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Urban renowal through the renovation of a façade.

Energetic rehabilitation and urban regeneration of the back façade of a multi-family housing complex.

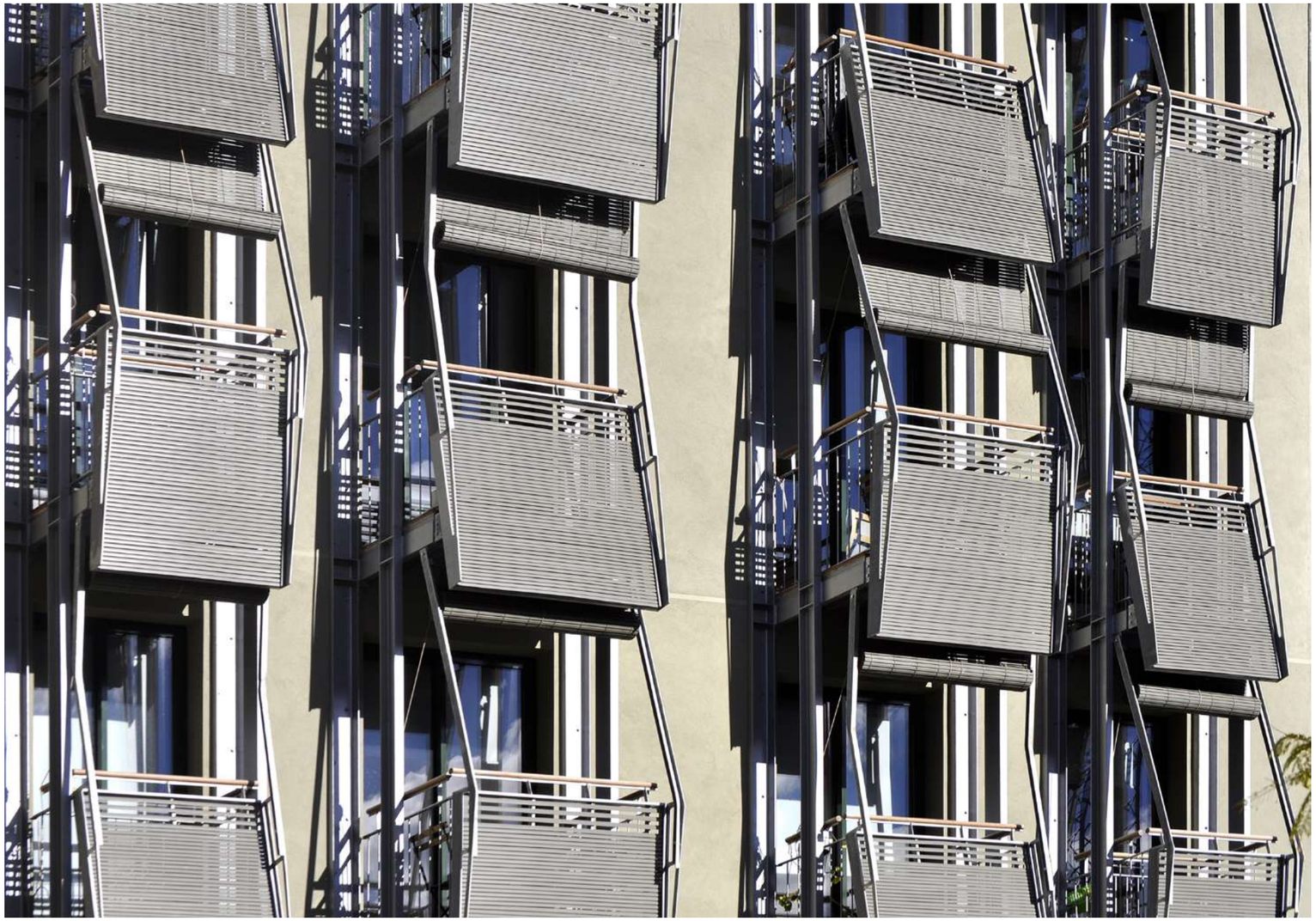
Type of intervention

☐ *Restoration* ☒ *Rehabilitation / Renovation*

Concerned elements on the intervention project

- ☐ *1. Foundations and underground structures*
- ☐ *2. Vertical structures*
- ☐ *3. Horizontal structures and vertical connections*
- ☐ *4. Roof and terraces*
- ☒ *5. Façade and building envelope*
- ☒ *6. Finishes and completion elements*
- ☐ *7. Integrate services*
- ☐ *8. General strategies for building recovery*

Site	Carrer Lope de Vega 111, Barcelona, Catalunya, Spain
Objectives	Energetic rehabilitation and urban regeneration of the back façade of a multi-family housing complex.
Property	Private
Designer	Carlos Pérez Arquitectos Asociados SLP: Archs. Carlos Pérez Sánchez & Carlos Pérez Mir
Date	Project date : 2016 Date of agreement within the European Grow Smarter project: March 2017 Deadline for implementation: September 2017 - June 2018



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Background to the intervention

The rehabilitated facade corresponds to the rear of the property located at 111 Lope de Vega Street. Formerly, it faced a wall, but now it has the privilege of facing an open, public space with excellent sunlight, facing west and with ample views.

This intervention has been carried out due to several factors. On the one hand, the willingness of the Cornerstone Company, located on the opposite side of the same block, which wanted to dignify the back of its building, which would face the future square of Pallars Street.

Secondly, the will of the owner, which in this case is the entire building at Lope de Vega 111, who understood that the improvement of the rear façade of the building would significantly increase the value of their homes.

Thirdly, the architects and authors of the project and construction management, who quickly understood the possibilities offered to make a different project on this façade.

Fourthly, the possibility of participating in the Grow Smarter project, a European-wide project, and being eligible for extraordinary grants given all these circumstances.

The initial facade facing the square was exactly the same as that of the rest of the neighbors. The main idea of this renovation was to enlarge the existing window openings and add balconies that would improve the performance of the dwellings and at the same time allow the laundry to be hung out privately.

Description of the building

This is an existing building on consolidated urban land dating from 1934 and is surrounded by consolidated buildings, on a plot with a floor area of 236m². The typology is multi-family housing between party walls with a constructed area of 1,194 m². The access to the property is through Lope de Vega Street nº 111.

