

CA L'ALIER STEAM HIGH

A Transition From the **Past** Into the **Future**

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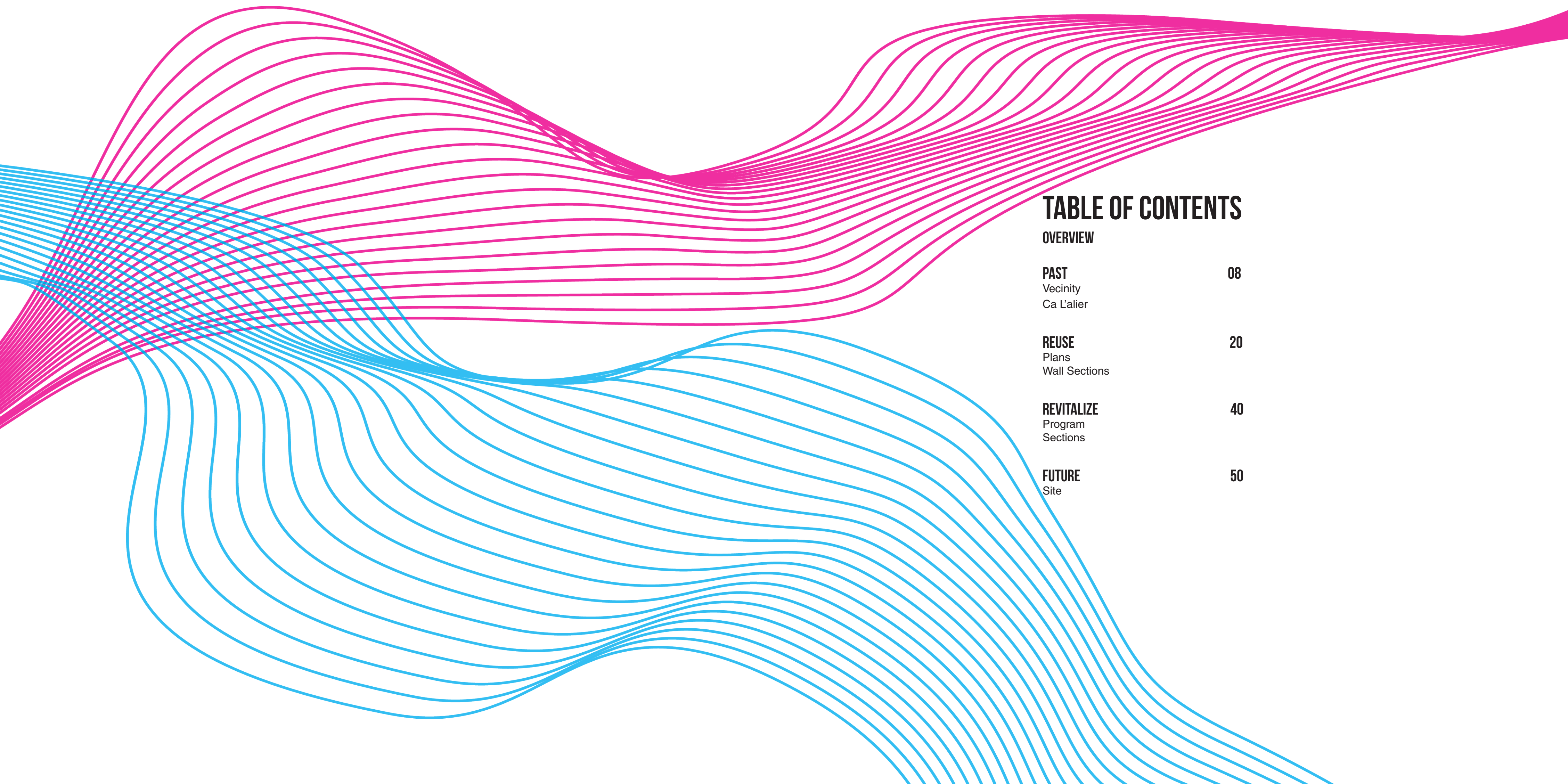


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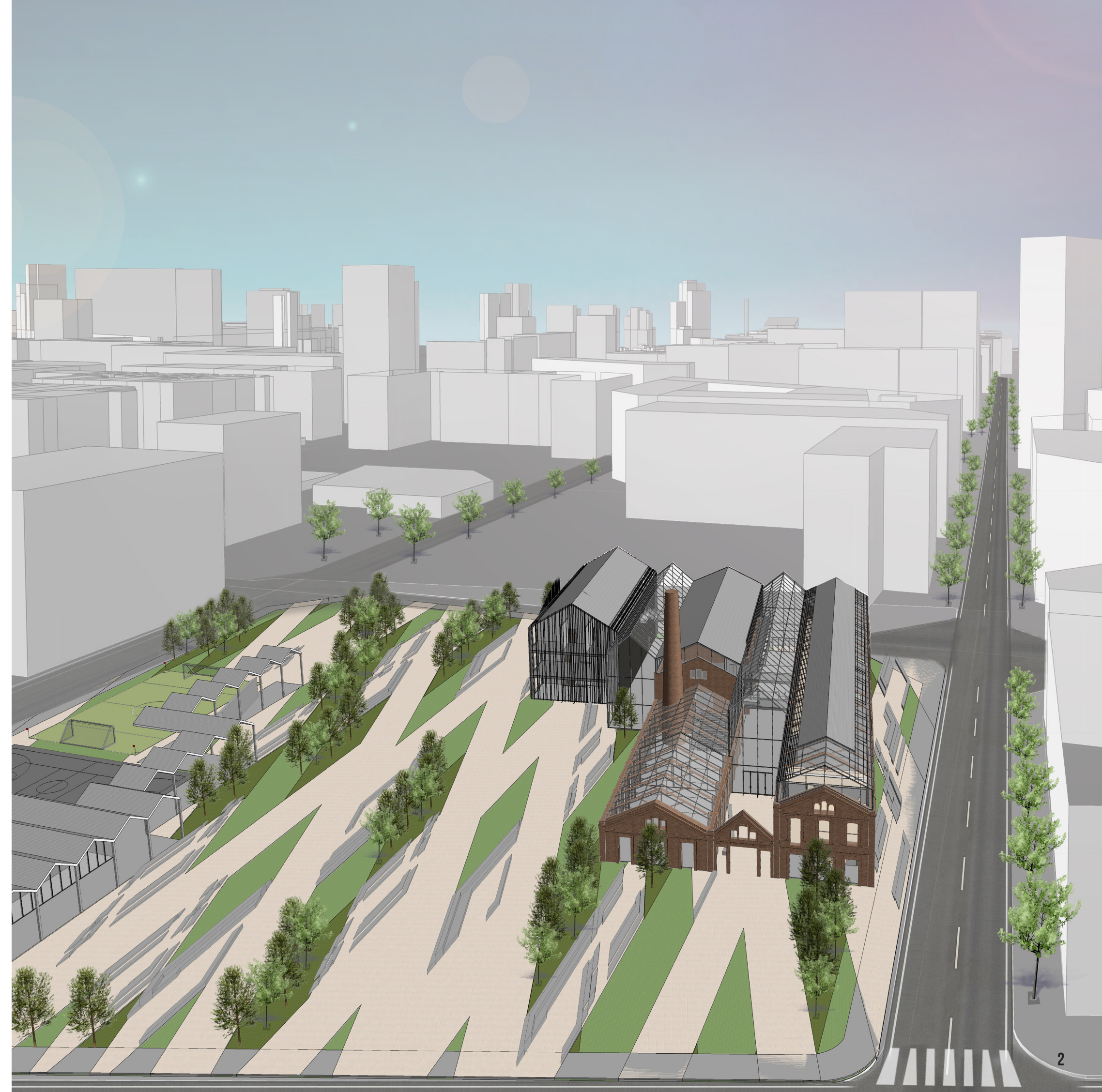
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OVERVIEW

Ca L'Alier STEAM High is an adaptive reuse of a 19th century textile factory in the 22@ district of Barcelona. The neighborhood used to be the industrial neighborhood of Sant Marti but is now a part of Poblenou. The neighborhood transitioned from an industrial use to modern technology industry. The proposed Ca L'Alier high school is a new addition to the already thriving technology and creative hub of Barcelona. The school provides students with a private education focused on science, technology, engineering, arts, and mathematics and a connection to existing companies in the area to prepare them for a career in that field.

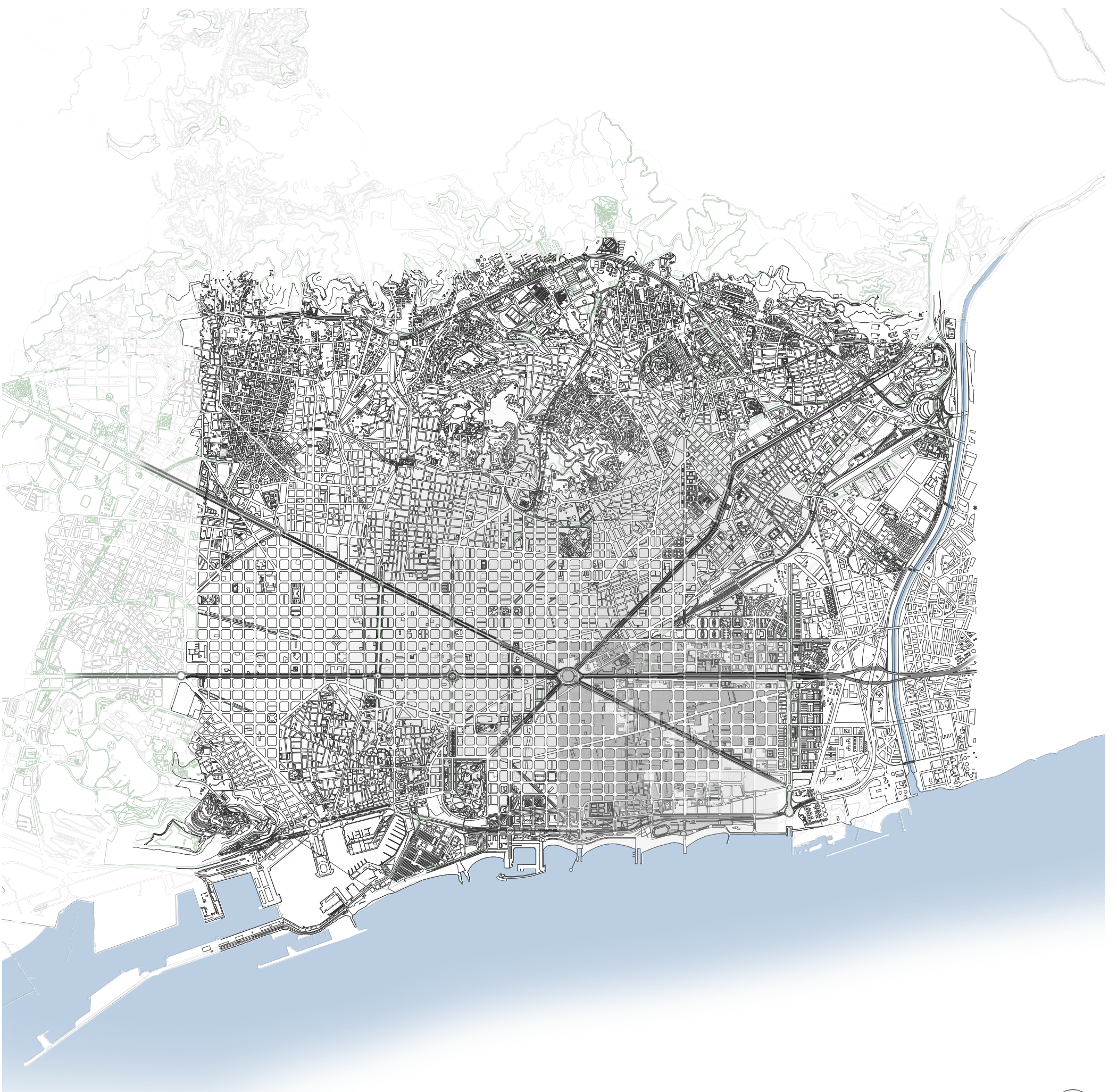
Ca L'Alier STEAM High School is a building that responds to not only the future of its community but its past. Revitalization and preservation are important for Barcelona due to its important history but also the lack of open land. Historic buildings, such as Ca L'Alier textile factory, are protected and cannot be torn down due to their historic significance so they are just being left abandoned as the community grows around them. Ca L'Alier STEAM High School gives the historic factory a new use in the modern technology industry while also creating a community space by linking the old with the new and providing a green space for the students and the community.





BARCELONA

Ca L'Alie STEAM High is located in the city of Barcelona, Spain. Barcelona is Spain's major Mediterranean port and commercial center and second largest city. The city spans 38 square miles (98 square km) while the metropolitan area is 1,249 square miles (3,235 square km) with a total population of about 1,611,013. The city dates back to the 1st century B.C when the Romans founded Barcino. As the city grew with time neighborhoods began to establish around the old city walls. Most of what is now considered Barcelona used to be its own village but with the implementation of the Eixample grid in the mid-19th century it has become one large city full of culture and history growing into the future.



PAST

HISTORIC - SANT MARTI

The neighborhood that became Sant Marti was once a swamp land because of the Besós river delta. This area was not populated, it was mostly used for pasture. During the 18th century 'Els Prats d'indianes' (fields where fabrics were boiled, bleached and dried) appeared, due to extensive flat land and an abundance of water. It was the beginning of the textile industry. During the Industrial Revolution, Sant Marti and other industrial neighborhoods in the area played a central role in the Catalan and Iberian industry, particularly in the textile sector. This area came to be known as 'Catalan Manchester'. The textile industry grew immensely due to cheap land and access to the harbor as well as the railway built in 1848 connecting Barcelona to Mataro. Many factories were built fast and along the main street that ran parallel to the sea, Pere IV.

The industrial boom kept going during the entire first half of the 20th century with textile industry as well as chemical, metallurgical and food and wine. Between 1960 and 1970 the local government decided to build another industrial hub farther away from the city center, in the Zona Franca neighbourhood. Gradually, local factories and plants became empty and started being used for other purposes. The neighbourhood entered a period of urban degradation only made worse by having been designated as industrial soil in 1978 a new Metropolitan General Plan was approved, which designated the entire Poblenou area as industrial. That impeded the development of the necessary urban infrastructure, such as housing units, schools, hospitals, green areas.



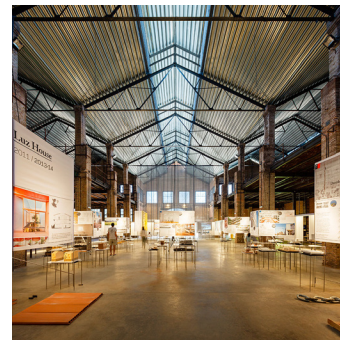
Can Framis Museum
BAAS

'The buildings themselves were not important from an architectural point of view, One of the most interesting things, however, is the level, with factories set 1.5m below the contemporary city.'
- Jordi Badia



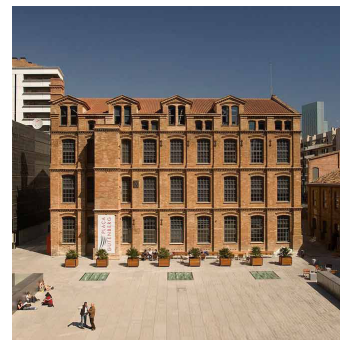
La Farinera del Clot
Carlos Sanfeliu and José Abascal

Cultural center La Farinera del Clot is a rehabilitation of a former flour mill. It houses and exhibits machinery that was once used there to produce flour.



