DERIVATIVE DESIGN

A new approach for an organic growth of historic Usonian Houses

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Introduction

In 1954 Frank Lloyd Wright stated that he and his Taliesin apprentices had already built over a hundred of Usonian houses across the United States.[1] Usonian houses were derived from the original Usonian concept, which was developed by Wright in 1936 through the design of the Jacobs House, the first Usonian house. This Design Thesis will address the problem of unsympathetic additions to Usonian houses that are destructing the historic significance of these houses as *derivatives* of Frank Lloyd Wright's Usonian concept. To solve this problem, it is necessary to change the negative connotations of the word "*derivative*" – generally understood as something imitative of another and usually disapproved of for that reason- and to recognize that the significance of *true Usonian Houses* resides in their own derivative transformations of Wright's original Usonian concept.

In order to prove that Usonian design is by definition a derivative design, this Thesis will work with an Usonian house, *4 Wright Way*, as a case of study; the first goal is to understand the historic and architectural significance of *4 Wright Way* as a *derivative Usonian house*. *4 Wright Way* is a house located in *Usonia Homes*, in Pleasantville, New York, which is a cooperative community better known as "*Usonia.*" Usonia was founded with the guidance of Frank Lloyd Wright as a direct application of his Usonian principles developed during the 1930s. *4 Wright Way* was designed and built by David Henken, who was a Taliesin apprentice and the founder of Usonia. The house was built in 1949 as part of the first group of homes

[1] Frank Lloyd Wright, *The Natural House* (NY: Horizon Press, 1954), 97

built in the community under Wright's review and approval. *4 Wright Way* and *Usonia* are physical manifestations of Henken's vision of establishing a cooperative suburban community based on Wright's Usonian ideal. *Usonia* was designated a Historic District and placed on the National Register of Historic Places in 2012.[2]

Usonia and *4 Wright Way* have changed through time. The wildness and winding roads have helped to preserve the original organic character of the community; however, the attendant condition of a changing built environment raises the question of how will *usonian houses* evolve in the future. *4 Wright Way* is an intriguing example of this situation. The house was originally designed in 1949 as a small house directly derived from Wright's Usonian concept; by the 1980s, the same owner and designer, David Henken, had built two major additions. The first was a studio, attached to the original house in the 1950s; and the second was a new bedroom wing built around 1980. Unlike the original house, the added bedroom wing presents an unsystematic layout plan with awkward spatial proportions and non-functional rooms, establishing a tenuous connection with the original house and its landscape. After Henken's death the house fell into neglect magnifying the disconnection between the components of the complex and obscuring the significance of the original unit.

This Thesis will embrace *Derivative Design* as a methodology to define design principles for the development of sympathetic additions that allow an organic growth of historic Usonian Houses. The final objectives of this Design Thesis are to facilitate the work of other architects facing the problem of expanding Usonian houses, to assist in the prevention of the complete dilution of Wright's

[2] Kathleen LaFrank and Jess Ouwerkerk, *Usonia Historic District National Register Nomination*, National Register of Historic Places, March 2012.

Usonian concept and particularly to preserve the joint effort of David Henken and the original Usonian members to build the largest Usonian community in the country.

The Usonian Concept: a derivative transformation

The planning innovations, construction systems and materials developed by Frank Lloyd Wright to formulate the Usonian Concept were conceived as a kit of parts that had to be ordered and assembled according to a particular sequence. Designs were sensitively varied according to client's needs as well as siting and local building materials, but were recognizable "of a family", both in planning concept and construction.[3] Wright's original intention was not to create a style, he developed a construction grammar. In theory, this construction grammar could be adapted to different sites and client needs, besides offering the possibility of later growth.

The Usonian Concept was demonstrated by Frank Lloyd Wright through the plans and photographs of the canonical Jacobs House designed in 1936 and presented in the January 1938 edition of Architectural Forum. Through the Jacobs House design, a 1,500-sq-ft home built for $5,500, Frank Lloyd Wright also showed the Usonian concept as an efficient model to address the problem of moderate-cost housing.[4] Wright considered the house of moderate cost as America's major architectural challenge. As part of his Usonian manifesto he wrote,

> *"In our country the chief obstacle to any real solution of the moderate-cost house problem is the fact that our people do not really know how to live, imagining their idiosyncrasies to be their "tastes", their prejudices to be their*

[3] John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture* (NY: Whitney Library of Design, 1976), 22
[4] Ibid, 16

predilections and their ignorance to be virtue where any beauty of living is concerned."[5]

For Wright, to resolve the problem of moderate-cost housing meant to change the lifestyle of the American family and that implied eliminating everything that was unnecessary, such as the old fashioned basement, the garage –being substituted by a Carport-, and the traditional boxy spatial arrangement which Wright substituted by an open plan living-dining space with a big fireplace as its focal point. In addition, to build a moderate-cost house required geting rid of unnecessary complications in construction, to take advantage of the work in the mill to prefabricate as much of the house as possible, to use the intrinsic beauty of the construction materials avoiding interior trim, plastering and painting; and, in order to eliminate field labor, to consolidate and simplify the three appurtenant systems, heating, lighting and sanitation.[6]

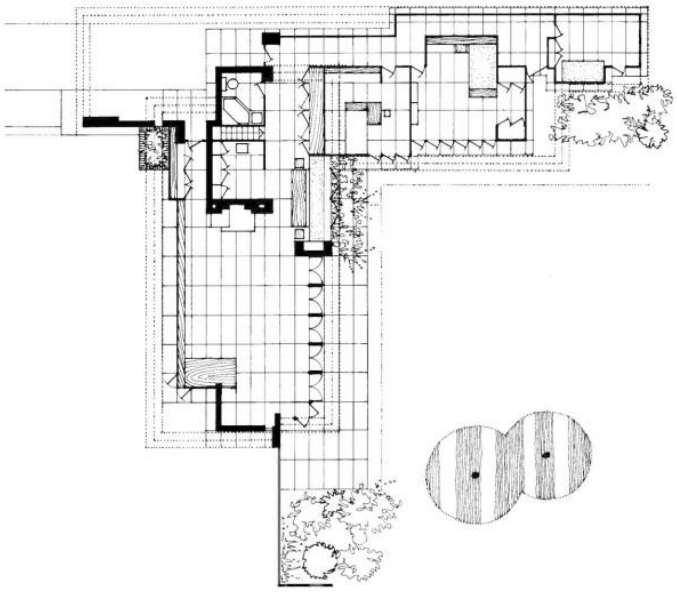

Fig.1 – The Jacobs House, Floor Plan (Source: Save Wright, Frank Lloyd Wright Building Conservancy)

[5]Frank Lloyd Wright, *Frank Lloyd Wright*, The Architectural Forum, January 1938, 78
[6]Ibid, 81

In the Jacobs House, a 2 by 4 foot grid was used by Wright to develop an L-shape plan in which the services were assembled in a central brick core that articulated the bedroom wing from the social areas. The kitchen, attached to the service core, was open to the dining and living areas, creating a flow between the cooking, dining and living that continued through the large windows into the garden (Fig. 1). The board and batten walls, of pine in the Jacobs House, but in subsequent projects of grained cypress wood, formed both the interior and exterior finish; the dimensions of board and batten gave the vertical module of thirteen inches. The Jacobs House was conceived as a three-dimensional gridded cage in which the 2 by 4 foot plan module yielded spatial layers that were interwoven with the vertical thirteen-inch layers governing the horizontal recesses, window transoms, door heights, and built-in furniture (Fig. 2).[7]

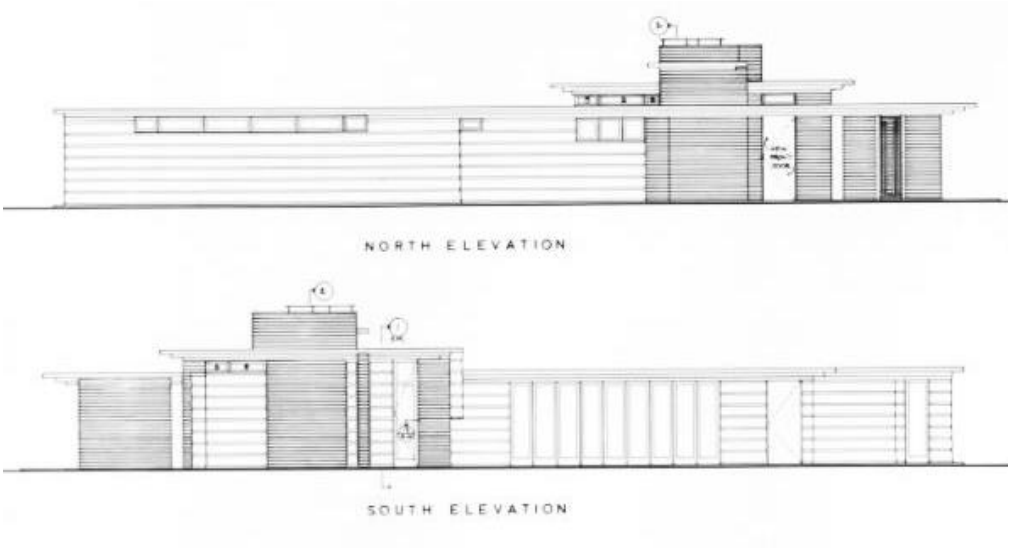

Fig. 2 – The Jacobs House, North and South Elevations (Source: Save Wright, Frank Lloyd Wright Building Conservancy)

[7] Kenneth Frampton, "The Tex-tile Tectonic, The origin and Evolution of Wright's Woven Architecture," in *On and By Frank Lloyd Wright A Primer of Architectural Principles,* ed. Robert McCarter. (New York: Phaidon Press, 2005),186

The Jacobs House incorporated three major construction features that were used in all subsequent Usonians; a planning grid, the board and batten walls, and the underfloor heating.[8] The Jacobs house would become the primary source of all posterior derivative Usonian houses. Wright transformed and derived his original Usonian Concept designing Usonian houses until his death in 1959, action that would be also replicated by his Taliesin apprentices across the country.[9]

Usonia Homes: a Usonian community in Pleasantville New York.

David Henken would be one of the most active Taliesin apprentices in pursuing Wright's Usonian ideal. David Henken's first involvement with Wright's Usonian concept occurred when he and his wife Priscilla visited the Museum of Modern Art retrospective exhibition, "The Work of Frank Lloyd Wright" in 1940. The exhibit included a model of Broadacre City and drawings for a planned community in Michigan, which Wright called Usonia I.[10] Broadacre city and the Usonian House shared a similar hypothetical socioeconomic basis; Wright's egalitarian vision was one acre reserved for every citizen at birth.[11] With its acre of land for every family and its faith that a proper dwelling could transform the lives of

[8] John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture*, (NY: Whitney Library of Design, 1976), 19
[9] Ibid, 97
[10] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 4
[11] Kenneth Frampton, "The Tex-tile Tectonic, The origin and Evolution of Wright's Woven Architecture," in *On and By Frank Lloyd Wright A Primer of Architectural Principles,* ed. Robert McCarter. (New York: Phaidon Press, 2005),189

the dweller, Broadacre City planted the ideas that would later take root in Usonia, Pleasantville.[12]

Inspired by the idea of Broadacre City and yearning for a home of his own, Henken, in 1942 asked Frank Lloyd Wright if he would be willing to accept him as a Taliesin apprentice. He wrote to Wright,

> *I am writing to ask that I may come to Taliesin and work with you. This is no sudden whim that has come to me. My belief in the brotherhood of man, in the co-operative commonwealth as a means for achieving it… has been growing in me steadily… I have thought long and calmly, and I stand ready to offer myself as an apprentice.*[13]

When Wright agreed, Henken and his wife went to Taliesin, where Henken became an apprentice architect, staying there for two years.[14] David Henken was born in New York City in 1915 to Jewish Russian immigrant parents, his mother was a garment work and his father ran a candy store in New York. David graduated from Stuyvesant High School and at the age of fifteen enrolled in the City College of New York where he received his Bachelors of Science and Masters degree in mechanical enginnering. Henken went on to work as a research and development engineer in the areas of packaging design and lighting until 1942, when he moved to Taliesin.[15]

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[12] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), XVii
[13] Ciorsdan C. Conran, *Usonia I,* (Master's thesis, University of Pennsylvania, 1991), 35
[14] John Bradford, "*Usonia Homes.*" *Journal of Housing, Self Help*, 10 (1953): 319
[15] Priscilla Henken, *Taliesin Diary: A Year with Frank Lloyd Wright* (New York: Norton & Company, 2012), 256

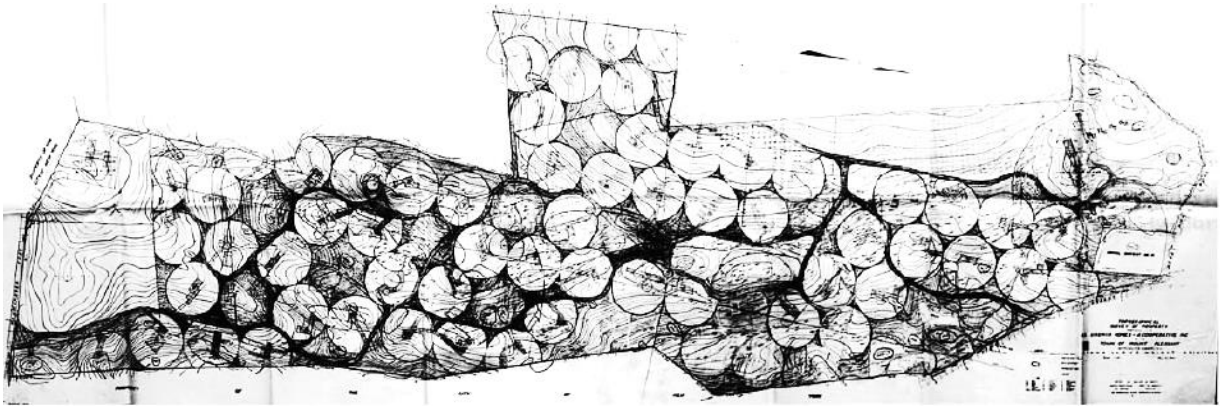


Fig. 3 – The original 1947 Usonia Site Plan (Source: Usonia New York, Building a Community)

While at Taliesin, Henken asked Wright if he would like to help design a cooperative community of modern houses near New York. Wright agreed, and when David and Priscilla Henken returned from Taliesin in late 1943, the Henkens started a campaign to find others families interested in joining them to create the cooperative community.[16] By 1944 the cooperative was founded and in 1945 was incorporated under the laws of New York state as a pure Rochdale cooperative. The community would be established as a Rochdale cooperative of about fifty members with the goal to build a community of individually designed, cooperatively owned, affordable homes on at least one acre sites in a suburb of New York City with the guidance and participation of Frank Lloyd Wright.[17] The land was acquired in 1946 and in 1947 Frank Lloyd Wright sent the site plan featuring narrow serpentine roads and one acre circular home sites that were not to be delineate from the adajacent natural common land (Fig. 3).[18]

[16] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 7
[17] Ibid, 10
[18] Ibid, 11

Since Wright finally decided to limit his participation to the design of the site plan, three houses, and the community buildings, and to serve as the consulting architect, the Design Panel of Usonian Homes was organized by two of the members of the cooperative as a partnership, at the request of Usonia Homes. The two member-principals, David Henken and Aaron Resnick, would act as a conduit for the payment of the design fees to the architects, engineers and designers under contract. The Design Panel was empowered to assemble and to make contractural arrangements with a selection of former apprentices and non-apprentices who would make themselves available for selection by the Usonians and who would agree to submit their designs to Wright for his review and approval before they could be executed.[19] David Henken would become the group's founder, teacher, guiding figure and liaison with Frank Lloyd Wright;[20] Henken and Resnick would design and build, each of them, thirteen derivative Usonian houses in the community, which represents about the half of the homes in Usonia (Fig. 4).

Fig. 4 – Frank Lloyd Wright and David Henken reviewing plans for Usonia (Photograph by Pedro E. Guerrero, Source: Usonia New York, Building a Community)

[19] David Henken, "Usonia Homes… A summing up," in *Realizations of Usonia, Frank Lloyd Wright in Westchester*, Priscilla Henken (New York: The Hudson River Museum, 1985), 14
[20] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 20

Henken early derivative Usonian houses.

David Henken designed thirteen houses in Usonia between 1949 to 1959 After the war, building boomed in the United States as never before, driving up the cost of materials and construction. To build a house at minimum cost, savings through standardization and simplification were critical in the development of the architectural plans of Henken's houses in Usonia.[21] The first houses designed by Henken feature a layout plan based on a 4 by 4 foot rectangular grid that defined spatial proportions and circulation schemes (Fig. 5). As a general rule, the main access of these houses was placed in front of or integrated into the utility core, which grouped the kitchen, the bathroom, the fireplace and utilities. This core articulated and linked the private bedrooms with the living and dining areas, avoiding corridors (Fig. 6).

