Marc-J. Saugey, *Miremont-le-Crêt*, Geneva, 1953-1957, detailed view of the façade from the balcony, with its aluminium *brise-soleils* and opaque panels and the pre-fabricated concrete parapets. © G. Klemm, n.d., Archives IAUG, Fonds Marc-Joseph Saugey, cote 205.03.012.

The *Miremont-le-Crêt*: Preserving a Geneva Post-War Modern Icon

BY PATRÍCIA VENDRELL DUARTE

The collective apartment building, ***Miremont-le-Crêt***, in Geneva is the product of the inventiveness of the local architect Marc Joseph Saugey (1908–1971), who planned and built it between 1953 and 1957. Listed as a Cantonal monument in 2002, it is considered today an original and unique example, far beyond the context of Geneva.[1] Recently, it has become the object of a large rehabilitation project, led by the Geneva-based architecture office, ***Meier+associés***. Mainly focused on the building's envelope, the project also includes several technical improvements of some of its other components; all of them introduced with respect to Saugey's spirit and the building's existing substance.

Geneva in the post-War and the architect Saugey

During its recent history, Geneva has known several phases of economic and demographic growth; however the apogee of its development only occurred after the WWII[2], with the establishment of the UN European headquarters, in 1946.[3] The city extended into its peripheral communes and gradually acquired the form of a metropolitan area[4], demanding its "urban restructuring (...) and the creation of new dwellings, services and facilities"[5]. The architect Marc Joseph Saugey was one of the notable personalities who participated in these transformations.

Born in 1908 in *Vésenaz*, a village on the shore of Lake Geneva[6], Saugey completed his academic education in Geneva, then starting an important collaboration with Louis Vincent, René Schwertz and Henri Lesemann, who together formed the *Atelier d'Architectes* (1933–1940). In 1940, he opened his own architecture office, building his most important projects between 1950 and 1958 — the *Hôtel du Rhône* (1947–1950), the *Malagnou-Parc* (1948–1952), the *Mont-Blanc* Center (1951–1954), the cinema *Le Paris* (1955–1957), the *Terreaux-Cornavin* (1951–1955), the *Miremont-le-Crêt* (1953–1957) and the *Gare-Centre* (1954–1957)[7]. Dying in 1971, Saugey managed to leave his mark on Geneva, with his *avant-garde* buildings of the 1950s, as well as "distinguishing himself, by his structural researches and new techniques"[8], and by his active engagement in the urban-planning of the city.

The *Miremont-le-Crêt*: Saugey's "l'*espace habitable*"[9]

The *Miremont-le-Crêt* apartment building, located in the Geneva district of *Champel*[10], is the result of the creative inventiveness of Saugey and was conceived from 1953, in close collaboration with the engineer Pierre Froidevaux and the artists Edouard Nierlé (1916–2006) and Louis Bongard, being built between 1956 and 1957.

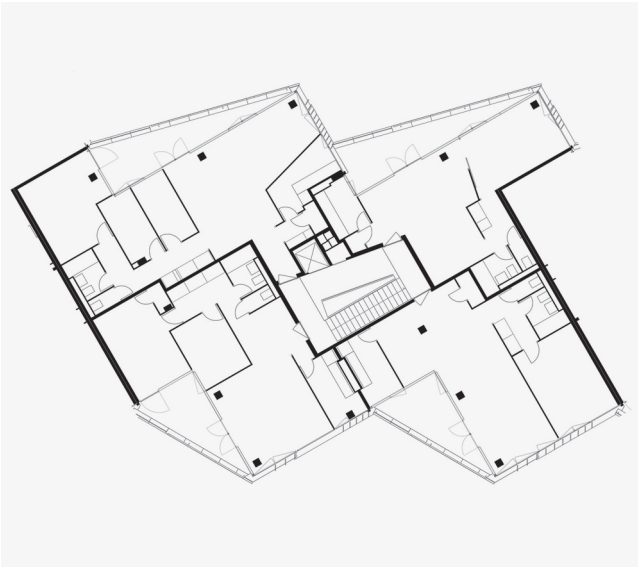
The building's existing pedestrian access points are located on both sides of the volume, on the nearby streets: *avenue de Miremont* and *avenue de Calas*. They were designed to integrate with the surroundings of the building and, therefore, breezeways superimposed on the sidewalks lead the residents to the entrance halls (*Miremont* serving units A, B, C, and *Calas*, the D, E).

