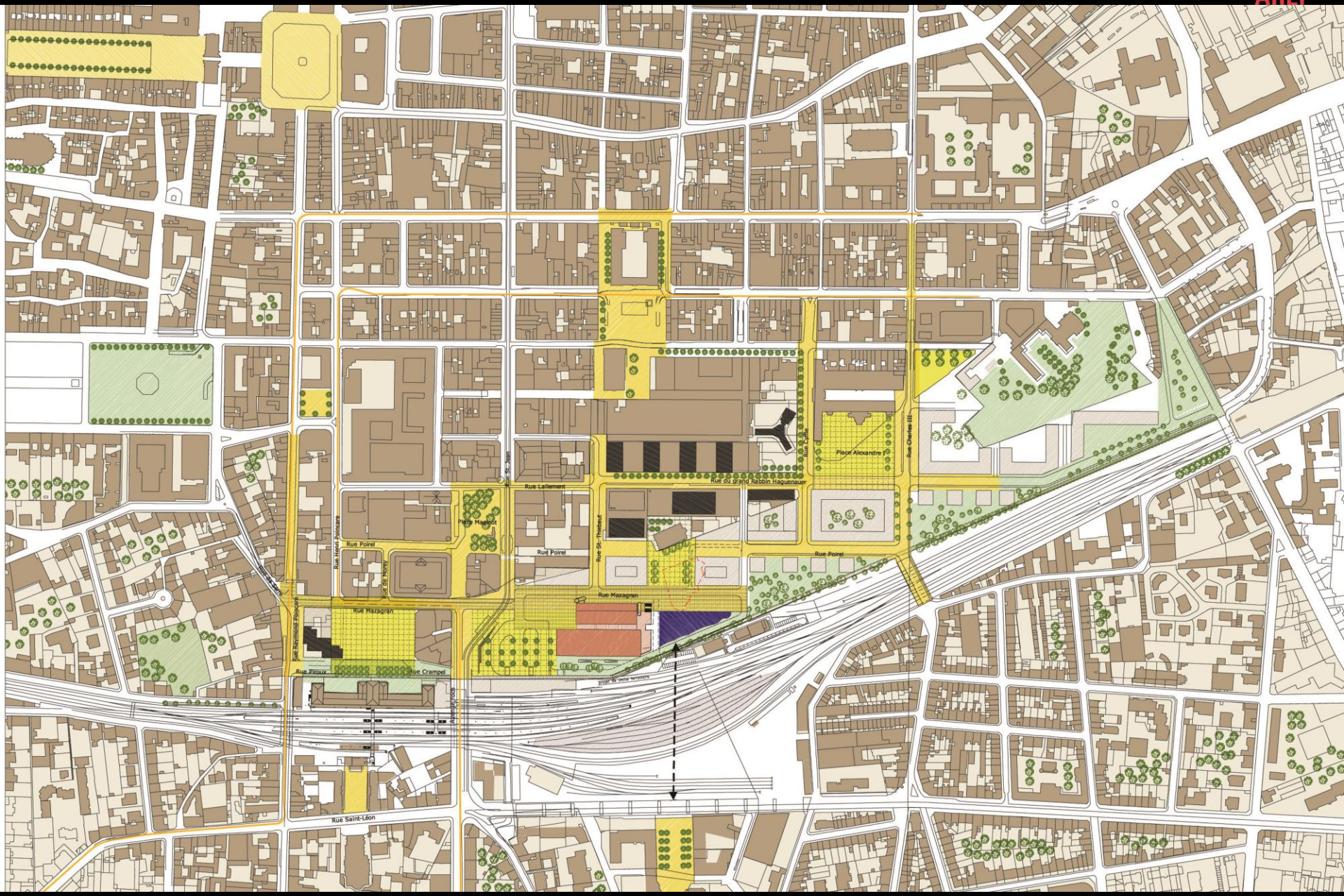
AREP



The runoff rainwater polluted by hydrocarbon on the road is retained on the planted side walk.
The peaks of rainwater discharge in the collector are reduced and the control of water pollution is achieved locally by the macrophyte plants.

AREP

Reims-Bezannes



Nancy Grand Cœur

AREP

Besançon Porte Verte


Gare
Gare routière
Jardins d'exposition
en terrasse
Services liés
à la gare

7. Conclusion…

AREP

Une gare…

- **Intermodale**
- **Au cœur de la densité urbaine**
- **Flexible et évolutive**
- **Qui s’inscrit dans la continuité des lieux**
- **Qui garantit confort et qualité environnementale**

…durable

1. Mobility

1.1 Optimizing movement flows

La Plaine – Stade de France station, Regional express line B, Saint-Denis, suburbs of Paris

Major infrastructure modernization of the regional express line station :
Routing 25 000 passengers in 45 minutes during events at the Stade de France

Main entrance of the station -
The pedestrian avenue crossing the station transforms into a hall providing practical platform access –The transparancies prevent the common area from being divided into two

Two 8 meter wide ramps which open up at mid-height of the structure, allow the crowds arriving from Paris to reach the stadium without any detours.

The concrete piles supporting the tracks form an imposing 100 meters long « peristyle » entrance for the crowds arriving from the stadium

The highly flexible series of wide ramps permit the large flow of people expected prior to and after events to be channeled – Station peak capacity : evacuates 25 000 persons in 45 minutes

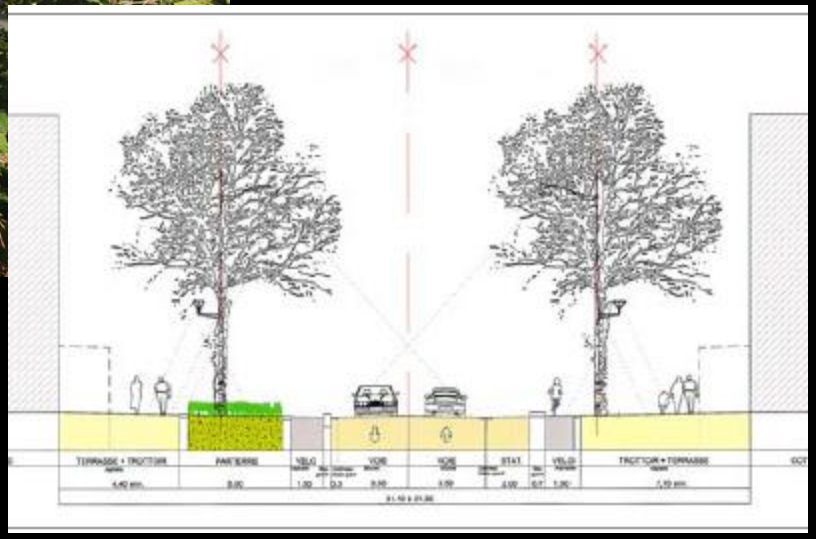
Providing direct light on the ramps with linear glazed strips on the canopy-covered platforms to make space as legible as possible.

1. Mobility

1.2 Developing pedestrian and cycling as modes of transport

Jean-Jaurès avenue, Paris

The space is designed to harmoniously redistribute modes of travel and occupation : « soft traffic » is set aside on planted and large spaces



The program aims to return the street to pedestrians : the common single-level platform is fluid and takes on a more functional character – the breathing spaces invite rest and recreation.

The public transport traffic is made efficient with separate bus lanes

1. Mobility
2. Movement flows
3. Intermodality
4. Building materials
5. Rainwater management
6. Energy and comfort
7. Acoustic comfort in public spaces