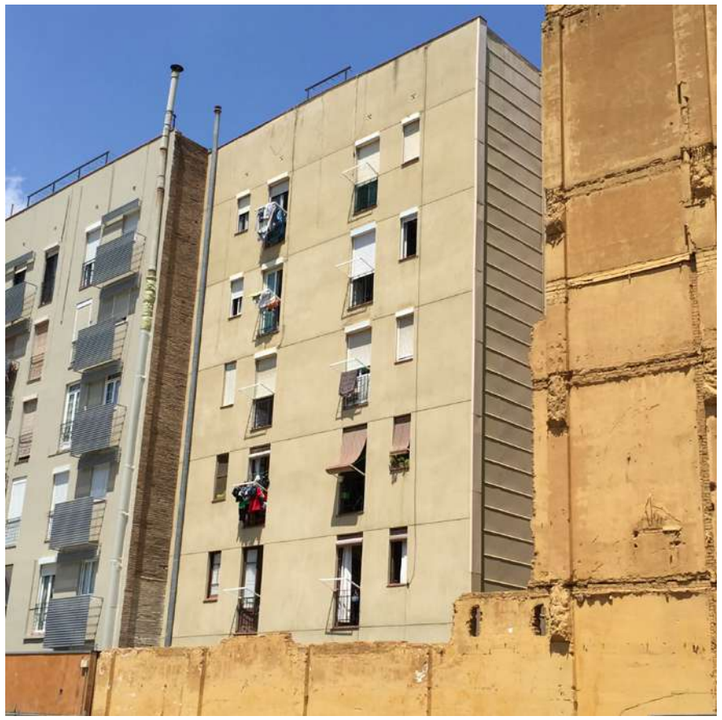

Fig.1: Existing façade.

On the block of Lope de Vega, Pallars, Bilbao and Camí Antic de Valencia, an office building (Cornerstone) was built with an urban park. The interior of the block is enclosed by three facades of the Cornerstone in addition to the rear facades of the residential buildings facing Lope de Vega Street.

In order to proceed with urban regeneration, it was necessary to renovate these rear facades with a south-west orientation Furthermore, it was necessary to renovate and adapt the adjoining party wall that was part of this set of rear facades and to complete the urban renewal, a square open to Pallars Street would be created in the interior space of the block, whose front would be the set of renovated facades and party walls.

Given all of these conditions, a building was proposed as a reference action within the European GROWSMARTER project, so that it would be the dynamizing agent of the aforementioned urban improvement.

The building located at 111 Lope de Vega Street, 08005-Barcelona was one of the buildings selected to be integrated in the GROWSMARTER project, facilitating an optimization of its energy consumption and a reduction of its environmental impact.

The façade has a load-bearing character, forming part of the vertical structure of the building, which is supported by narrow-flange metal joists. The walls have a very low load-bearing capacity. The walls were of 15 cm of solid brick with lime mortar of very low resistant quality as a result of a typical construction practice of the time and as a finish it presented a single layer coating without any type of insulation. It had exposed clotheslines that distorted the urban landscape with the clothes hanging out. The walls were flat and unprotected, with no balconies or overhangs to mitigate the rigors of the weather. There were no energy efficiency criteria.

Energy rehabilitation was one of the priority lines of the European Grow Smarter project, an initiative articulated by a consortium of different European cities (Cologne, Stockholm and Barcelona, among others) and companies that is part of the EU's Horizon 2020 program.

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Growsmarter sought to reduce the environmental footprint in the rapid urbanization of cities and a way to respond to the needs of its citizens in areas such as energy, infrastructure, and transportation through the development of different projects.

The GROWSMARTER Project required monitoring of energy savings improvements for a minimum of two years. The results were the proof that certified the energy savings of the passive building strategies. Strategies used on the rear façade of the building located at 111 Lope de Vega Street, Barcelona.

To articulate this process, a framework collaboration agreement is established between the Property of the building located at Lope de Vega 111, Natural Gas Services SDG S.4., the Community of Camí Antic de València 54, and the Institut Municipal del Paisatge Urbà i Qualitat de Vida of the Barcelona City Council, for the rehabilitation of the rear façade.

The Diagnosis of the building (values and state)

Influencing conditions or performance requirements:

- Energy efficient building. Its coating is state-of-the-art, reflective with high resistance to dirt and decontaminating effect.
- Total elimination of thermal bridges, contrasted with thermographies. Total control of infiltrations through the carpentry.
- Providing large openings towards the inner courtyard of the block, eliminating the obscurantism created by the existing architectural openings, due to the original factory landscape.
- Creation of balconies. Outdoor living spaces. Create hidden clotheslines integrated into the facade.
- The need to structurally guarantee the performance, given that the solid areas of the façade were reduced and that the bearing capacity of the wall was deficient, as was reflected in the laboratory tests carried out. Therefore, the section of the façade wall on the first floor was enlarged and a metal structure was created to relax the tensions in the façade.
- Possibility of privacy by means of roller shutters.
- The fixed metal louvers, at their junction with the wooden handrail, are separated on each upper floor to ensure the view without losing privacy.
- Solar control and cross ventilation on balconies.
- Uniform facade, but with movement. Creation of vertical waves. All balconies are different from adjacent balconies.
- Maintain coherence between the separating fence with the square and the facade.
- Generation of space in the first-floor courtyard independent of the upper structure and with a pergola for gathering.

Rehabilitation works

This improvement meant "moving from darkness to sustainable clarity through urban regeneration".

Indeed, the enlargement of the original windows, both in height and width, in order to convert them into balcony doors; the incorporation of the balcony, large enough to install a small table with chairs; the incorporation of blinds that allow sifting sunlight and create a private atmosphere inside the balcony much more pleasant, as well as the detail of designing a railing that hides the clothes hanging and at the same time graduates the passage of light and views, are elements that, together with the addition of an exterior insulation to the entire facade, taking special care in the elimination of thermal bridges, and the interior rehabilitation of some homes, made the habitability of these residences has gained in quality and comfort, while reducing energy consumption, and therefore, the cost of the energy bill.