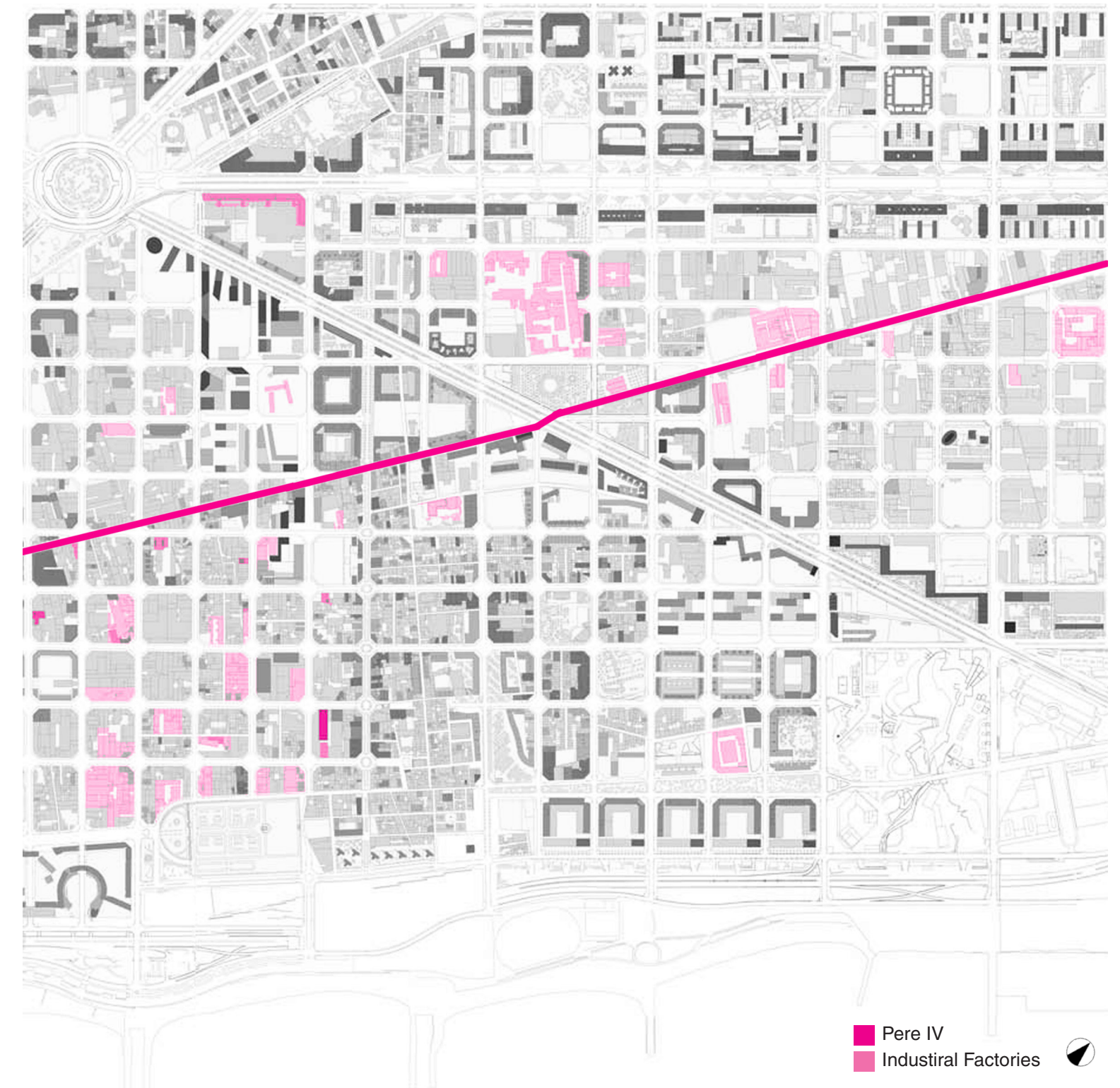
MUHBA Oliva Arté
BAAS

The old nave was restored and a new hanging lamp was added to the center of the space to hold a temporary exhibit.



Pompeu Fabra Univ –
Poblenou Campus
RQP Arquitectura

The Ca l'Aranyó former textile mill's chimney and façade were restored as well as interior elements such as wrought-iron pillars and girders, Catalan vaults and roof trusses.



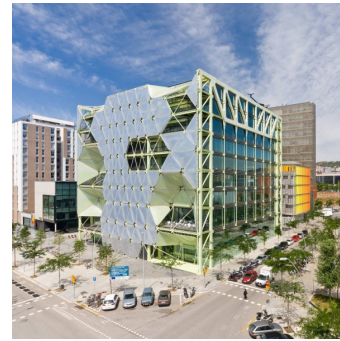
■ Pere IV
■ Industrial Factories



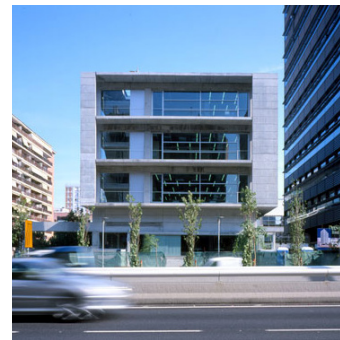
MODERN - POBLENOU

The 1992 Olympic Games triggered development in the decaying area of Poblenou. Most of the factories and train lines next to the seafront were torn down while those in good shape and located throughout the district were mostly preserved. Many new areas were developed such as the Vila Olímpica (the residential area for the athletes during the Olympics), and new artificial beaches were built. The Vila Olímpica also became the first residential area built next to the city's coastline, besides the old fishing neighborhood of Barceloneta. Also, in 1999, the Diagonal Avenue, which previously stopped at Glòries Square, was stretched to the sea and the new Diagonal Mar and Fòrum areas.

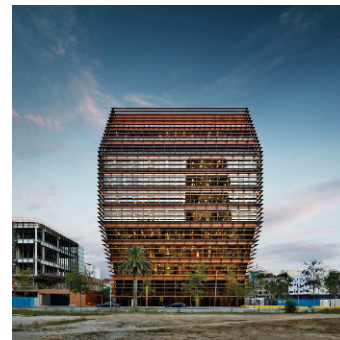
Poblenou's revitalization continued with a new plan called 22@, aimed at reviving the entire area through the creation of a two-hundred-hectare technological and innovation district, which was definitively approved by Barcelona's City Council in 2000. The aim was to attract local and international companies, mostly working in the technology and creative sectors, along with the development of residential and leisure zones. The area has already changed significantly and continues to grow. Multinational companies and Universities have also moved to this area of the city, such as UPF with its communication campus in Ca l'Aranyó. Companies such as Mediapro, RBA, Ogilvy, RTVE, Indra, T-Systems already set up important offices.



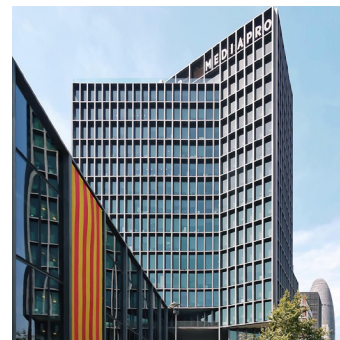
Media-TIC
Enric Ruiz Geli
The Media-TIC building in Barcelona is an information and communication technology hub designed to incubate, generate, exhibit and invite new ideas and developments in ICT.



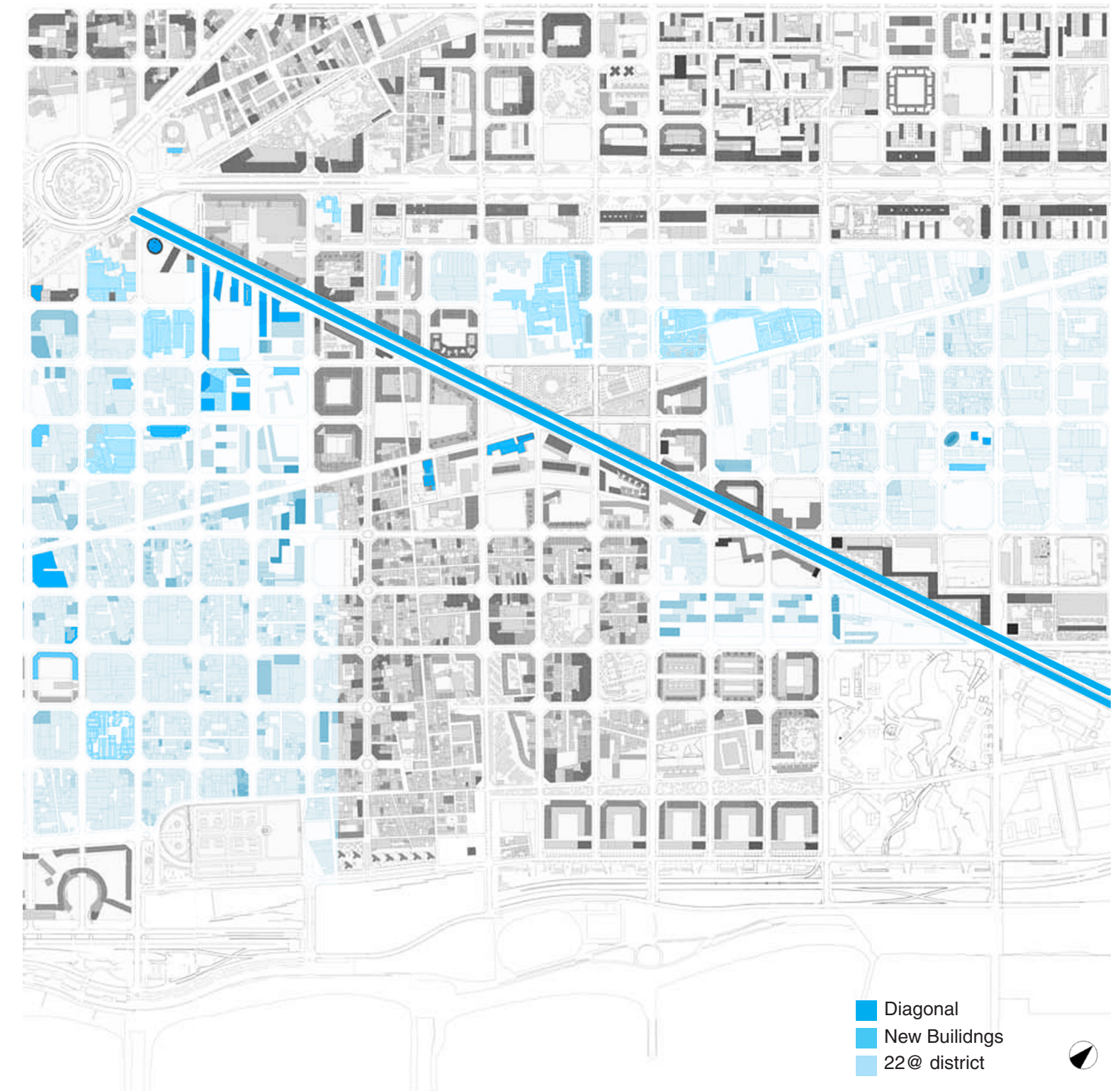
Barcelona Activa
Roldan + Berengue Arquitectes
Barcelona Activa is the organization responsible for boosting economic policies and local development to ensure a better quality of life for the Barcelona citizens.



Head Offices Of CMT
Batlle & Roig Architects
The Telecommunications Market Commission (CMT) forms a business park in the 22@ district.



Mediapro Tower
OAB
The Mediapro Building is a part of the Audiovisual Campus and is equipped with film sets and technical facilities, and offices occupied by the company, and other tenants.



Diagonal
New Buildings
22@ district

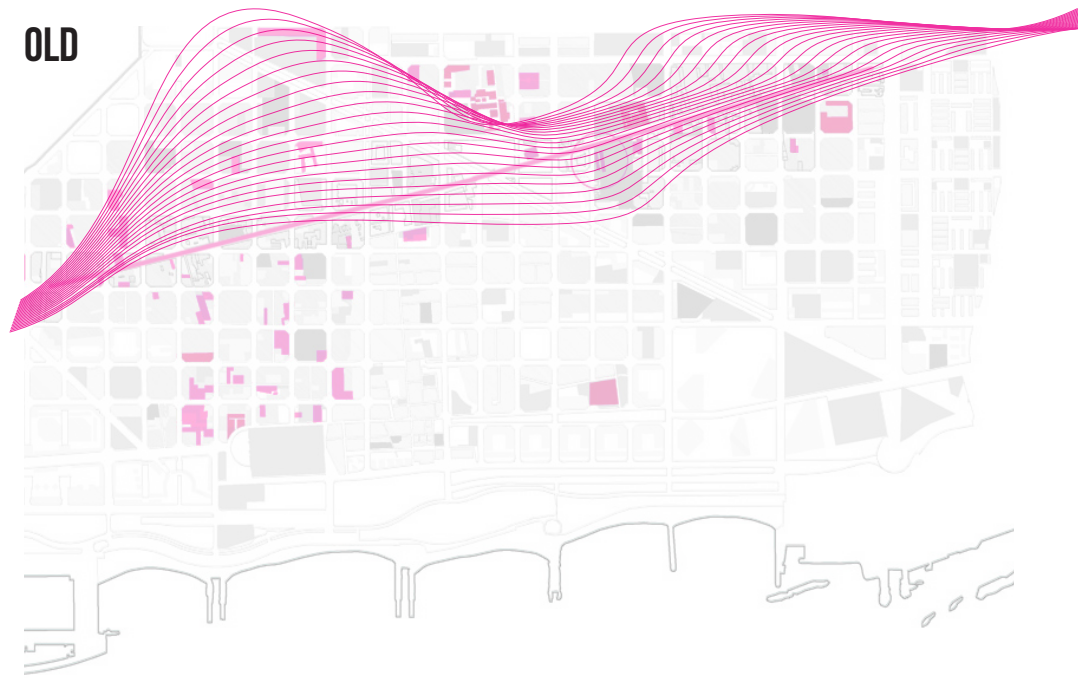


MERGING OLD AND NEW

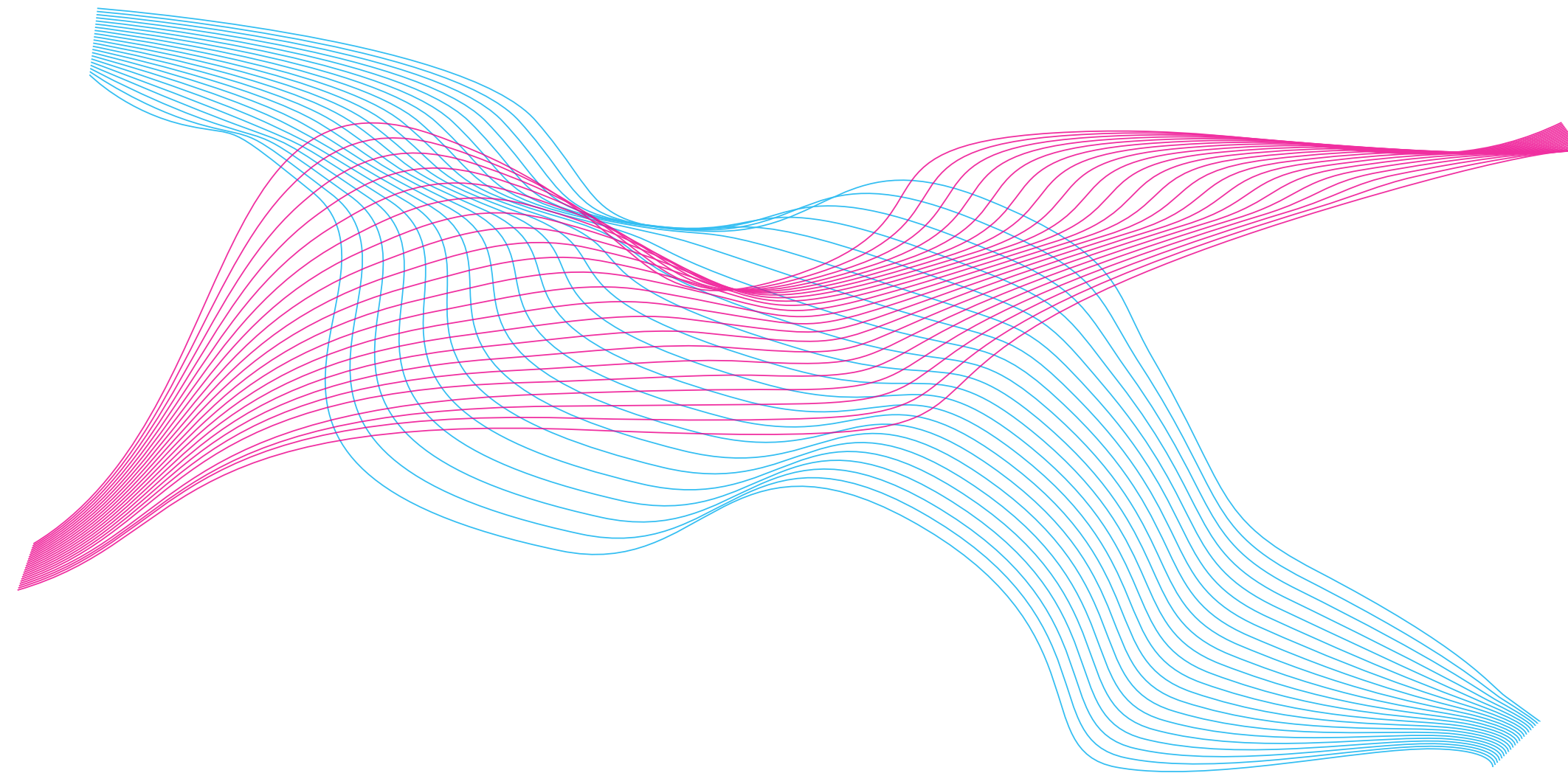
The history of the neighborhood is just as important as the history of the building. The future of the neighborhood is just as important as the future of the building. The concept behind the adaptive reuse of Ca L'Alier is transitioning it from the past to the future. Transitioning from a textile industry to a technology industry. Transitioning from a historic building to an innovative building. Transitioning from a abandoned factory to a active school.