The two halls are open towards the garden that was conceived as an interior street, serving as a passage between both adjacent roads. With completely glazed façades, they allow a permanent contact between the building and its "exterior elements, natural or built"[11] - the circles and stripes of vegetation, the water basin and the mural paintings from Louis Bongard and Edouard Nierlé.

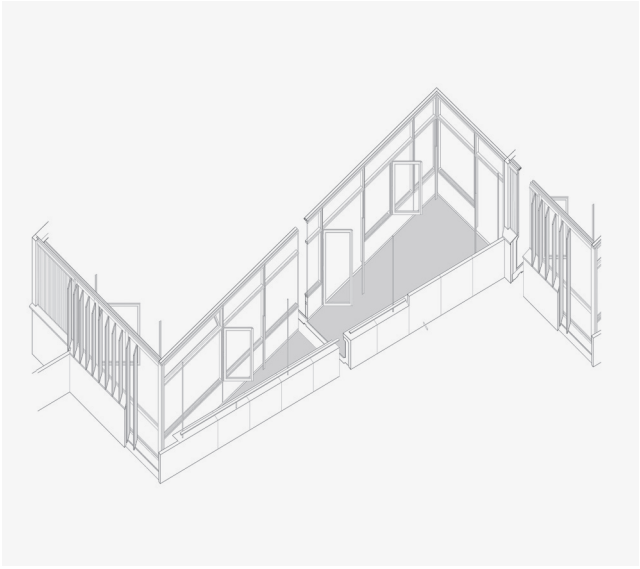
For the upper floors, Saugey proposed a plan type of four non-traverse apartments per vertical stairwell, each of them with a private triangular balcony. The whole building totals 139 single-level apartments, distributed over seven floors on the *Miremont* side and 6 floors (plus an attic) on the *Calas* side.

The organization of the plan, according to a frame of 60°, allows each apartment to benefit from a double exposure — East and West[12] — as well as a multiplicity of points of view towards the exterior, granting these "collective housing cellules, (...) the qualities of a *villa*"[13]. However, the fundamental element for the creation of this "*villa*" is the triangular balcony "around which a plan of great spatial fluidity is articulated"[14]. In addition, the diagonal orientation of the plan, together with the *brise-soleils*, leads to the preservation of privacy between the apartments and the nearby buildings.

Apart from the use of a punctual load-bearing system, Saugey opted for the rationalisation of the second-fix elements[15], which was beautifully mastered in *Miremont-le-Crêt*, with the employment of a set of different materials that highlight the spatial qualities of the building — the prefabricated concrete panels covering the façade's opaque parapets, the translucent wired glass parapets, the blue pine window frames, their bottom fiber cement panels, and the aluminum *brise-soleils* and panels overlaying the façades's opaque sections.



01 Marc Joseph Saugey, *Miremont-le-Crêt*, Geneva, 1953–1957. Type-plan of the apartments. © Atelier Oleg Calame.



02 *Meier+associés architectes, Miremont-le-Crêt*, Geneva, 2011–2014. Axonometric view of the rehabilitation project for *Miremont-le-Crêt*'s façade. Northwest façade. Not to scale. © Patrícia Vendrell Duarte, 2014.

In Geneva, "the new housing of the fifties was conceived fundamentally in terms of functional and technical rationalization (...) often to the detriment of research linked to the quality of space"[16]: Consequently, the city owes to Saugey its most remarkable typological innovations, with *Miremont-le-Crêt* being one of its finest examples[17]. The replacement of "single-function rooms with a single fluid and continuous space"[18], turned to the maximum sunshine, "offered him the possibility of exploring [beautifully] the theme of space"[19] in a housing program.