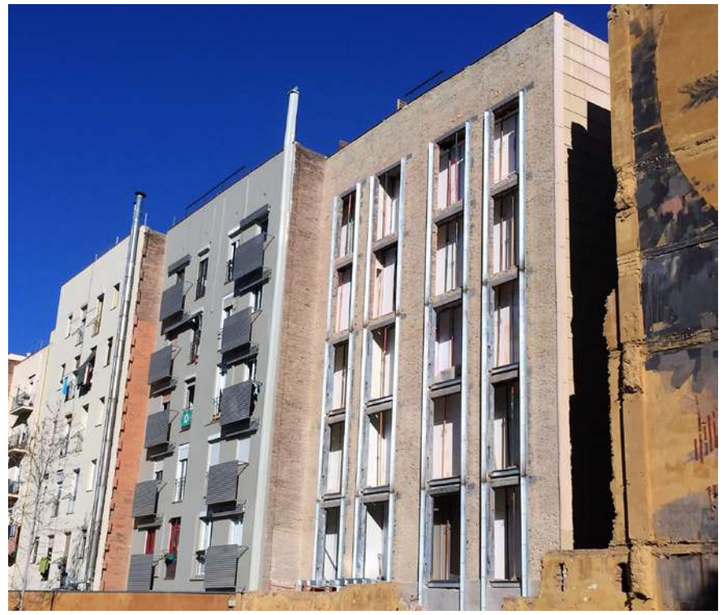

Fig.2: Enlarged window openings.

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Fig.3: Reinforcement of the openings so they can be enlarged.

The project was completed with the design of a new fence on the first floor facing the new square, which provided new terraces to the dwellings on this floor and allowed some visibility of the exterior while offering security to the tenants.

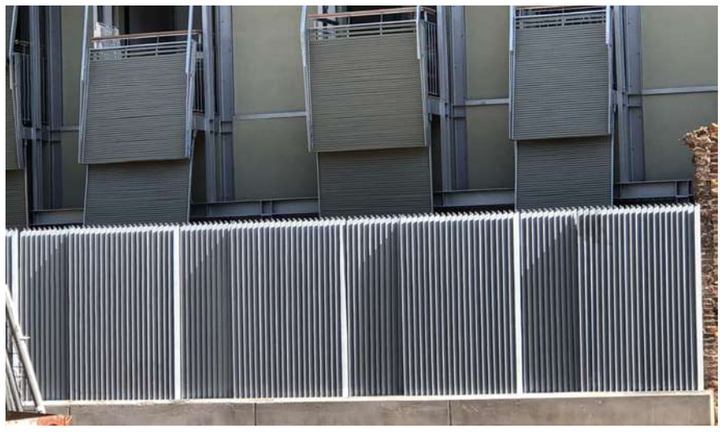

Fig.4: Detail of the fence, as seen from the square.

Not everything was easy in this process, which was carried out with the houses occupied, although the result was very satisfactory for both the property and the tenant users. The construction process was slow and difficult.

What was interesting was the multiple agreement between the Barcelona City Council, Cornerstone, Gas Natural and the property, which allowed the project to be carried out. It also offered the possibility of being replicated in the rest of the facades that face the same square and share the same characteristics with this Lope de Vega 111 building.

Fig.5: Finished rear façade.

Assessment of the results

This type of intervention, on a small scale, represents an important improvement not only for the users of the directly rehabilitated building, but also for the rest of the neighbors of the neighborhood, who will enjoy a free, well-conditioned space and the view of the rehabilitated facades.

References

Qüestions d'Habitatge: El modelo de rehabilitación de Barcelona. 23 de noviembre de 2019: https://www.habitatge.barcelona/sites/default/files/qh23_es_web.pdf

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Images of the rehabilitation works

Fig.6: Before and after of the intervention.

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Fig.7: View of the urban renovation.

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Fig.8: View of the urban renovation.

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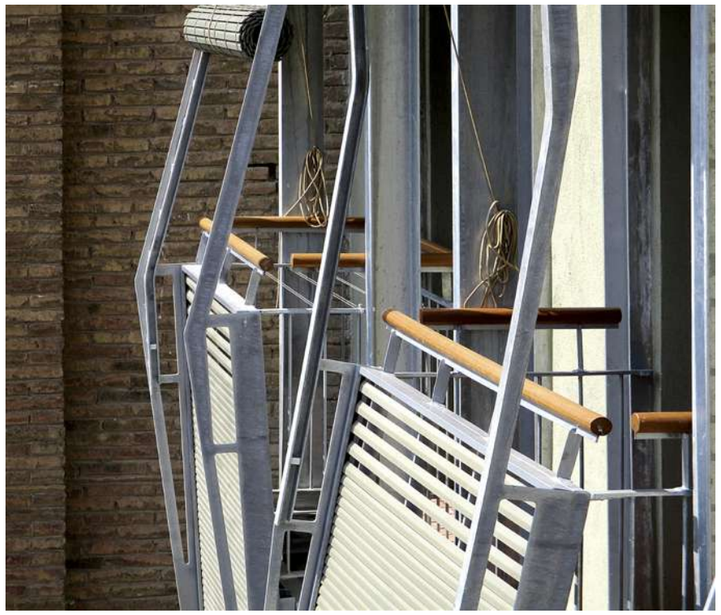

Fig.9: Details of the balconies and hidden clotheslines.

Fig.10: Detail of the finished balconies.