The site is related to the historic industrial Pere IV as well as the new hub of diagonal. It is important to maintain the connection to the historic past of the factory while also creating a connection with the new programs are built around the main street, Diagonal.

OLD



NEW



CA L'ALIER

The Ca L'Alíer factory dates back to 1853 and was renovated and expanded in 1875. The original use was a painted textile factory. This was typical for the industrial area of Sant Martí. In 1921 the building was bought by the Alíer family and became a burlap factory. The, now referred to as Ca L'Alíer, factory was a part of the large industrial boom in Barcelona. The entire neighborhood of Sant Martí was focused on industrial factories from 1800s to early 2000s. This area was ideal for industries such as textile, oil, cars, metal, and other because it was on the outskirts of the city of Barcelona, it was close to the train station, and the road Pere IV used to be the main road in and out of Barcelona. Pere IV ran parallel to the coast of the sea which is why it is off the current grid of the city. The Ca L'Alíer factory was aligned to this street surrounded by other textile factories. Although those industries eventually moved further out of town and this area was no longer in the outskirts but now a neighborhood of the city of Barcelona, the factory buildings remained. The street Pere IV still remains and stand out as one of the few streets in the city of Barcelona, outside of the old city walls, that don't follow the Cerda grid established in the late 19th century for the Eixample expansion.

The factory stopped being used in the late 20th century. It suffered severe damages after four fires in two weeks in 2007. The Ca L'Alíer factory was left abandoned for many years but most of its damage was caused by the fires. Although majority of the brick walls were still intact, there were some portions that had fallen down. For the most part the roof was completely burned off or severely charred and unusable. The structure of the building survived only to be able to tell its story but not serve its purpose. The wood trusses were charred black and the iron columns were covered in dirt and debris. Due to it being abandoned for so long, homeless people and graffiti enthusiasts, loved to venture into the building. A lot of the walls were covered in graffiti. All of the original windows were gone and were filled in with brick in an attempt to keep people out. The lack of maintenance and the safety hazards during its time abandoned proved the factory needed to be given a new life.



gonzalo mauleon

1859

Introduction of Eixample Grid

1992

Barcelona Olympic Games



2004

Image of the abandoned factory.



2016

Factory stripped and ready for reconstruction

1853

Factory was constructed

1921

Factory was bought by Alíer family

2000

Barcelona City Council approves 22@ plan

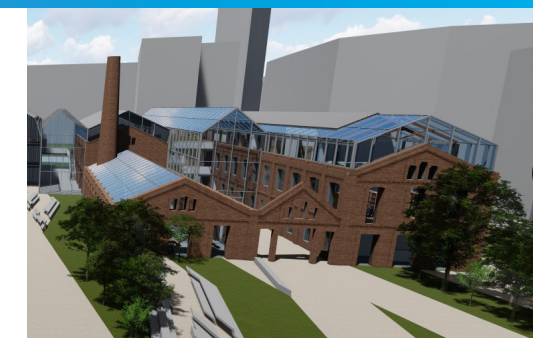


2007

Factory suffered four fires in one week

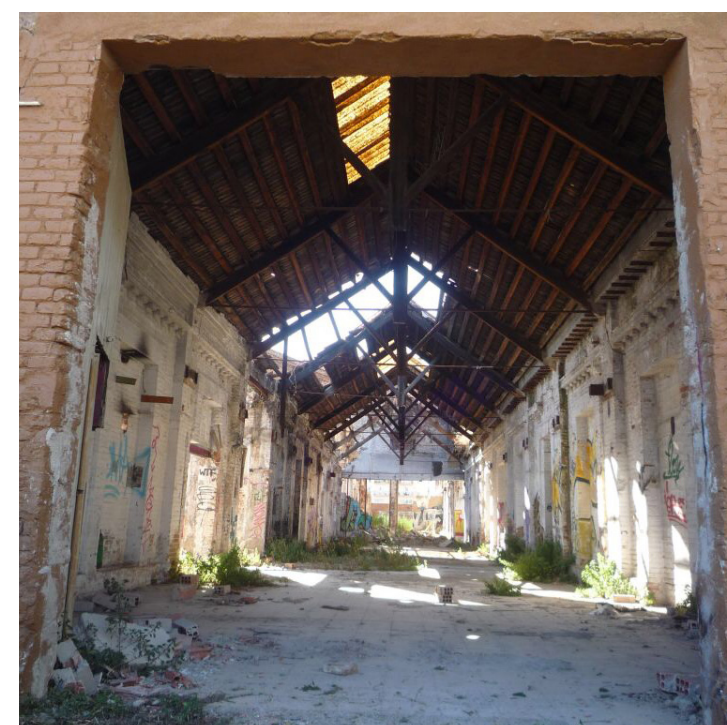
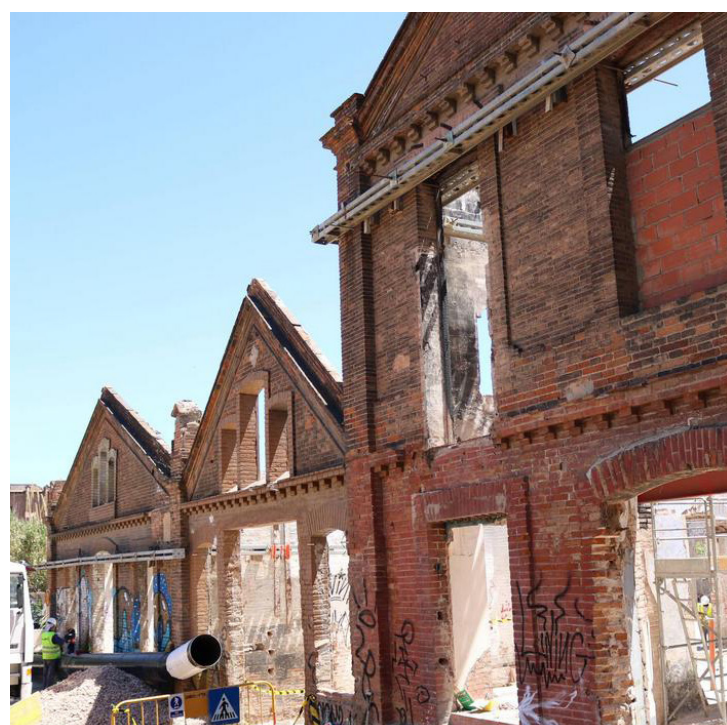
2010

4,500 new companies had moved to the district since 2000



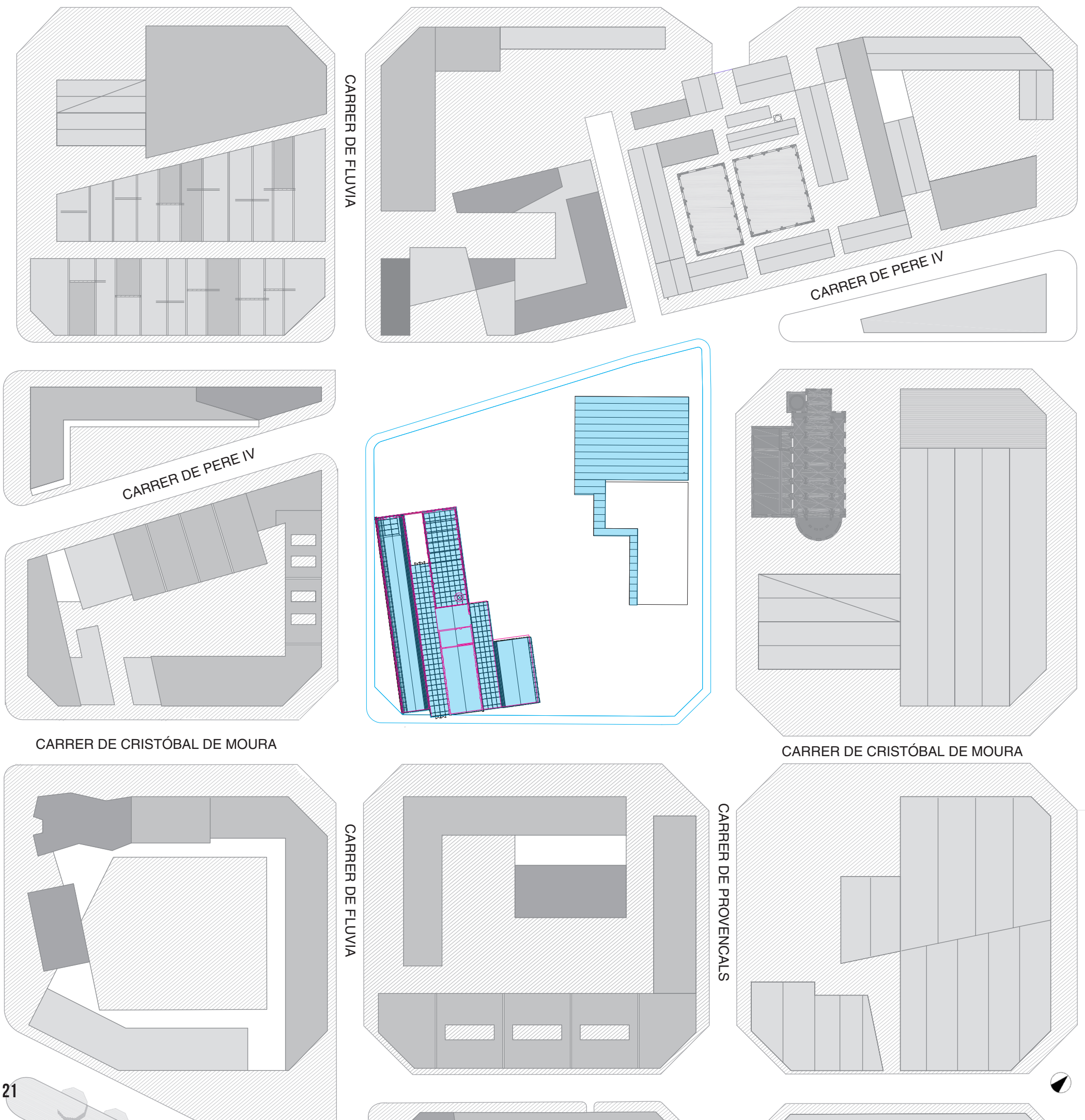
PRESENT

Preposal for new construction



gonzalo

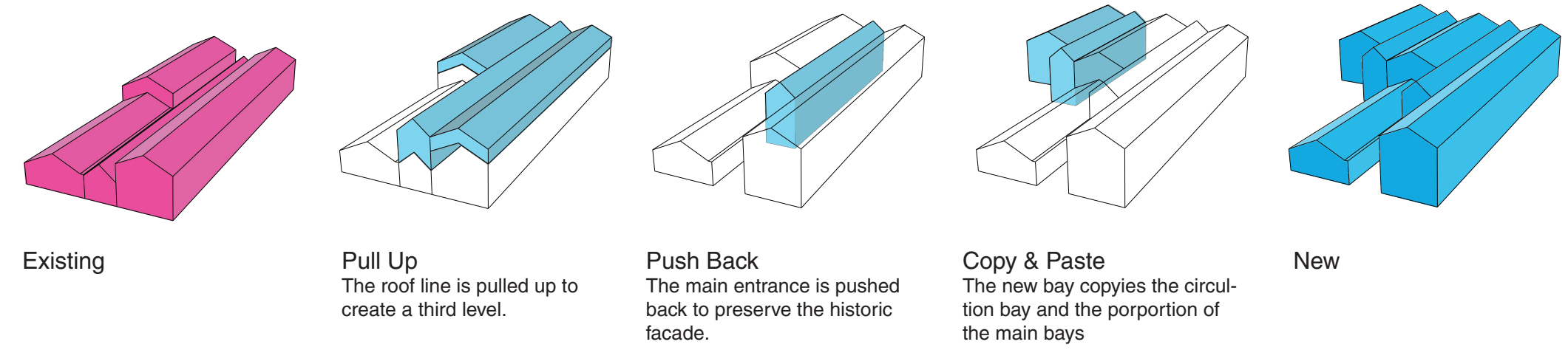
REUSE



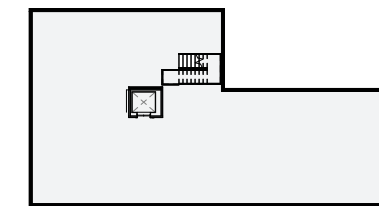
ADAPTIVE REUSE OF CA L'ALIER


The adaptive reuse of the building is meant to show the old factory walls in their former glory while having a small addition that doesn't compete with the buildings history. What was left of the Ca l'Alie factory was 3 bays, a two level main bay, a narrow single level central bay, and a wide single level bay with a second level bay added past the chimney. The new program fits into the old walls and the proportions of the new bays mimic those of the old. The massing of the addition began by pulling the roof up to add height and allow for the third level. This addition became a light glass "greenhouse" hovering over the old factory walls. The next addition was closing in the central bay and setting back the main entrance away from the brick. This was to allow the old façade to breathe and not be lost in a new towering façade. The exterior space between the brick wall and the new glass wall creates a transition space for users when entering the building. A larger addition was needed to be able to include required spaces such as a high bay auditorium. This addition repeats the center bay that now serves as circulation, and added a bay that is proportionate to the width of the two outer bays of the factory.