2. Movement flows

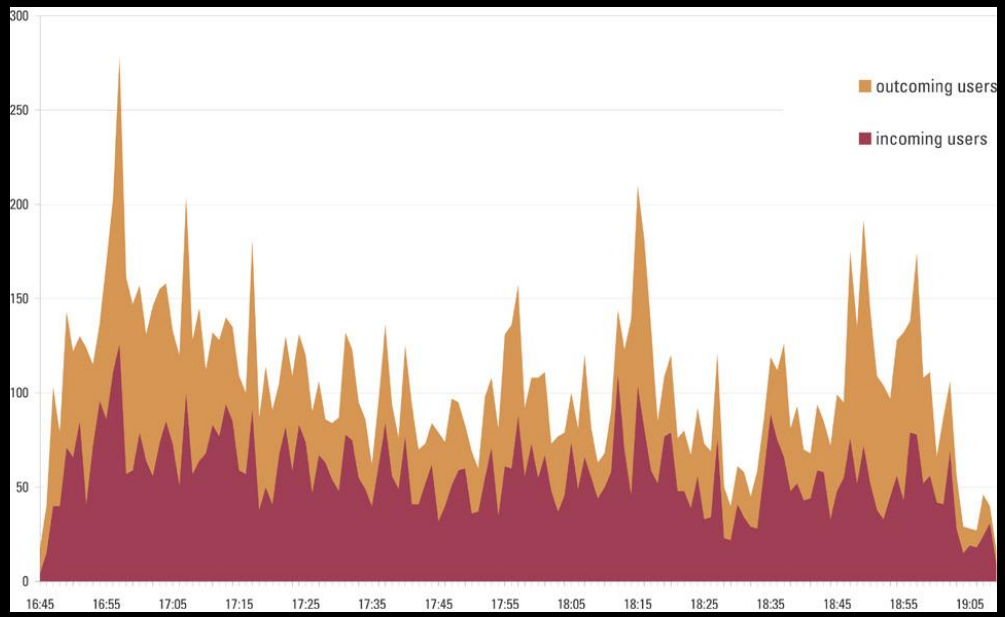
2.1 Method and tools

2.2 Organizing the space for movements

2. Movement flows

2.1 Method and tools

Gathering data



Sample count of incoming/outgoing users taken at a particular point

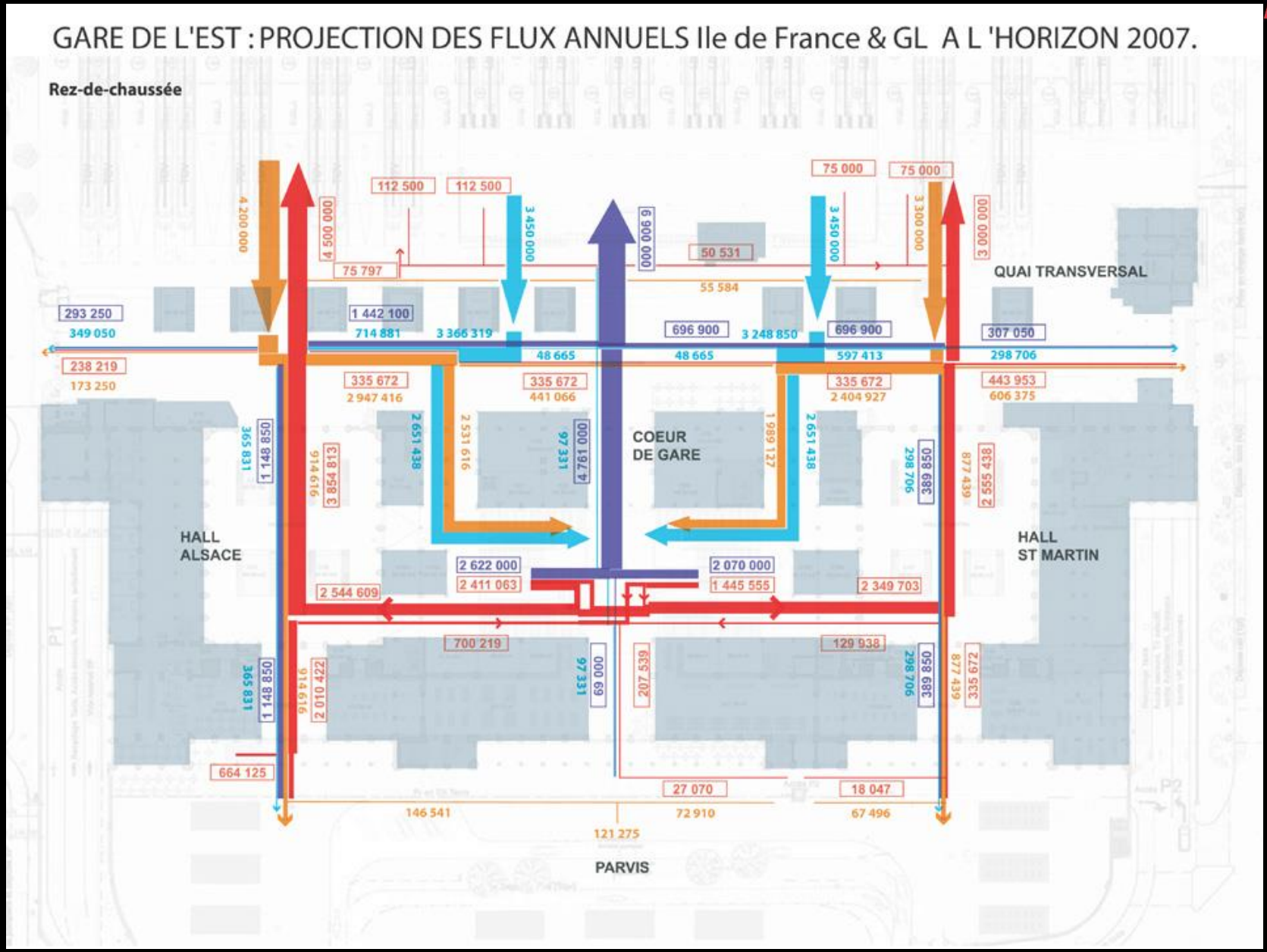
Station mobility studies are based on a subtle approach to data gathering to explore the nature of traffic flows, their spatial distribution and the behaviour of individuals over time.

2. Movement flows

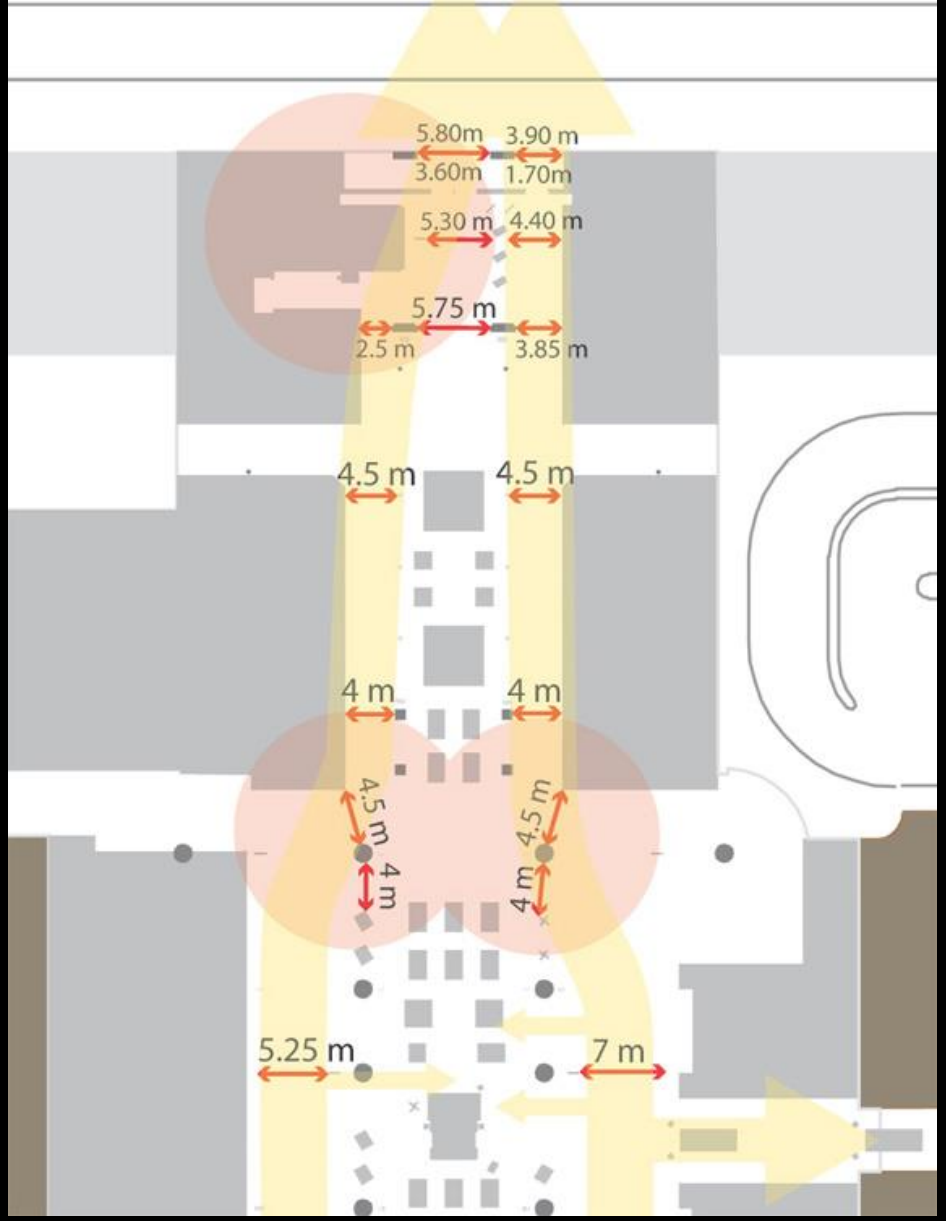
2.1 Method and tools

Diagnostics and graphic representation

AREP



The forecast flows are represented according to their type (colour-coded arrows) and quantity (thickness of arrows) - Paris-Est station, Paris