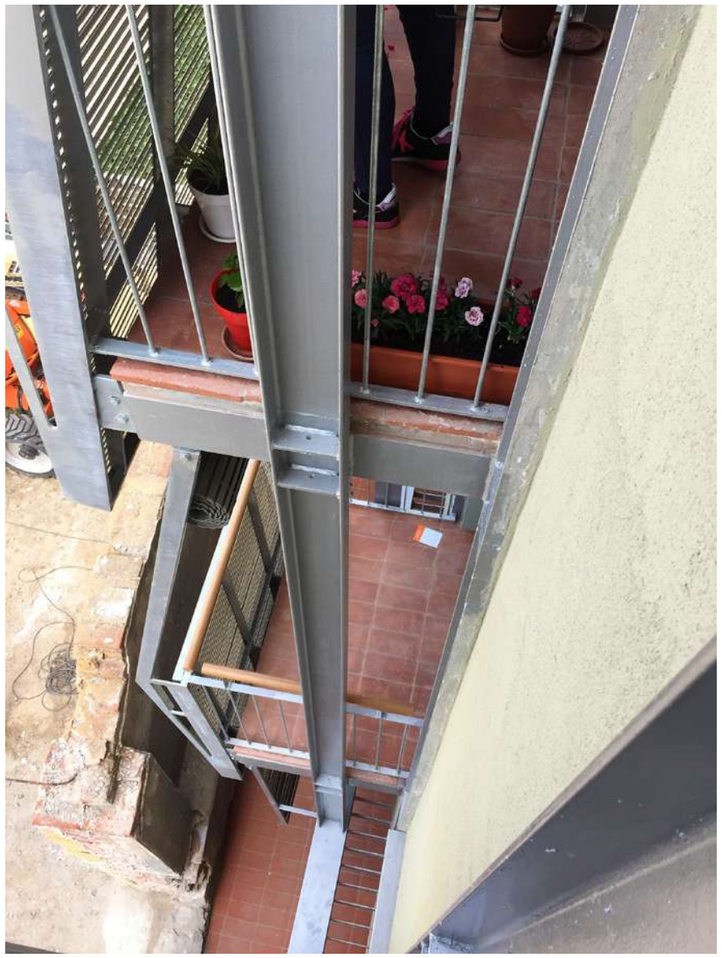

Fig.11: View of the balconies side with its new structural supports.

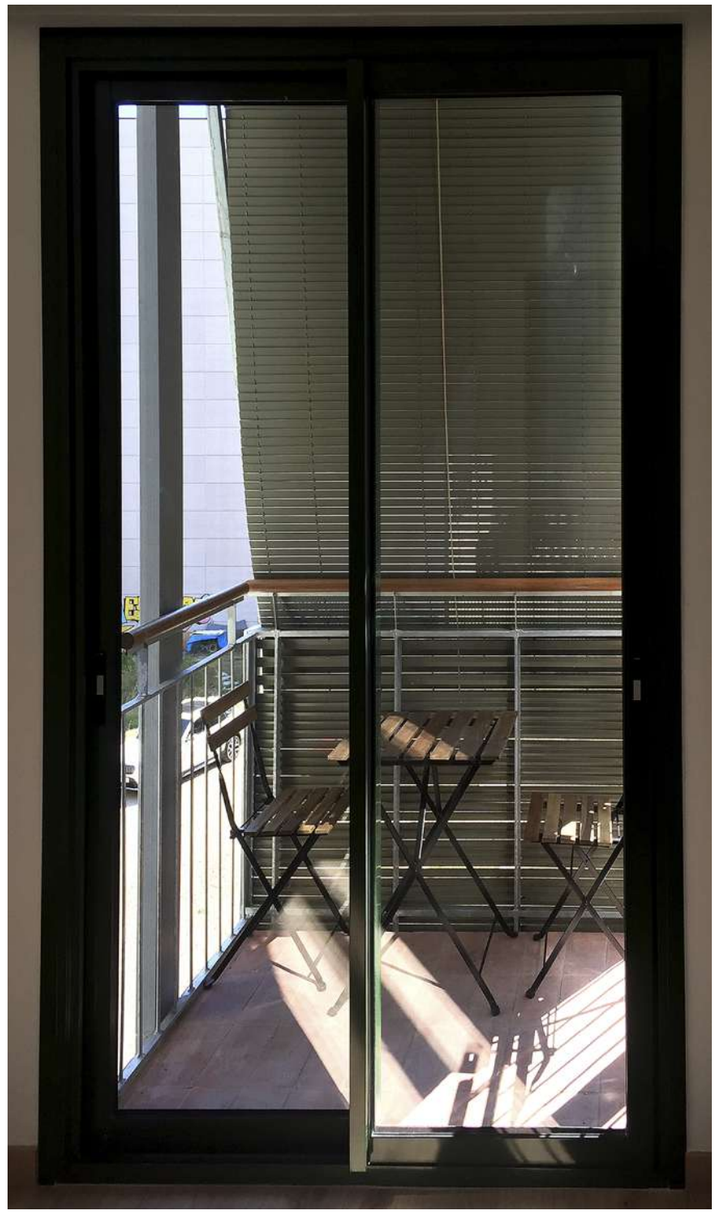

Fig.12: View of the balcony from the inside of the dwelling.