Therefore, *Miremont-le-Crêt* is Saugey's invention of an *immeuble-villa*, where "each apartment plays the role of an individual *villa*"[20], and "the plastic effect of the ensemble (...) breaks with the monotony of parallel blocks of buildings"[21].

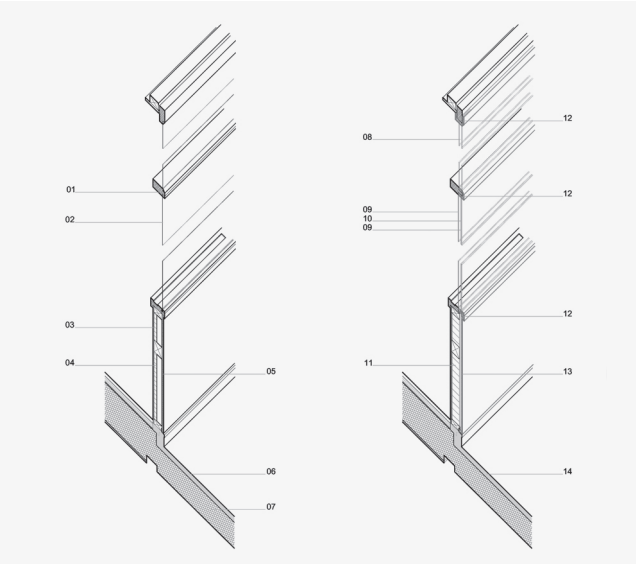
The *Miremont-le-Crêt*: preserving a post-War Modern Geneva Icon

The first step towards the rehabilitation of *Miremont-le-Crêt* was taken by the *Institut d'Architecture de l'Université de Genève* (IAUG) [Geneva University Architecture Institute], that in 1998 wrote an appeal to the *Direction du Patrimoine et des Sites* [Directorate of Patrimony and its Sites][22] requesting the opening of a heritage classification process for *Miremont-le-Crêt*, motivated by some concerns arising from the execution of minor alteration works in the building.

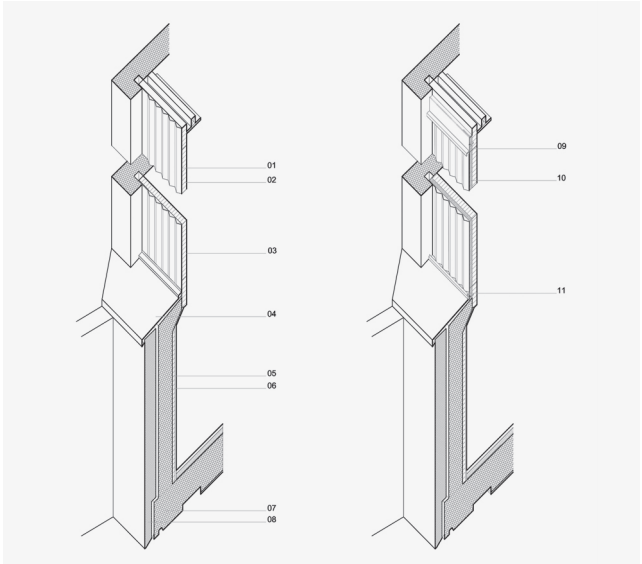
Along with this process, a detailed study on *Miremont-le-Crêt*'s condition and the definition of the necessary works in the framework of future rehabilitation was given as a commission to the architecture office of Devanthéry & Lamunière[23] — which became an essential guideline for the restoration works. On February 20th 2002, by a decree of the Council of State, the *Miremon-le-Crêt* apartment building was declared a Cantonal monument. The heritage classification statute issued by the State of Geneva contemplates, besides its exterior envelope, "the exterior spaces of the site, as well as the common areas on the ground floor of the buildings, (...), the stairwell enclosures, as common parts [of the buildings], and the original typology of the apartments"[24].