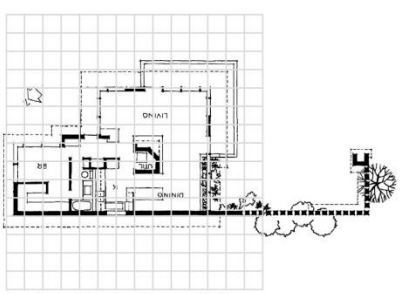
The Miller house and the Kepler house have a 4 by 4 foot rectangular grid, with overlapping diagonal elements. This scheme was frequently used by Frank Lloyd Wright in his usonian postwar designs in which a change of geometry could differentiate zones of the house, such as daytime from nighttime functions (Fig. 7).[22]

The Brandon House, built in 1949 (Henken's most published house, it appears in Progressive Architecture in 1953 and House and Garden in 1951) and the Brody House, built in 1951, have the same 4 by 4 ft rectangular grid but they present an emerging L-shape plan derived from Wright's Jacobs House (Fig. 8). In the Anderson house, Henken splits the service core and locates the access at the

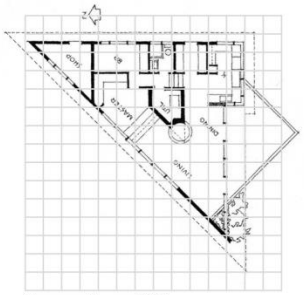
[21] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 32

[22] John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture* (NY: Whitney Library of Design, 1976), 51.

intersection of the two main axes of the plan, creating an efficient cross axis composition with open plan spaces and open views (Fig. 9).

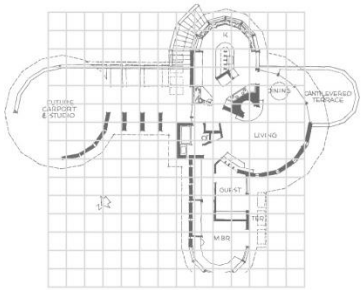


Benjamin Henken House 1949

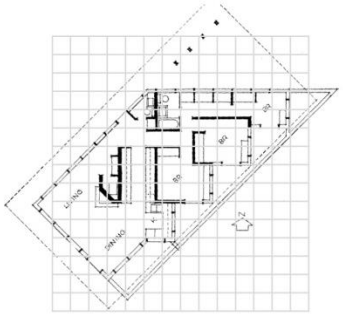


Masson House 1951

Kepler House 1949

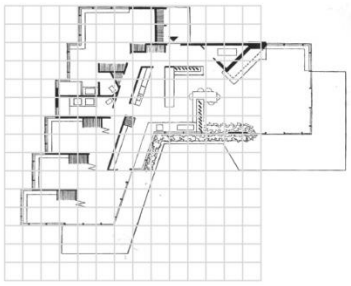


Brody House 1951



Miller House 1949

Anderson House 1951



Brandon House 1949

Fig. 5 – Early Henken Houses: 4 by 4 foot rectangular grid (Diagrams by the author)

Fig. 6 – Early Henken Houses: Core Services and social areas (Diagrams by the author)

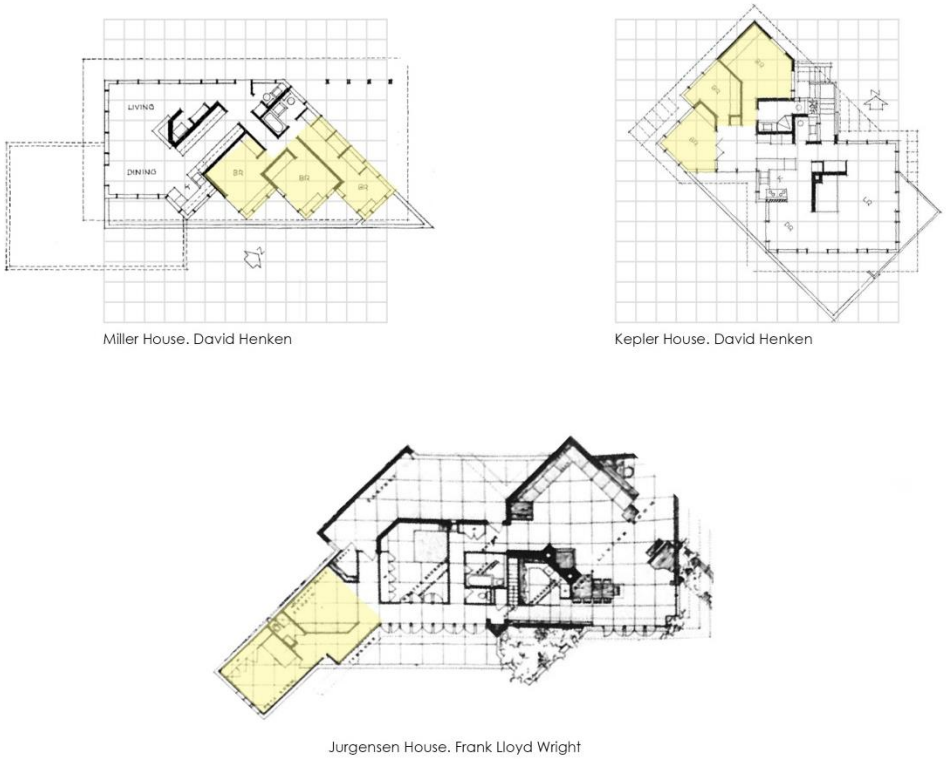
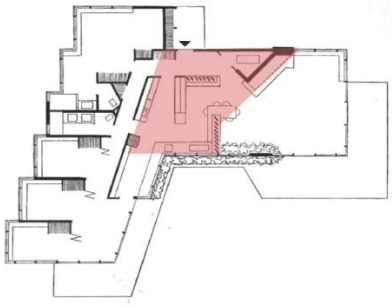
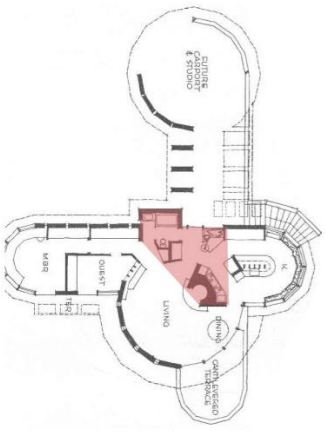


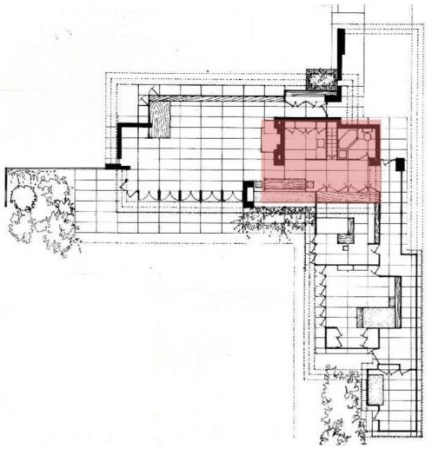
Fig. 7 – 4 by 4 foot rectangular grid with overlapping diagonal elements (Diagrams by the author)



Brandon House. David Henken



Brody House. David Henken



Jacobs House. Franlk Lloyd Wright

Fig. 8 – L-Shape plans. Henken derivatives of the Jacobs House (Diagrams by the author)

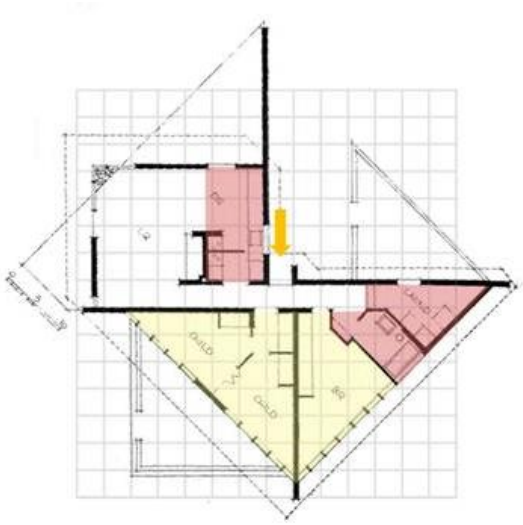


Fig. 9 – L-Shape plans. Anderson House. David Henken (Diagrams by the author)

Six of these houses were published in the 1954 book *Quality Budget Houses, a Treasury of 100 Architect-designed Houses from $5,000 to $20,000*. Four of them under the category *Cooperatives*, *How to save by building with others* (Benjamin Henken, Miller, Brody and Masson houses); and two of them under the category *The owner as a builder, How to save through your own work*, (Kepler and Anderson houses). The objective of this book was to prove that it was possible to design and build a special house to suit the needs of a client with a limited budget in any part of the country. The book, which included houses designed by renowned architects such as Richard Neutra, recognized David Henken as the principal designer and coordinator of Usonia, realizing that his houses, although were not conventional plans, were arranged in such a way that the basic structure was simple and easily built .[23]

[23] Katherine Morrow Ford and Thomas H. Creighton, *Quality Budget Houses, A Treasury of 100 Architect-Designed Houses from $5,000 to $20,000* (NY: Reinhold Publishing Corporation, 1954), 201

4 Wright Way: a derivative Usonian house

Fig. 10 - Frank Lloyd Wright in Usonia, in front of 4 Wright Way (Under Construction). 1949 © Pedro E. Guerrero

(Source: Usonia, New York: Building a Community)

Henken designed and built his own house in Usonia, *4 Wright Way*, in 1949 (Fig. 10 and Fig. 11). The house is the result of Henken's derivation of Wright's usonian principles. *4 Wright Way* presents a brick service core that integrates the kitchen, utilities, storage space and the fireplace. It is the heart of the house and the living-dining areas revolve around it, following a spatial proportion defined by the diamond modular plan system (Fig. 12).

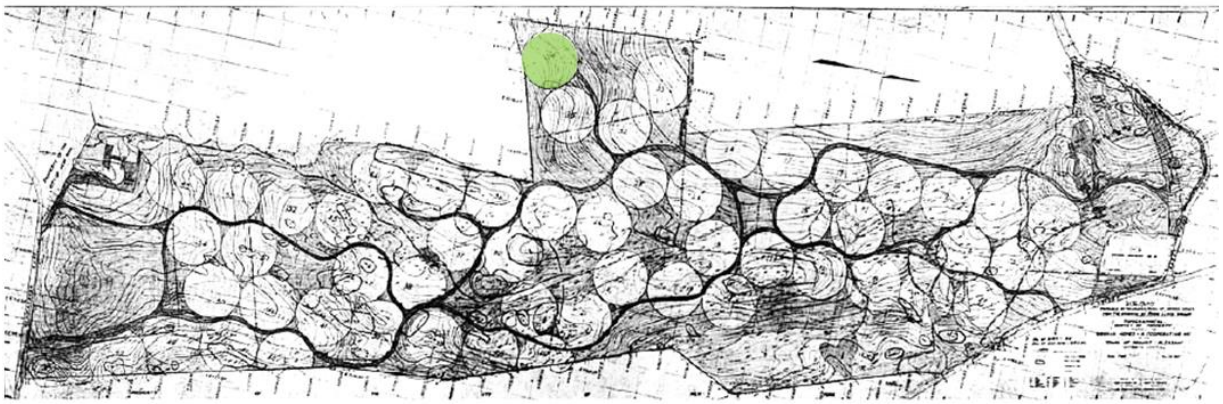


Fig. 11 – 4 Wright Way site in Usonia Site Plan ((Source: Usonia New York, Building a Community)

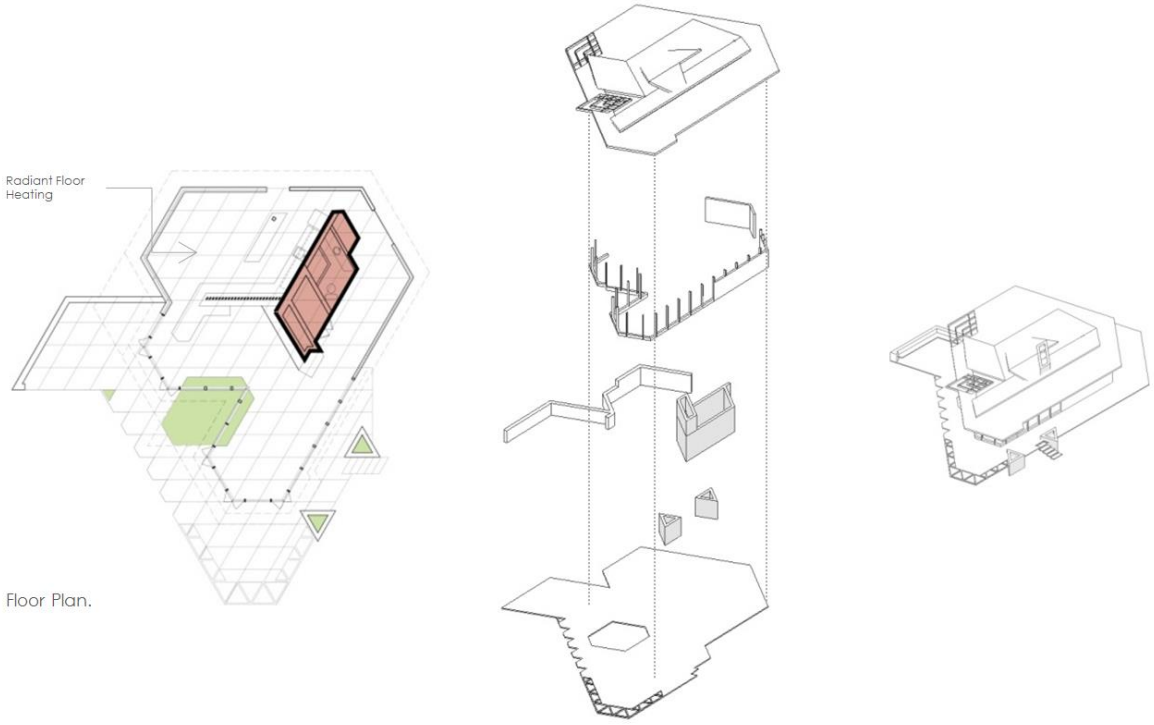


Fig. 12 – 4 Wright Way, Floor Plan and exploded isometric perspective (Diagrams by the author)

The house has a strong inside-outside relation, which intensifies the perception of the site; and the use of Cypress wood, brick and red-colored concrete gives a rich texture and a warm ambience. The house is nestled against the side of a hill to the North but open to the South through large windows, maximizing natural light and the views to the surrounding forest (Fig. 13).

Fig. 13 – 4 Wright Way interiors (Photos by the author)

This house and the one that belonged to Odiff Podell, his brother-in law, were the only two houses from Usonia's first homes in which Henken did not use a rectangular grid; rather he used a 4 by 4 foot diamond grid. Why did Henken used a diamond grid in his house instead of the efficient rectangular one? Henken was an apprentice at Taliesin from 1942 to 1943. The diamond pattern was first used by Wright in his 1941 Snowflake house located in Michigan . The plan was of head and tail form and its planning grid was projected as a 2 by 2 foot diamond module.[24] Wright's explorations with different modules began with the design of the Hanna

[24] John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture* (NY: Whitney Library of Design, 1976), 62.

House, where he used a hexagonal module as the horizontal unit. Wright believed that the hexagonal form gave a greater spatial freedom, this spatial freedom would have given to the house that quality which the Hannas called "endless fascination."[25] Later on, he fragmented the hexagon into equilateral triangles, designing houses with triangular configurations as the Palmer House located in Chicago, and the Reisley House, built in Usonia in 1951. In his latest usonian houses, Wright commonly used a 4 foot diamond module; a combination of two 4 foot equilateral triangles, which was easier to draw in the field while retaining the flexibility of the hexagonal and triangular forms (Fig. 14).

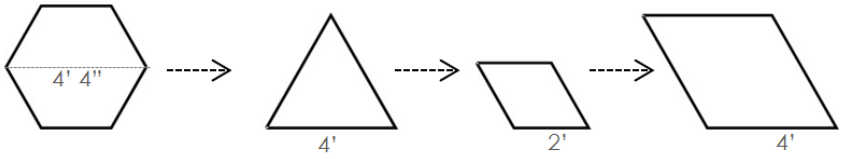


Fig. 14 – Usonian Horizontal modules (Diagram by the author)

The diamond module used as a planning grid could yield triangular, diamond and hexagonal spatial configurations. In the Snowflake house, Wright chose the last one to group services and the main living areas of the house. On the other hand, Henken used in *4 Wright Way* a larger diamond grid, 4 by 4 foot, in a smaller footprint house, with no tail. It seems that he chose the diamond configuration to enclose service areas, however the hexagonal form is also used in a subtle way; the built in furniture in the kitchen and the service core complete a hexagonal shape; and also the living spaces are glass-enclosed hexagons which

[25]John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture* (NY: Whitney Library of Design, 1976), 64

break the typical Wright's large living room and create the diamond indoor-outdoor garden in the middle of the space (Fig. 15).