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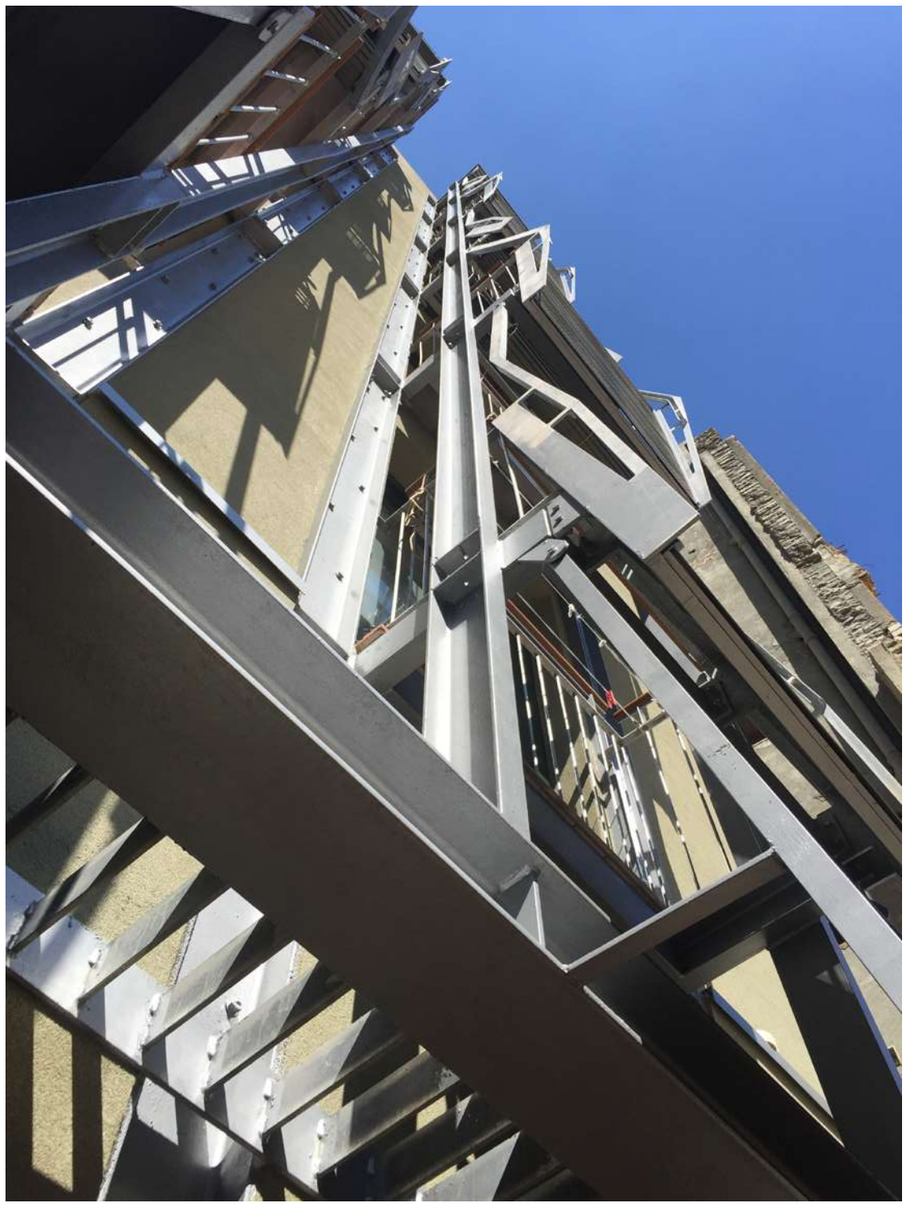

Fig.13: View of the renovated façade from the ground-floor patio.

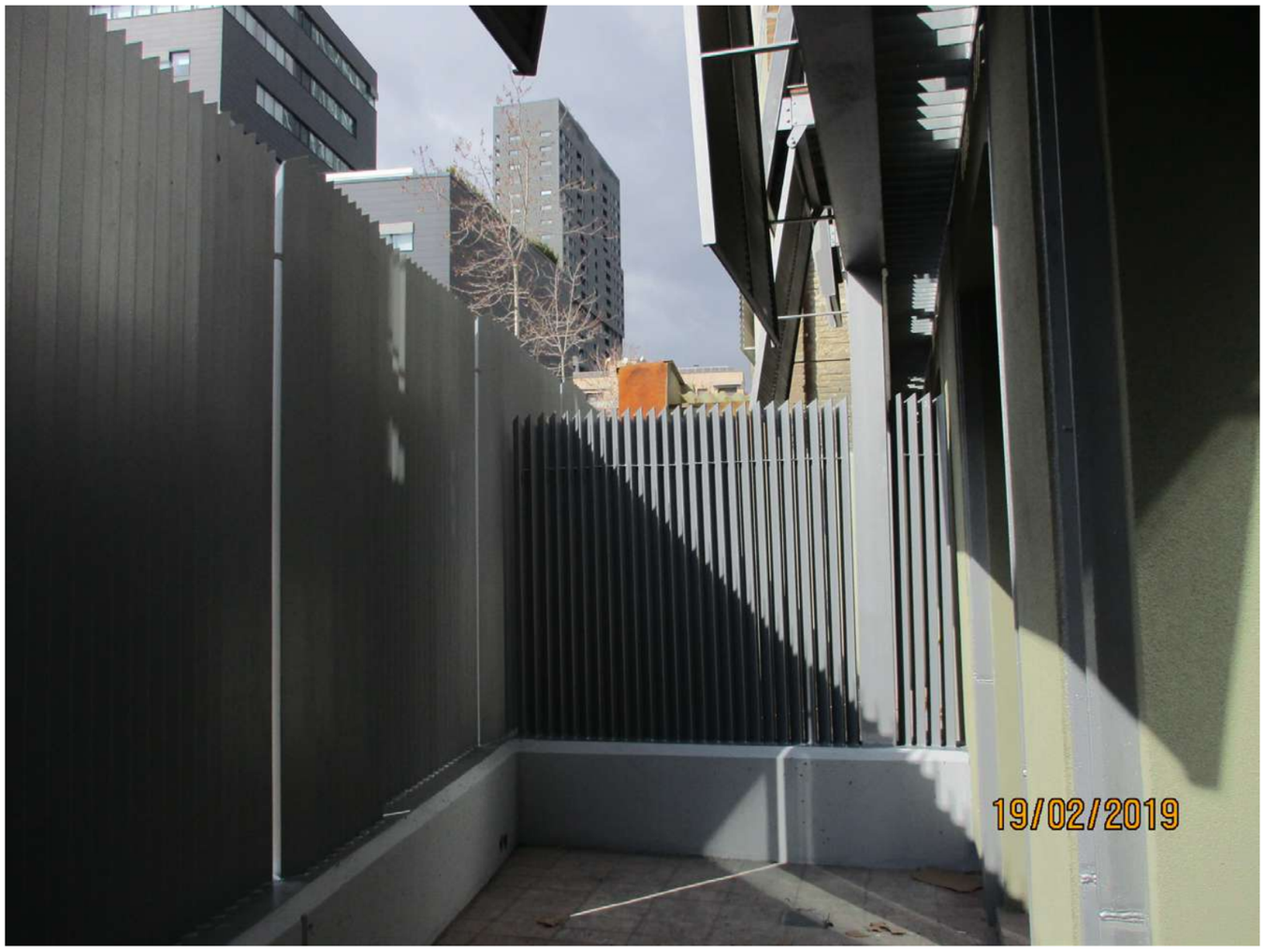

Fig.14: Façade-Fence integration.