Since the *Miremont-le-Crêt* apartment building had never experienced any extensive rehabilitation intervention, many of its materials were starting to show signs of being worn or obsolete, and so, in 2010, the decision was made to restore the building. The project was awarded to the architecture office *Meier+associés*, and developed in collaboration with the *Atelier Oleg Calame*, between 2011 and 2014. Its program comprised primarily the renovation of its façades, including, however, the introduction of other technical improvements and restoration works inside and outside the entrance halls.

It is however important to refer that the main reference for the development of this rehabilitation project was the pilot study developed for the *Cité du Lignon*[25], in Geneva, between 2008 and 2011, by the TSAM — *Laboratoire des Techniques et de la Sauvegarde de l'Architecture Moderne* [Technical Laboratory for the Conservation of Modern Architecture] of the *École Polythechnique Fédérale de Lausanne*. The research carried for the rehabilitation of the building envelopes of the housing precinct was unparalleled, being innovative in terms of the methods applied, in the considered thought on the restoration of buildings from the 1950s and 60s, and in terms of rehabilitation techniques used, such as keeping the original window frames by inserting performance glazing, and in the use of efficient insulation materials such as aerogel. All these techniques were used in *Miremon-le-Crêt*— as



03 *Miremont-le-Crêt*, Geneva, 1953–1957 | 2011–2014. Axonometric sections of the balconies' glazed walls and their opaque parapets. Left: original project; Right: rehabilitation intervention. Scale 1:15. [01 fixed window frame in pine wood; 02 single glazing; 03 wood block board (8mm); 04 mineral wool insulation board (15mm); 05 "Eternit" fibre cement panel (10mm) with asbestos; 06 concrete screed (+tiled flooring added by the owners in many of the apartments); 07 reinforced concrete slab; 08 "Sofraver" heat mirror glazing THERM (24mm); 09 float glass (4mm); 10 PVC film; 11 aerogel (60mm); 12 reinforcing elements in oak wood; 13 "Eternit" fibre cement panel (10mm) without asbestos; 14 insulating coating resin].© Patrícia Vendrell Duarte, 2014.



04 *Miremont-le-Crêt*, Geneva, 1953–1957 | 2011–2014, axonometric sections of the façades'opaque walls. Left: original project; Right: rehabilitation intervention. Scale 1:15. [01 corrugated aluminium sheet (2mm); 02 wooden fibre board (30mm); 03 plaster+paint (10mm); 04 protecting drip in aluminium (2,5mm); 05 cork (20mm); 06 plaster+paint (10mm); 07 reinforced concrete slab; 08 prefabricated concrete panel (80mm); 09 fixing and protecting element in aluminium (1,5mm); 10 aerogel (20mm); 11fixing element in aluminium (1,5mm)]. © Patrícia Vendrell Duarte, 2014.

05 Marc Joseph Saugey, *Miremont-le-Crêt*, Geneva, 1953–1957. View of the housing building from the *avenue de Miremont*. © Alain Grandchamp, n.d., Christoph Schmidt-Ginskey, "Miremont-le-Crêt 1953–1957. L'espace habitable", *Faces, Journal d'Architectures*, n°. 21, Dossier: Marc Joseph Saugey, Genève, EAUG, 1991, 53.

06 Marc Joseph Saugey, *Miremont-le-Crêt*, Geneva, 1953–1957. View of the triangular balcony from the bedroom. © G. Klemm, n.d., Archives IAUG, Fonds Marc Joseph Saugey, cote 205.03.011.

07 Marc Joseph Saugey, *Miremont-le-Crêt*, Geneva, 1953–1957. View of the exterior garden and pedestrian passage from *Miremont*'s entrance hall. On the left Louis Bongard's mural painting. © G. Klemm, n.d., Archives IAUG, Fonds Marc Joseph Saugey, cote 205.03.009.

described below — a fact which proves the importance of this research and its contribution to the understanding that the preservation of building complexes from this period can be sustainable.