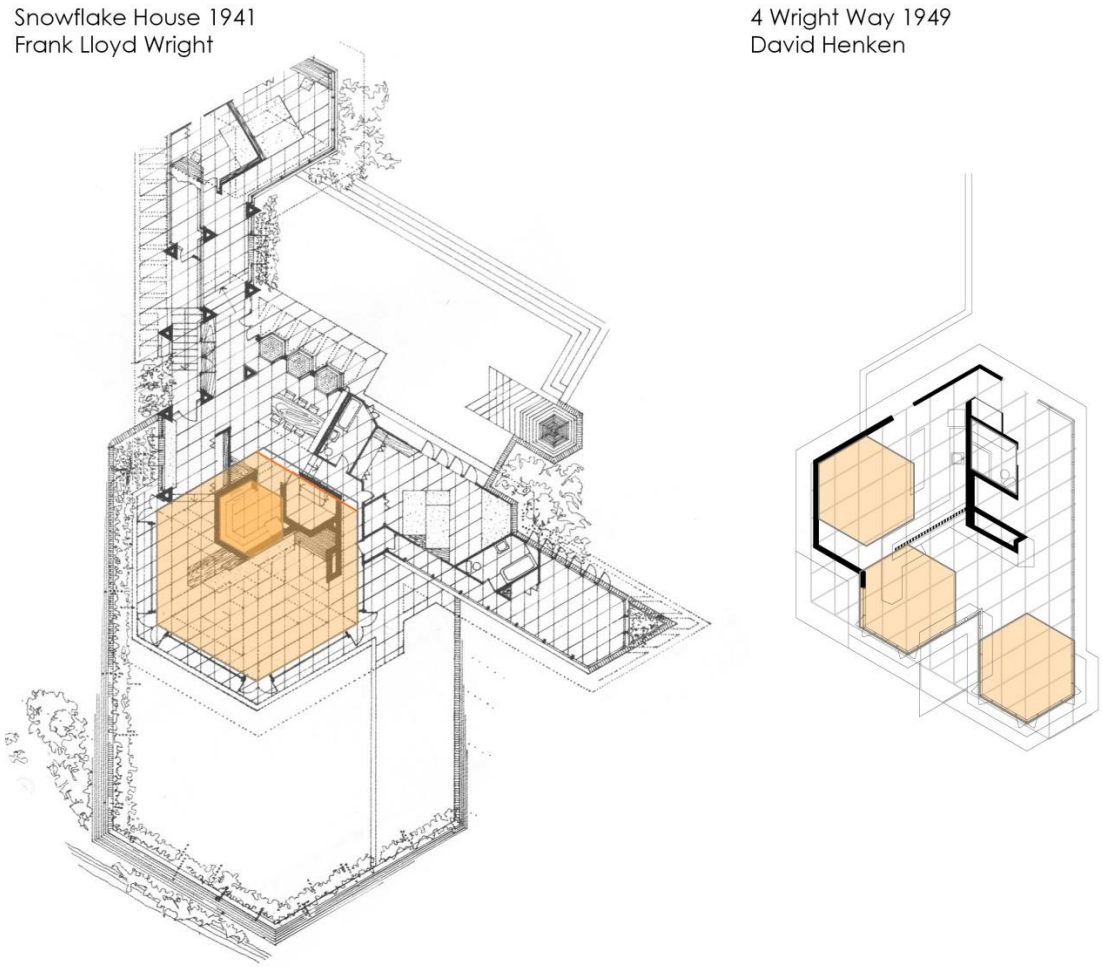


Fig. 15 – Hexagonal derivations by Frank Lloyd Wright and David Henken (Diagram by the author)

Unlike the thirteen-inch vertical unit used by Wright in the Jacobs House, *4 Wright Way* has a vertical proportion determined by brick courses. A section drawing for the Brandon House, designed by Henken, shows that the horizontal decking were placed at the height of 30 brick courses, which also corresponds to *4 Wright Way's* vertical proportion.[26] As a general rule, the board and batten system employed by Wright was simplified by Henken as a tongue and groove

[26] Aaron Resnick Collection, *Herbert Brandon Extensions by Aaron Resnick* (Avery Architectural and Fine Arts Library, Columbia Univesity, CA3.08 /A162.6)

system which achieved the 30 brick course height through a random arragment of cypress boards of 5, 7 and 9 inches (Fig. 16).[27]

Fig. 16 – Henken derivative vertical grid. (Diagram and photos by the author)

Inside the original *4 Wright Way*, a constant concern for the human experience of the space is evident; continuous flow through the space between floor, decks, and ceilings creates an enjoyable experience of open space through which constant movement is taking place. In the kitchen, the clerestory windows not only allow for light and air to go in and out, but they were also designed to enhance the elevation of the fireplace core, adding to the vertical character of it.

Henken was designing a condensed single unit house, like the other ones in Usonia, but he tried to create an original design, with more spatial diversity and closer to the non-rectilinear organic houses designed by Frank Lloyd Wright after the War. The mobile and built-in original furniture (sofas, tables and wooden screens) also reinforces the Henken's design effort to build a flexible, modern and low-cost house.[28] Clearly *4 Wright Way* was Henken's experimental field and a

[27] Aaron Resnick Collection, *Herbert Brandon Extensions by Aaron Resnick* (Avery Architectural and Fine Arts Library, Columbia Univesity, CA3.08 /A162.6)
[28] Roland Reisley, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), xvii

place where, as Priscilla Henken stated, he could build a house one of its kind; a work of art with the artist's signature (Fig. 17) .[29]

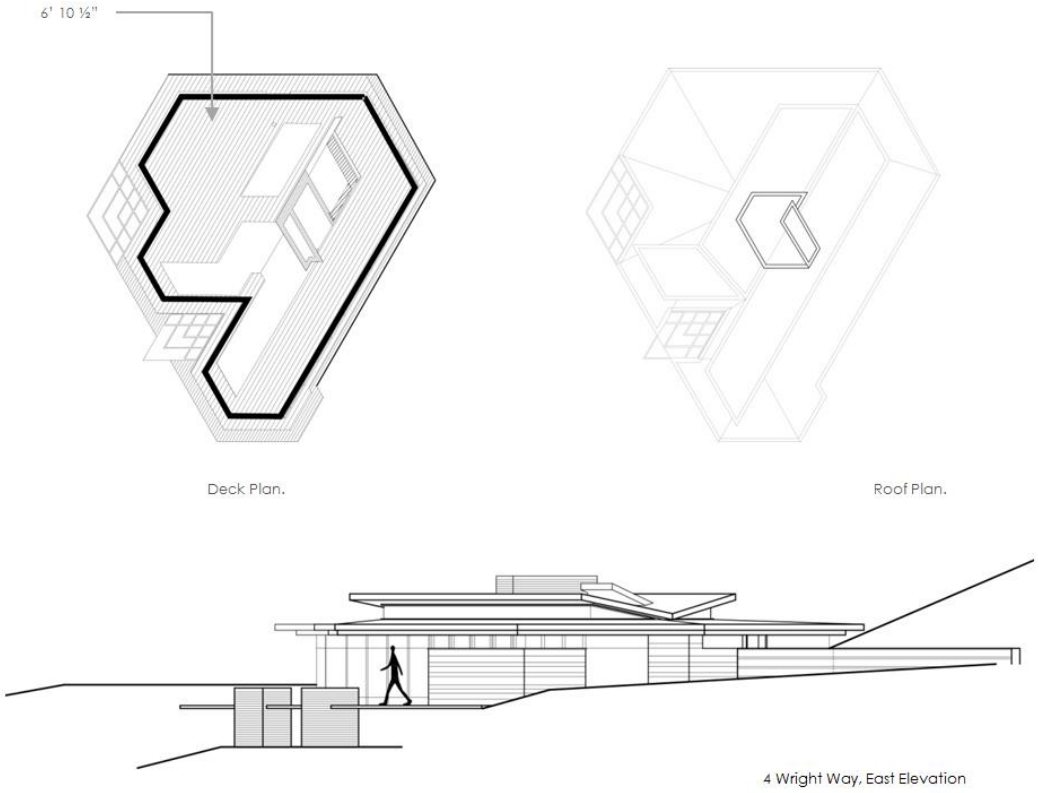


Fig. 17 – 4 Wright Way Deck Plan, Roof Plan and East Elevation (Drawings by the author)

It is important to recognize that David Henken worked with one of the most difficult, financially unrewarding, and challenging architectural problems, the design of moderate-cost housing.[30] Henken built thirteen Usonian houses under a strict design methodology, utilizing concepts of the planning grid, built in furniture, relationship to site and use of local-natural materials. In *4 Wright Way,* Henken tried to create a customized and creative design through a standardized construction grammar. If we place the house in a Usonian timeline, we notice that the house is a hybrid located between the original usonian principles used by

[29] Priscilla Henken, *Taliesin Diary. A year with Frank Lloyd Wright* (NY: W.W. Norton & Company, 2012), 215.
[30] Katherine Morrow Ford and Thomas H. Creighton, *Quality Budget Houses, A Treasury of 100 Architect-Designed Houses from $5,000 to $20,000* (NY: Reinhold Publishing Corporation, 1954), 7.

Frank Lloyd Wright in the Jacobs House, and his further explorations of organic architecture. It is a delayed derivative of the original low-cost 1938-Usonian concept trying to find a singular expression, and this is why *4 Wright Way* is architecturally significant. It is a strange hybrid that stands out from its near context and from other suburban house designs of the same period; the singularity of its design intent becomes one of its most significant defining features (Fig. 18).

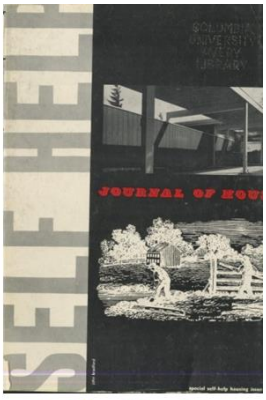
Fig. 18 – 4 Wright Way, 1949 (Source: Usonia New York: Building a Community)

Sixty six years have passed since the construction of 4 Wright Way, and now the dwelling is a contributing building of the Usonia Historic District.[31] The house and the community are part of the American heritage; in terms of national significance, they are associated with events that have made a significant contribution to the broad patterns of our history and they embody the distinctive characteristics of a type, period or method of construction while representing a

[31] Kathleen LaFrank and Jess Ouwerkerk, *Usonia Historic District National Register Nomination*, National Register of Historic Places, March 2012.

direct influence of the work of a master, Frank Lloyd Wright.[32] *4 Wright Way* is historically significant because, besides of belonging to the broader Usonian family spreaded across the country, it is an example of a house built through a cooperative scheme and a communal effort driven by the American dream of owning a modern and affordable home in the United States during the mid-twentieth century suburban housing development following World War II (Fig. 19 and Fig. 20).

4 Wright Way, 2014 (Photo by the author)



4 Wright Way, published in Self Help Journal of Housing Vol. 10, October 1953.

Fig. 19 – 4 Wright Way

Fig. 20 – Usonia Homes Historic District (Photo by the author)

[32] Kathleen LaFrank and Jess Ouwerkerk, *Usonia Historic District National Register Nomination*, National Register of Historic Places, March 2012

Additions to Henken Usonian houses

Henken houses in Usonia were originally small, condensed houses. However, several of them have changed through time, doubling and tripling their square footage to satisfy the space needs of growing families or new residents (Fig. 21). Many of these houses have been heavily transformed and expanded in recent years and now are non-contributing buildings in the Usonia Historic District.[33] The expansion of these dwellings is related to the slow but gradual change of ownership in the community. Before 1984, only six families had sold their homes and moved away.[34] By 2001, only twenty four of the original forty-eight Usonian families remained in the community.[35] Due to the fact that additions to usonian houses cannot be prohibited, efforts should be made in order to preserve their most significant design features, which are generally concentrated in the open plan living rooms that revolve around the fireplaces. Retaining the form and the size of the defining features implies a more important issue, the preservation of the original use of the spaces and core services, which should be strongly encouraged.

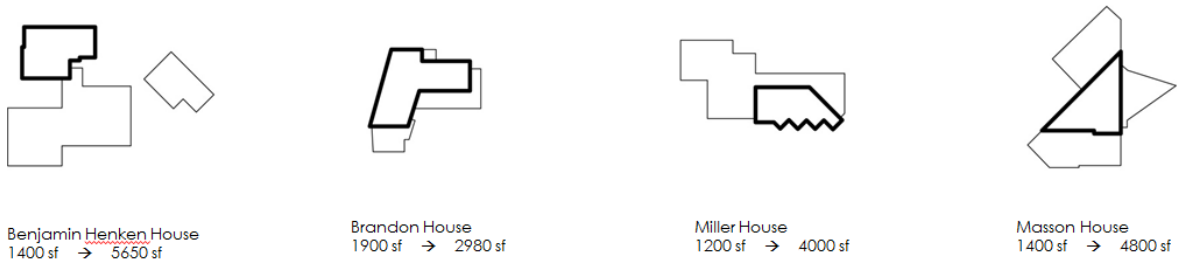


Fig. 21 – Additions to Henken houses (Diagram by the author)

[33] Kathleen LaFrank and Jess Ouwerkerk, *Usonia Historic District National Register Nomination*, National Register of Historic Places, March 2012
[34] David Henken, "Usonia Homes… A summing up," in *Realizations of Usonia, Frank Lloyd Wright in Westchester*, Priscilla Henken (New York: The Hudson River Museum, 1985), 15
[35] Roland Reisley, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 124

Aaron Resnick, who was a member of the Design Board of Usonia made several additions to two of Henken's houses, the Brandon house and the Miller house. These interventions consisted of the enlargement of living areas or the attaching of small studios, bathrooms and bedrooms. The materials and structural systems employed were similar to the existing ones. These two houses originally featured a three bedroom layout, which explains the fact that the additions made by Resnick were complementary spaces and not major interventions in the original fabric. The first Resnick intervention in the Miller House was the addition of a bedroom on the north side in 1955. The second one was the expansion of the living room in 1962. Resnick enlarged the living room, creating a new entrance in the North façade and a new fireplace. Resnick used the same 4 by 4 foot rectangular grid to outline the expansion and raised the new roof above the original one. The last intervention consisted in the addition of a small bathroom in the attached bedroom in 1985 (Fig. 22).[36]

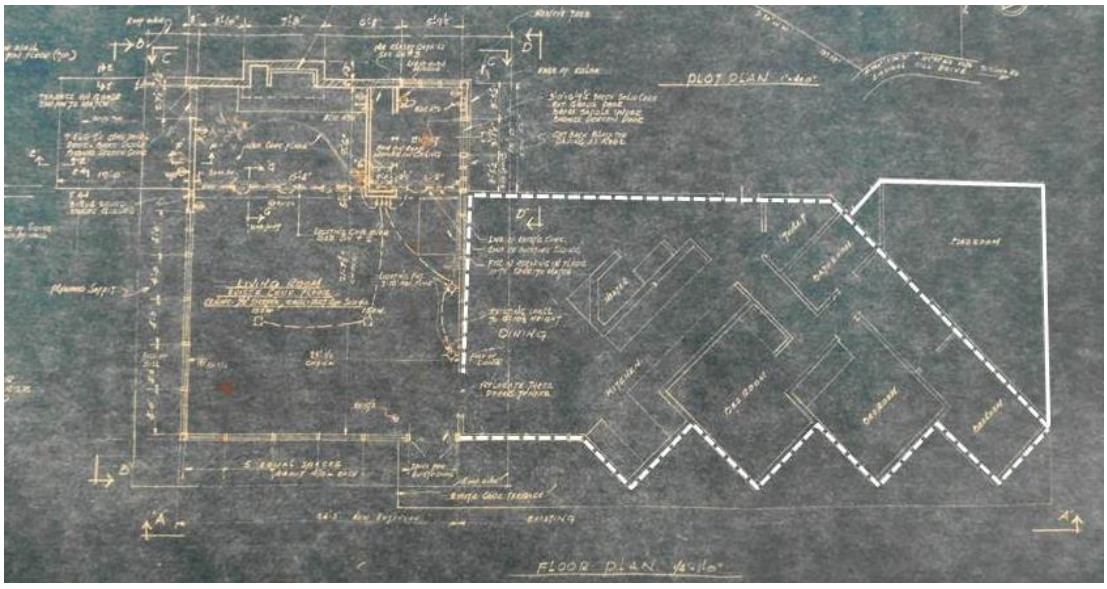


Fig. 22 – Resnick Additions to the Raph Miller House, original unit inside the dotted line (Source: Avery Library)

[36] Aaron Resnick Collection, *Ralph Miller Extensions by Aaron Resnick* (Avery Architectural and Fine Arts Library, Columbia Univesity, CA3.10/A162.6)

The Resnick additions to the Brandon house were similar to those at the Miller house. He added a studio at the end of the bedroom wing in 1955, which subsequently was enlarged in 1975. In 1962, Resnick expanded the living room towards the central court (Fig. 23).[37]

The Resnick additions to the Brandon and Miller houses are derivative usonian additions in the sense that employed the same construction grammar; Resnick used the same planning grid, materials and assembling construction systems to enlarge the houses, achieving a seamless growth with blended the old and the new. However, Resnick projects, while retained the use of the original spaces, modified one of the most important character defining features of the houses, the open plan living rooms, which deformed the condensed proportions of the original units.