Lyon-Part-Dieu Station, Lyon, France : Disfunctions

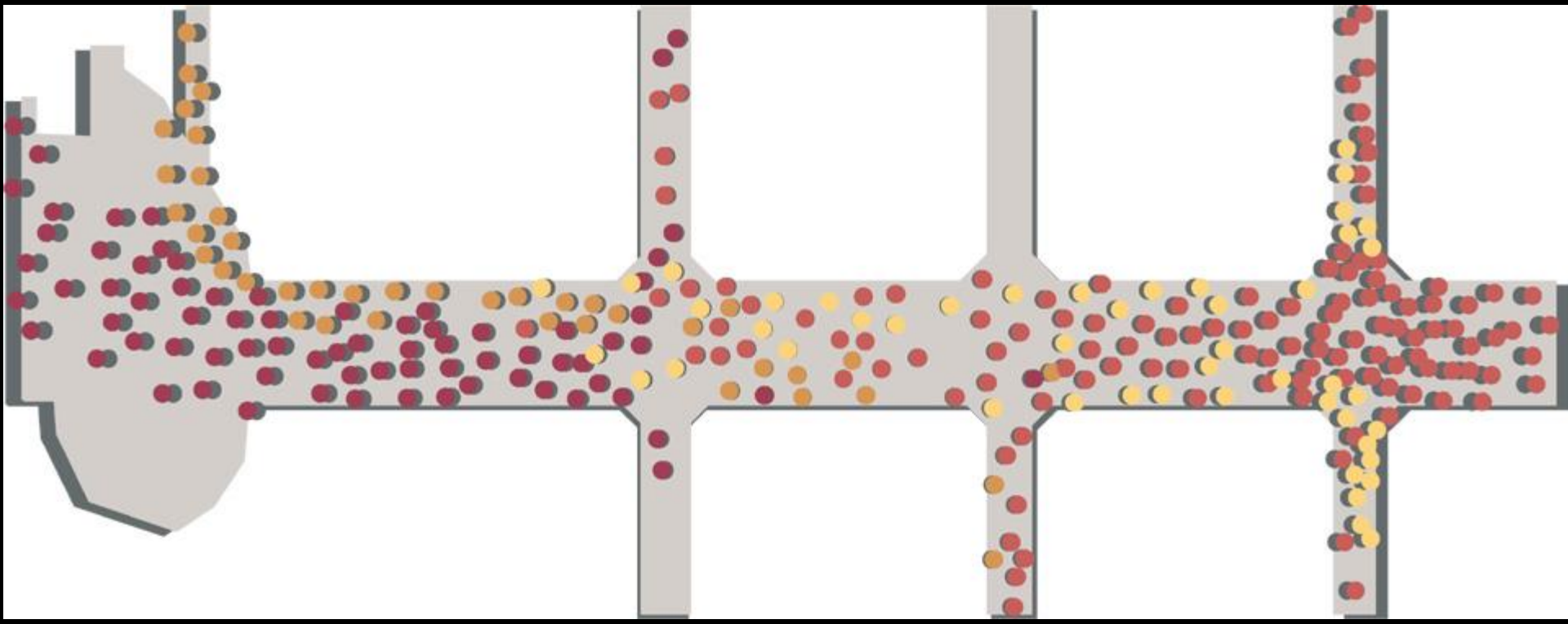
The most constricting areas are measured with the pink circles representing the main congestion points.

Graphic representation is a major stage in that it’s illustrations are key to understanding the project

2. Movement flows

2.1 Method and tools

Simulation



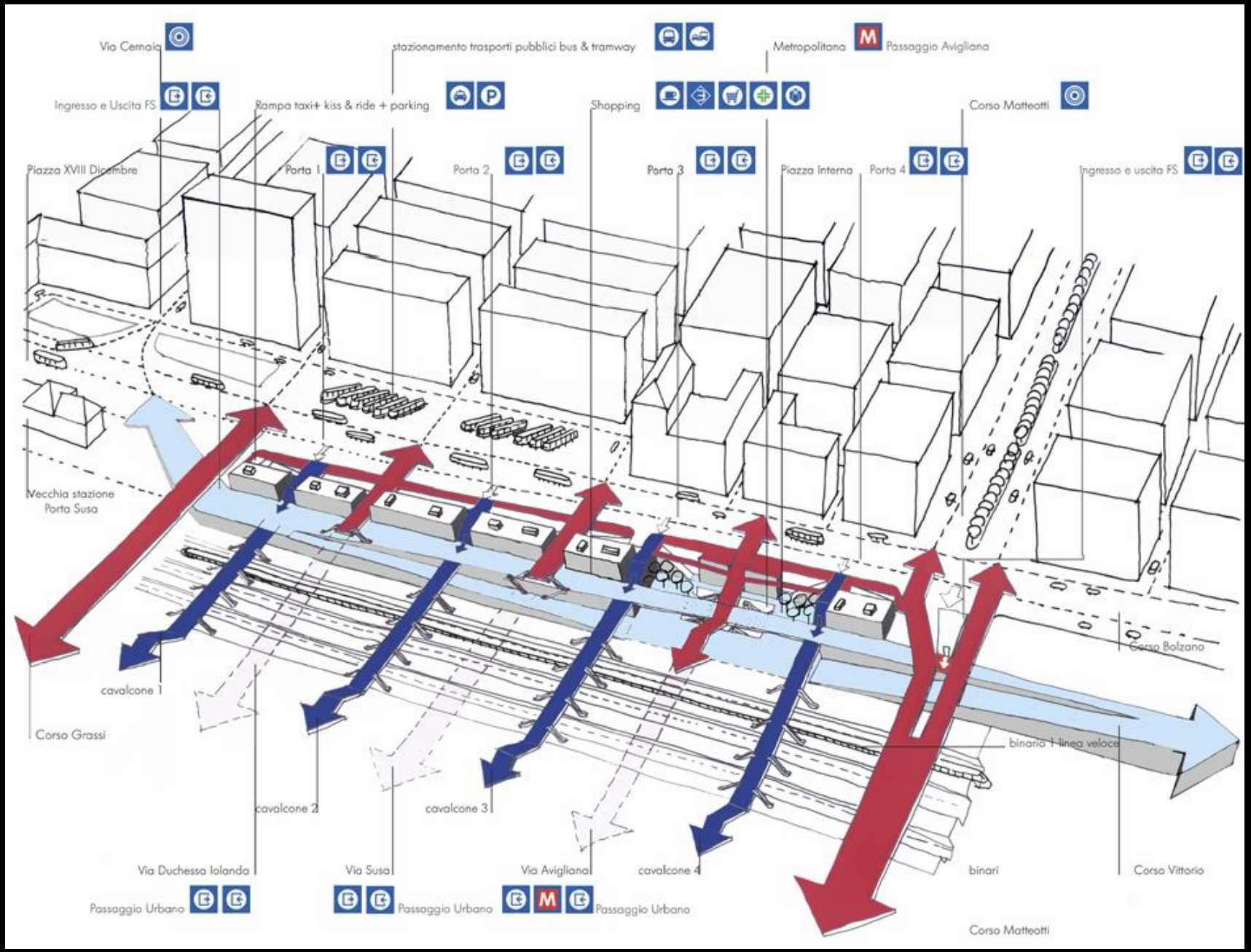
Research – Development (APREP/IRISA) : SIMULEM « Simulating mobility loci » - An application used to model transport locations which can represent individual and collective movement rationales

Simulations help to optimize the development, operation or showcasing of the station

2. Movement flows

2.2 Organizing the space for the movements : City Integration

Turin Porta Susa, Italy



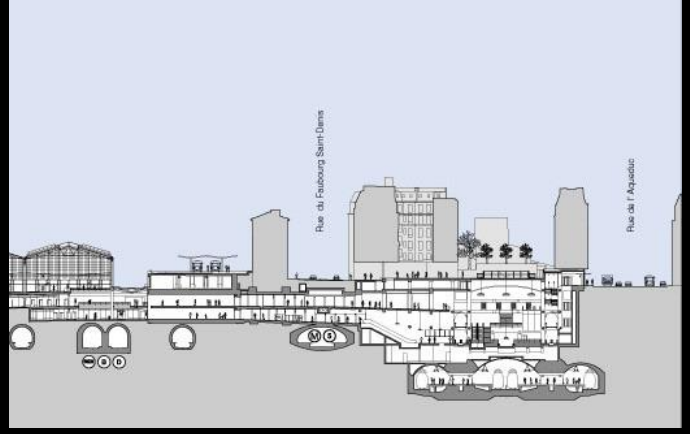
New Turin Porta Susa station, Turin, Italy
A study of intermodal principles, two-way links with the city and integration within the urban grid

2. Movement flows

2.2 Organizing the space for the movements : Continuity from platforms to street

Paris-Nord station, Magenta station, exchange hub, Paris

AREP



The lightwell of the distribution hall leading to the regional express train network (30 meters deep) provides a visual continuity from street entrance to the platforms.