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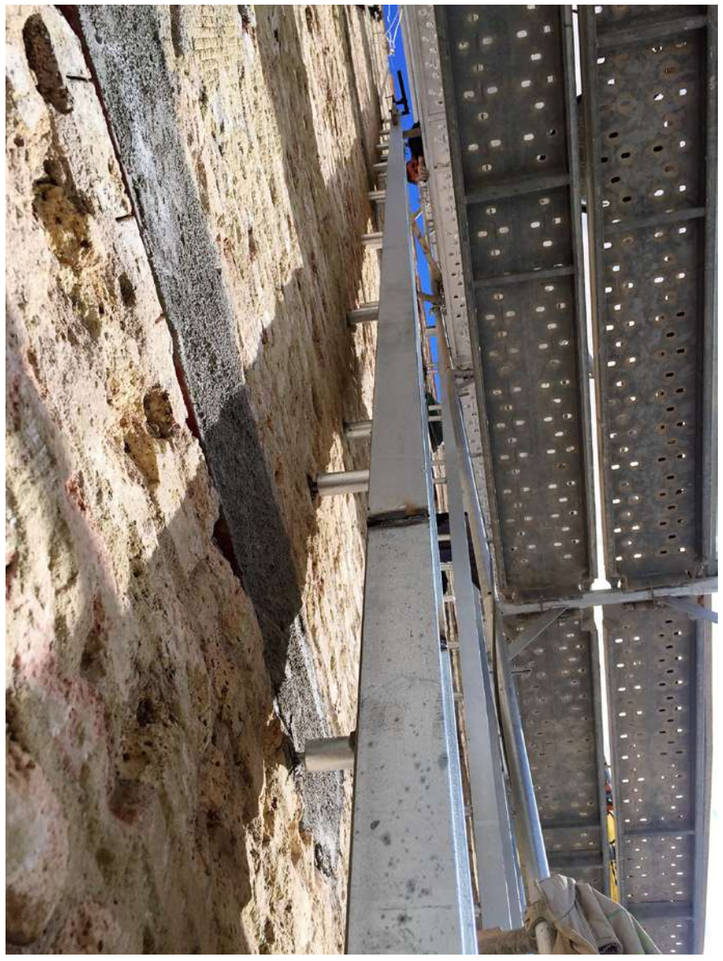

Fig.15: Anchorage of new façade's structure to the wall.

Fig.16: installation of the balconies.

Fig.17: installation of railing and louver structure.

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Plans & drawings

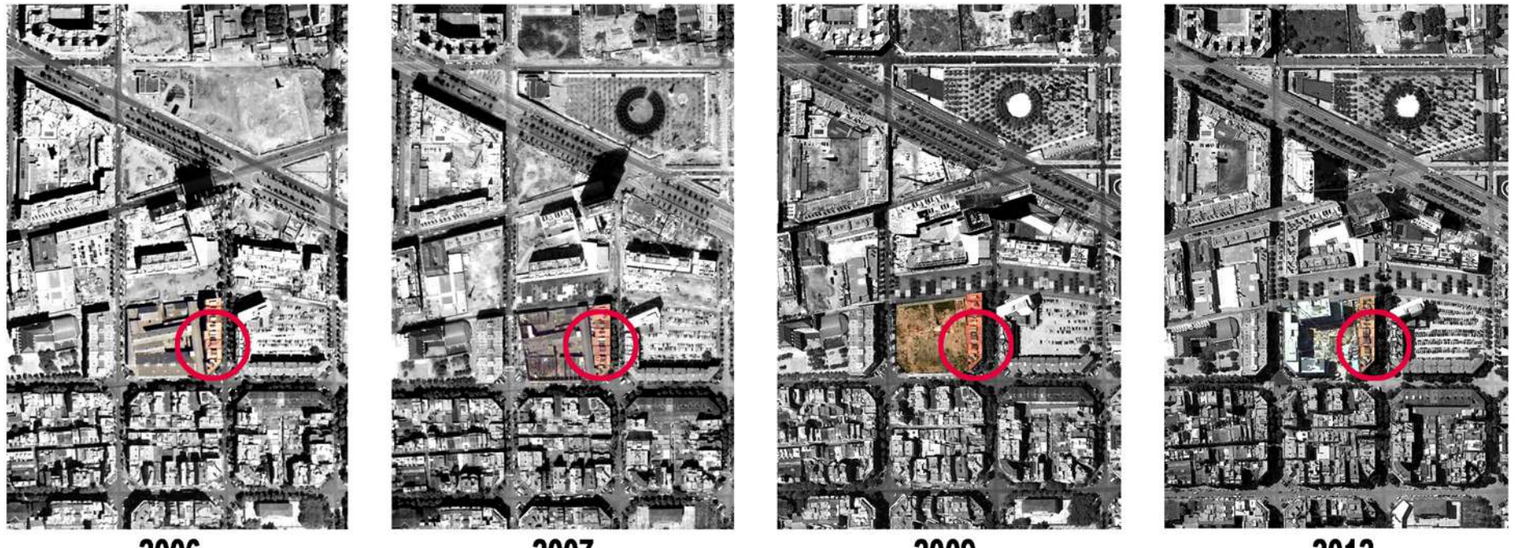

Fig.18: Aerial photos of the evolution of the block.