Besides Resnick additions, recent interventions by other architects have been made to different Henken houses. The photographic records of 1994's Peter Gluck intervention on the Jerry Podell House, designed by Henken in 1959, show that this project completely modified the aesthetic of the original house, both internally and externally (Fig. 24). Gluck preserved almost intact the upper floor of the original Podell House where the main amenities were concentrated. However, the lower floor of the original unit was drastically changed; the project added a round barrel construction which contained the enlargement of the original bedrooms. The interior photos of the project show a drastic contrast between the preserve proportions and materials of the upper floor and the new interior spaces

[37] Aaron Resnick Collection, *Herbert Brandon Extensions by Aaron Resnick* (Avery Architectural and Fine Arts Library, Columbia Univesity, CA3.08/A162.4)

of the lower floors evidencing that the new intervention was not derived from the original unit nor used the same construction systems and materials.

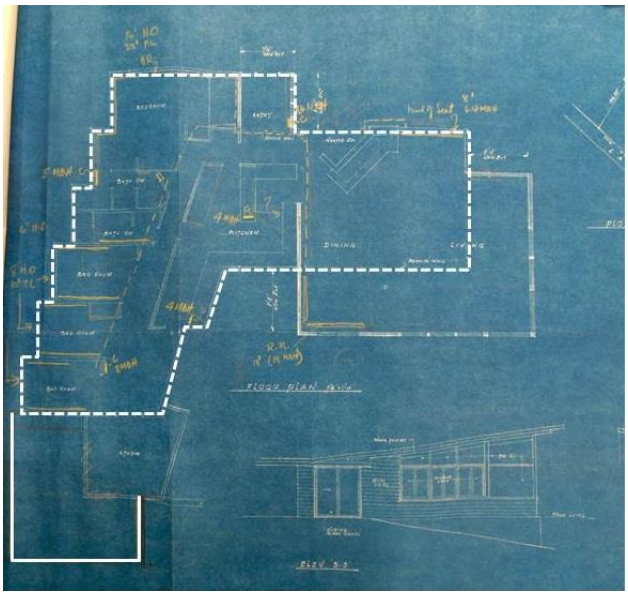


Fig. 23 – Resnick additions to the Brandon House, original unit inside the dotted line (Source: Avery Architectural and Fine Arts Library, Columbia University)

Fig. 24 – Peter Gluck intervention on the Podell House (Source: Gluckplus.com)

4 Wright Way Bedroom wing: a not derivative Usonian addition

4 Wright Way was the first building of an originally planned three-unit house (Fig. 25). The Henken's original intentions for the expansion of the house are unclear, as the original *4 Wright Way* plans are missing and with them the chance to look his first ideas related to the future growth of the house. However, in the article featured in the 1951 July edition of Popular Mechanics we can find some information about this issue. At that time, Henken planned to build his studio above the original unit, higher up on the hill and connected to the central unit by a covered corridor. Below the present home, he intended to build a bedroom unit with the roof at the level of today's floor. Henken planned to sod the roof of the bedroom unit, so that then from the living room his family could walk straight out onto a broad green terrace.[38]

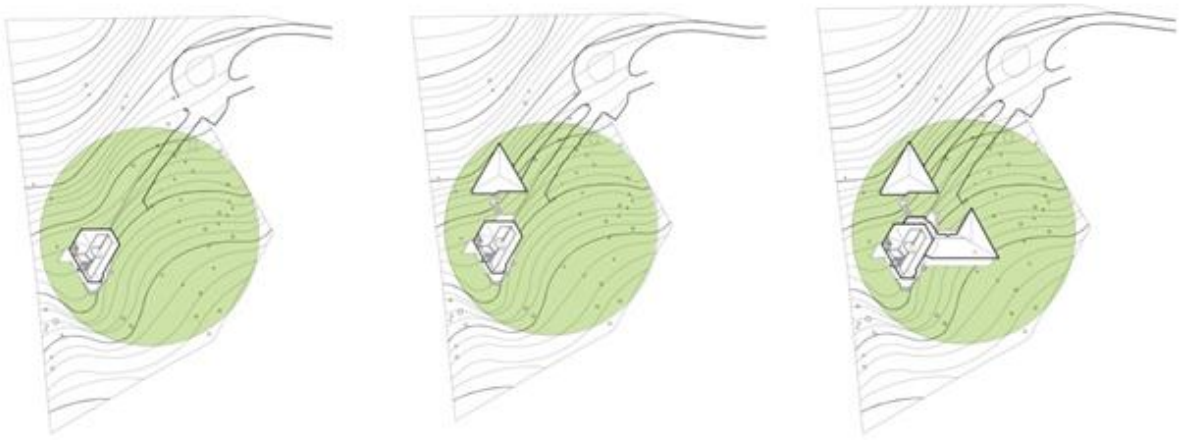


Fig. 25 – 4 Wright Way Building phases (Diagrams by the author)

The studio was built according Henken's original plans, but the covered corridor was never built. The bedroom wing was added as a tail to the original unit around 1980. The wing was connected to the central unit by an indoor-outdoor

[38] Clifford Hicks, " Village in the woods", in Roland Reisley, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 94

space with a skylight and a pool, maybe responding to the original idea of having a green terrace at that level (Fig. 26). The bedroom wing, now located at the same level as the central unit, created an access courtyard between the studio and the original unit (Fig. 27)

Fig. 26 – 4 Wright Way, connections between the original unit and the added bedroom wing (Photos by the author)

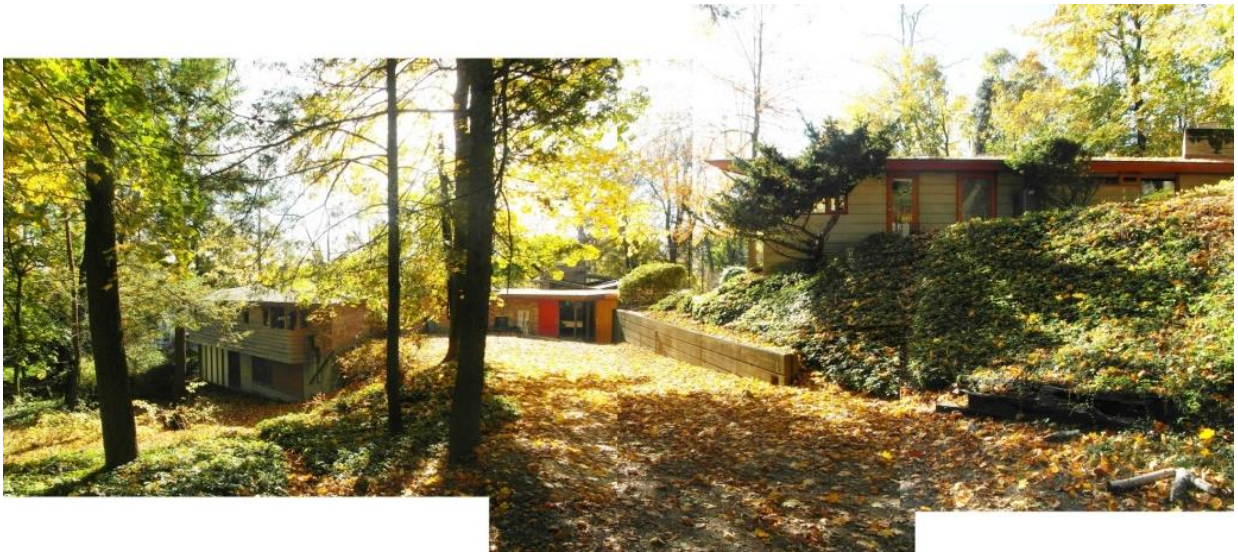


Fig. 27 – 4 Wright Way, view from the access of the site (Photo by the author)

Even when the exterior walls of the added wing were designed to follow the expanded diamond grid of the central unit, all the interior partitions are displaced, giving the sense of a incoherent distribution; which is striking, since previous Henken designs, and even the original unit, are strictly ordered with their planning grids (Fig. 28). In addition, the added wing has also suffered modifications; and here is where Henken's original intentions become diluted and weakened by possible contractor or third-person interventions. As a result, the added wing presents awkward spatial proportions and non-functional rooms, establishing a tenuous connection with the original house and its landscape (Fig. 29).

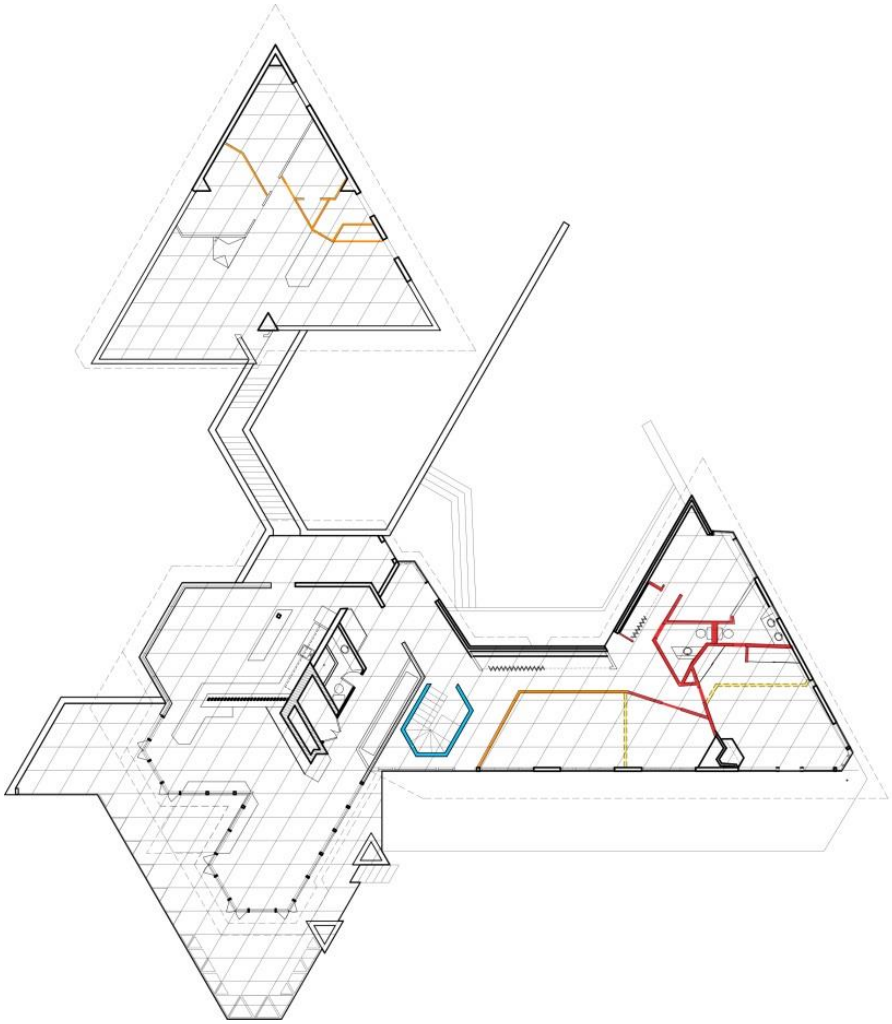


Fig. 28 – 4 Wright Way, current Floor Plan (Displaced walls outlined in colors, diagram by the author)

Fig. 29 – 4 Wright Way, South elevation showing the current addition and interiors (Photos and plans by the author)

It is difficult to understand this change in Henken's practice and we can only make suppositions. He was expelled from Usonia in 1955 and he faced economic and personal problems since then. He never went through the process of getting licensed as an architect, and therefore needed another architect to sign off on his designs, which was sometimes frustrating for him.[39] However, he continued to do architectural design throughout Westchester and neighboring counties. The Bickel Residence in Ossining, built in 1956, and the Dusek Residence in Armonk, built in 1970, are large projects that still respond to an organic design and where we can see an improvement in his design practice (Fig. 30)

Fig. 30 – Houses designed by Henken outside Usonia (Source: Architectural Homes NY)

[39] Priscilla Henken, *Taliesin Diary. A year with Frank Lloyd Wright*, (NY: W.W. Norton & Company, 2012), 224

After a few years, *Henken Builds* was forced into bankruptcy. Henken took a job as a design administrator at a college in Maine and, after a few years, a similar job at a college in New York. In 1987 Henken traveled to Ann Arbor, Michigan, to consider sites to reconstruct the full-scale Usonian model that he had helped to build for Wright in the future site of the Guggenheim Museum and which Henken kept in *4 Wright Way*. In that year, Henken suffered a cerebral hemorrhage and died in Ann Arbor before he could complete the reconstruction of the Usonian model.[40]

The perception of the built heritage evolves through time. The research and design analysis of this thesis is already modifying the original perception of *4 Wright Way* while quietly adding value to the one that originally used to have as a merely strange Wright-looking house. For unknown reasons, David Henken, the one who found Usonia and the same one who was a fervent Wright's apprentice, had a different perception of the value of the house when he built the current bedroom wing in the 1980s; creating an unsymphatetic addition which is not a derivative from the original unit and which obscured its original design intent. *4 Wright Way* is a modern building old enough to be a historic building; but, most importantly, is now a significant contributor to the heritage of the community. This change in our perception of the house is the main argument for the demolition of the current bedroom wing, and the departing point in the development of the design principles for its reconfiguration.

[40] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 110

Derivative Design

In order to develop design principles for creating sympathetic additions to *4 Wright Way* it is important to identify the original Usonian design concept. Prudon argues that for modern architecture the original design intent and concept are paramount.[41]As described earlier in this thesis, the original Usonian concept is canonically represented in the Jacobs House. Departing from economic constraints and predicting the later suburban development, Wright replanned the American house typology creating a new interior concept enhancing the potential of the livable space, creating open plan layouts, grouping services and removing the barriers between outside and inside.[42] Wright worked with the nature of materials, manipulating mass, outline, and proportion; this manipulation allowed him to transform them into patterns of construction and integral ornament. "*When we say "Form and function are one"-only then do we take mere fact into the realm of creative thought.*"[43] For Frank Lloyd Wright, form does not follow function, form and function should work together.

The fact that form and function are equally important for the usonian design intent may lead to the conclusion that the preservation of the original material fabric is less significant in the restoration of usonian houses, especially if they retain their original use. In the restoration of the Richardson House, the original concrete mat floor was removed and rebuilt in order to replace and update the radiant

[41] Theodore Prudon, *Preservation of Modern Architecture* (NY: John Willey & Sons, 2008), 35
[42] Frank Lloyd Wright, *The Natural House* (NY: Horizon Press, 1954), 50
[43] Frank Lloyd Wright, *Frank Lloyd Wright*, The Architectural Forum, January 1938, 78

heat system, which is one of the most clear examples of a usonian feature developed with aesthetic and functional purposes (Fig. 31).[44]

Fig. 31 – Restoration of the radiant heat system and the concrete mat floor in the Usonian Richardson House, designed by Wright in 1941 and built in 1951. (Source: Tarantino Architects)

If form and function are equally important for Wright, then the original Usonian design intent was not to create a style, rather, it was to develop a construction grammar. The significance of Usonian houses resides in their own derivative transformations of the same Usonian construction grammar, enhanced by their conception as a kit of parts easily assembled and adapted (Fig. 32).

As stated before, the process of Usonian adaptation implied a derivative transformation of the construction grammar which was intensified if the adaptation was not performed by the same architect. Therefore, it is necesary to look not only at Wright's Usonian concept but also how it was derived by David Henken in the design of *4 Wright Way*. In Usonia, David Henken used the traditional usonian construction grammar. However, Henken performed a simplification of the construction systems -as in the board and batten wall systems- while the design intent in others was retained, such as in the use of the planning

[44] Tarantino Studio, *Richardson House Restoration project*, http://www.tarantinostudio.com/pres/richardson.html (accessed 15 Feb 2015)

grid, the design of roofs, pergolas and built-in furniture. In *4 Wright Way*, the placement of the original unit and the studio in the landscape, their outdoor connections and the ways to approach them, as one moves across the sloping topography, are quite unique.