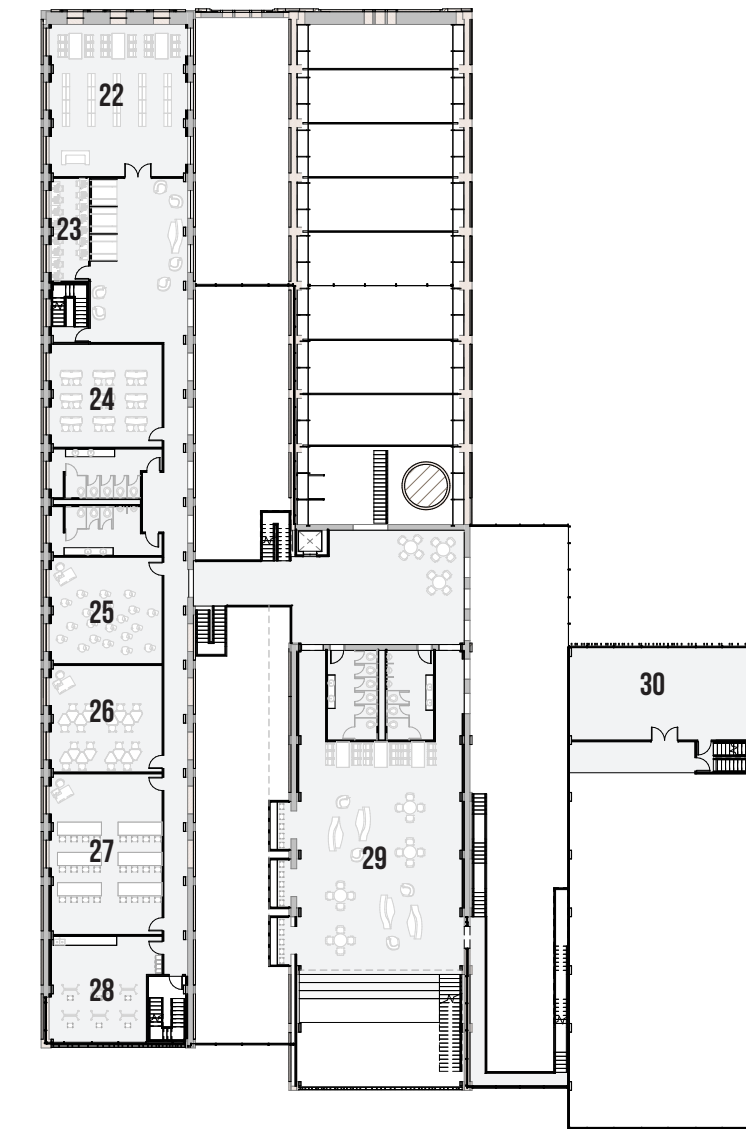
Another form of preservation is the preservation of the buildings role in its community. In the past, the factory was a part of the large textile industry that allowed Barcelona to grow into a huge port city. The textiles produced at Ca l'Alie, and other factories like it, were exported all over Spain and Europe. It brought money and trade into the city and provided jobs for the growing population of the area. The new function for the building, STEAM high school, preserves the role of producing but rather than producing goods it produces students with the knowledge and preparation for the thriving technology based industry. The factory in the 19th and early 20th century was a part of a large community of industrial factories but now in the 21st century it will be a part of the large community of 22@ including engineers, architect, media producers, technology moguls, and innovators.




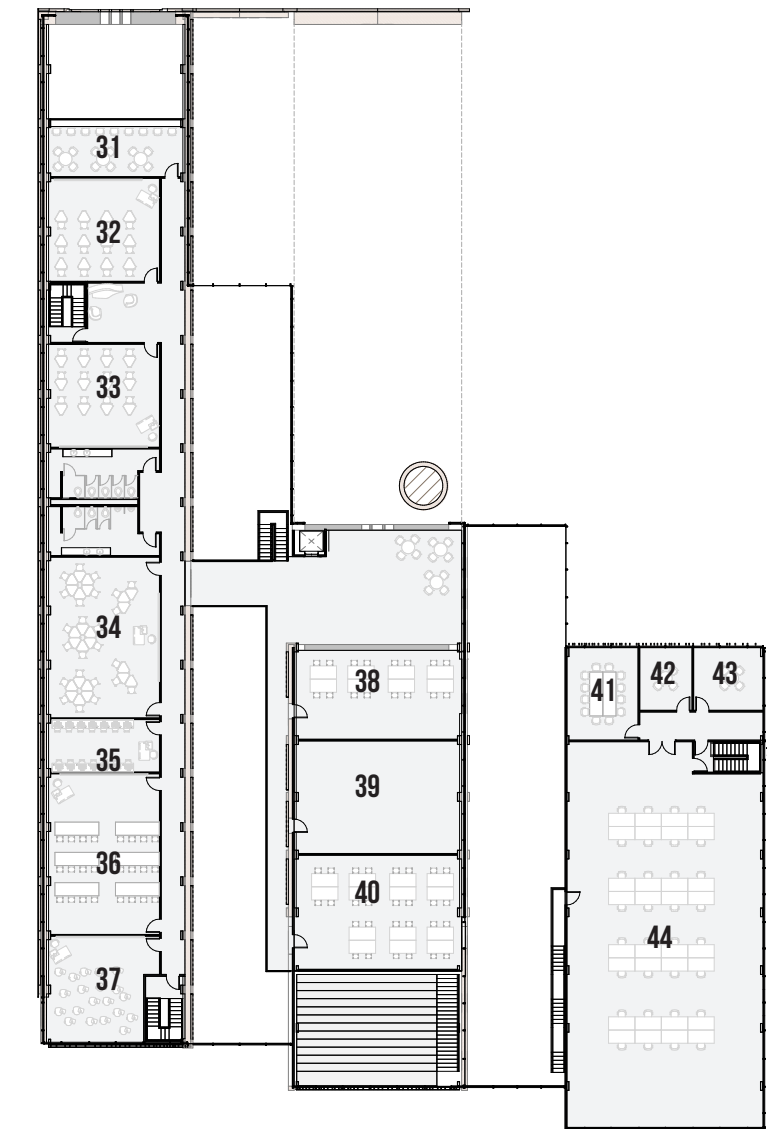
LEVEL -1 
 0 MECHANICAL



LEVEL 1 
 22 LIBRARY
 23 COMPUTER LAB
 24 DIGITAL CLASS
 25 CLASSROOM
 26 CLASSROOM
 27 LAB
 28 ART STUDIO
 29 STUDENT LOUNGE
 30



LEVEL 2 
 31 STUDY
 32 CLASSROOM
 33 CLASSROOM
 34 TEAM CLASS
 35 RESEARCH
 36 LAB
 37 FLEX CLASS
 38 LAB
 39 DANCE STUDIO
 40 LAB
 41 CONFERENCE ROOM
 42 MENTOR ROOM
 43 MENTOR ROOM
 44 SENIOR STUDIO



LEVEL 0 

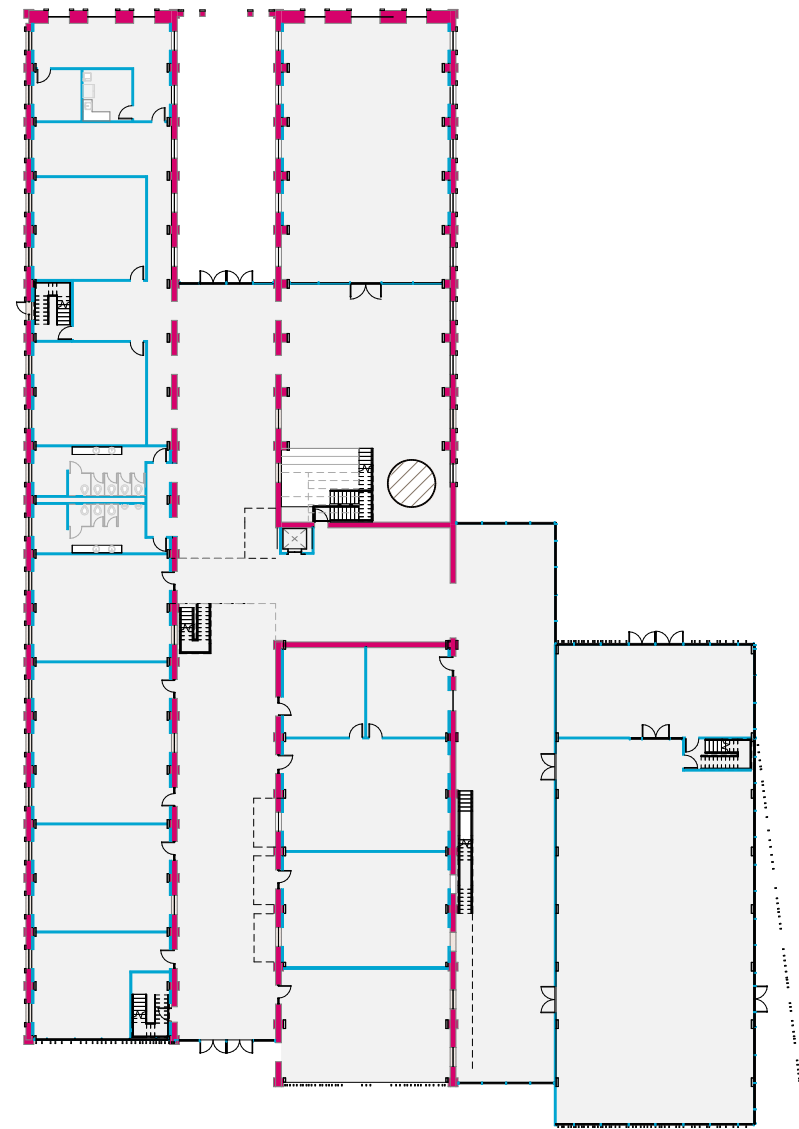
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|-------------------|-----------------------|
| 1 ADMIN | 12 BUILD SPACE |
| 2 CLASSROOM | 13 SHOP |
| 3 CLASSROOM | 14 OUTDOOR |
| 4 CLASSROOM | 15 STUDENT GALLERY |
| 5 LAB | 16 HIGH BAY AREA |
| 6 CLASSROOM | 17 WOMENS LOCKER ROOM |
| 7 FABRICATION LAB | 18 MENS LOCKER ROOM |
| 8 CAFETERIA | 19 WEIGHT ROOM |
| 9 COMMONS | 20 COACH'S OFFICE |
| 10 THINK SPACE | 21 STORAGE |
| 11 THINK SPACE | |

CA L'ALIER OLD VS NEW

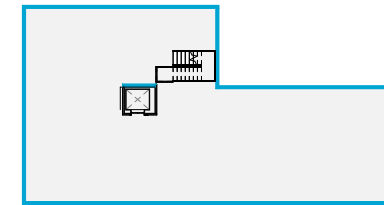
The additions and changes made to the Ca L'Alier factory in order to create a STEAM high school focused on the programmatic needs of the school while preserving and restoring the old brick walls. Due to the damage caused by the fire, the walls were left like an empty shell. This allowed for the new walls, floors, roofs, and systems to be placed within the shell. Classrooms and labs in the first bay are along the South-West wall providing circulation space along the North-East wall of that bay. This allows the inner brick wall to be uncovered. The central bay then becomes an open atrium space with the exposed brick walls. The additions to the third bay align with the existing openings. The structure added followed the previous gridline allowing the organization of the new spaces to fit seamlessly with the existing geometry and openings.

