Evolution of A Modern American Architecture: Adding to Square Shadows

Fon Shion Wang
University of Pennsylvania
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Disciplines
Historic Preservation and Conservation

Comments
Advisor: David G. De Long

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EVOLUTION OF A MODERN AMERICAN ARCHITECTURE:
ADDING TO SQUARE SHADOWS

Fon Shion Wang

A THESIS

In

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Advisor
David G. De Long
Professor Emeritus of Architecture

Reader
John Milner
Adjunct Professor of Architecture

Program Chair
Frank G. Matero
Professor of Architecture
to my parents
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David G. De Long
John Milner

Randy Mason
William Whitaker
John Hinchman

Dominique Hawkins and Lori Plavin Salganicoff
The De Long Fellowship Alumni Committee

Brian Chevchek
HSPV Class 2007
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If we accept the argument that architecture is a direct reflection of the economic, cultural, and social constructs of its time, the built environment is a distinct symbol of the adaptation of architecture to meet the needs of a changing society. Architecture reflects the way people live and employ the technology and materials of their time. The hierarchy and flow of spatial constructs mirror social constructs. This juxtaposition of time and form is especially apparent in the architecture of additions. Not only is the old directly comparable to the new, but also apparent is how the architects for the new understands and interpret the old to create a single entity with distinct identities.

**Statement of Thesis**

It is the contention of this thesis that the success of a contemporary addition to a historic structure lies in the architect’s ability to understand the design intentions of the past and translate them to meaningful ideas in contemporary culture. As with a good story, the beginning of the story must be understood before the next chapter is written. How the story evolves, whether it reflects a turn of events or is simply a rumination of the past, is dependent on the character and context of the building. Equally important are the requirements of the occupant and ambitions of the designer.

**Project Selection**

To test these principles, I propose to design an addition to Square Shadows, the William Stix Wasserman country house (1934) by George Howe located just outside of Philadelphia, Pennsylvania. I will address the question of how contemporary ideas can
inform the built fabric of the past. I will consider the constructs of a present-day addition to a historic structure, and whether it can address the social and cultural concerns of our time, employ contemporary materials and technology, and fulfill the needs of a new use while retaining the integrity of the original design. Moreover, I will explore methods to assimilate the addition to its context and embody a sense of belonging despite new construction.

**Justification**

Increasingly, the preservation of the recent past has become a concern as modern buildings are being altered, or worse, abandoned, due to constraints of use and the deterioration of the building fabric itself. In order for a structure to remain as a component of the built environment, it becomes necessary for the form of the building to be adapted to the requirements of the present occupants. If evolving spatial and environmental requirements are introduced in a cohesive and sensitive manner, then the alteration succeeds in enhancing the existing architecture as well as informing its present context. The creation of contemporary additions is successful when it considers authenticity to its own time or place while respecting that of the original. Architecture cannot remain static.
01. Methodology

The primary objective of this thesis is to create an addition that enhances the original design while maintaining and continuing the building’s narrative. Design principles for additions will be extracted from the history of the building, George Howe’s design intentions, the occupant’s requirements, and case studies. The proposed addition to Square Shadows will accommodate the growing needs of the current occupants and assess the potential of recovering and reinvigorating original design elements.

The methodology of this thesis can be expressed in two generalities: the pragmatic and the experiential. The pragmatic is illustrated in the form of diagrams depicting formal axes, hierarchy, sequence and order. This rationale guides the design recognizing that final decisions and overall aesthetics are based just as much on instinct and sensibility, the experiential. Square Shadows has become a human commodity, losing richness in experience and materiality to function. A building works when it meets the functional needs of the occupants. However, it is not until the form engages the user in physical phenomena that it becomes architecture. The direction of this design is guided by both the pragmatic and the experiential, hand in hand.

Pragmatic
Research begins with the history of the building, including significant additions, past and current occupants, and the building’s significance as a point departure in the career of George Howe. The programmatic requirements of the current occupants will be examined as well as the interface of public and private realms. Landscape and site will be reviewed, as architecture has an integral relationship with the surrounding land. Additionally, case studies will be examined in order to extract design principles that may inform the project at hand.
History

The design process shapes the evolution of the building towards its final form, in turn the form places the building in time and space by representing the preoccupation of the builders and occupants. In particular, the articulation of the exterior elevations expressed Howe’s interpretation of modernism of which he spoke extensively. My objective is to dissect the original design intent and extend the idea to the addition. The building then has the opportunity to read as a whole, rather than separate entities. In order to retain or reinvent the aura and memory of Square Shadows, Howe’s original intent must exist within the progression of changes to the structure and its context.