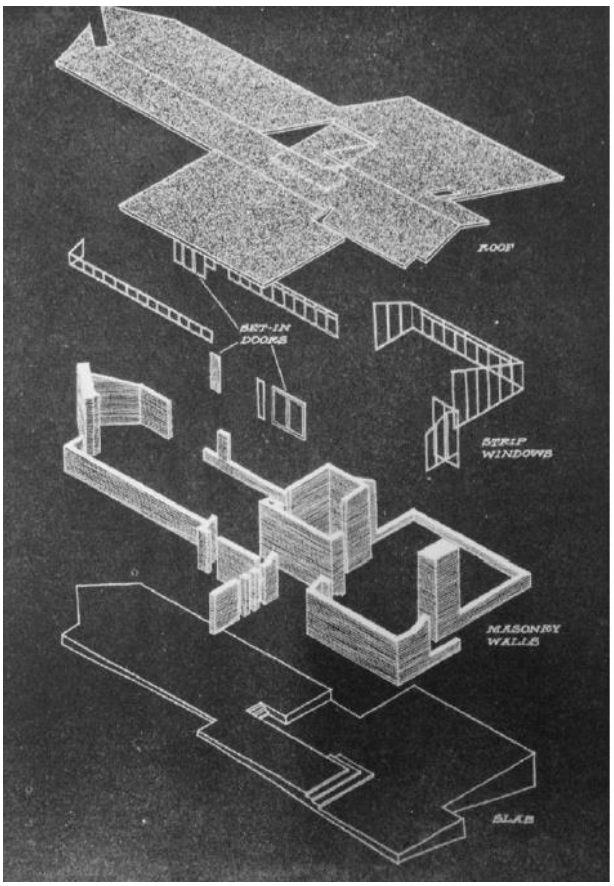


Fig. 32 –"Building in Masses" diagram from " What We Learned from Frank Lloyd Wright", House and Home, February 1959 (Source: Usonian Houses, the case for organic architecture)

Usonian design is by definition a derivative design. Derivative Design is a creative process of taking a original source -object, building or design concept- and deducing another from it. In order to achieve an organic growth of historic Usonian Houses, it is necessary a derivative design process that turns the original into a source, enhancing the value of the original and ensuring its place at the

head of the combined hierarchy. Additions to *4 Wright Way* can only derive their own expression from an elaboration of the expressive possibilities of the original unit, maintaining a particularly close and respectful relationship with it.[45]

The original *4 Wright Way* unit is already a derivation of Wright's Usonian concept. Therefore, the derivative process required for the design of the new addition implies a double derivation which should have *4 Wright Way* as its direct first source, and Wright's Usonian concept as its original reference. *4 Wright Way*, the first source of this derivative process, is a building complex composed by the original house unit, the site and the attached studio (Fig. 33).

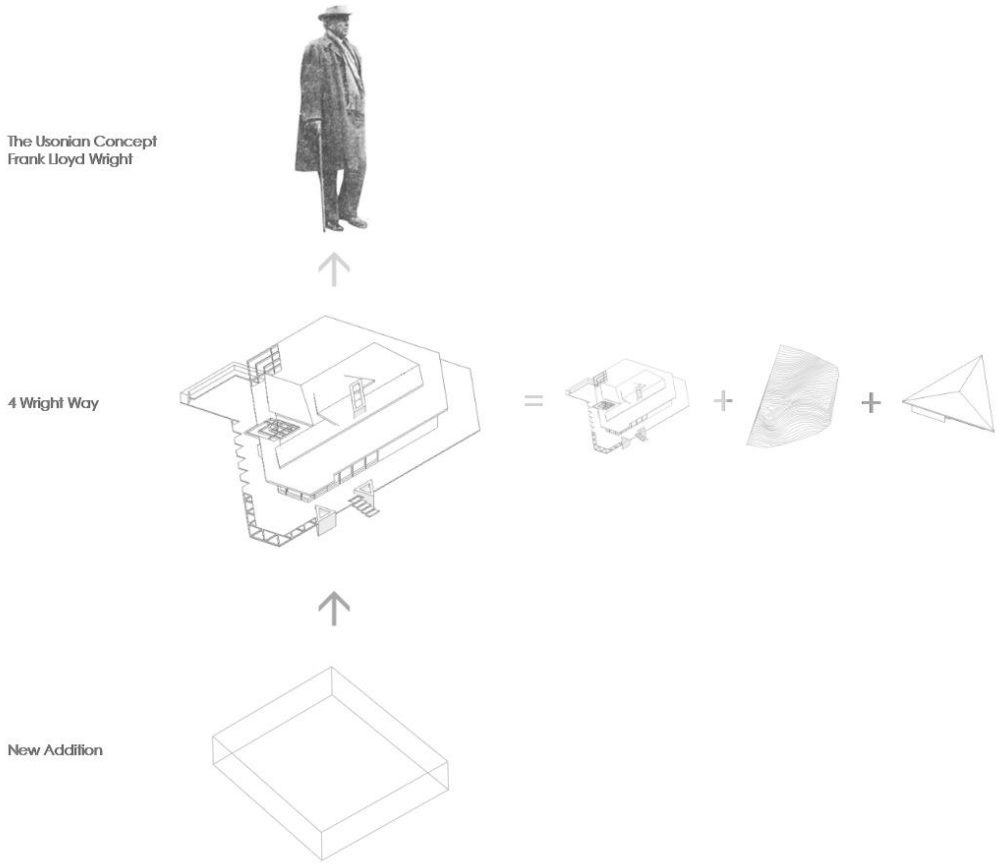


Fig. 33 – Double derivation for the design of 4 Wright Way's new addition (Diagram by the author)

[45] Paul Byard, *The architecture of Additions: design and regulation* (New York: Norton & Company, 1998), 50

The character defining features of *4 Wright Way* are determined by Henken's derivations of usonian principles such as the planning grid, the strong interior-exterior relation and the use of natural materials. Working with these usonian principles and introducing subtle changes in their manipulation will create new derivations slightly different from the original, which should outline the original unit, improve the original design concept and create an aesthetic relationship between old and new. Using the elements of the usonian grammar, the same construction logic and the same proportional and ordering systems are valuable design tools to manipulate the scale, massing and placement of the addition, which will allow a better interaction with the site and an architectural and historical integrity to the entire building complex.

Derivative Design Principles for the new addition

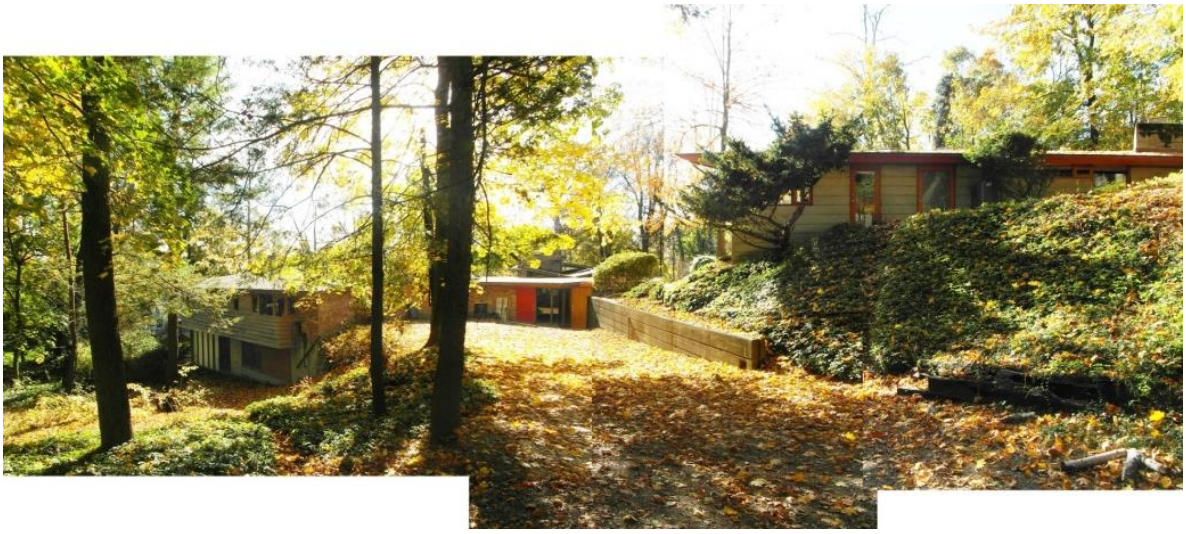


Fig. 34 – 4 Wright Way, view from the access of the site (Photo by the author)

Separating

The first step in the redevelopment of the 4 Wright Way's bedroom wing is to preserve the smallness of the original unit and its original functions. Therefore, it is important to evaluate the potential growth areas adjacent to the houses that wont interfere with their defining features; assessing at the same time the new space needs requirements, the relation to the site and other constructions that may exist (Fig. 34). In the case of 4 Wright Way, the original unit has maintained a high degree of integrity. The south façade with its glass walls, angular pergolas and butterfly roofs create a design complexity which must be preserved. The bedroom wing could be attached in the north façade, next to the kitchen; however the new owner's space requirements make difficult to develop this part of the site, which is very close to the lot edge and the studio attached up in the hill. This thesis

will explore the redesign of the addition in the place where the current bedroom wing is placed. (Fig. 35).

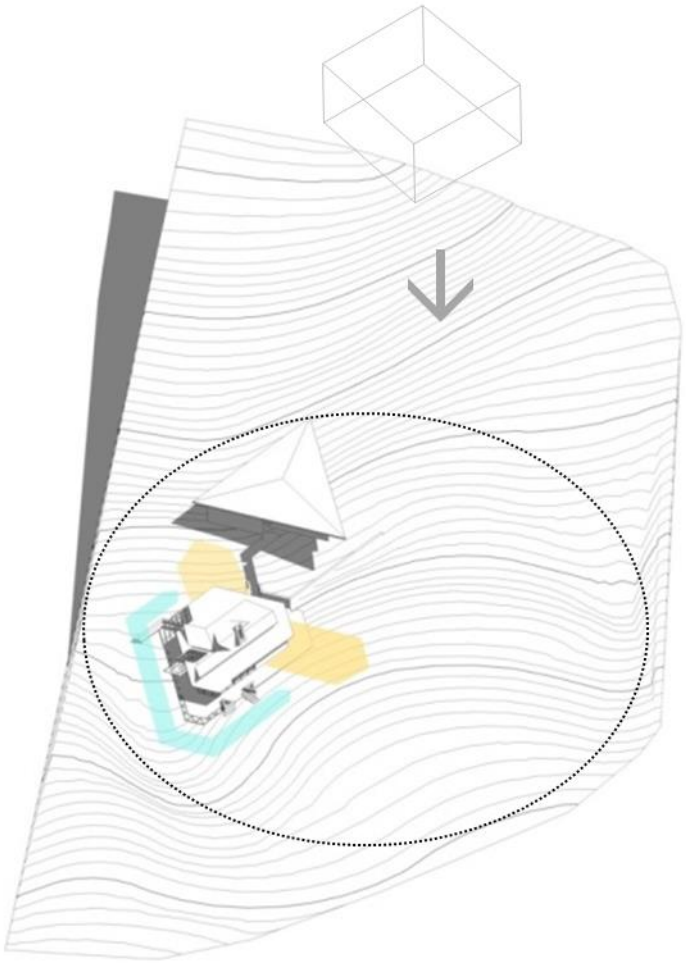


Fig. 35 – 4 Wright Way, placing the new addition

Preserving the use of the original Usonian units with its concentration of amenities, implies that posterior additions should be developed as attached annexes connected to the original fabric. According to Wright's organic principles, Usonian houses should be flexible enough to expand in accordance the owner's needs,

"…without deformity, be expanded later for the needs of a growing family. As you see from the plans, Usonian houses are shaped like polliwogs (or tadpoles)… with a shorter or longer tail. The body is the living room and adjoining kitchen –and the whole Usonian concentration of conveniences. From there it starts out, with a tail: in the proper direction, say one-two bedrooms, three, four, five, six, bedrooms long; provision between each two rooms for a convenient bathroom.. the size of the polligwog's tail depends on the number of children and the size of the family budget. If the tail gets too long, it may curve like a centipede. Or you might break it, make it angular. The wing can go on for as many children as you can afford to put in it."[46]

Frank Lloyd Wright planned the Berger house, designed in 1950 and located in California, to be built in stages based on a 4 by 4 foot diamond module. The first element at the center of the design was the service core, this contained fireplace, kitchen, utilities, and bathroom. Stage two in the building process involved surrounding the core with the living area and the parents' bedroom. The last stage, the children's wing, contained a second bathroom, a bedroom and a playroom.[47] Wright's additions to the Berger House, the Reisley House in Usonia or to the early Usonian Rosembaum House in Alabama, are connected seamlessly and grow organically following Wright's description (Fig. 36).

[46] Frank Lloyd Wright, *The Natural House* (NY: Horizon Press, 1954), 167
[47] John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture*, (NY: Whitney Library of Design, 1976), 143.

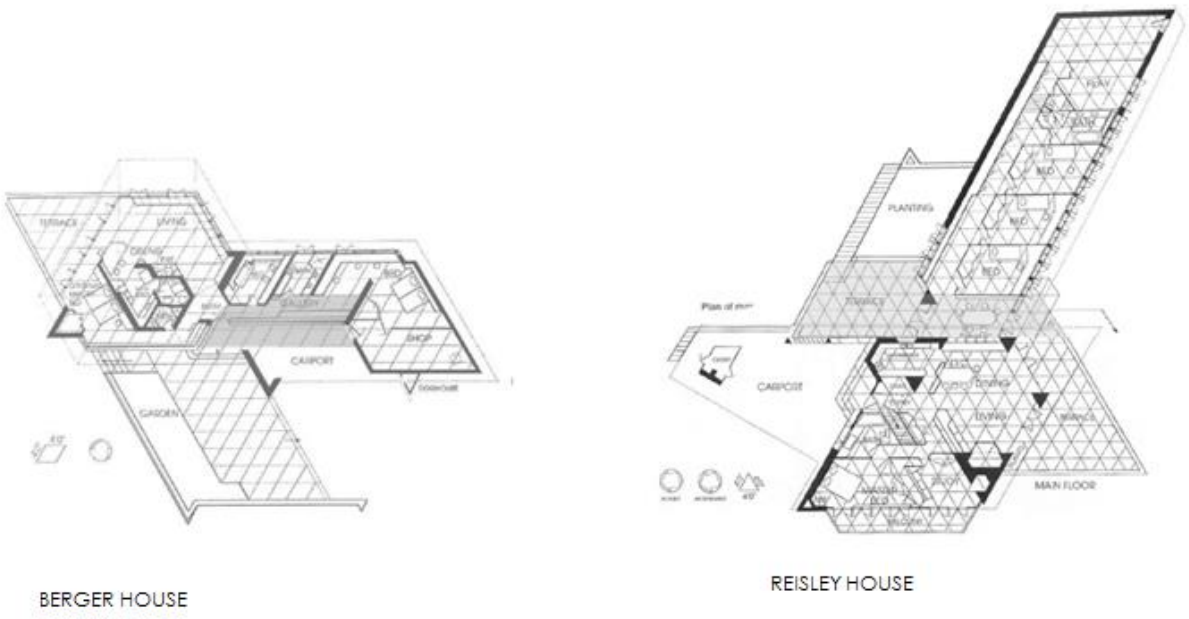


Fig. 36 – Organic growth of Usonian houses by Frank Lloyd Wright, (Source: William Storrer, *The architecture of Frank Lloyd Wright: a complete catalog*)

For contemporary interventions in historic Usonian houses it is necessary to define a different approach to the design of the connection between the old fabric and the new intervention. In 4 Wright Way, the original building provides ready-made integration in an existing historical and cultural fabric and the concentration of the main living amenities. If the original building provides key functions, the addition, as an attached appendage, should become one with it, but being easily readable at the same time.[48]

According to the Venice Charter, additions to historic fabric should not detract from the significant parts of the original building, its traditional setting, the balance of its composition and its relation with its surroundings; furthermore, new interventions must be distinguishable from the original so that they not falsify the

[48] Francoise Astorg Bollack, *Old Buildings New Forms: New directions in architectural transformations* (China: The Monacelli Press, 2013), 65

artistic or historic evidence.[49] In a context where explorations with different materials, forms or colors are restrained, the manner in which the additions are connected to the original fabric becomes an important issue to examine. The same Wright specified that sometimes it was necessary to separate the added tail from the living room wing with a logia, for quiet and especially, for grace.[50] The lightness of the usonian construction systems and the use of the loggia, as a suitable indoor-outdoor articulation, are rich fields of exploration in order to achieve reversibility of the new intervention, its material dilution and a clear distinction between the old and new.