Existing
Addition

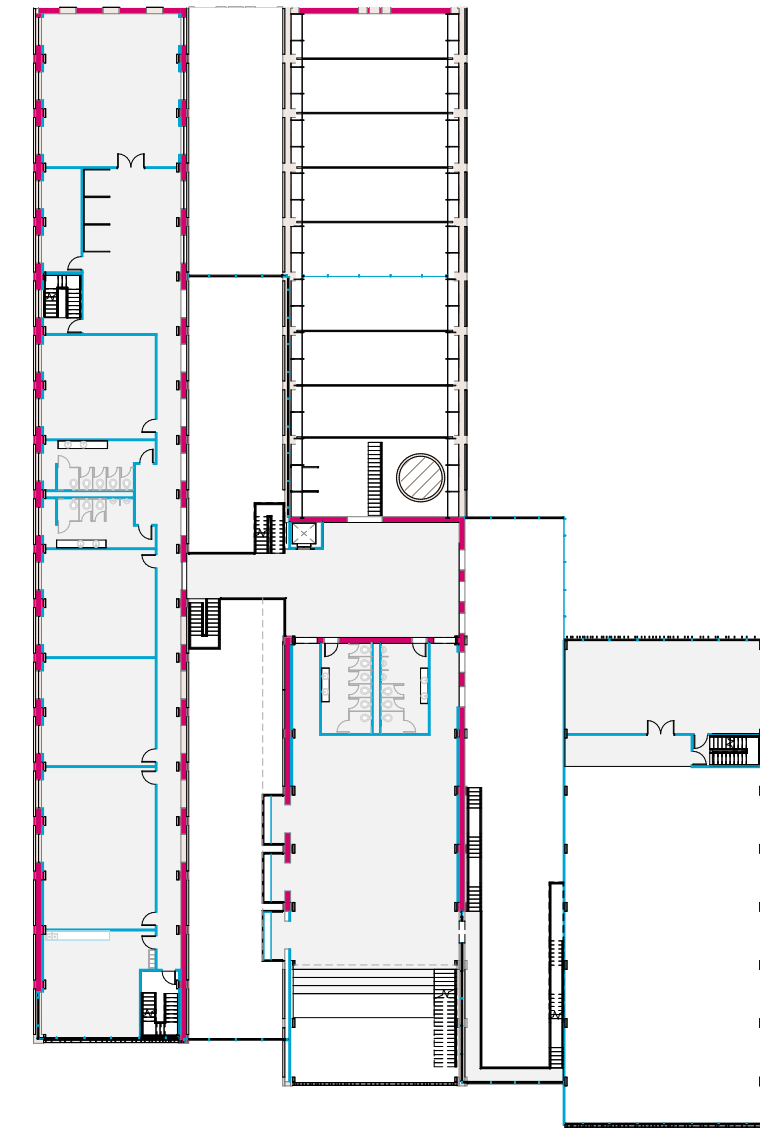
LEVEL 0



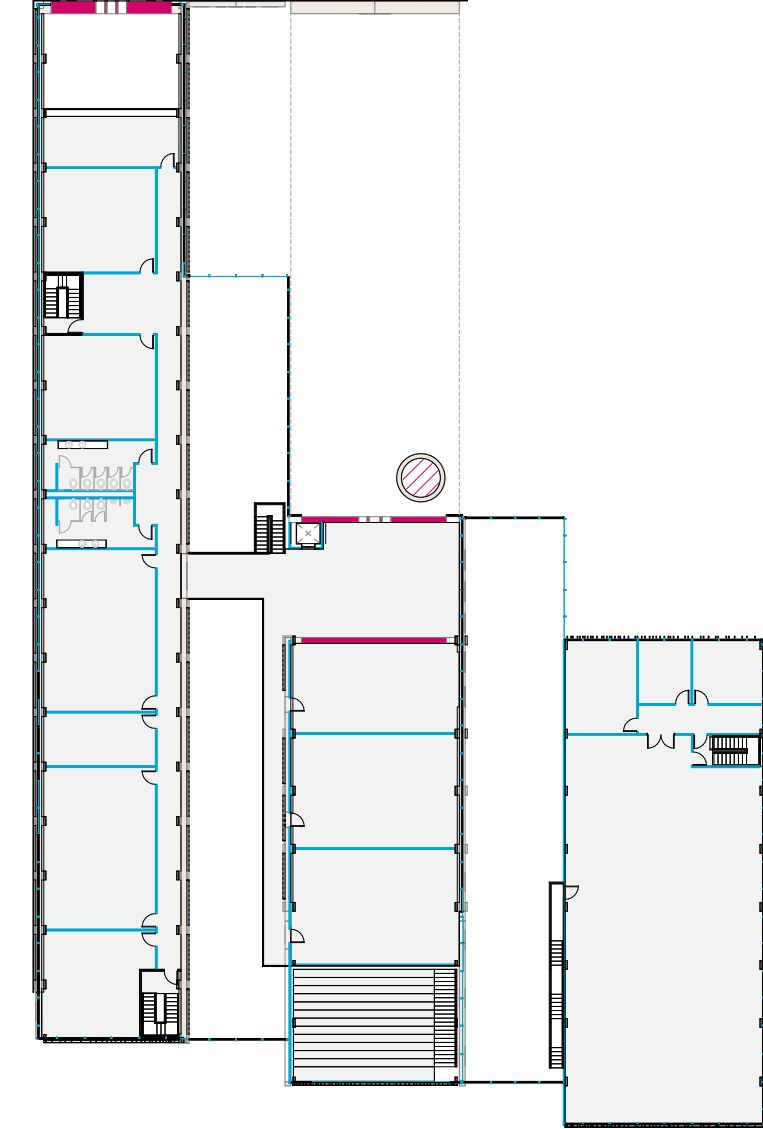
LEVEL -1



LEVEL 1



LEVEL 2



NORTH-WEST ELEVATION



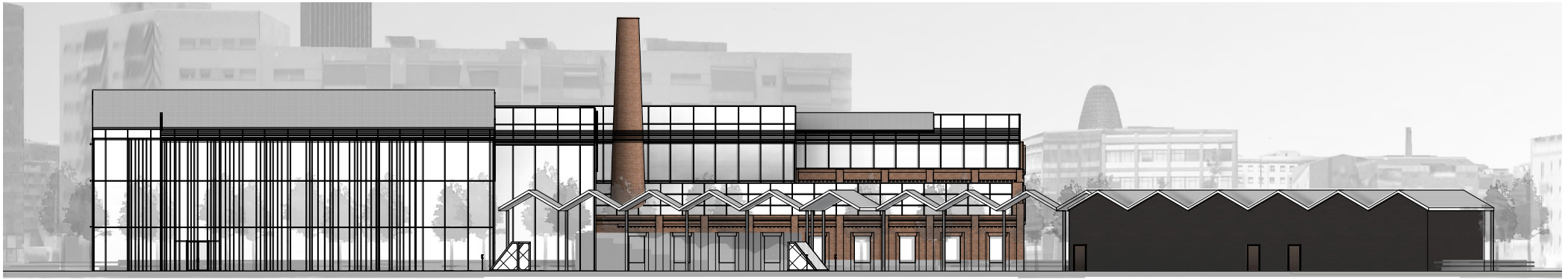
SOUTH-WEST ELEVATION



SOUTH-EAST ELEVATION

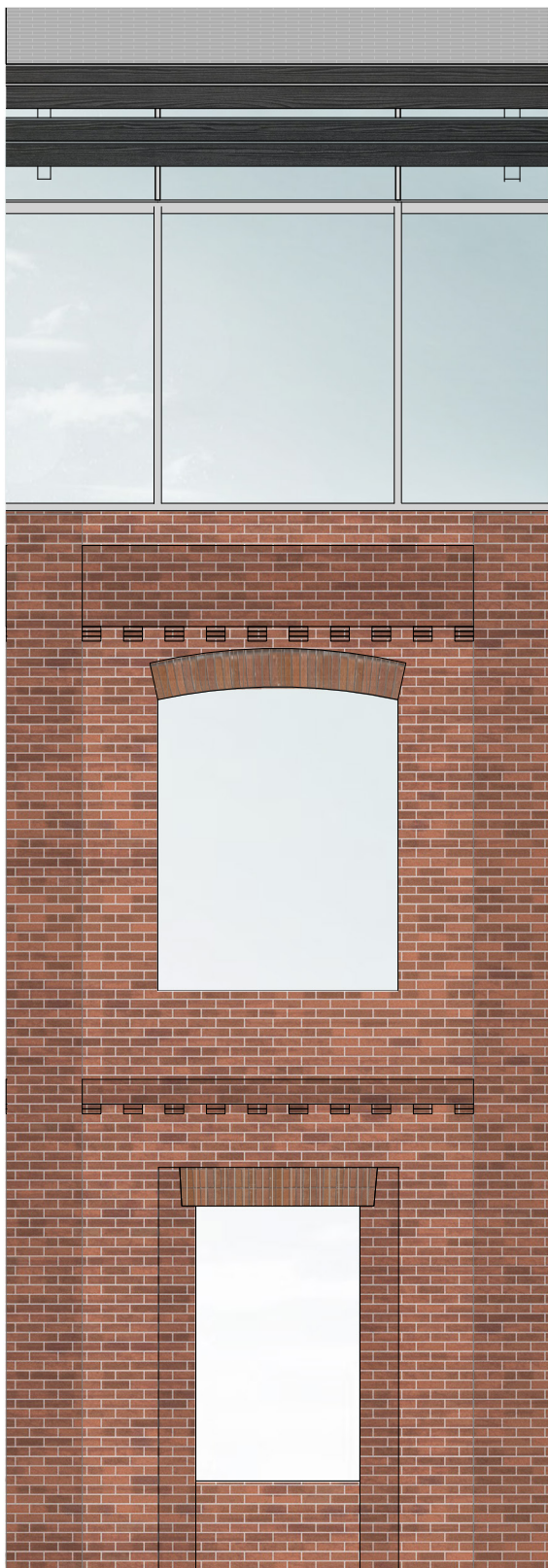


NORTH-EAST ELEVATION



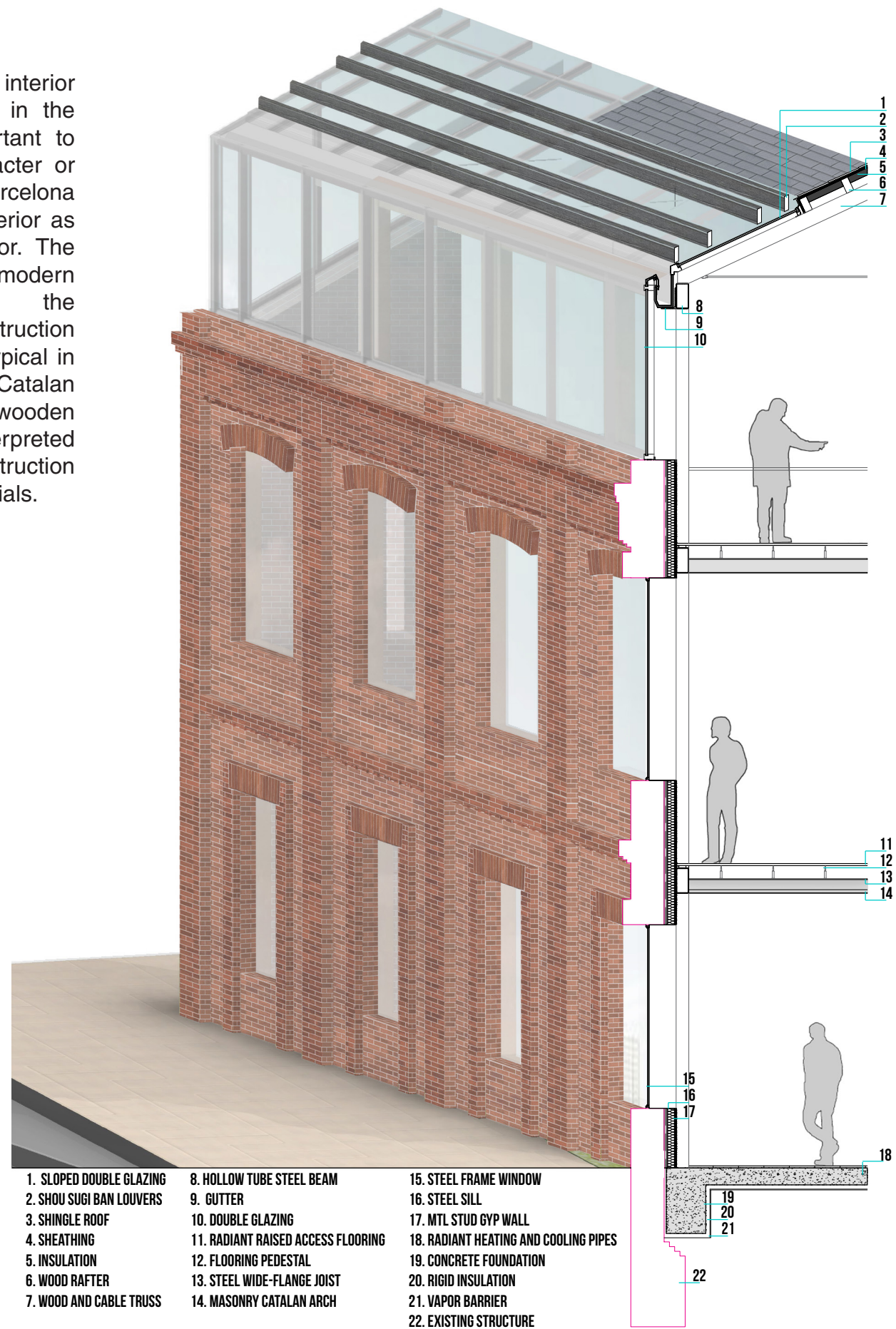
MATERIALS

Some parts of the factory were more damaged than others. The North-West façade was mostly intact but the South-East façade was completely gone. The materials used help tell the history of the building and its transition into its new use. The exterior additions are in glass so that there is a clear distinction between the old and the new. The missing South-East façade is replaced with glass. The glass clerestory is highly reflective, seeming to just be the sky above the brick walls. Shou sugi ban is used to represent the moment a decision had to be made to do something with the abandoned building. The fires in 2007 caused the conversation of adaptive reuse. The Japanese-burned wood is used on the interior where the brick wall end and the addition is and on the exterior as louvers to shade the new glass walls and roofs.

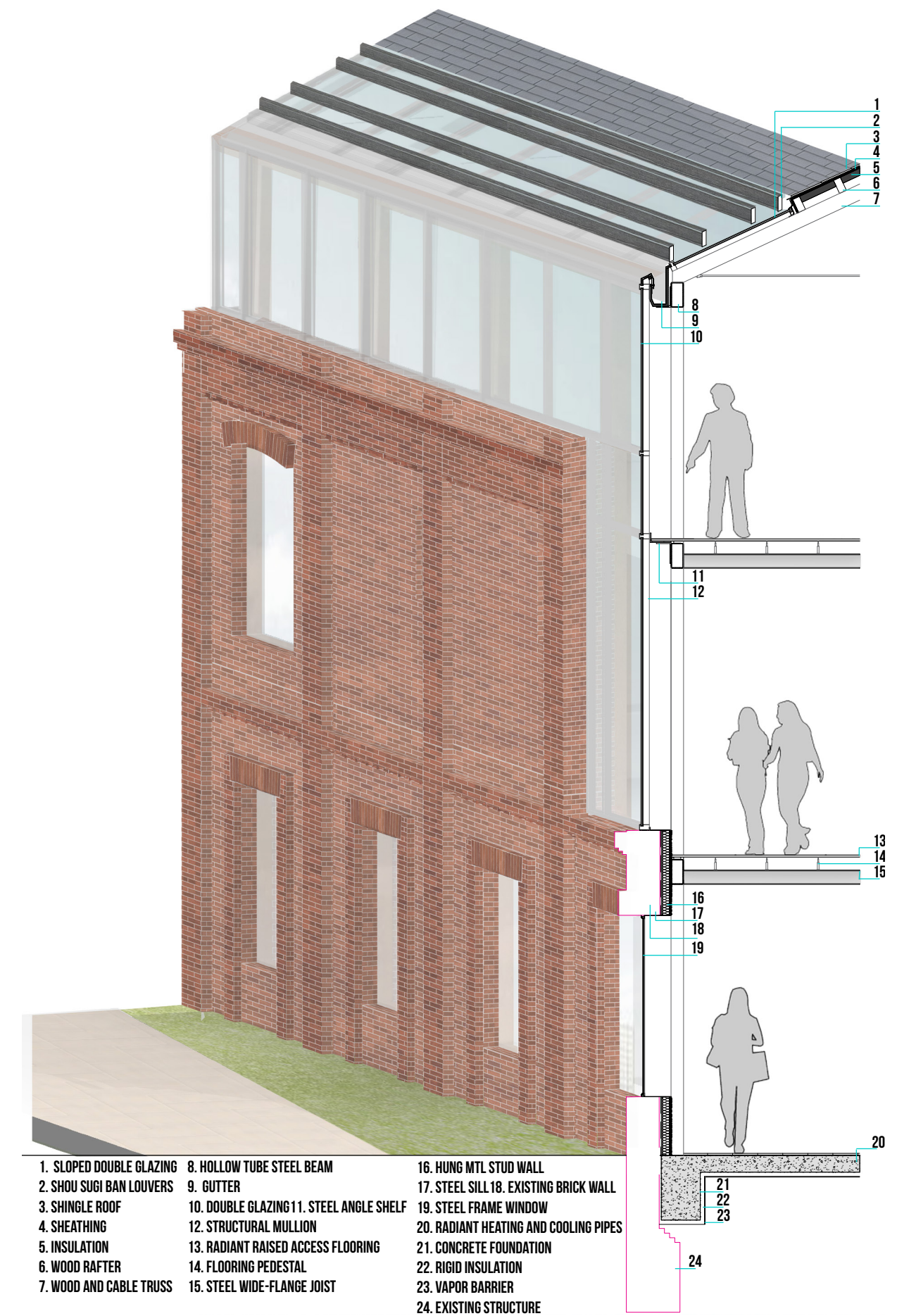


WALL SECTIONS

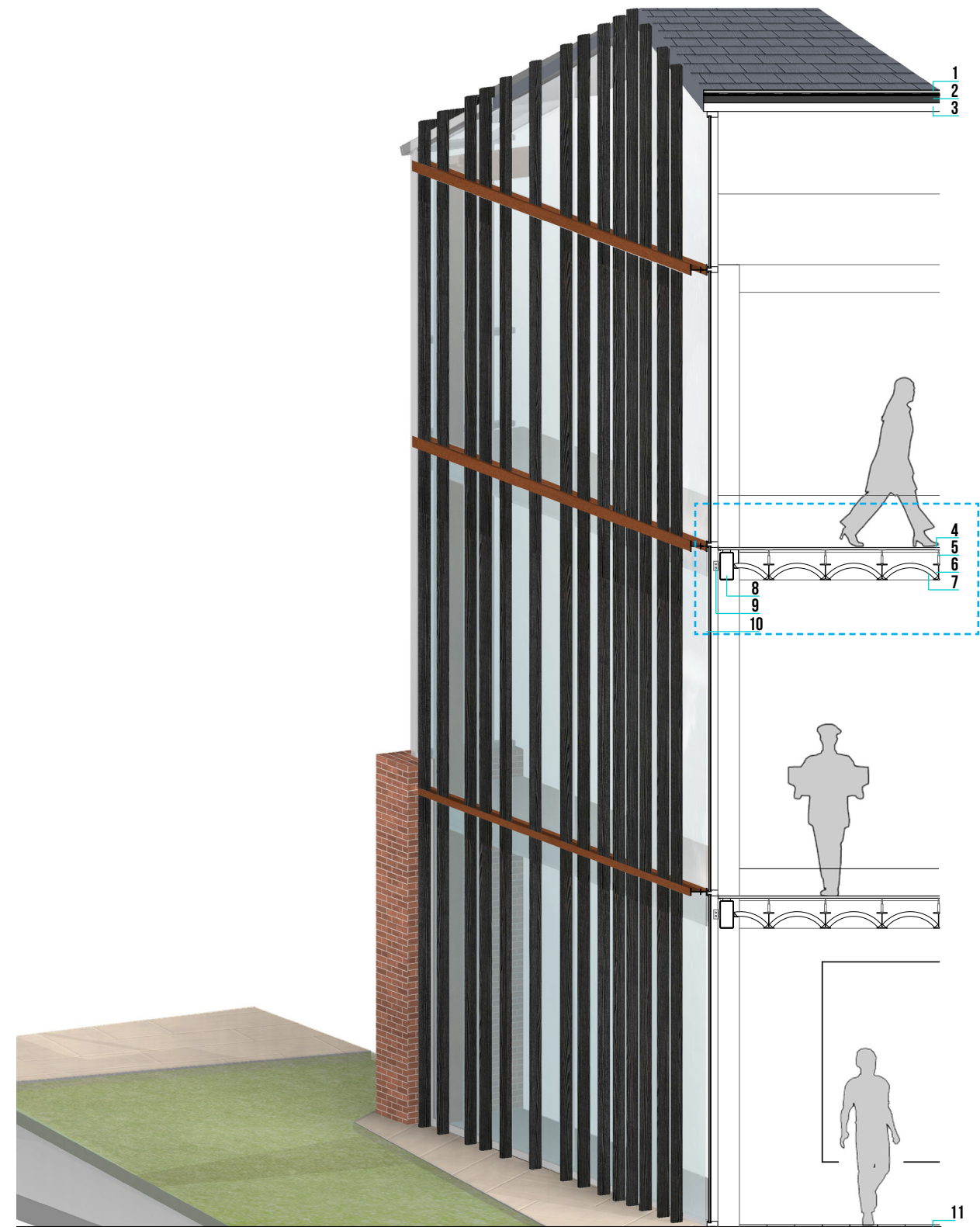
Because the interior structure was lost in the fires, it was important to preserve the character or the factory and of Barcelona to preserve the interior as well as the exterior. The new structure is a modern interpretation of the traditional construction method that was typical in the 19th century. Catalan arches and wooden trusses are reinterpreted using modern construction methods and materials.