Miremon-le-Crêt's rehabilitation intervention was essentially linked to the enhancement of its inhabitants' comfort, requiring the building's exterior envelope to be submitted to a significant thermal improvement. The architects' main goal was to reduce the envelope's original thermal losses, from 580 MJ/m².year to 200 MJ/m².year[26] — a special limit of heat loss accorded by the responsible authorities (since obtaining a heat loss complying with the SIA standard 380/1[27] — 120 MJ/m².year — would not allow a respectful intervention on the particular materiality and image of the existing building). However, this target was not only achieved but significantly surpassed, being now set at 160 MJ/m².year[28], rather close to the values imposed by the regulations in force in Geneva, especially considering the building's date of construction and the fact that its envelope is mainly composed of glazed façades and thermal bridges like the numerous balconies.

In order to achieve such values, the rehabilitation solutions proposed by the architects had to be primarily focused on the most critical elements of the building, in terms of thermal performance, which included *Miremon-le-Crêt*'s façades, and more particularly its glazing surfaces. This challenge was, however, made bigger by the associated need to keep the appearance and substance of the building as close to the original as possible. Therefore, instead of attempting to renovate, in detail, all the elements of *Miremon-le-Crêt*'s façades, they rather decided to operate only in the most delicate ones, in a very efficient way.

This was achieved by replacing the building's single glazing by a Heat Mirror glazing, although maintaining the original pine window frames, which had to be reinforced in order to cater for the new glazing; by switching the windows' opaque parapets insulation with a better performing solution — aerogel — as well as, substituting their exterior fiber cement boards with new ones — free of asbestos; and by adding an insulation layer — also of aerogel — to the aluminium walls and gable-end façade.

However, in order to preserve the building's original fabric, both the prefabricated concrete parapets and the wired glass ones, were not subject to any significant thermal improvement. The wired glass parapets were replaced by a double glazing solution — combining an exterior wired glazing with an interior single glazing (that is not sufficient to attain a satisfying thermal performance) — only because most of the original had already been substituted by solid elements or single glazing, and the remaining were largely deteriorated.[29] On the other hand, the roof was optimally insulated and solar panels were installed for pre-heating of domestic water — as required by the present legislation of the Canton[30].

In addition, a solution also had to be found for the building's entrance halls, whose entire glazing façade largely contributed to the heat loss of the building. Despite the existence in the entrance halls of an original and ingenious system of heat radiation — a false-ceiling, made of perforated steel sheets that radiate the heat from hot water pipes located above[31], large amounts of heat were lost through their single-glazed façades, making it difficult to cope with the required energy standards. Therefore, a choice had to be made between keeping the heating system and the original single glazing.

Taking into account not only the rehabilitation principles but also considering the co-owners' opinion and the economics of the alternatives, the decision taken was to keep the hall's glazing façade. Therefore, to allow the thermal insulation of the upper floors, an insulation layer was place on the hall's ceiling, hidden by the original steel panels, although no longer fulfilling their original function.
Some renovation works were also planned to other parts of the building at the request of the co-owners, although the works had no influence on the building's heat balance. Therefore, the building's piping system was totally refurbished. Thus, apart from the substitution of both water-supplying pipes and drain pipes, inside the apartments, the rehabilitation project foresaw the creation of separated vertical drain pipes for the kitchen's wastewater and the roof's stormwater, as demanded by the present legislation of the Canton of Geneva[32]. In addition, the ventilation system, which contained asbestos, was also remodelled.

At the same time, a number of changes with the aim of returning the building to its original appearance were also carried out. On the façades, those included the treatment of the carbonation on the prefabricated concrete panels, that presented several cracks and fragments, and on the balcony slabs, where the carbonation of concrete was also causing the spalling of their edges.[33] The aluminum *brise-soleils*, panels, and respective fixings were cleaned and restored, with most of the fixings being replaced, as most of the original were corroded. Also the balcony floor coverings were renovated, since their tiled flooring contained asbestos. Thus, to avoid future infiltrations an insulating coating resin was applied to the balcony floors. In addition, some other rehabilitation works were conducted on the ground floor, both inside and outside the entrance halls. Apart from the renovation of the interior and exterior flooring, the walls were repainted in their original colours — following chromatic analysis to discover their previous colours. The covered interior and exterior circles and bands of vegetation were refilled with earth and replanted, and the original water basin, outside *Miremon-le-Crêt*'s hall, was refilled with water. However, not without the construction of a new passage over it, allowing the reconciliation of Saugey's original project with the access needs of users.