4 Wright Way is nestled in the middle of a sloping landscape; its butterfly roofs become incidents in the topography if they are perceived from the upper levels of the hill. From beneath, the roofs are slowly dissolved into pergolas that shade the social spaces. The studio, added by Henken in the 1960s, is another object in the site, physically detached from the original unit but strongly linked visually (Fig. 38). In order to outline the original 4 Wright Way unit and to enhance the perception of the house as a three-unit complex, this Design Thesis will explore two schemes for the development of the bedroom wing, pursuing at the same time a double operation of connecting and distancing the new intervention and the original unit (Fig. 39).

[49] *International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964)* International Council on Monuments and Sites (ICOMOS)
[50] Frank Lloyd Wright, *The Natural House* (New York, Horizon Press, 1954), 167

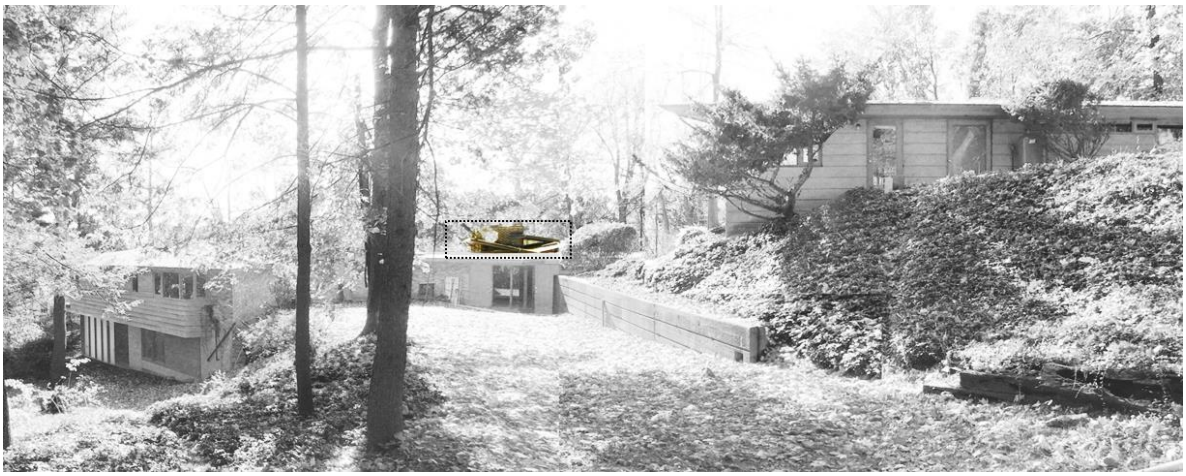


Fig. 38 – 4 Wright Way, the original unit detract from the current addition (Diagram by the author)

Scheme A

Scheme B

Fig. 39 – 4 Wright Way, schemes for the development of the bedroom wing (Scheme A: Next to the Original Unit, Scheme B: Beneath the Original Unit)

Planning Grid

In *4 Wright Way*, the diamond planning grid was conceived as a patterned concrete mat which provided proportion and order to the layout plan, included the radiant heat system and, as construction planning tool, facilitated the assembling of the house as a kit of parts. The diamond planning grid and its embedded radiant heat system are character defining features of the original *4 Wright Way* that should be preserved and derived in the development of any kind of additions to its historic fabric (Fig. 40).

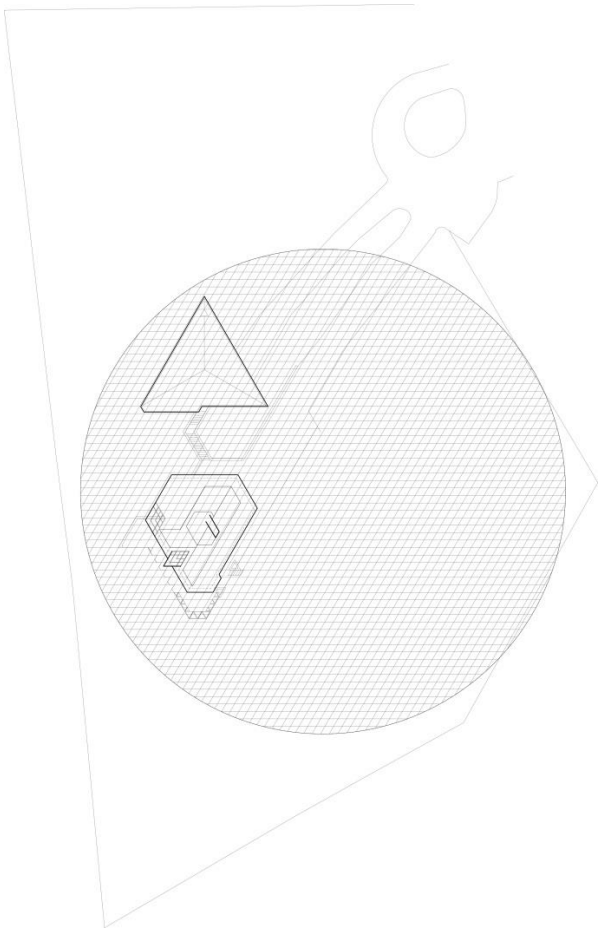
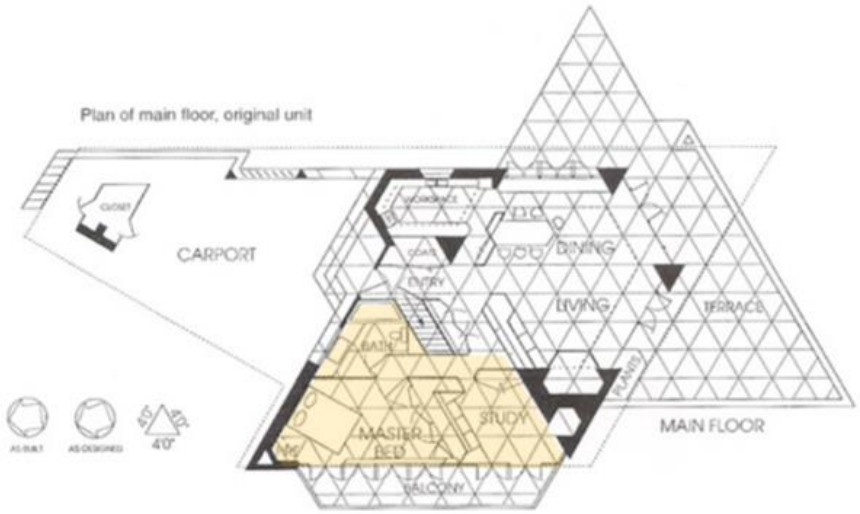


Fig. 40 – 4 Wright Way, expansion of the diamond grid inside the original circular lot plan (Diagram by the author)

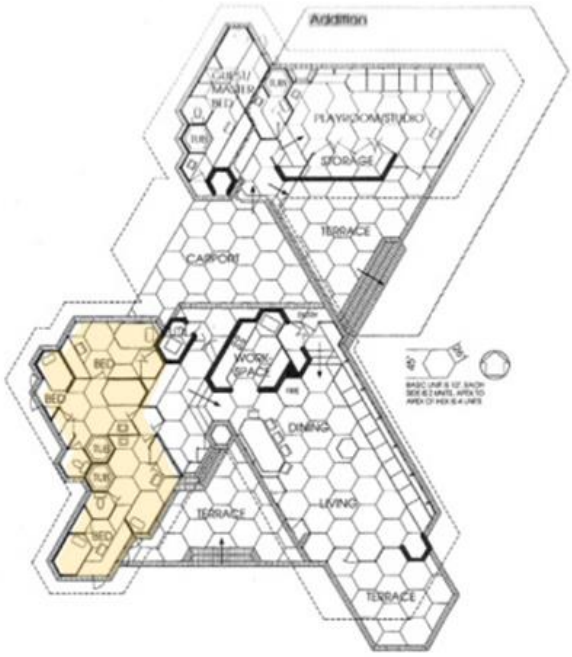
When Frank Lloyd Wright asked himself what was essential in the design of the Jacobs House, he concluded that the house had to have as big a living room with as much as garden as the owners can afford.[51] In his later usonian explorations, the open plan living room with the big fireplace remained as the principal element where Wright's design efforts were focused. The bedrooms and bathrooms were utilitarian spaces, sacrificed to the use of diamond, hexagonal and triangular grids. As a result, many of Wright's usonian houses have bedrooms wings with awkward and non-functional spaces which required built-in furniture to resolve their complex geometries (Fig. 41).

The design intent of open plan living rooms and efficient service cores, accomplished in *4 Wright Way's* original unit, should be used in the development of a flexible bedroom wing scheme, while maintaining the proportion and order imposed by the diamond planning grid. In that way, functional and livable spaces could be achieved in the design of the new addition, accomplishing, at the same time, contemporary and less restrained ways of living.

[51] Frank Lloyd Wright, *Frank Lloyd Wright*, The Architectural Forum, January 1938, 78



REISLEY HOUSE. Frank Lloyd Wright



BAZETT HOUSE. Frank Lloyd Wright

Fig. 41 – Usonian houses by Frank Lloyd Wright, bedroom and private spaces shown in yellow (Source: Plans by William Storrer, *The architecture of Frank Lloyd Wright: a complete catalog*, diagram by the author)

Vertical Grid

4 Wright Way was built as a three-dimensional gridded cage in which the horizontal spatial layers are interwoven with the vertical layers. The gridded cage gives order and proportion and encloses a small architectural program. The smallness of the house and its proportional dimensions transform the gridded cage into a unified object with an expressive architectural language. The use of the original *4 Wright Way's* vertical grid is necessary to define the vertical proportion of the new addition; David Henken utilized a vertical proportion determined by a random arrangement of cypress boards of 5, 7 and 9 inches. The manipulation of these vertical layers could allow a vertical fragmentation and simplification of the new building elements, revealing the construction grammar and intensifying the perception of the derivative addition as a kit of parts, rather than a closed object (Fig. 42).

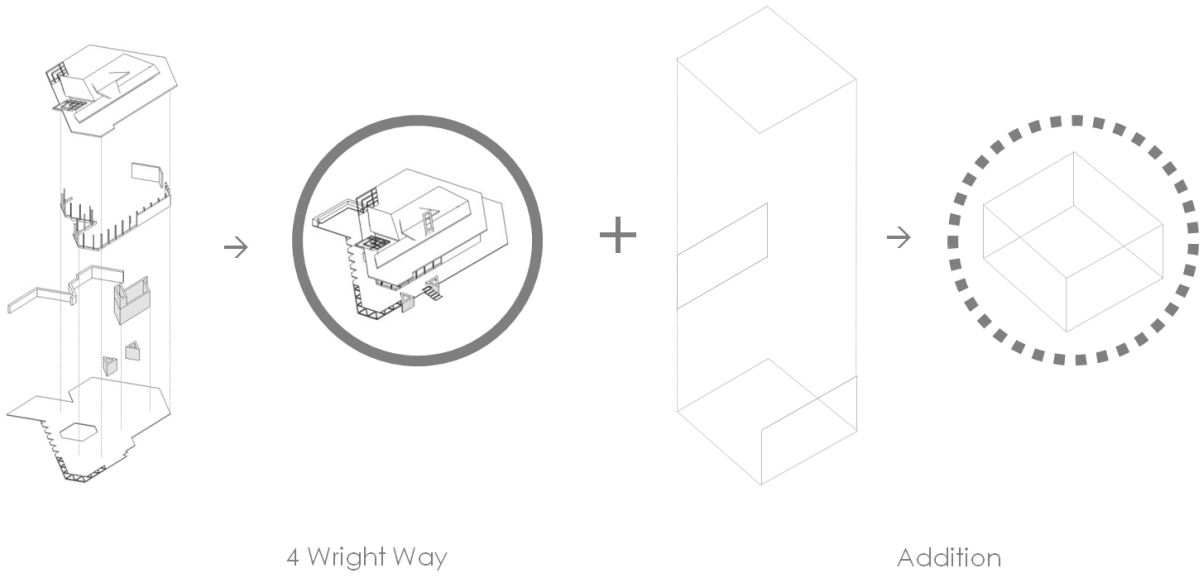


Fig. 42 – Fragmentation and simplification of the vertical grid allows the revealing of the construction grammar in the new addition (Diagram by the author)

Interior-Exterior Relation

In *4 Wright Way* the strong inside-outside relation intensifies the perception of the site and exemplifies Wright's interior space concept of no longer having an outside and an inside as two separated things. For Wright, the use of glass in Usonian houses held amazing means in modern life for awakened sensibilities… "air in air to keep air out or keep it in; light itself in light, to diffuse or reflect, or refract light itself."[52] In the design of *4 Wright Way's* new addition, the use of glass should be directed to enhance the interaction between old and new, visually connecting the interior spaces of the new intervention with the historic fabric and the surrounding landscape. In addition, the derivative indoor-outdoor gardens used by Henken to weave interior and exterior in the original unit, should be used as intertwine devices between the old fabric and the new intervention.

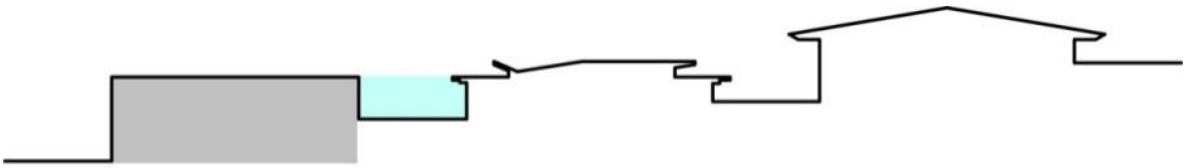
Natural Materials

The close interaction with nature is one of the most successful aspects of derivative Usonian houses; the elements of Usonian houses that truly make a difference are the elements that bring the dweller close to nature: all the glass and the use of nature materials.[53] The tactile quality and warm of the brick and concrete and even the scent of the cypress wood used by Henken to build *4 Wright Way* are determining attributes of the aesthetic perception of the house. *4*

[52] Frank Lloyd Wright, *The Natural House* (NY: Horizon Press, 1954), 51
[53] Roland Reisley with John Timpane, *Usonia, New York, Building a Community with Frank Lloyd Wright* (NY: Princeton Architectural Press, 2001), 121

Wright Way material palette, applied to the addition, should ensure the blending of the new intervention with the surrounding landscape while recognizing the significance of the original unit as the source of the sensorial perception of the whole house complex.