- | | | |
|--------------------------|------------------------------------|---------------------------------------|
| 1. SLOPED DOUBLE GLAZING | 8. HOLLOW TUBE STEEL BEAM | 15. STEEL FRAME WINDOW |
| 2. SHOU SUGI BAN LOUVERS | 9. GUTTER | 16. STEEL SILL |
| 3. SHINGLE ROOF | 10. DOUBLE GLAZING | 17. MTL STUD GYP WALL |
| 4. SHEATHING | 11. RADIANT RAISED ACCESS FLOORING | 18. RADIANT HEATING AND COOLING PIPES |
| 5. INSULATION | 12. FLOORING PEDESTAL | 19. CONCRETE FOUNDATION |
| 6. WOOD RAFTER | 13. STEEL WIDE-FLANGE JOIST | 20. RIGID INSULATION |
| 7. WOOD AND CABLE TRUSS | 14. MASONRY CATALAN ARCH | 21. VAPOR BARRIER |
| | | 22. EXISTING STRUCTURE |



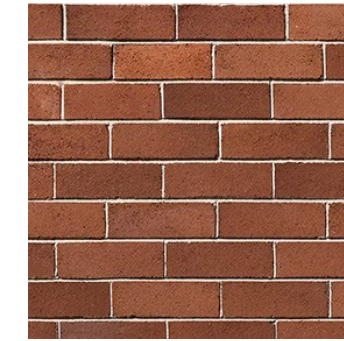
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|--------------------------|------------------------------------|---------------------------------------|
| 1. SLOPED DOUBLE GLAZING | 8. HOLLOW TUBE STEEL BEAM | 16. HUNG MTL STUD WALL |
| 2. SHOU SUGI BAN LOUVERS | 9. GUTTER | 17. STEEL SILL |
| 3. SHINGLE ROOF | 10. DOUBLE GLAZING | 18. EXISTING BRICK WALL |
| 4. SHEATHING | 11. STEEL ANGLE SHELF | 19. STEEL FRAME WINDOW |
| 5. INSULATION | 12. STRUCTURAL MULLION | 20. RADIANT HEATING AND COOLING PIPES |
| 6. WOOD RAFTER | 13. RADIANT RAISED ACCESS FLOORING | 21. CONCRETE FOUNDATION |
| 7. WOOD AND CABLE TRUSS | 14. FLOORING PEDESTAL | 22. RIGID INSULATION |
| | 15. STEEL WIDE-FLANGE JOIST | 23. VAPOR BARRIER |
| | | 24. EXISTING STRUCTURE |



- | | |
|-----------------------------------|---------------------------------------|
| 1. SHINGLE ROOF | 8. HOLLOW TUBE STEEL BEAM |
| 2. INSULATION | 9. BOLTED PLATE |
| 3. WOOD RAFTER | 10. DOUBLE GLAZING |
| 4. RADIANT RAISED ACCESS FLOORING | 11. RADIANT HEATING AND COOLING PIPES |
| 5. FLOORING PEDESTAL | 12. CONCRETE FOUNDATION |
| 6. STEEL WIDE-FLANGE JOIST | 13. RIGID INSULATION |
| 7. MASONRY CATALAN ARCH | 14. VAPOR BARRIER |



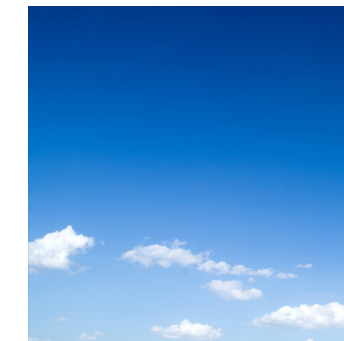
Shou sugi ban
Charred wood inspired by the damage caused by the fires. It is used as interior wall cladding and exterior vertical louvers.



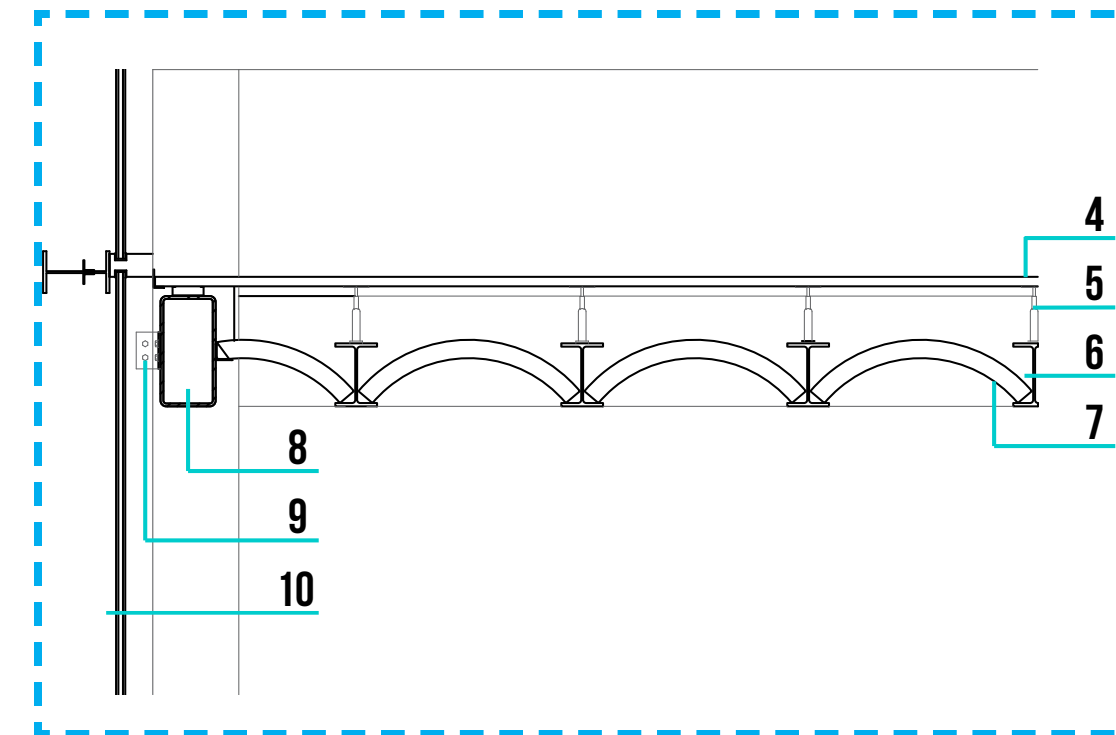
Brick
The brick is resorted and replaced where need in order to maintain the character of the old walls.



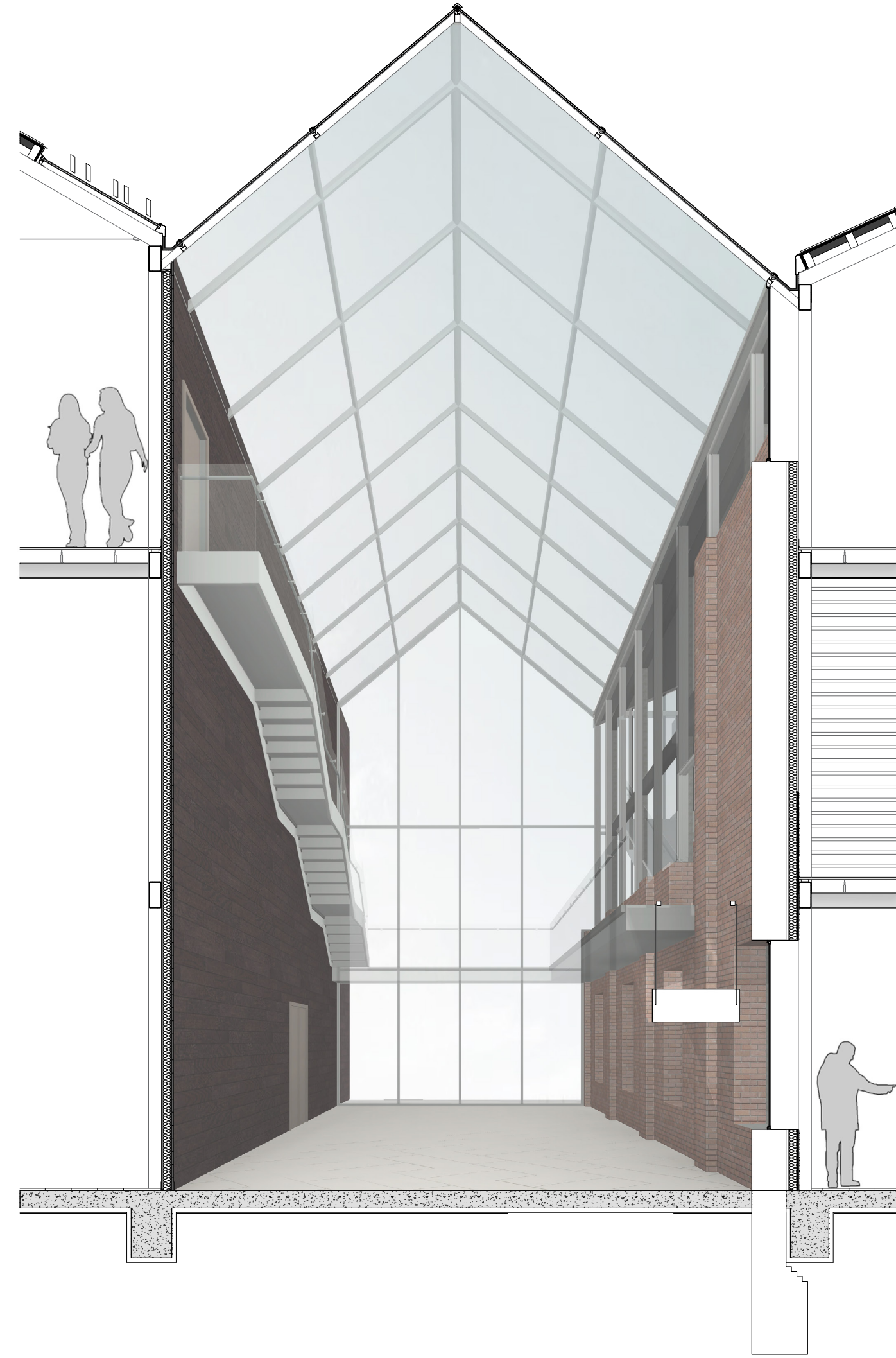
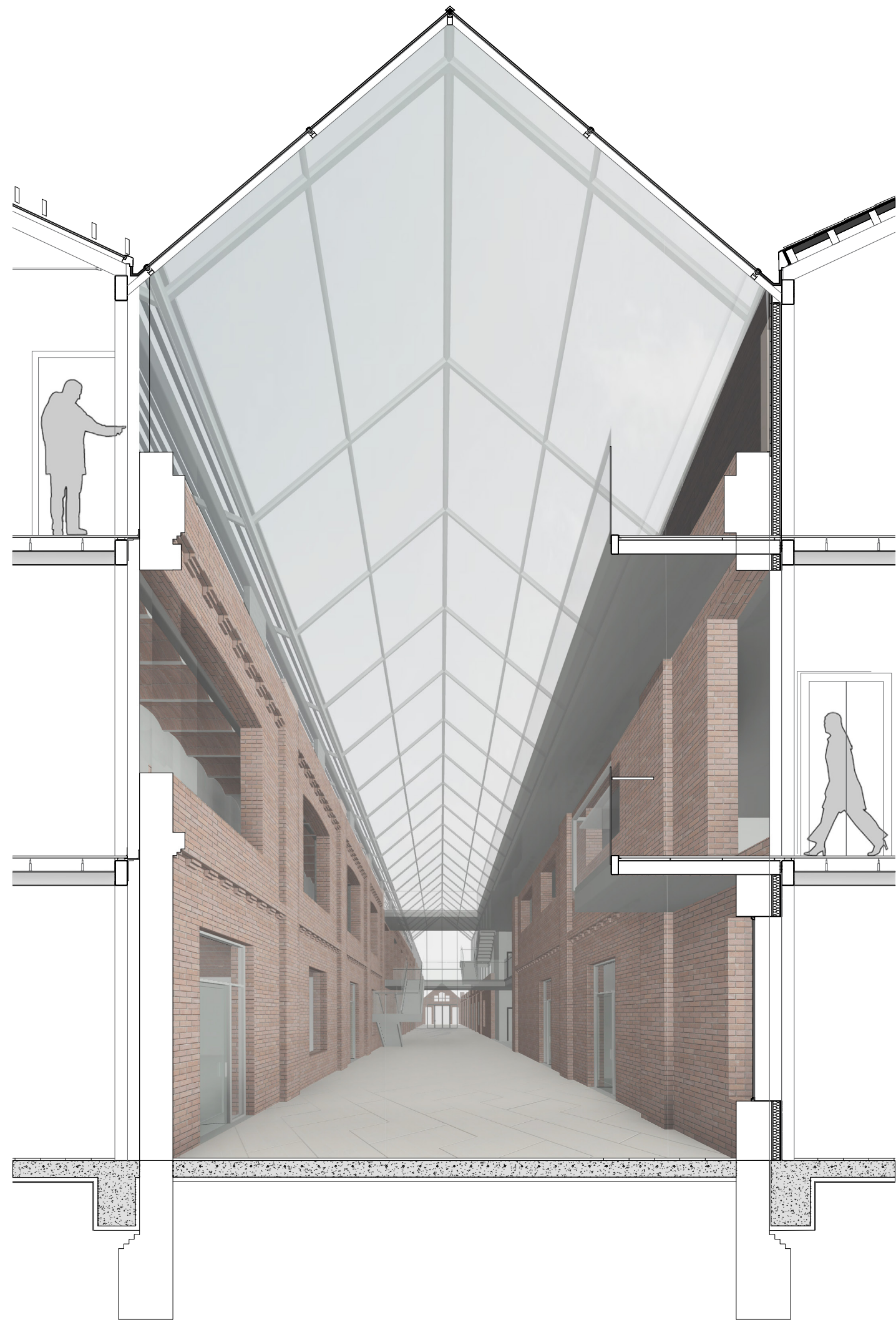
Weathered Steel
Treatment to the steel to match the color of the existing brick.