Significant alterations and additions to the building have been made to accommodate the growing needs of the occupants. These modifications will be discussed in terms of their effect on the original built fabric, and their success as functional elements. Once documentation of the building in its past and present states is complete, an exercise in simplification of geometric forms will aid in deciphering the necessary components of the building. This exercise is purely an examination of forms and volumes regardless of function. The goal is to reveal opportunities for modification while retaining built fabric critical to expressing Howe’s design intent.

Intersection of Public and Private

The façade acts as the physical edge between the public and private. It gives the building presence and identity, its first impression. The original elevations were designed according to the desires of both the clients and the architect. The architect expressed a reaction to a broad movement in architectural history, the adaptation of the International Style to American soil. The client appreciated modernism but did not want to create an
anomaly in the quiet landscape of the countryside. What resulted is the cohesion of the two ideals, integrating local materials with a modern vocabulary.

The Wasserman family occupied the house until 1953. The building experienced a number of transitions until the current occupation of a school and church. The change of use from private residence to an educational and religious facility warrants a reexamination of the presence of the building to the public. The ideas of the original façade will be extracted in terms of the use of materials and expression. The rhythms of fenestration, hierarchy of expressions, and juxtaposition of volumes will be examined. These ideas will be translated into contemporary language, construction techniques and materials.

**Site and Landscape**

Building orientation and site resources will be explored, including occupant modifications and natural phenomena in the surrounding land. This research will address the orientation and location of the addition, including the approach and sightlines of the visitor and the impact of the addition to the natural landscape. The existing and proposed built forms in conjunction with landscape and vistas will balance the site. The objective is to make use of the expanse of the property, which is currently underutilized.

**Case Studies**

Case studies that embody various approaches to additions will be researched for perceived successes and failures. Every situation merits a different method of analysis relying on the creativity, judgment, and experience of the designer to infer the potential compatibility of a design. Whether or not the result is accepted is inconclusive until the building is complete, sometimes not until many years after completion.
To that end, the architecture of additions is examined through completed works as a method to approach the dilemma of the meeting of the old and the new in an effort to provide a basis for evolving design theory, an open dialogue rather than a recipe solution. The focus of the study is contemporary additions to buildings that emerged as a precursor, model or an interpretation of the modern movement. Four case studies with distinct approaches to design have been compiled in an effort to formulate design principles to approach the architecture of additions today. The goal is to formulate design theories that holds true without prescribing rules of do’s and don’ts.
Experiential

“For if the intervention is to find its place, it must make us see what already exists in a new light. …I believe those buildings only to be accepted by their surroundings if they have the ability to appeal to our emotions and minds in various ways. Since our feelings and understandings are rooted in the past, our sensuous connections with a building must respect the process of remembering”¹

– Peter Zumthor

As an overlay of the pragmatic approach, the concept of creating atmosphere is examined.² It is an inherent goal of most architects to create space that evokes an emotive reaction from its occupants. Though the formal effort leads to the organization of spaces, the hope is to reach beyond formalities and move the human spirit, stir the soul. Design will be approached formally and rationally as a base to think freely and instinctively.

Architecture, over many forms of art, has the unique ability to engage the observer. The occupant has the ability to use all five senses to experience the building. Two primary characteristics that architecture holds over most forms of art are that the observer can occupy the form, and that the observer can touch the form. It is in these two instances where the opportunity to actively engage the occupant occurs. Volume and human scale address the first concern while the juxtaposition of the textures of materials used address the second.

² Peter Zumthor. Atmospheres. (Basel: Birhauser- Publishers for Architecture. 2006), 11-13. Atmosphere is understood as defined by Peter Zumthor in Atmospheres as the undefined quality that moves a person emotionally while experiencing and occupying the form of a building.
The study of scale and composition of materials and textures will speak to the primary occupant, school age children. Colors and textures have the ability to express purposeful meanings. A dark floor and a light ceiling exert a different effect on the occupant than a light floor and dark ceiling.\(^3\) Over-ornamentation expresses a different feeling than clean lines and simple gestures. Symmetry and balance convey order. Humans by nature are more comfortable in order rather than chaos.\(^4\) Architecture can be created by perceiving how one may occupy, circulate, and engage with the form. This thesis explores assemblages, materiality, and function, and contends that an addition can expand a meaningful narrative to the context of contemporary culture.