By the end of the rehabilitation process the building will be back to a condition incredibly close to that found just after the completion of its construction by Saugey, both inside and outside.

In *Miremont-le-Crêt*, almost all materials and components that were still able to perform their role were maintained and/or rehabilitated, and any changes were introduced in compliance with Saugey's spirit, maintaining the basic appearance and functions of the building. Only the decision

to dismantle the entrance hall's heating system can be seen as a loss for the building and Saugey's original project and intentions, raising an important question. Should a rehabilitation intervention be more concerned in complying with the actual thermal standards rather than with the preservation of the original architectural quality and technical solutions of the building? Or should a balance be found between energy, comfort and authenticity?

The construction site opened in January 2014 on the building's *Miremont-le-Crêt* side and the rehabilitation works are now coming to an end, with the final works outside the entrance hall being finished. Following the achievement of the renovation works on the *Miremont-le-Crêt* side, the architects will initiate the works on the building's *Calas* side. ▮

Notes

The present essay summarises the work developed for the author's MSc dissertation — *Preserving the Legacy of the Modern Movement: Miremont-le-Crêt (1953–1957) in Geneva.* Developed during an exchange year at the *École Politechnique Fédérale de Lausanne*, it had as coordinators Professor Ana Tostões (ISTUL) and Professor Franz Graf (EPFL). The information regarding the rehabilitation project of the *Miremont-le-Crêt* apartment building was provided by the architecture offices of Meier+*associés architectes* and *Atelier* Oleg Calame.

1 "*Miremont-le-Crêt est un bâtiment dans l'histoire du logement bien au-delà du contexte genevois.*" in Catherine Dumont d'Ayot, "*Miremont-le-Crêt: manifeste de l'espace habitable*", *Patrimoine et Architecture*, nº. 9, Genève, Georg Editeur SA, 2000, 29.

2 Cf. Laurent Moutinot, "Préface", *L'Architecture à Genève, 1919–1975*, Lausanne, Editions Payot, 1999, vol.1, 9.

3 Cf. Catherine Courtiau, "*Le contexte historique de la Genène international de l'après guerre*", *Marc J. Saugey, Spacialité, Urbanisme et Nouveaux Programmes de l'Après-Guerrre: la Ville des Années 50 et 60*, Genève, IAUG, 2007, 18.

4 Cf. Laurent Moutinot, *op.cit.*, 9.

5 "(...) *la nécessité d'une restructuration urbaine (...) de la création de nouveaux logements, services et équipements.*" in Catherine Courtiau (2007), *op. cit.*, 60.

6 Cf. Armand Brulhart, "Marc Saugey (1908–1971) *ou la Tentation d'Icare*", *Faces,* nº. 21, Genève, EAUG, 1991, 8.

7 Cf. Patrick Devanthéry, "*La Contingence et l'Apesanteur*", *Faces,* nº. 21, Genève, EAUG, 1991, 4.

8 "(...) *distingué par ses recherches structurelles et de techniques nouvelles" in Catherine Courtiau* (2007), *op. cit.*, 18.

9 "*L'espace habitable*" — designation used by Saugey in Marc Joseph Saugey, "*L'espace habitable, Miremont-le-Crêt*", *Architecture, Formes, Fonctions*, No. 8, Lausanne, Édition Anthony Krafft, 1961–62, 77–82.