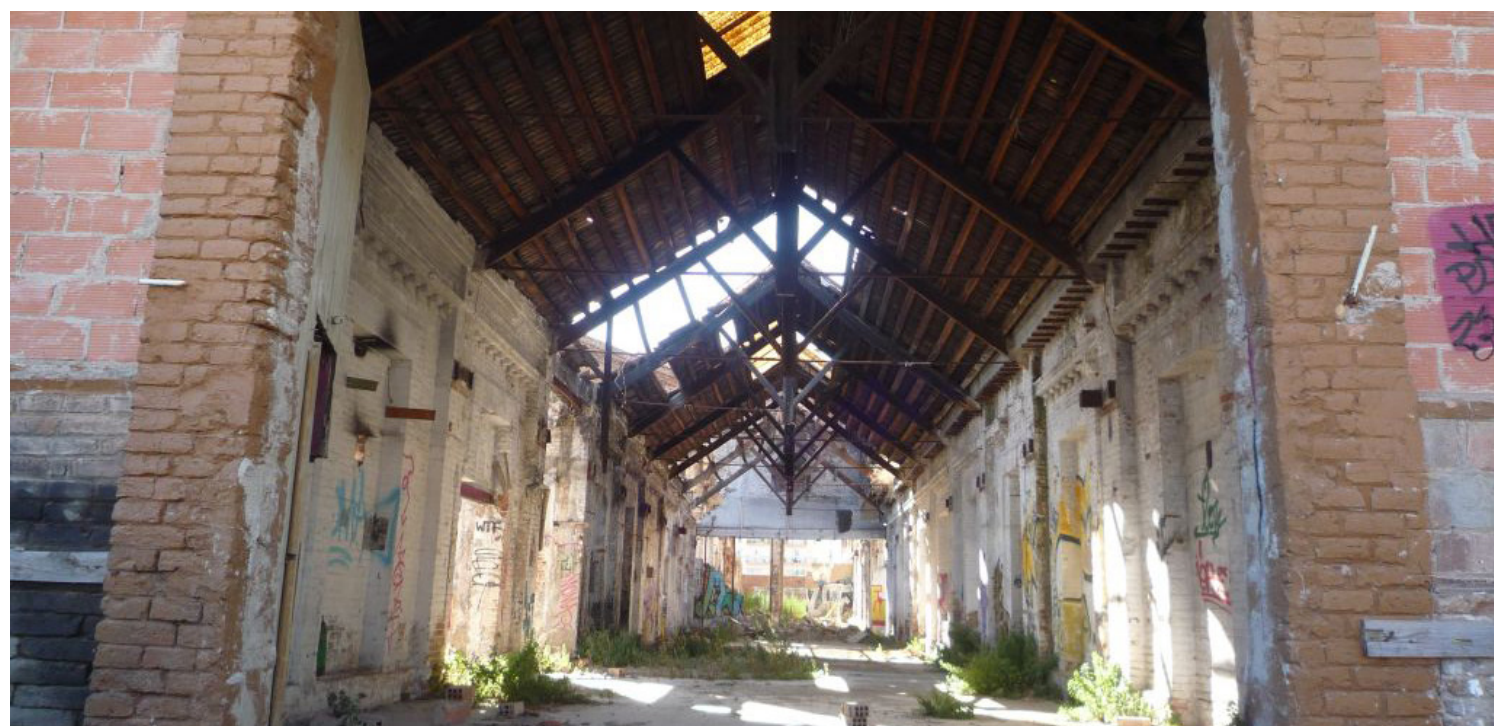
Reflective Glass
Glass is used to be light and not compete while still contrasting with brick. The glass is meant to reflect the sky as if there is no wall there.



The raised access flooring system provides innovation solutions for mechanical and electrical systems as well as bringing back traditional elements with the catalan arches. The floor panels not only provide flexibility in the classrooms but also condition the space. Radiant heating and cooling pipes are integrated into panels and connected through tubes in the wall cavity to water heaters in the basement. The pedestals for the raised access flooring sit on wide-flange beams that become the ribs for the catalan arches. Brick arches span between the beams similar to tradition methods.







REVITALIZE

REVITALIZATION PROGRAM

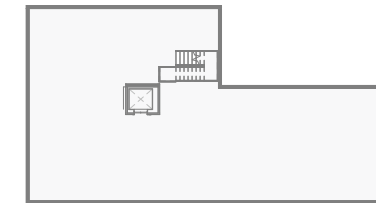
Ca L'Alie is a transition from an industrial era to a technological era. STEAM education is a transition from traditional learning systems to new innovative systems. The city of Barcelona has interest in STEAM because it fits in with their new plan for the SmartCity campus. The SmartCity is a master plan for the area to create a co-working space where corporations, innovators, universities, researchers, and entrepreneurs come together to create an ecosystem to lead in smart city solutions. The thing both 22@ and SmartCity are missing is where is the next generation of them is coming from. There are universities in the plan of 22@ and SmartCity but what about before university. What if there was a high school that prepared students and gave them a head start right in the middle of where it is all happening? Ca L'Alie STEAM High School provides students with the facilities to learn, create, and share. There are traditional classrooms as well a laboratories for various sciences. Flex spaces such as art studios and computing labs allow for various forms of teaching and different types of classes such as graphic design and architecture. Large open circulation spaces driven by the existing architecture prove the students with spaces to collaborate and learn from their peers about other STEAM fields. A large high-bay space provides the student with a flexible space to showcase their work such as robotics, dance, and sculpture. Above this space is an open senior studio to allow students in their last year to focus on what they want to continue studying past high school. This studio is connected to a series of rooms open to the public to allow local professionals and community members to be involved with the student's education and the school system. Conference rooms, workshop room, and an open gallery give the public a space to see what the students are working on, teach the students through a workshop, and mentor one on one with students.

- Group Learning
- Independent Learning
- Collaboration
- Community

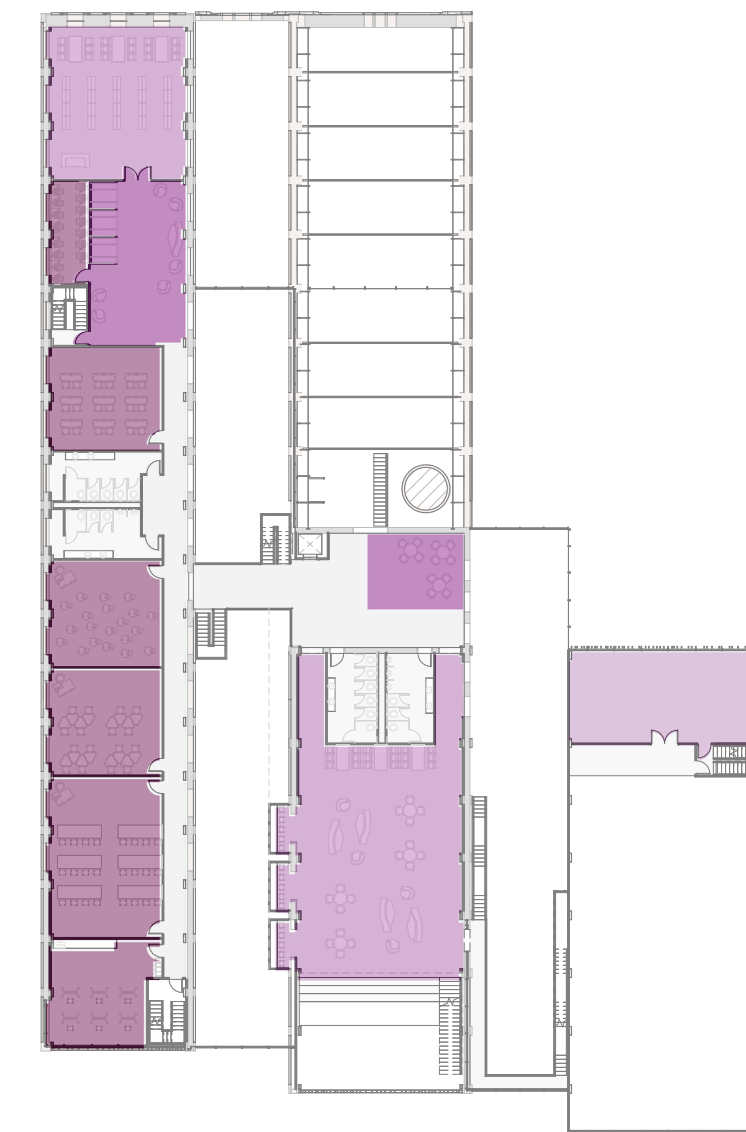
LEVEL 0



LEVEL -1



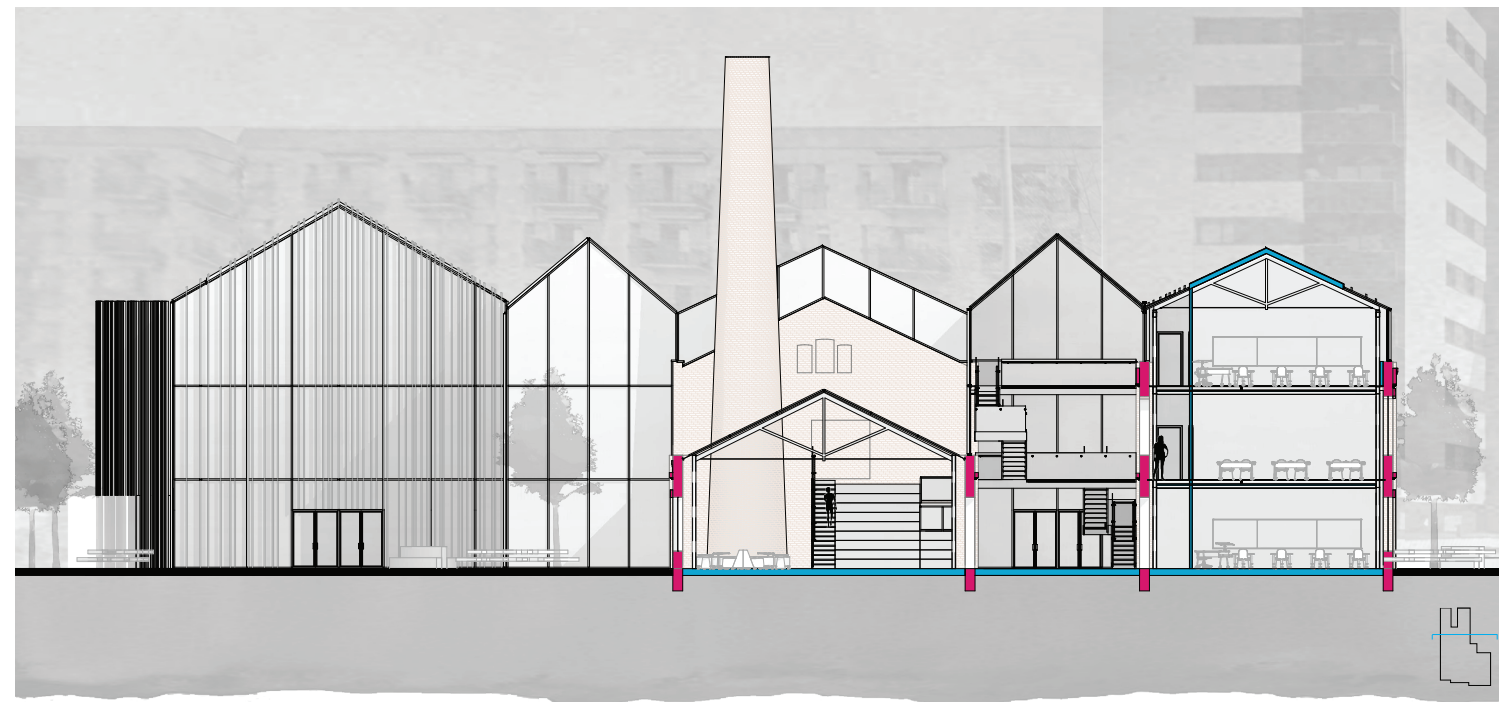
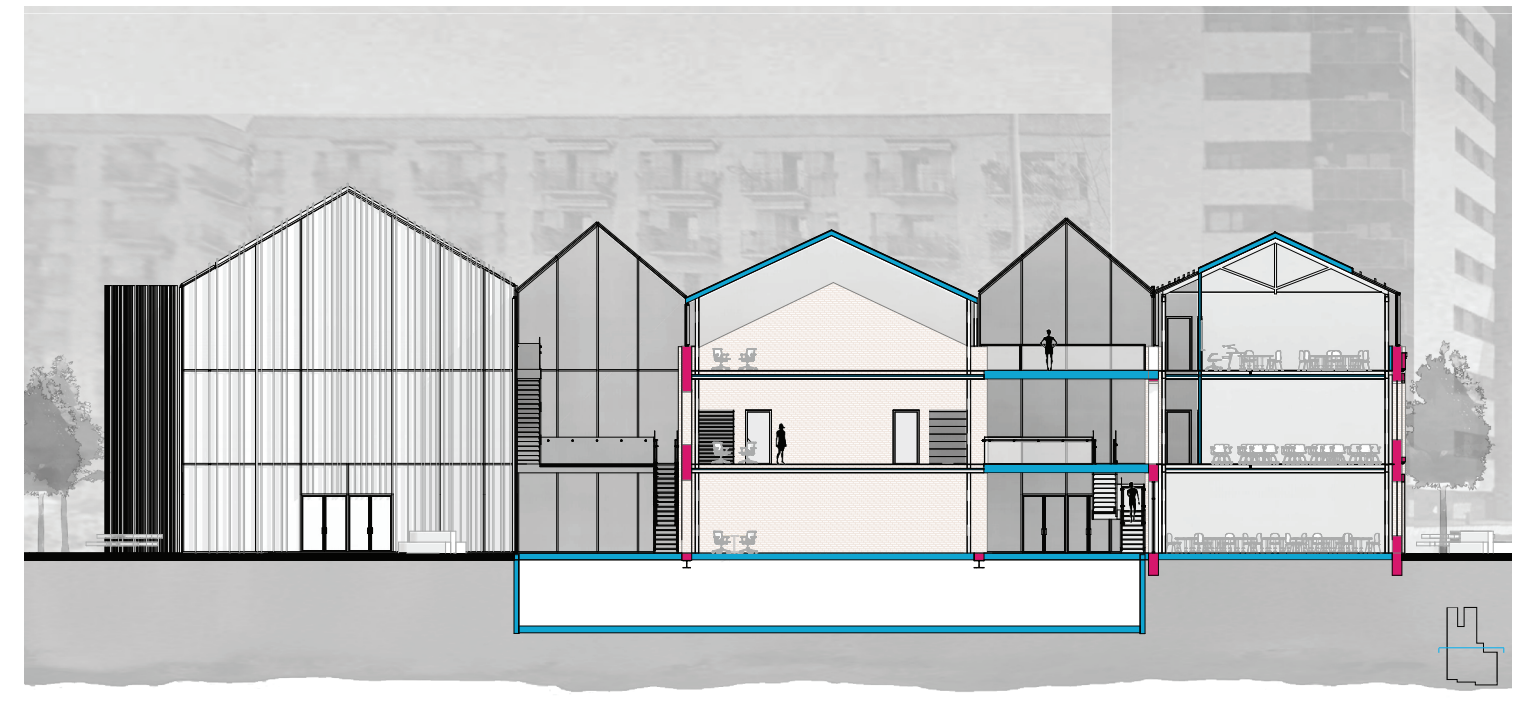
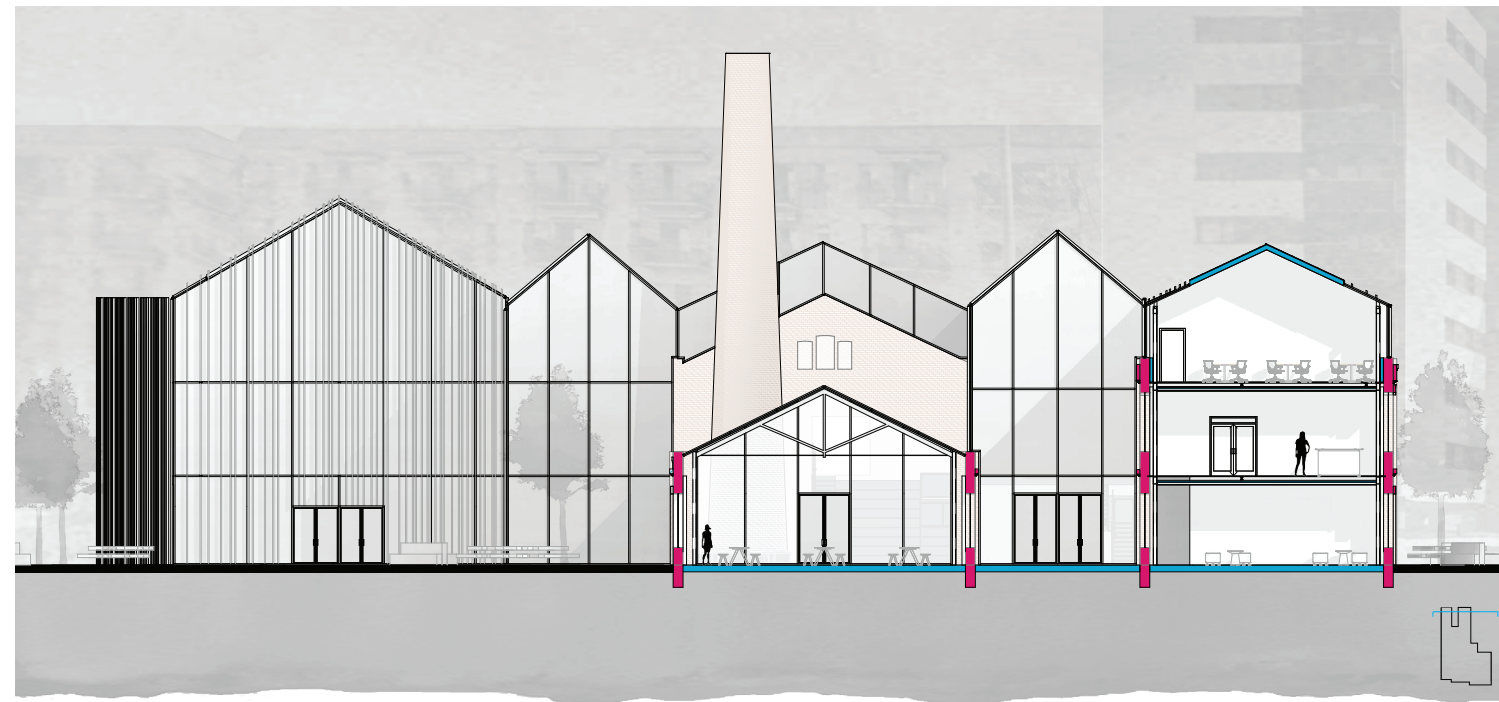
LEVEL 1



LEVEL 2









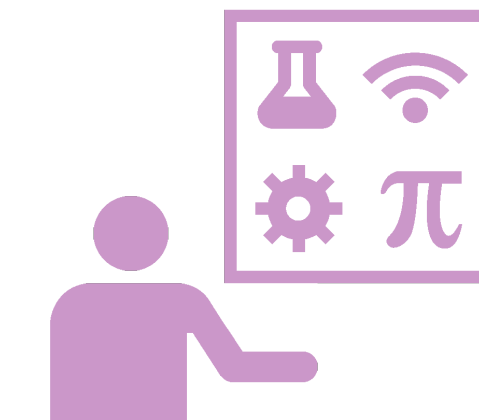
Group Learning
Classroom spaces and laboratories meant to teach multiple students. These rooms are flexible to be able teach specific topics both general and STEAM related.