Magenta station, regional express train station, Paris

Passengers are constantly aware of exactly where they are within the well lit station complex - Gare de Magenta RER E, regional express train station, Paris

The impression of enclosure is reduced by the design of innovative wall and ceiling-hung luminaires

The walkway used by passengers entering the station looks down over the exit level, the flows are fluid

Magenta station, regional express train station, Paris

2. Movement flows

2.2 Organizing the space for movements : Composition, space organisation

Gare de Lyon, Paris

Gare de Lyon, Paris

Gare de Lyon, Paris

1. Mobility
2. Movement flows
3. Intermodality
4. Building materials
5. Rainwater management
6. Energy and comfort
7. Acoustic comfort in public spaces

3. Intermodality – Assembling the modes

3.1 Marseille Saint-Charles station

3.2 Strasbourg multimdodal hub

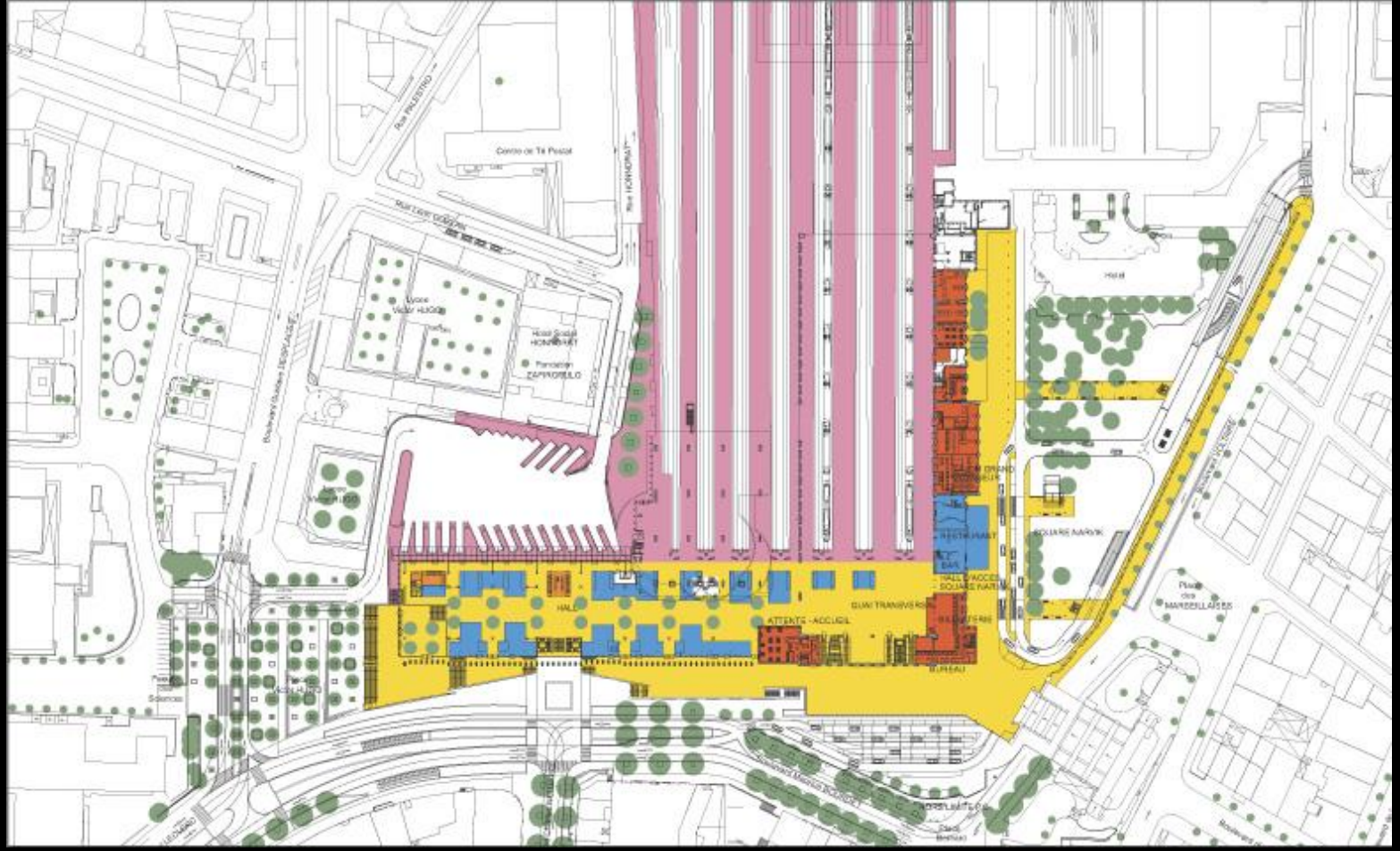
3.3 Lieusaint-Moissy multimodal hub

3.4 Shanghai-South station

3. Intermodality – Assembling the modes

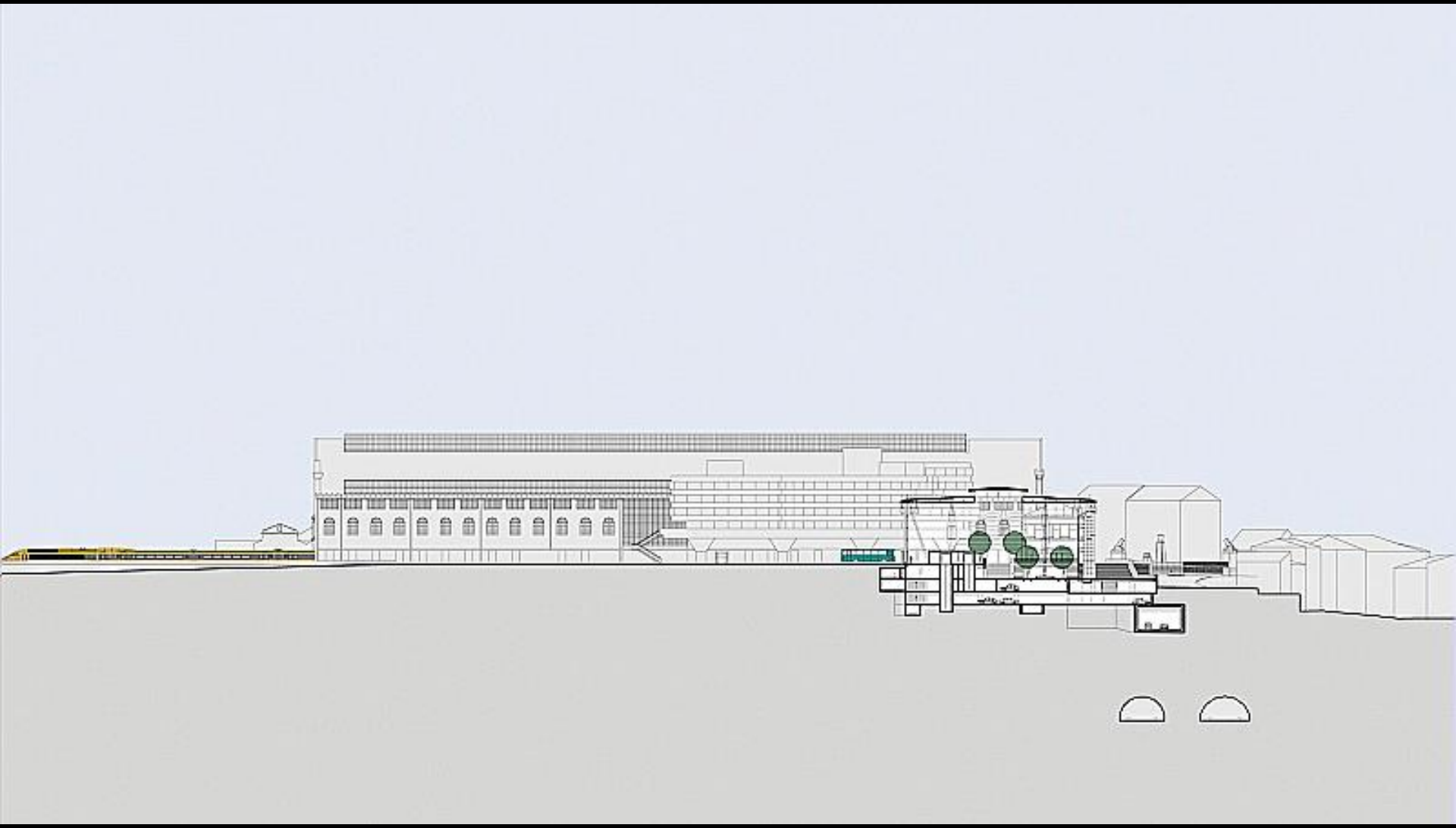
3.1 Marseille Saint-Charles station

Marseille Saint-Charles station,
a new multimodal hub, France

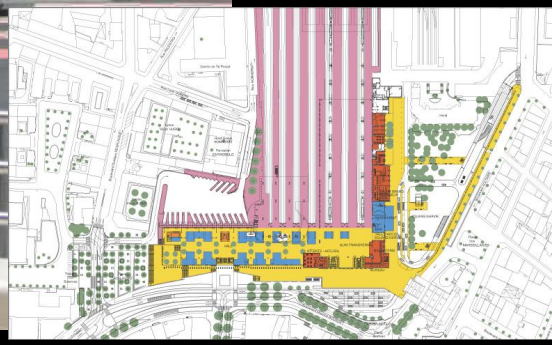


A new hub exchange :

- High speed train TGV of the national transport network
- Express train lines of the interregional transport network
- 2 subway lines
- Regional bus network
- City bus network
- Taxis
- Individual cars



All ticket counters of the different network and shops are located inside the new hall of 140x40m



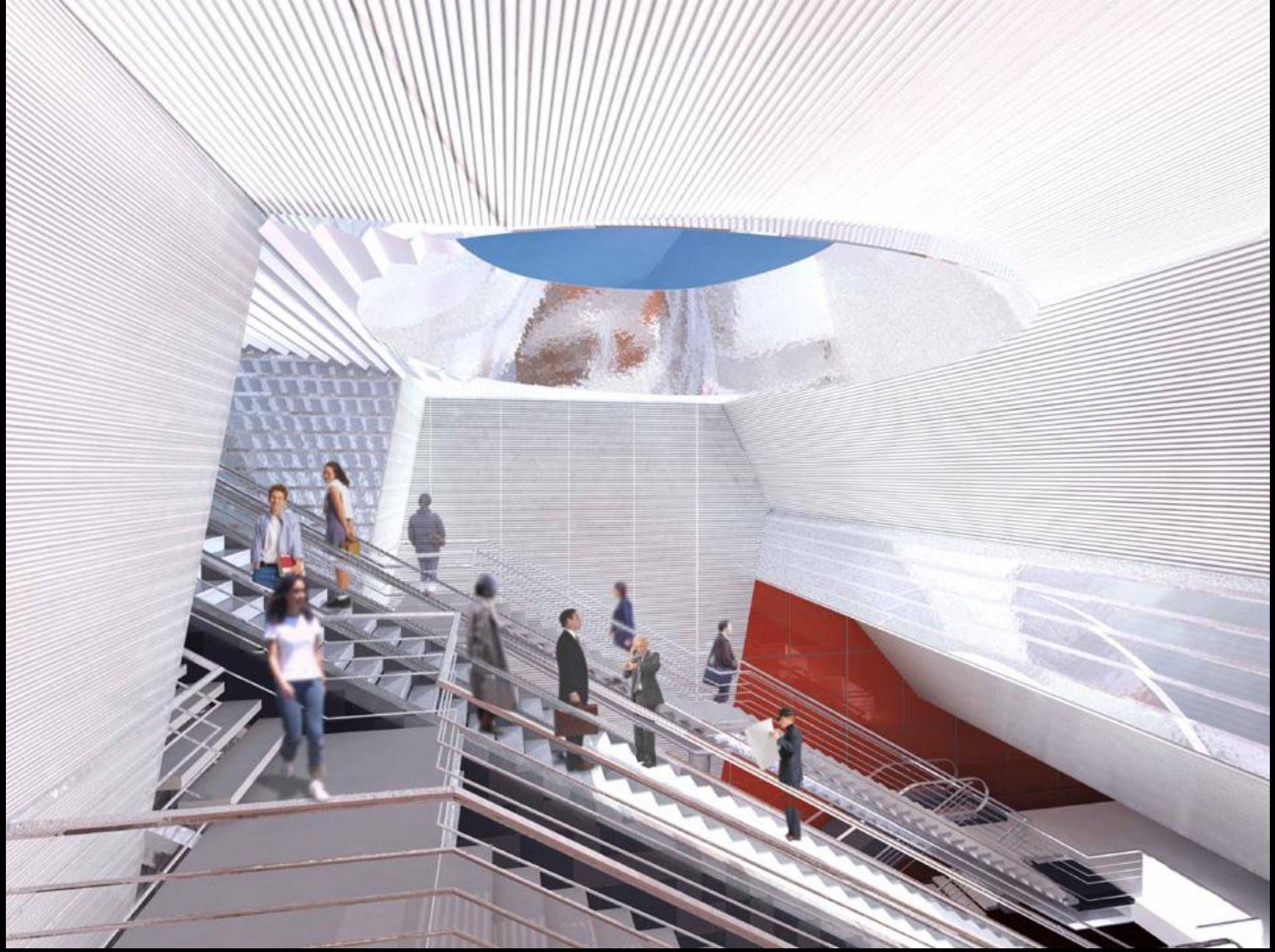