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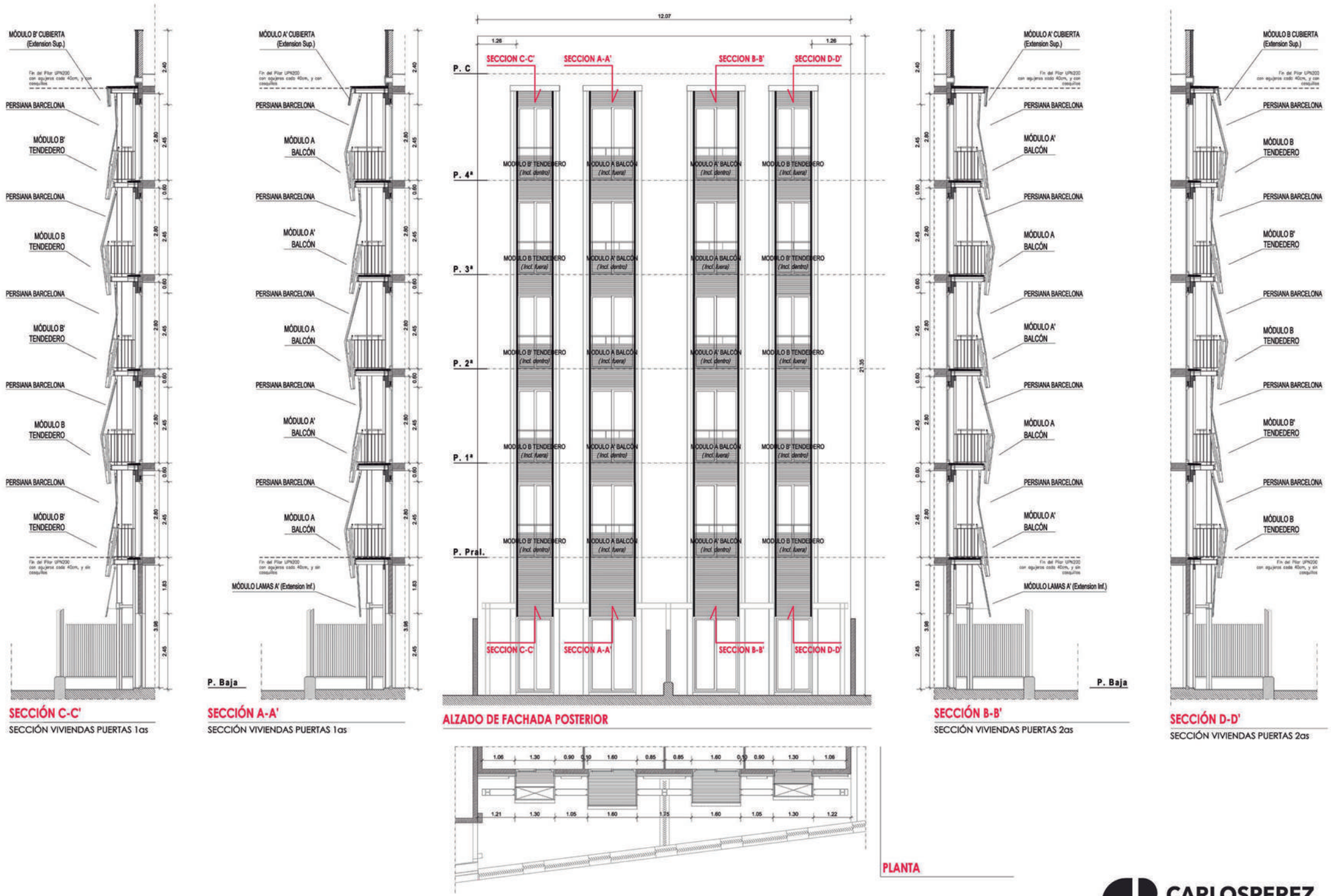

Fig.19: Elevations, sections, and floorplan.

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Fig.20: Window opening enlargement plan.

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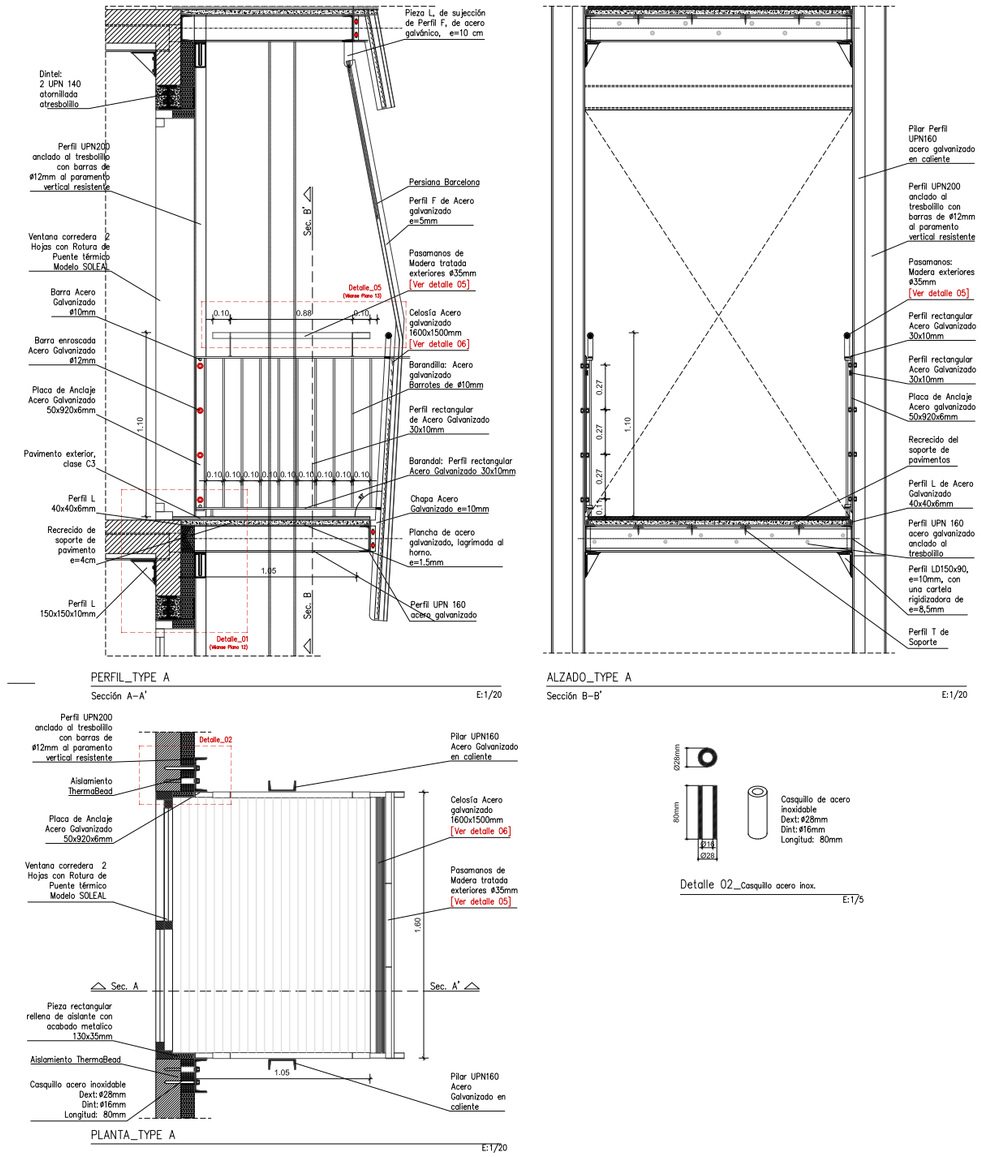

Fig.21: Construction details of the Type-A balconies.