DESIGN PROPOSALS FOR THE NEW ADDITION

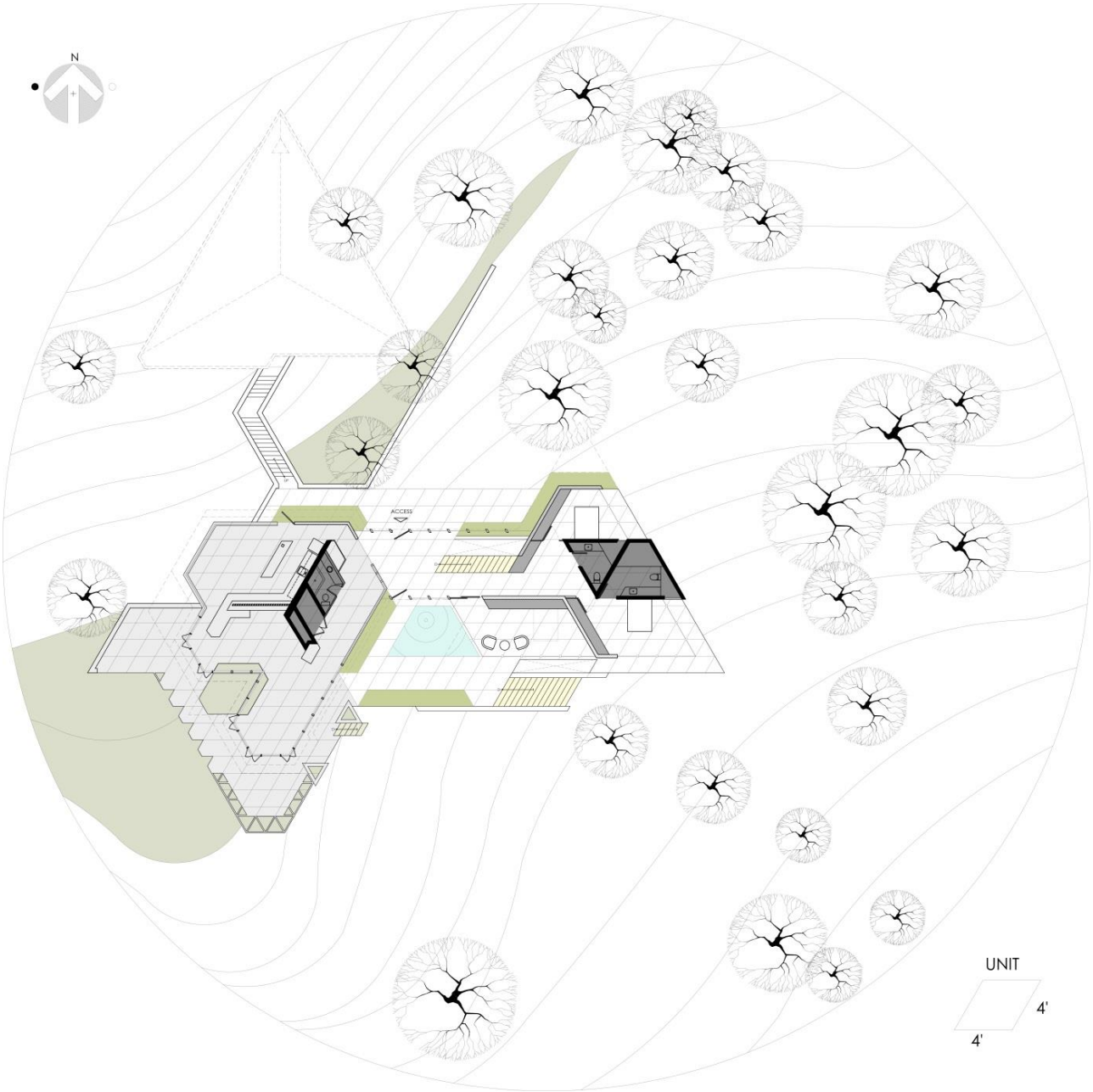


SCHEME A

Planning Grid → Separating

First Floor Level, original *4 Wright Wayunit* in gray

Planning Grid → Service Cores and functional spaces

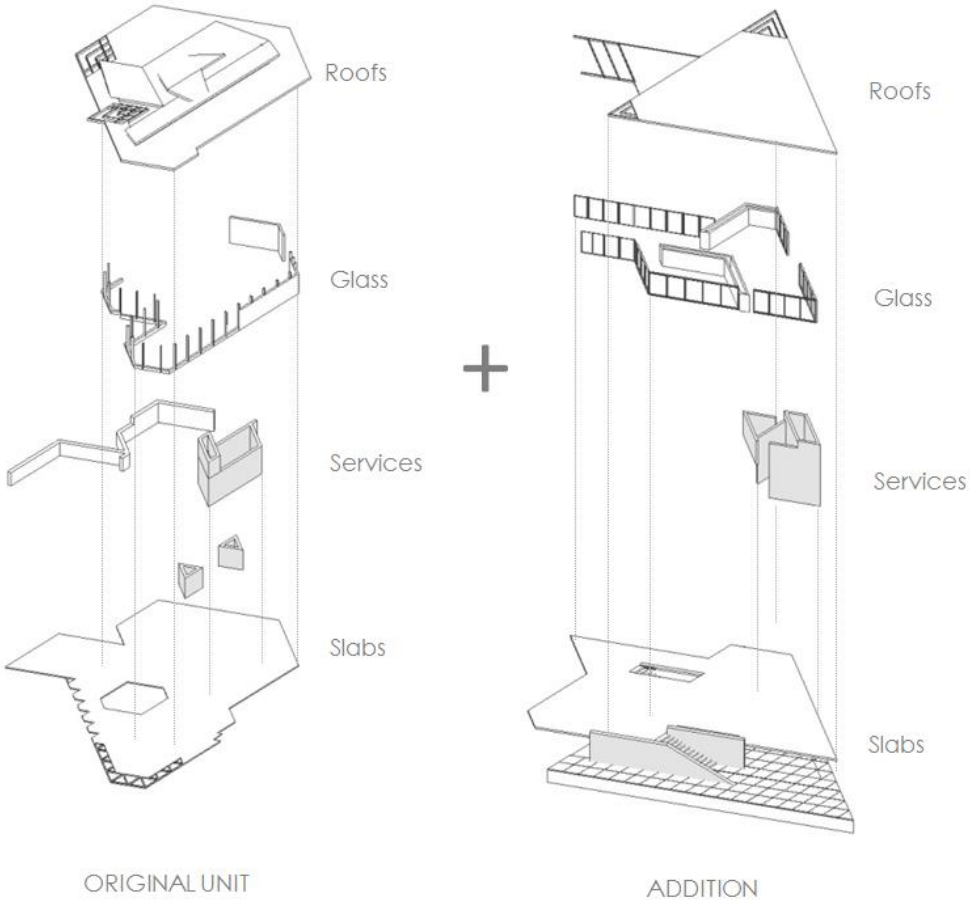


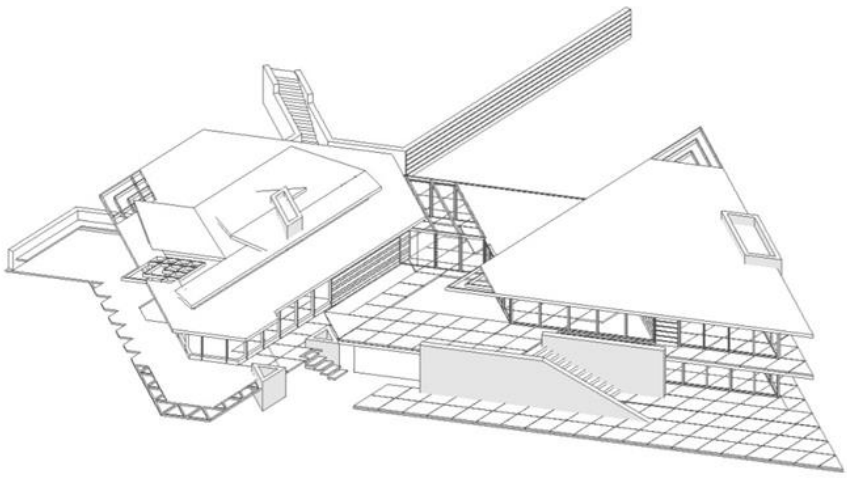
First Floor Level

Planning Grid → Service Cores and functional spaces

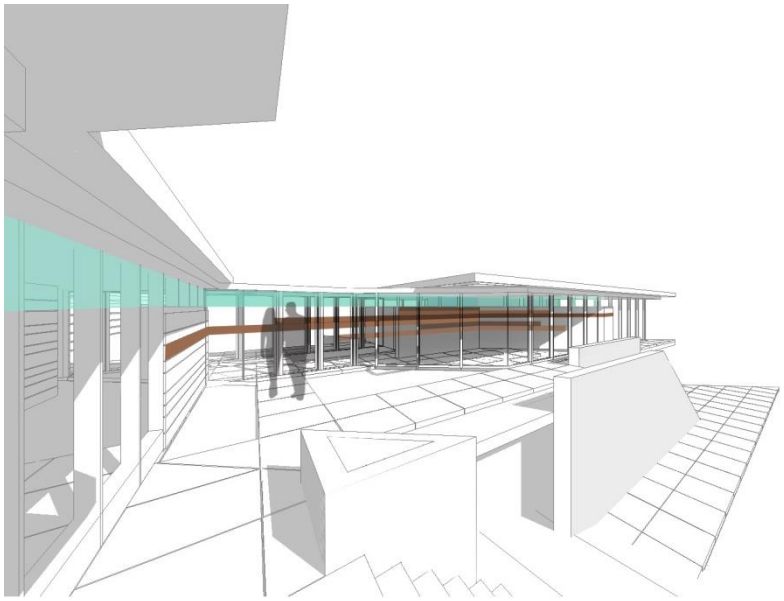
Ground Level: Studio

Planning Grid → Kit of Parts





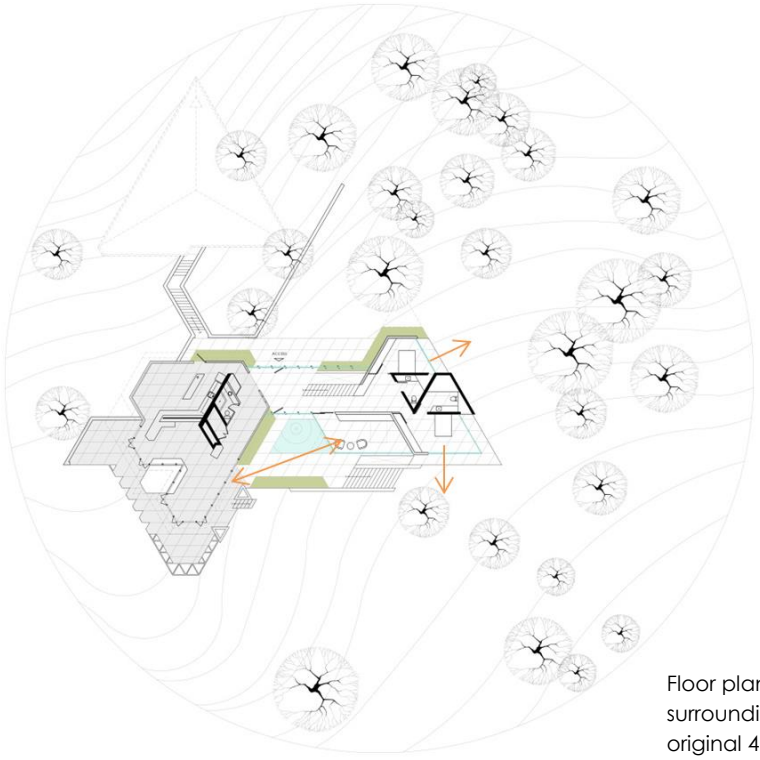
Vertical Grid → Fragmenting



Vertical layers, extended and simplified

Longitudinal Section

Interior- Exterior Relation → Weaving Old and New



Floor plan. Visual connections to the surrounding landscape and to the original 4 Wright Way Unit

View to the original 4 Wright Way unit from the new family room/bedroom

Interior – Exterior Relation → Weaving Old and New through the use of glass and vegetation

South Elevation

Materials → Blending

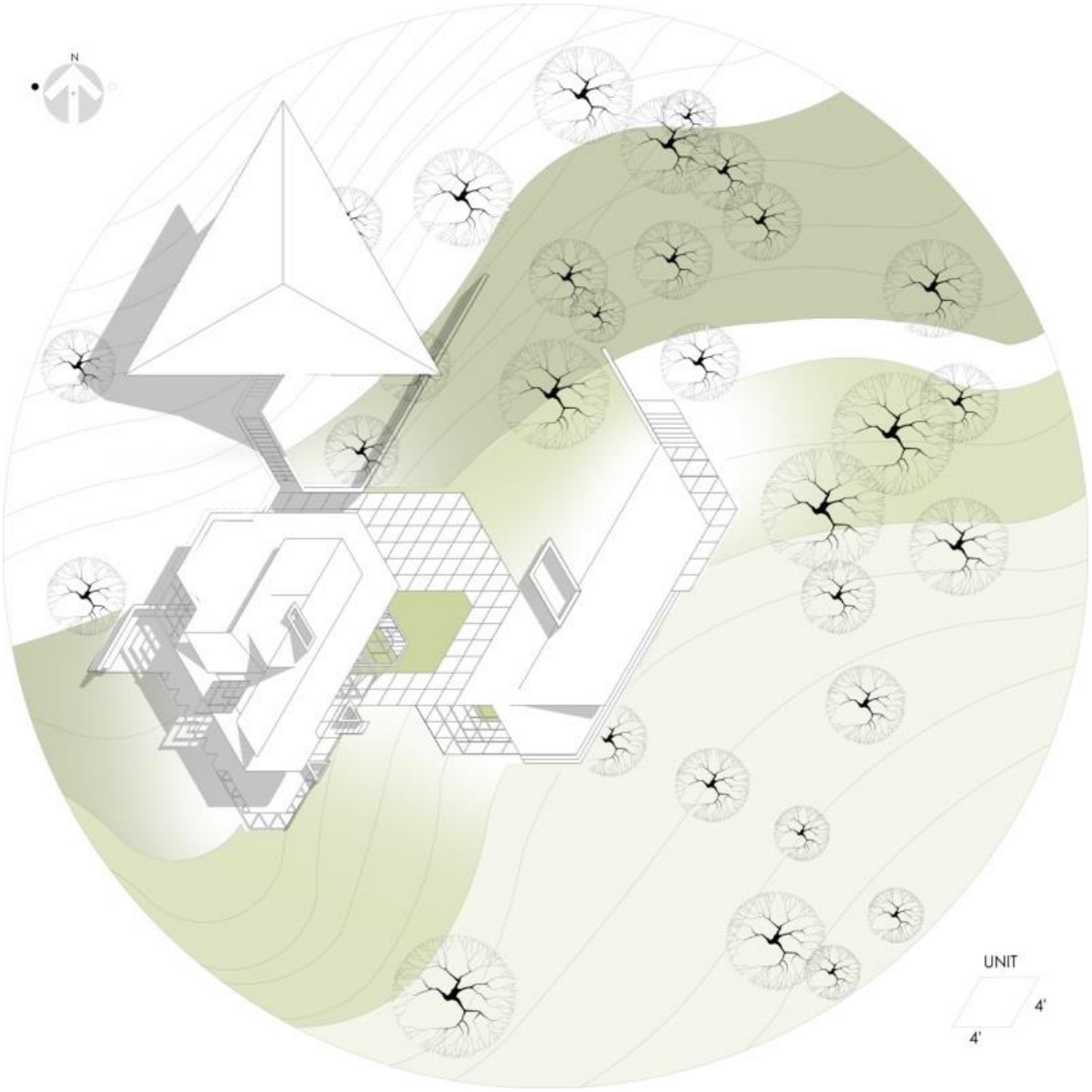
4 Wright Way. North view from the access