Intermodality between train and bus networks is eased by the location of the bus station right behind the new hall on the same level as the platforms


SETRA
Réseau de transport du département
des Bouches-du-Rhône
CARTREIZE
13
99
100
CARTREIZE

AREP

3. Intermodality – Assembling the modes

3.2 Strasbourg multimodal hub, France



The light well lit space is easily discernible

3. Intermodality – Assembling the modes

3.3 Lieusaint-Moissy multimodal hub, France


25
Lieusaint
Moissy
24
P

3. Intermodality – Assembling the modes

3.4 Shanghai-South station, China

1. Mobility
2. Movement flows
3. Intermodality
4. Building materials
5. Rainwater management
6. Energy and comfort
7. Acoustic comfort in public spaces

4. Building material

4.1 Timber material

4.2 Building stone

4.3 Street furniture

4. Building material

4.1 Timber material

The new high speed railway station Meuse, east of France

4. Building material

4.2 Building stone

Station of Marseille Saint-Charles, Marseille, France

4. Building material

4.3 Street furniture

Stations of the high speed train Méditerranée network, France

Minimal use of material, ease of maintenance and durability of the products

1. Mobility
2. Movement flows
3. Intermodality
4. Building materials
5. Rainwater management
6. Energy and comfort
7. Acoustic comfort in public spaces

5. Rainwater management

5.1 Business area, Rovaltain near Valence, France

5.2 Reconstruction of the operational and maintenance bus center after the explosion of a chemical plant in 2001, Toulouse-Langlade, France