10 In the urban context of Geneva, Champel stands as "an excellent example of the development of the bordering areas of the city" ["*un excellent exemple du dévéloppement des zones limitrophes de la ville*"], where, during the 20th century, the existent "villas and scattered properties were replaced (...) by a district organized in parallel blocks" [*des villas et propriétés éparses son remplacées (...) par un quartier organise en barres*"] in AL, EB, "Champel-Florissant-Malagnou, le standing urbain genevois", *XXe, Un Siècle d'Architectures à Genève. Promenades*, Gollion, Infolio, 2009, 87.

11 "(...) *éléments extérieurs, naturels et bâtis.*" in Marc Joseph Saugey, *op. cit.*, 77.

12 Cf. CB, "Miremont-le-Crêt", *XXe, Un siècle d'architectures à Genève. Promenades*, Gollion, Infolio, 2009, 107.

13 "(...) *aux cellules du logement collectif (d'acquérir) les qualités (réputées être celles) de la villa.*" in Catherine Dumont d'Ayot, *op. cit.*, 31.

14 "(...) *la pièce central autour de laquelle s'articule un plan d'une grande fluidité spatiale*", in *Idem*, p. 32.

15 Cf. Christoph Schmidt-Ginzkey, *op. cit.*, 56.

16 "(...)*le nouveau logement des années cinquante se conçoit essentiellement en termes de rationalisation fonctionnelle et technique (...) au détriment souvent des recherches liées à la qualité de l'espace.*" in IC, "De l'habitat social aux grands enseembles", *L'Architecture à Genève, 1919–1975*, Lausanne, Editions Payot, 1999, vol.1, 200.

17 *Idem*, 287.

18 "(...) *chambres monofonctionnelles juxtaposées, par un espace unitaire, fluide et continu.*" in *Ibidem*, 202.

19 "(...) *lui a offert la possibilité d'explorer le thème de l'espace.*" in *Ibidem.*

20 "(...) *chaque appartement joue le rôle d'une maison individuelle.*" in CB, *op. cit.*, 107.

21 "*L'effet plastique de l'ensemble (...), rompant ainsi avec la monotonie des bandes d'imemubles parallèles.*" in Christoph Schmidt-Ginzkey — op. cit., 54.

22 Presently called *Office du patrimoine et des sites* [Office of Patrimony and its Sites]. It is under the tutelage of the *Département de l'Aménagement, du Logement et de l'Énergie* [Department of Planning, Housing and Energy] — DALE — of the Republique et Canton de Gèneve [Republic and Canton of Geneva].

23 Inès Lamunière, Patrick Devanthéry, "Sauvegarder Miremont-le-Crêt?", *Patrimoine et Architecture*, nº. 9, Dossier: Miremont-le-Crêt (1956–1957), Genève, Georg Editeur SA, 2000, 11–28.

24 "*des espaces extérieurs des parcelles ainsi que des locaux communs du rez-de-chaussée desdits bâtiments. Les cages d'escalier, en tant que parties communes, et la typologie originale des apartements.*" in *Arrêté du Conseil d'État*, February 20 2002, 4.

25 Franz Graf, Giulia Marino, *La Cité du Lignon 1963-1971: Étude Architecturale et Stratégies d'Intervention*, *Patrimoine et Architecture*: *cahier hors série*, Gollion, Éditions Infolio, 2012.

26 Values provided by the architect Laurence Boyé (*Meier+associés architects*) on April 4 2014.

27 See the *Loi sur l'Énergie* and the *Règlement d'Application de la Loi sur l'Énergie* of the Canton of Geneva.

28 Value provided by the architect Laurence Boyé.

29 Cf. Inès Lamunière, Patrick Devanthéry, *op. cit.*, 24.

30 See the *Loi sur l'Énergie* and the *Règlement d'Application de la Loi sur l'Énergie* of the Canton of Geneva.

31 Cf. *Idem.*, 23.

32 See the *Loi sur les Eaux* and the *Règlement d'Éxecution de la Loi sur les Eaux* of the Canton of Geneva.

33 Cf. Inès Lamunière, Patrick Devanthéry, *op. cit.,* 24–26.

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