Collaboration
Open spaces for students collaborate with each other as well as socialize.



Independent Learning
Break out spaces provide students with study areas to do independent research or study.

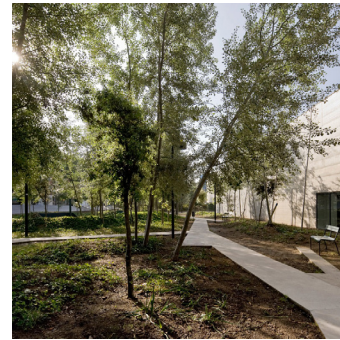


Community
Students can showcase their work as well as work with local professionals to begin their career and community involvement.

FUTURE

PUBLIC GREEN SPACES

To maintain the factories importance and role in the community while giving it a new connection to the future of its neighborhood, the school creates a public plaza and opens its facilities and students works to the public. By including the community, the school becomes a part of the neighborhood, the 22@ district, and the city of Barcelona. Due to the location of the site it is important to take advantage of the foot traffic and access to surrounding businesses and existing community spaces. The area is designed to be walked and accessed by public transportation. People can enjoy this new public space as they walk from a bus or metro stop to their destination. There are a series of green spaces in the surrounding area that vary from walk through spaces, sit down and enjoy parks, and public spaces shared with museums or shopping centers. The site of Ca L'Alie is a combination of those types of green spaces.



Avinguda Diagonal

The street of diagonal stretches from one end of Barcelona to the other. The vehical lanes are sperated by a pedestrian space lined with trees and benches. It designates green spaces for walking throuh the city.

Parc Poble Nou Central

Designed by Jean Nouvel, the large park has areas for seating, playing, walking and community events. This park uses different types of seating and different arrangements to create different socializing areas.

Jardins de Miquel Martí i Pol

The garden surrounds the museum Can Framis while also being a public green space. It is heavily wooded to provide a peaceful shaded area. There are walkways as well as seating.

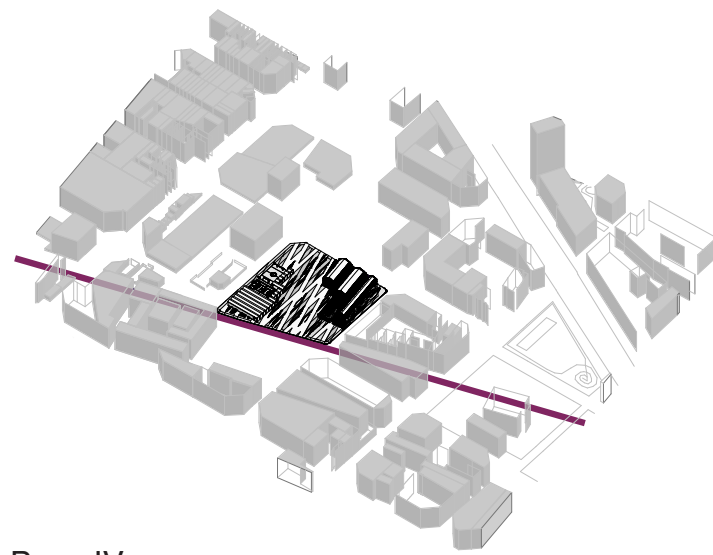
Parc de Diagonal Mar

Designed by EMBT, this park connects Diagonal to the beach. It is designed as an interaction with the city and has paths which spread out in all directions to surrounding streets and buildings. It has large open grassy areas.

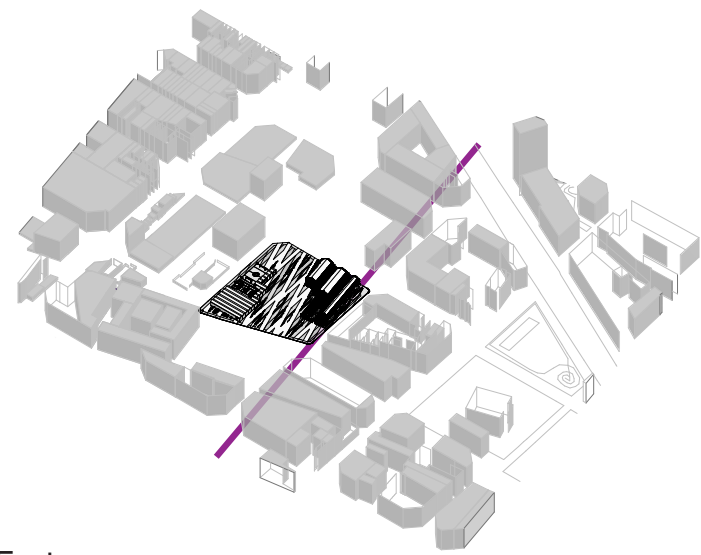


Green Spaces

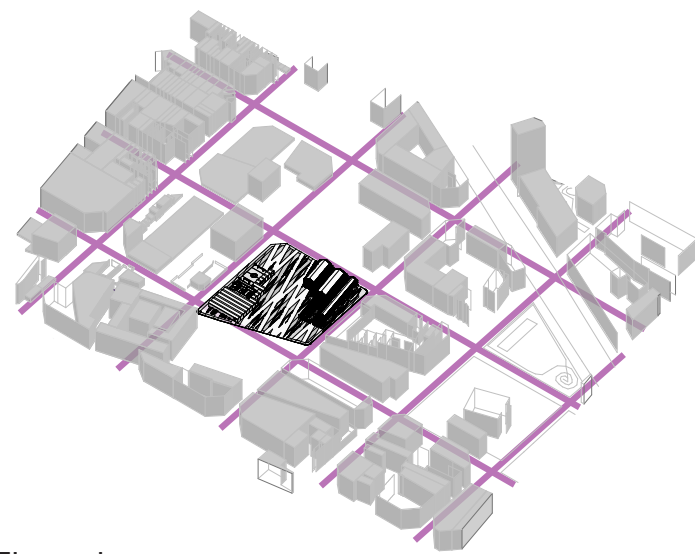




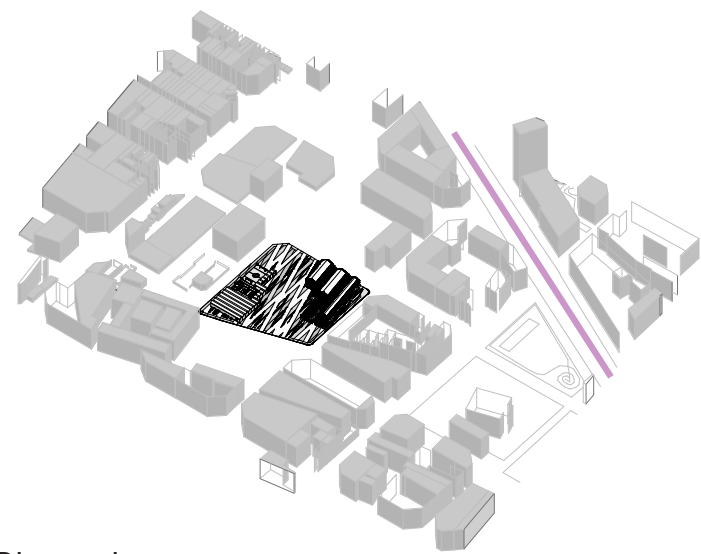
Pere IV
This road dates back to the industrial era when the city of Barcelona was still in the city wall and the outskirts were being developed.



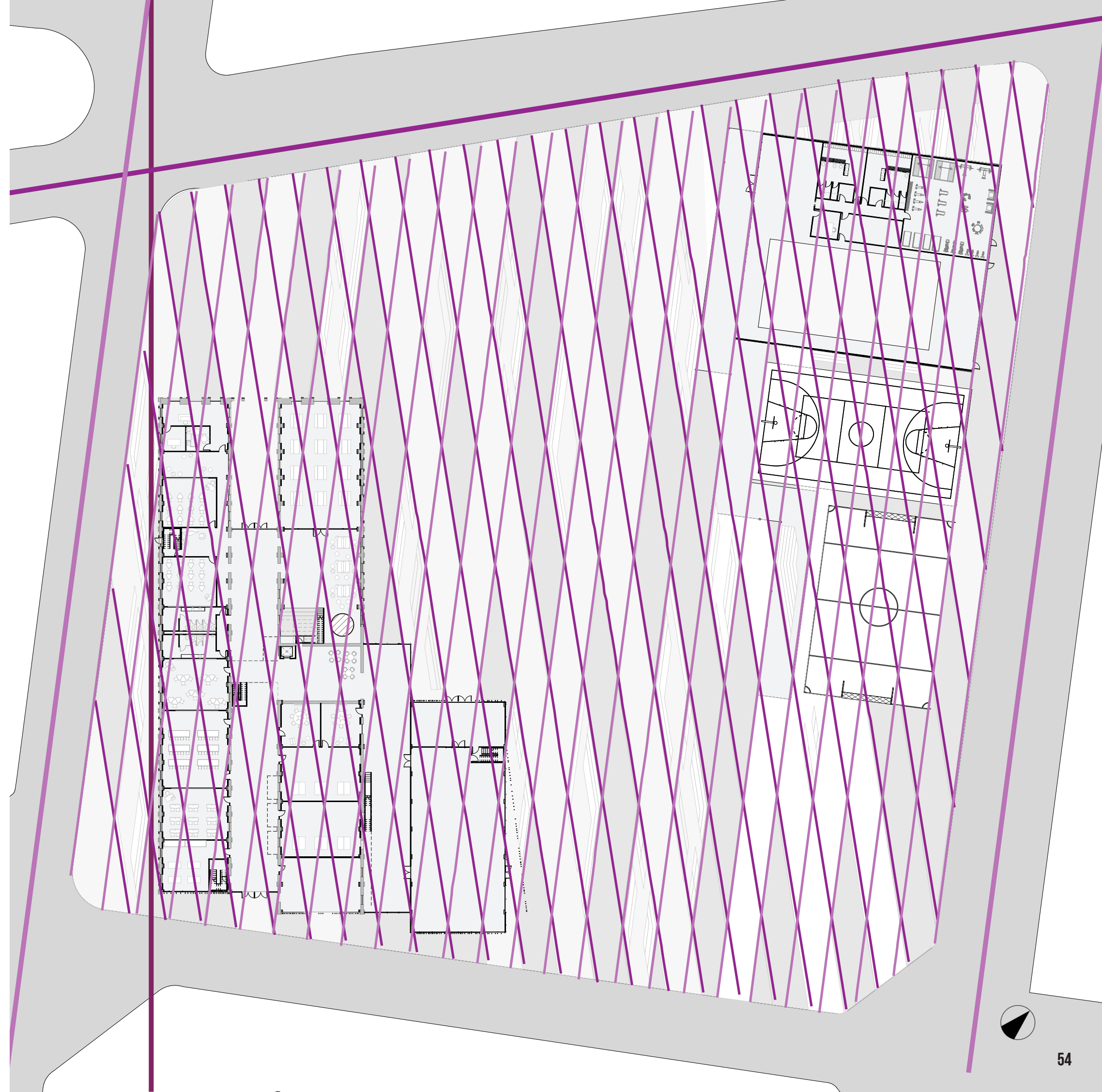
Factory
The existing building is off all grids because it dates before the example grid was established in the area. The original orientation was based on maximizing daylight, ventilation, and drainage.



Eixample
This road dates back to the industrial era when the city of Barcelona was still in the city wall and the outskirts were being developed.



Diagonal
The existing building is off all grids because it dates before the example grid was established in the area. The original orientation was based on maximizing daylight, ventilation, and drainage.



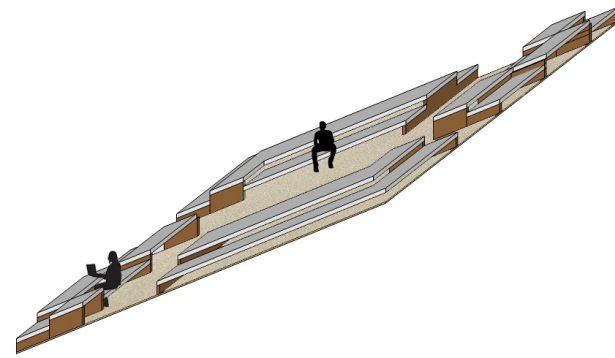
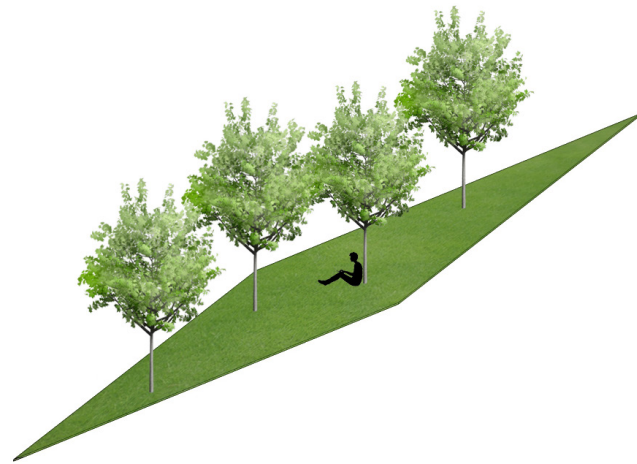


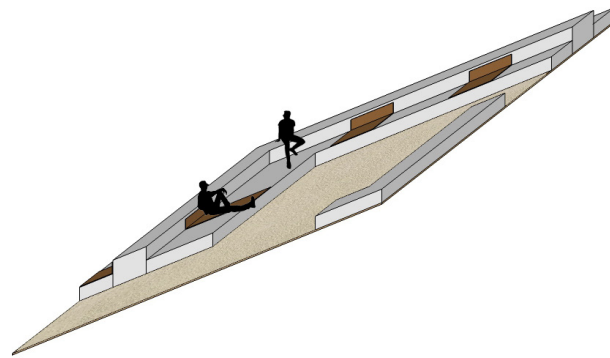
Table Seating

These zones provide seating with a surface for students to study or for the public to play cards. There are large tables for big groups and small tables for individuals.



Trees

These zones provide shade and flexibility to the users.



Bench Seating

These zones provide bench style seating. The arrangement of the benches allow for strangers to have their privacy or for large groups to gather.



Grass

These zones provide open areas for kids to play in or students to lay out and study.







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