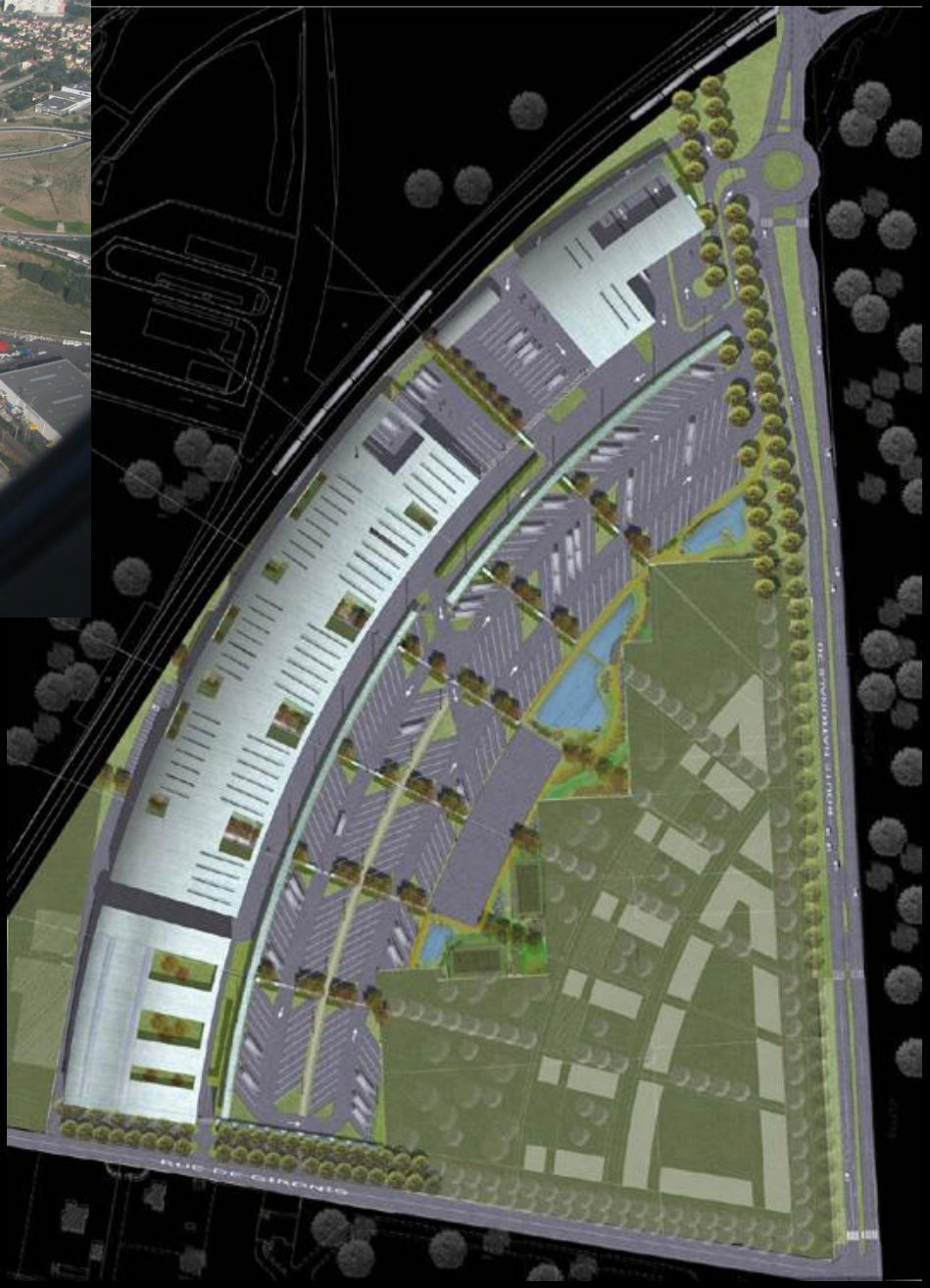
5.3 Green Center Shopping Complex, Toulouse, France

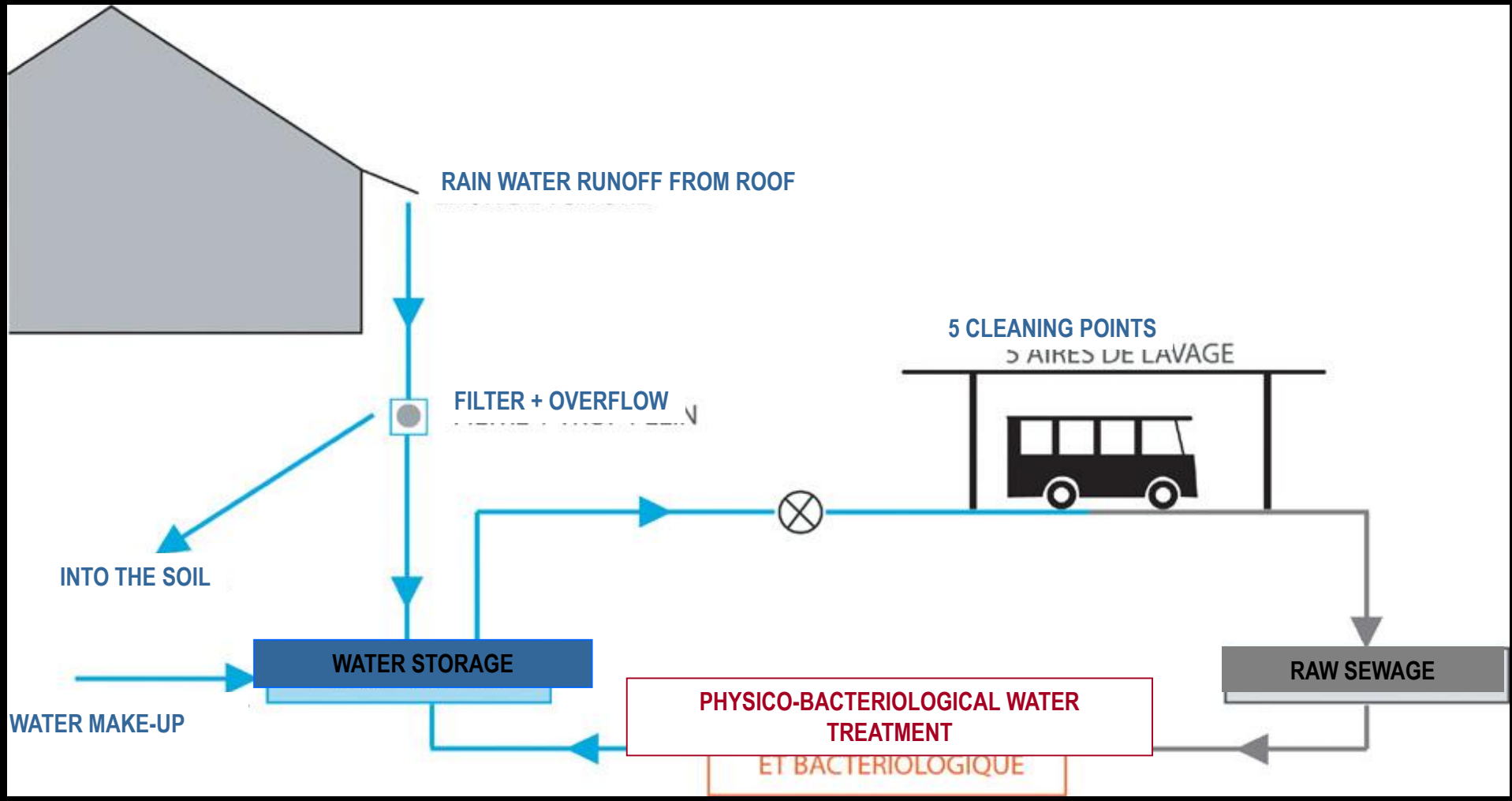
5. Rainwater management

5.1 Business area, Rovaltain near Valence, France

5. Rainwater management

5.2 Reconstruction of the (operational and maintenance) bus center after the explosion of a chemical plant in 2001, Toulouse-Langlade, France


RUE DE GIRONDE


RAIN WATER RUNOFF FROM ROOF
5 CLEANING POINTS
FILTER + OVERFLOW
INTO THE SOIL
WATER STORAGE
RAW SEWAGE
WATER MAKE-UP
PHYSICO-BACTERIOLOGICAL WATER TREATMENT

5. Rainwater management

5.3 Green Center Shopping Complex, Toulouse, France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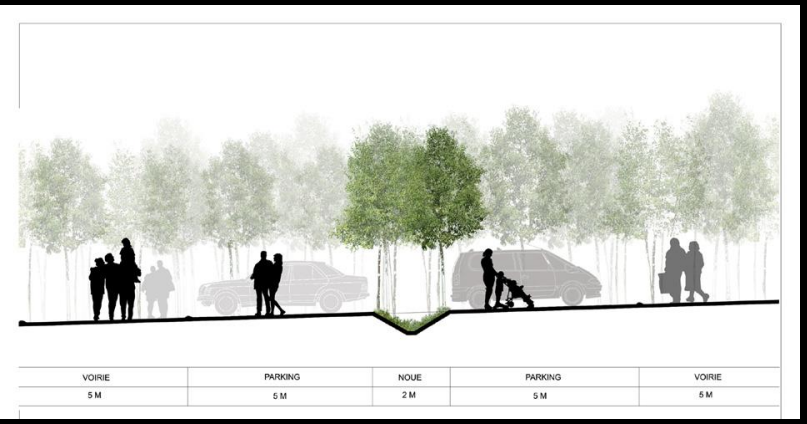


The runoff rain water polluted by hydrocarbon on the road is collected towards a large basin where the control of water pollution is firstly achieved by macrophyte plants.