4 Wright Way. Brick, Concrete and Wood

Scheme A. North View

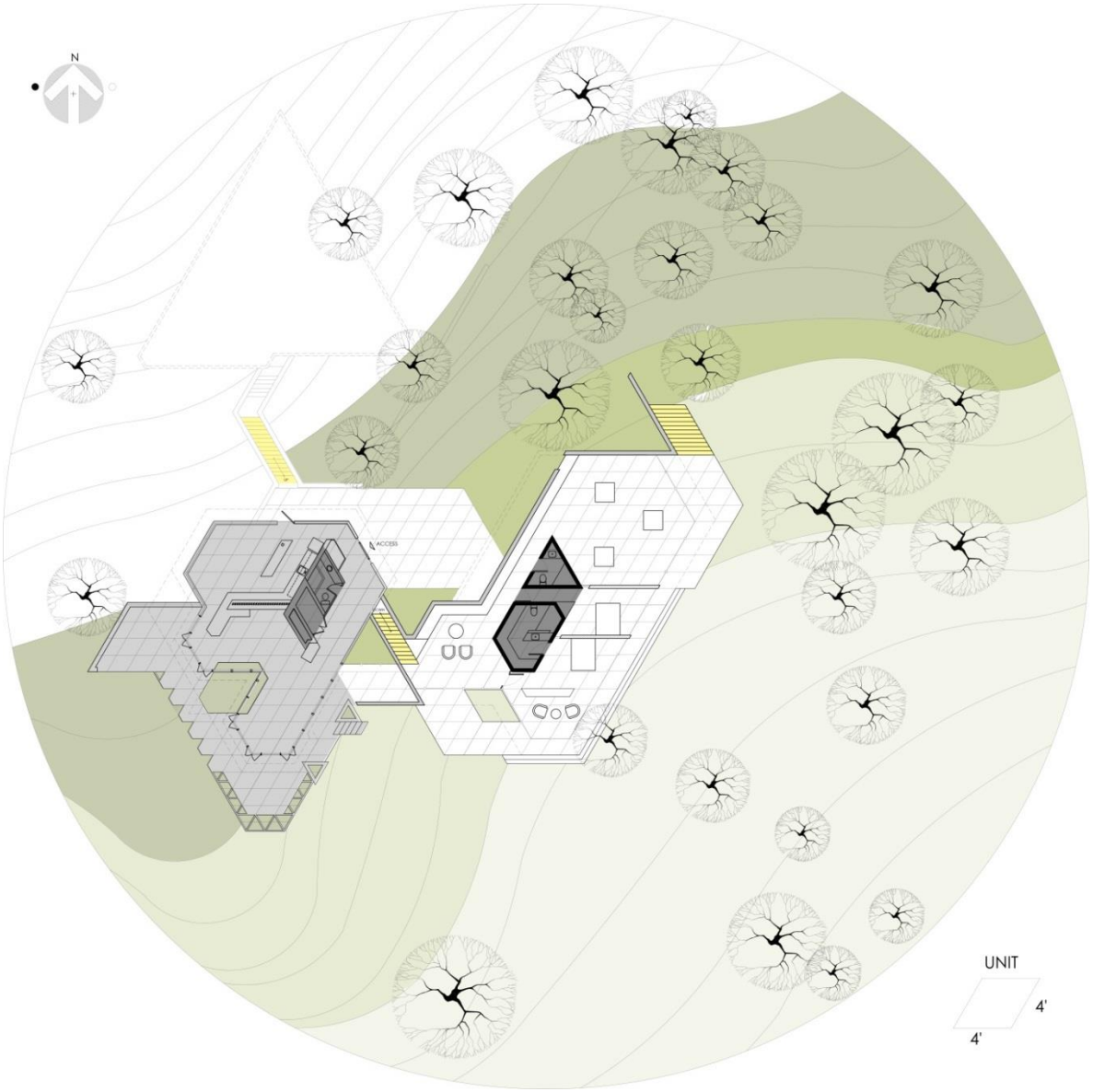
SCHEME B

Planning Grid →



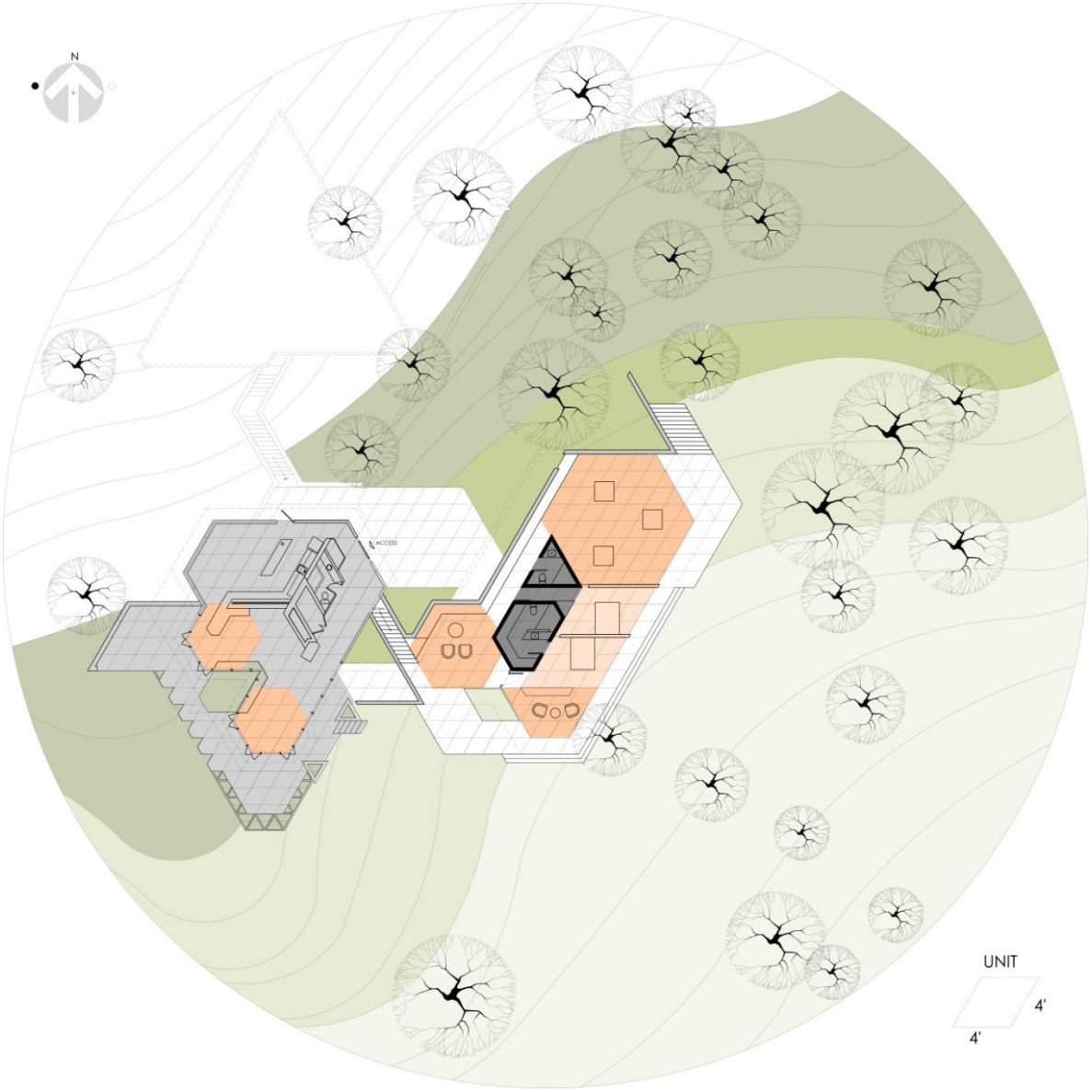
Site Plan showing the new addition developed beneath the original access level.

Planning Grid → Replicating vertical connections



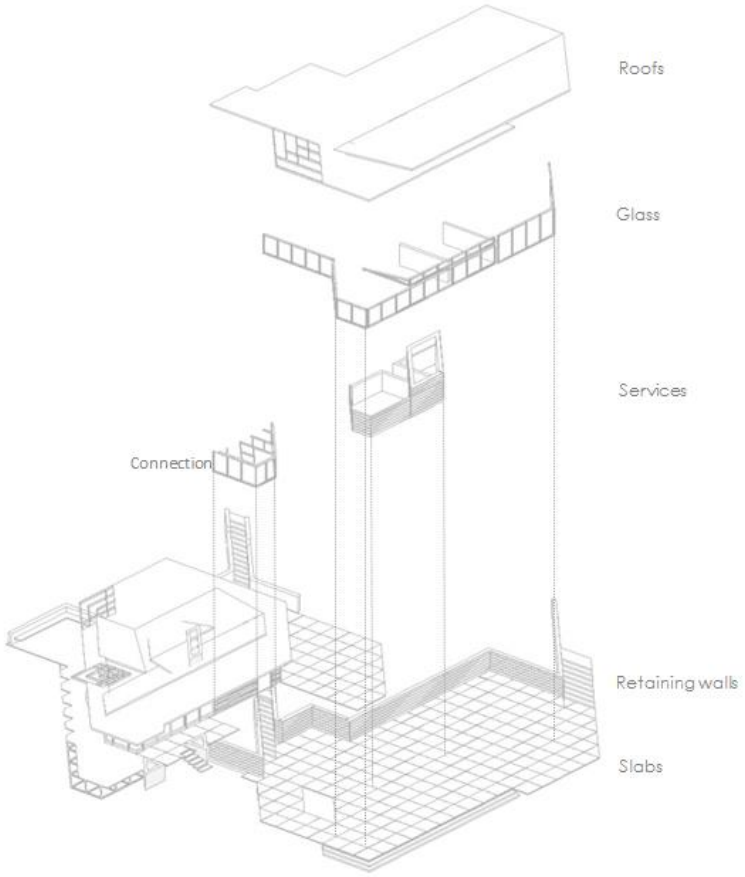
Ground Floor Plan. *4 Wright Way* original unit in gray

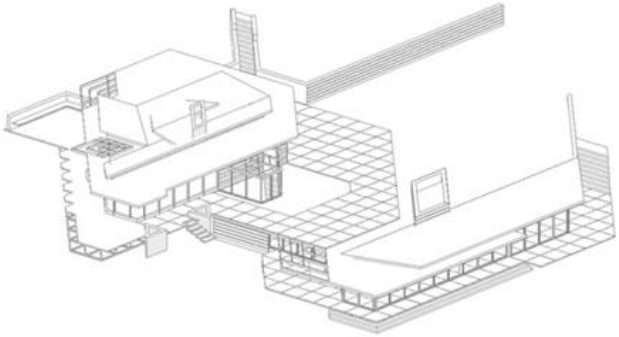
Planning Grid→ Service Cores and functional spaces



Ground Floor Plan. Main interior spaces in dark orange, bedrooms in light orange

Planning Grid → Kit of Parts



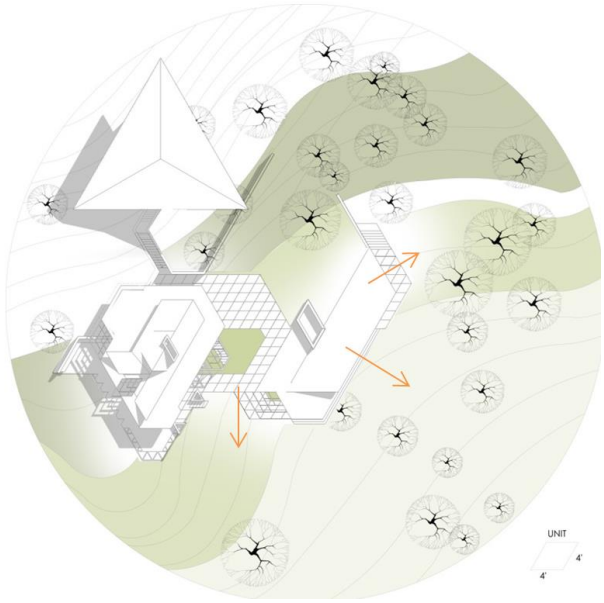


Vertical Grid → Fragmenting

Longitudinal Section

South Elevation.

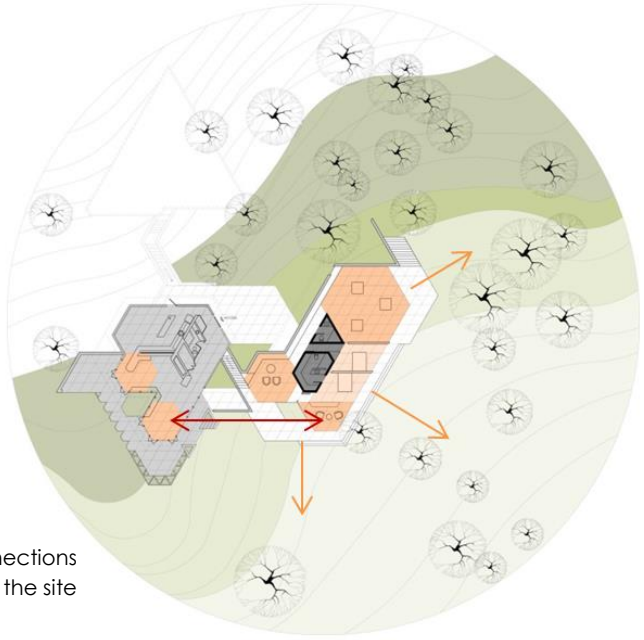
Interior – Exterior Relation → Topography



Site Plan showing visual connections between the new addition and the site

North view from the main access

Interior – Exterior Relation → Topography



Site Plan showing visual connections between the new addition and the site

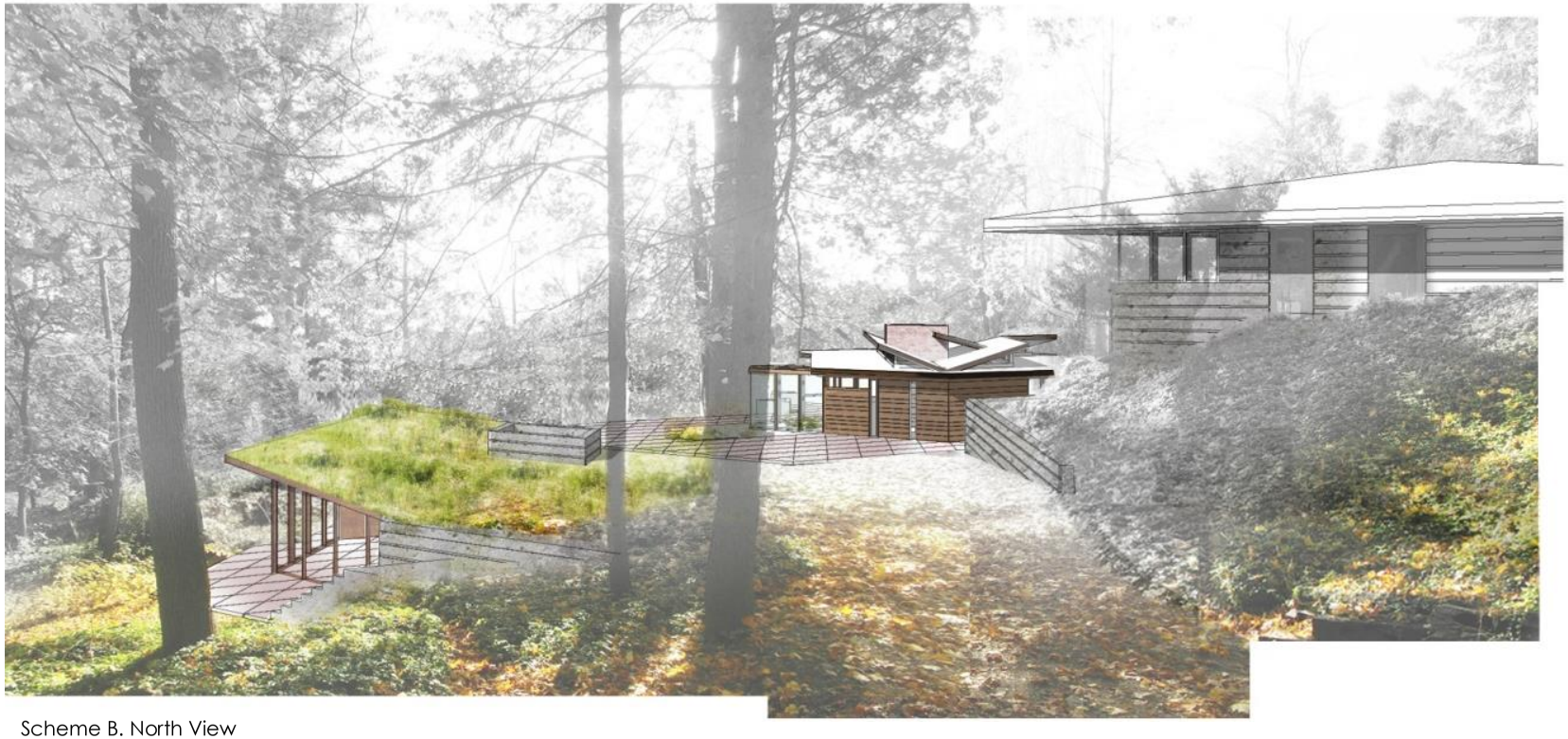
View from the original unit to the new addition

MATERIALS → Blending

South Elevation.

MATERIALS → Blending

North view from the main access



Scheme B. North View

Conclusions

Design explorations were a common usonian practice. Latest Wright's projects could not be regarded as answers to the small house problem; rather each building arose uniquely from its site, its climate, it client's needs and its budget.[54] With his own limitations and restrictions, David Henken also tried to move forward from condensed projects based on rectangular planning grids to more expressive explorations using the diamond module or developing larger houses outside Usonia. The gray zone where *4 Wright Way* is located in the Usonian timeline, could allow us to unfold further derivations of the usonian design concept; however, in doing that, the question that arises is how far can we go without diluting completely the original design concept and how much further can we take the design explorations without compromising the perception of *4 Wright Way* as the main architectural piece of the site.

If *4 Wright Way* were an isolated object, perhaps a different design approach to resolve its expansion could have been valid; for instance, making juxtapositions of new forms or different design concepts to its historic fabric. However, *4 Wright* is not an isolated object, *4 Wright Way* is part of a historic community composed by other houses with a shared identity. Implementing a Derivative Design methodology for the development of additions to historic Usonian houses allows the preservation of the Usonian identity through subtle derivations of the main principles of their shared construction grammar: Planning grid, vertical grid, interior-exterior relation, and natural materials.

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[54] John Sergeant, *Frank Lloyd Wright's Usonian Houses, The case for Organic Architecture* (NY: Whitney Library of Design, 1976), 81

Frank Lloyd Wright believed that consistency in grammar is the property of a well developed architect.[55] Therefore, a Derivative Design should be the result of a coherent use of the Usonian grammar and its possible derivations. The final goal of a Derivative Design for expanding Usonian houses, is to achieve the historic and architectural integrity of the whole intervention, while fulfilling the functional needs of the dwellers. Derivative Design involves a compromise with the historic fabric that in any case should be the cause of the dilution of the *original work* of an architect. The *original work* of the architect should be focused to resolve efficient architectural schemes with compelling interior spaces that enhace the connection between the dweller, the historic fabric and the surrounding landscape.

The author hopes that the design exploration developed in this thesis could prove that a derivative design methodology is helpful to solve the problem of expanding Usonian houses and that a derivative design analysis is required to unveil the significance of many Usonian houses which, even though were not designed by Frank Lloyd Wright, have a historic and an architectural value that should be preserved and recognized.

[55] Frank Lloyd Wright, *The Natural House* (NY: Horizon Press, 1954), 182

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