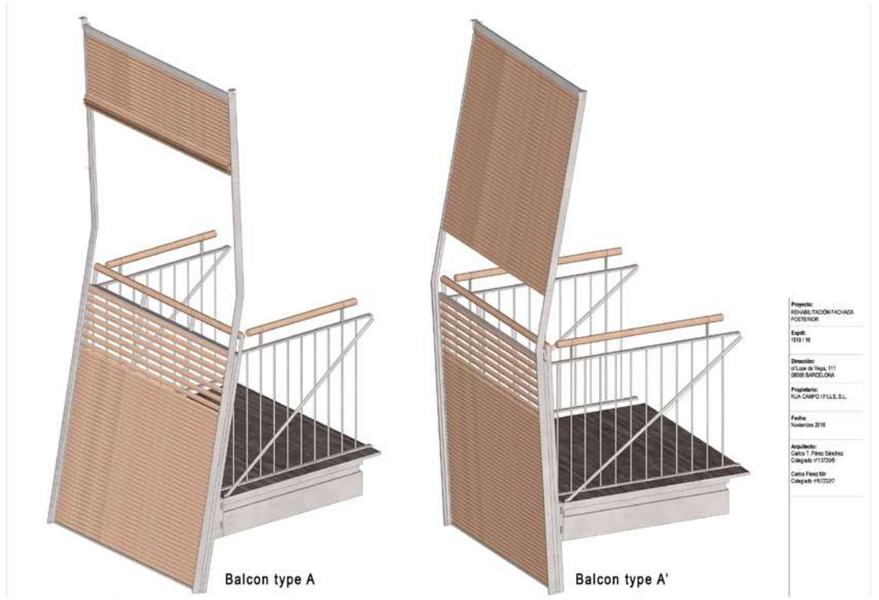

Fig.22: 3D-Views of the Type-A & Type-B balconies.

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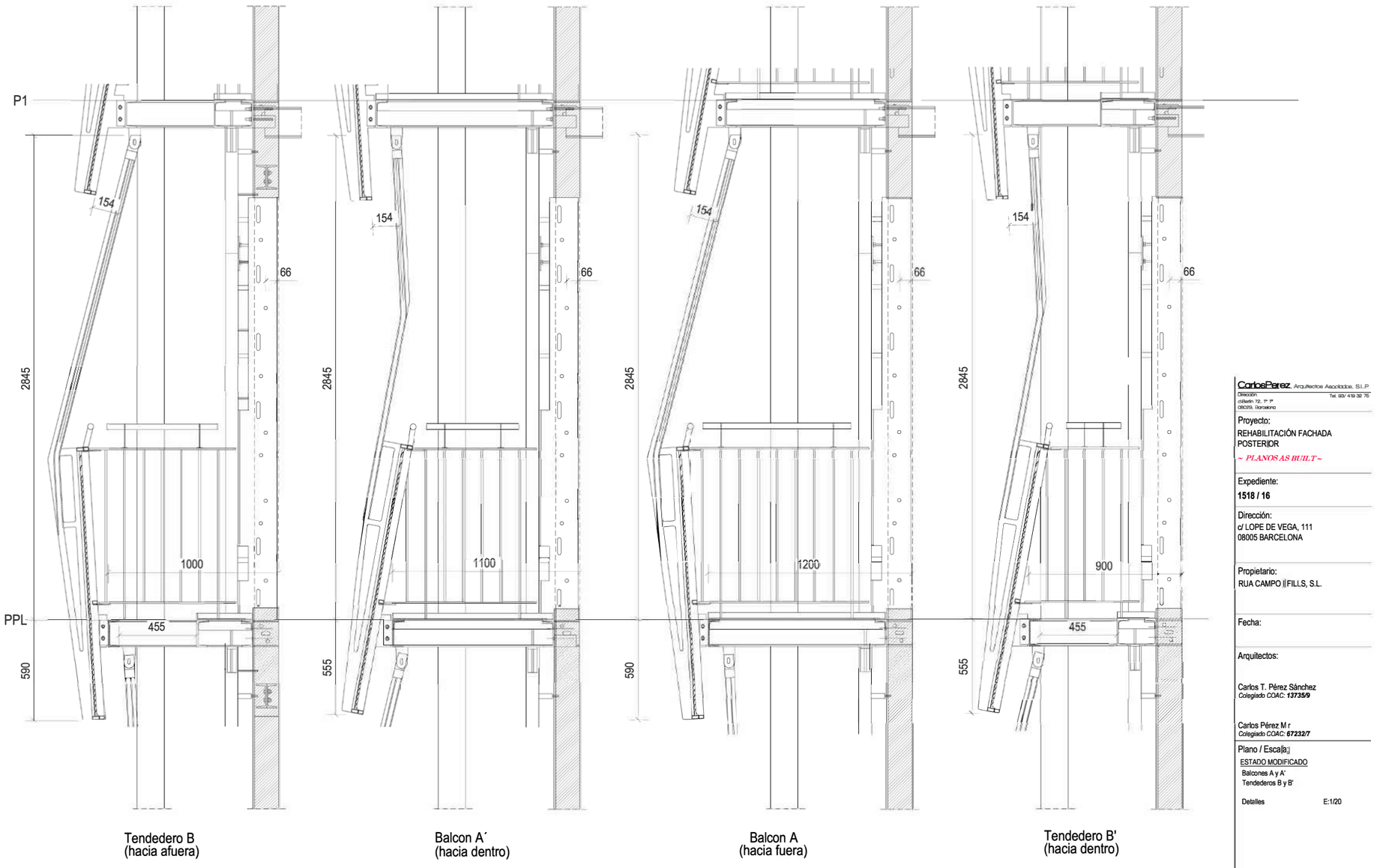

Fig.23: Detail of balconies.