After a second treatment by a hydrocarbon separator, the water from the basin is stored in an undergroung tank for watering of landscape.

Rain water runoff from roof is collected in landscape basins, the underground tank receives the overflow.

1. Mobility
2. Movement flows
3. Intermodality
4. Building materials
5. Rainwater management
6. Energy and comfort
7. Acoustic comfort in public spaces

6. Energy and comfort

Improving the comfort and reducing energy consumption :

6.1 Passive architectural design for reducing energy needs

6.2 Additional passive architecture

6.3 Renewable energy and high energy efficiency active systems for reducing energy consumption

6. Energy and comfort

6.1 Passive architectural design for reducing energy needs

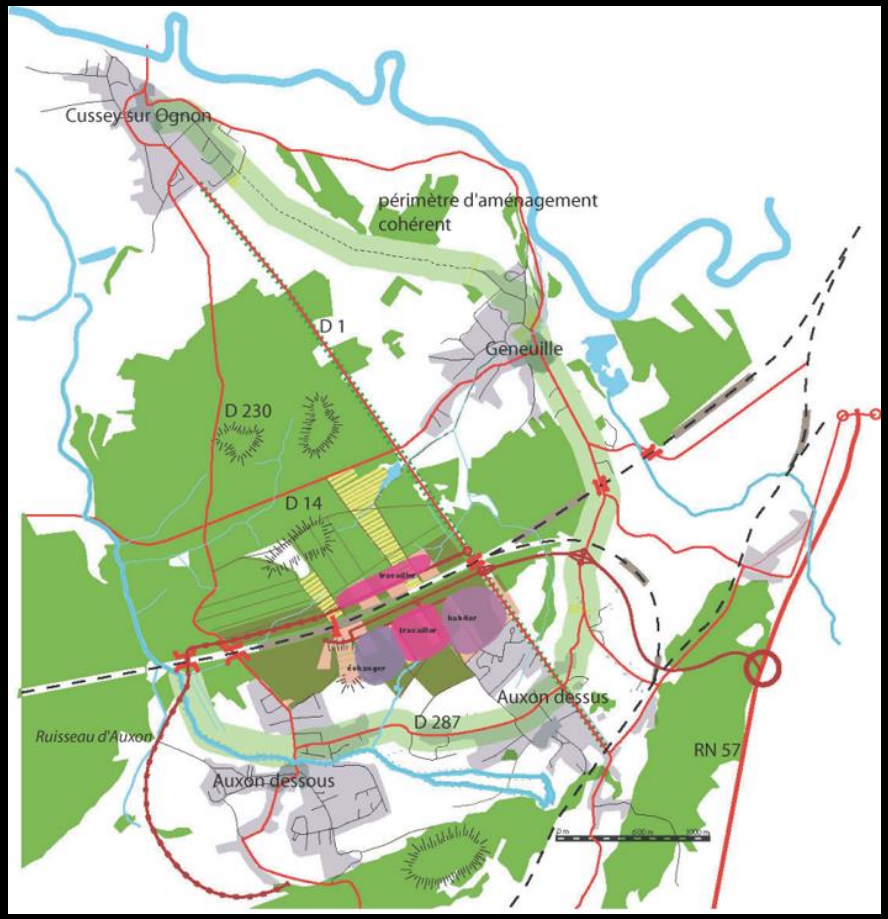
Avignon high speed trains station, south of France

The natural light from the north is smooth and avoids glare.

6. Energy and comfort

6.1 Passive architectural design for reducing energy needs

Besançon – Auxon station, new high speed train network, East of France


Cussey-sur-Ognon
périmètre d'aménagement cohérent
D 1
Geneuille
D 230
D 14
habiter
travailler
Auxon dessus
D 287
Ruisseau d'Auxon
RN 57
Auxon dessous


Gare
Gare routière
Jardins d'exposition
en terrasse
Services liés
à la gare

COUPE-PROFIL DU SITE DE LA GARE D'AUXON 1/12500 ème


Auxon-dessous


Depuis la prairie,
vers le site de la future gare

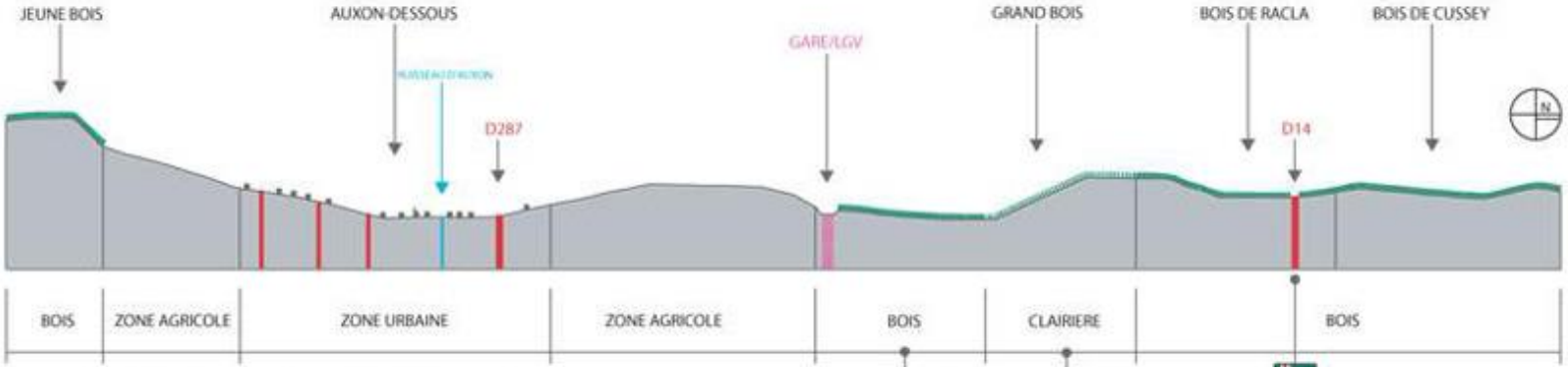

Grand Bois


Grand Bois, côté clairière


Bois de Racla
vers l'étang de l'Aurêtre

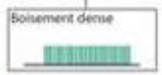

D14

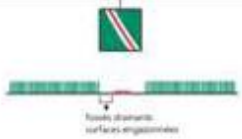

Bois de Cussey



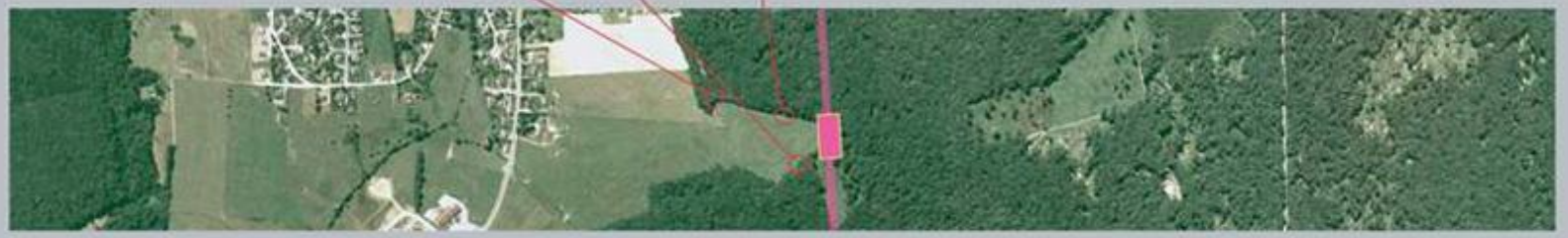
TYPOLOGIE DU BOIS AUX ABORDS DU SITE DE LA GARE

STRUCTURE DU BOIS



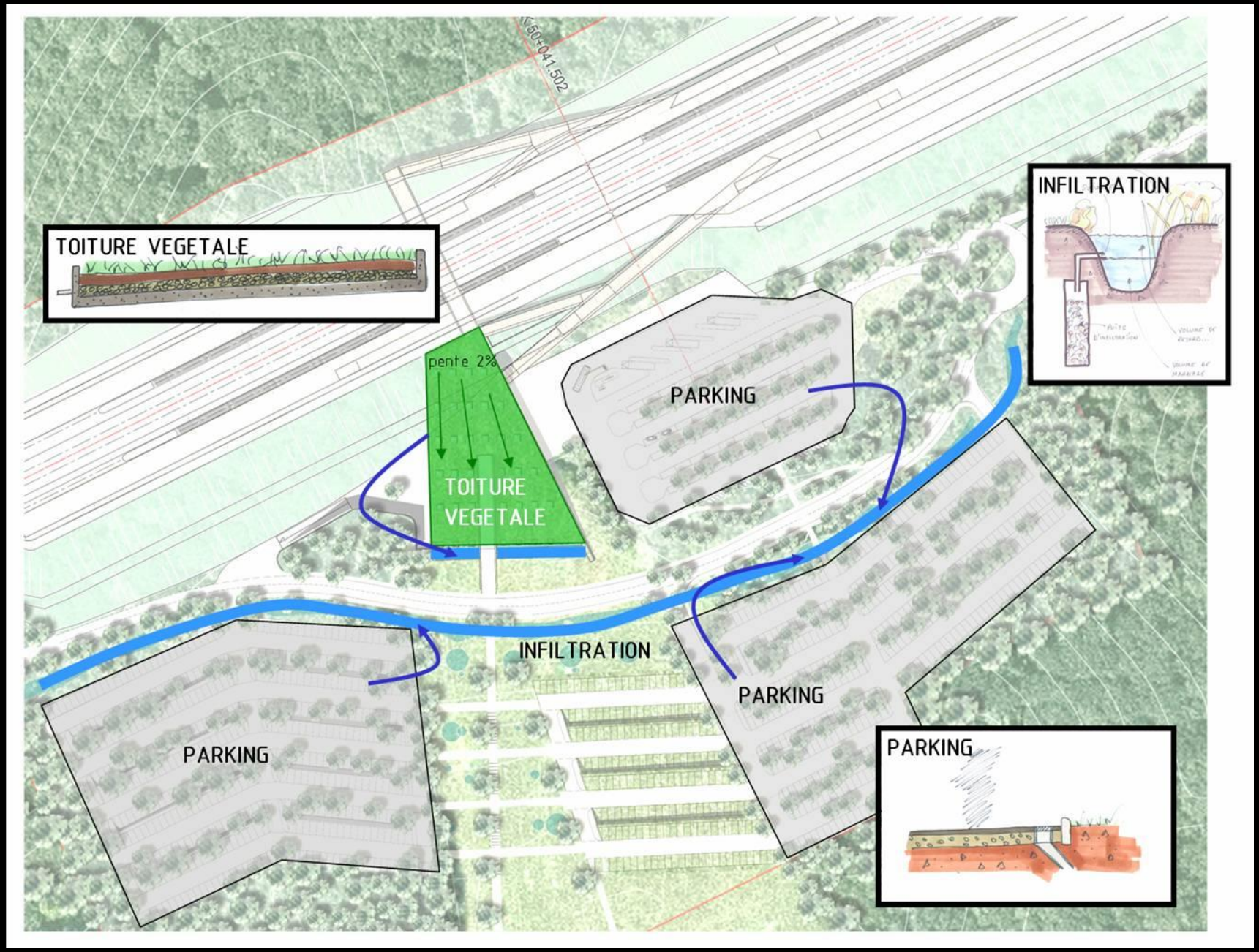


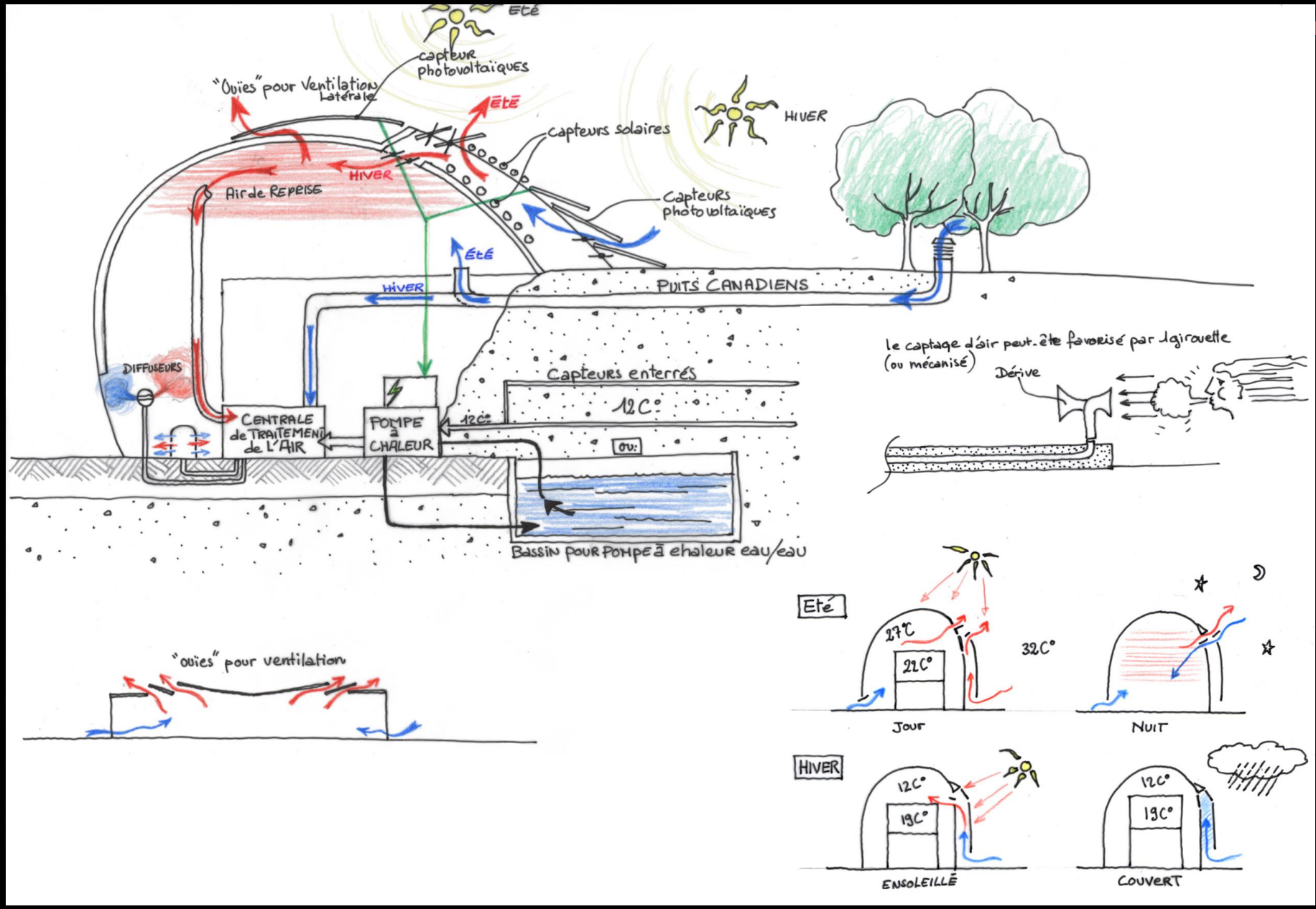
LES FRANGES BOISEES



Lisière franche

Lisière étagée


TOITURE VEGETALE
INFILTRATION
pente 2%
PARKING
TOITURE
VEGETALE
INFILTRATION
PARKING
PARKING
PARKING


Été
capteur photovoltaïques
"Ouïes" pour Ventilation Latérale
Été
HIVER
capteurs solaires
HIVER
Air de Reprise
Capteurs photovoltaïques
Été
HIVER
PUITS CANADIENS
DIFFUSEURS
Capteurs enterrés
12C°
CENTRALE de TRAITEMENT de L'AIR
POMPE à CHALEUR
12C°
ou:
Bassin pour pompe à chaleur eau/eau
le captage d'air peut être favorisé par girouette (ou mécanisé)
Dérive
"ouïes" pour ventilation
Eté
27°C
22C°
32C°
Jour
Nuit
HIVER
12C°
19C°
ENSOLEILLÉ
12C°
19C°
COUVERT

6. Energy and comfort

6.1 Passive architectural design for reducing energy needs

Turin Porta Susa station, Italy

6. Energy and comfort

6.2 Additional passive architecture

Using shading devices for controlling solar gains

6. Energy and comfort

6.3 Renewable energy and high energy efficiency active systems for reducing energy consumption

Local thermal comfort in large open places

Air conditioned outlet device
Valence high speed train station, France.

1. Mobility
2. Movement flows
3. Intermodality
4. Building materials
5. Rainwater management
6. Energy and comfort
7. Acoustic comfort in public spaces

7. Acoustic comfort in public spaces

Improving the comfort and reducing the energy consumption :

7.1 Space design

7.2 Material and Acoustic threshold

7. Acoustic comfort in public spaces

7.1 Space design

7. Acoustic comfort in public spaces

7.2 Material and Acoustic threshold