\(^4\) Ibid, 175.
George Howe and the International Style

To understand the significance of Square Shadows, the cultural and social context of its time is examined. The completed design symbolized a pivotal moment in the evolution of George Howe’s philosophy toward architecture. The building embodied Howe’s interest in Modern architecture and his personal struggle to reach beyond his Beaux-Arts training. Further, it symbolized a corresponding shift in the broader scheme of architectural theory in the United States when architects were divided between those who accepted and those who rejected the International style. In Robert Stern’s extensive writing about Howe, the author asserted that Howe’s later work found cohesion between the language of Modernism backed by the theories of the Beaux-Arts tradition. 5 Though Stern was referring specifically to the PSFS skyscraper, a similar sentiment holds true in regards to Square Shadows.

George Howe and Modernism

George Howe (1886-1955) was born in Worchester, Massachusetts. He spent little time there before moving on to life and studies in Boston, Philadelphia, and Europe. At an early age, Howe was interested in pursuing fine arts as a profession. However, his mother encouraged him to study architecture, which was considered a respected trade in her Quaker heritage. Howe’s architectural career began at the age of 18 at Harvard University where he studied architecture and fine arts. At Harvard he was influenced by the work of Charles Moore.6 Moore emphasized design theory that stressed the expression of the structure of the materials rather than hiding the construction behind a finished face. He felt that the architect was responsible for crafting, thus the forming of joints and connection were

intricate to the overall aesthetic. “Architecture for Moore, is less concerned with design than
with construction; more concerned with how the building got to be than with the aesthetics
of the building itself.”7

After his term at Harvard, Howe traveled to Italy for a year to study and sketch
Italian architecture. He then attended the Ecole des Beaux-Arts in Paris, where rationale and
traditional design theories were emphasized. Here, he was influenced by Paul Cret (1897), a
French born graduate of the Ecole, a professor at The University of Pennsylvania (1903-
1907), and a Philadelphia Architect. Howe’s own philosophies stemmed from these multiple
influences, which would both propel and force a change of direction later in his career

After the completion of his studies, Howe returned to Philadelphia in 1913. He
served briefly as an apprentice with Furness and Evans before joining the firm of Mellor and
Meigs as a third partner. Mellor and Meigs were considered conservative and well known
for there traditional country homes in Philadelphia’s neighboring suburbs.8 The residences
were grand but not palatial, and tended to use local materials such as Chestnut Hill
limestone. These structures, often accompanied by formal gardens, reflected tones of
romanticism. Howe followed the firm’s philosophy in his projects as seen in High Hollow,
his own residence bordering Fairmont Park in Chestnut Hill. (Figure 2.1) The plan was
axial and symmetrical overlooking formal gardens and graduated terraces. The house was in
the Beaux-Arts tradition. However, it was in the masonry construction of this house that
began to express Howe’s interest and Moore’s influence in the honesty of materials.9 Details
of the exterior stone expressed bearing versus nonbearing elements, relieving arches were

7 Robert A. M. Stern “PSFS: Beaux- Arts Theory and Rational Expressionism.” The Journal of the Society of
Architectural Historians, 21. no. 2 (May 1962), 86.
8 Ibid, 79.
articulated as accents in the face of the wall surface. These elements expressed the true construction of the wall.

After several projects with the firm, Howe began to feel restricted with the limitations of the traditional vocabulary. The partners Mellor and Meigs believed that any discussion of modern was unworthy of mention. Therefore, it was not until Howe left the firm that his work fully expressed his own philosophies.\footnote{“George Howe: An Architectural Biography.” \textit{T-Square} 2 (Jan 1932), 22.} A biography of Howe in the T-Square Journal describes one of his explorations beyond traditional design.

“In his first and perhaps best private house, near Philadelphia, the large sliding windows and cantilevered stair, as well as the complete absence of ornamental detail, are prophetic of his later development. He continued to adhere masonry with its restricted openings…but his architecture took on a fresher and simpler form”\footnote{Ibid, 23.}

Though the description does not name the building, the portrayal was clearly of Square Shadows. Howe’s struggle with understanding the modern movement as an overlay to his traditional training was finally realized in this structure. Inclinations of modernism can be seen in Howe’s earlier work such as the plan of the Arthur E. Newbold Estate, Laverock, PA (1921-24). (Figure 2.2) Though the overall scheme is traditional, the linear form of the plan resembled that of Square Shadows. The parti consisted of two rectilinear bars with a grand stair that served as a pivot point. The plan for the Newbold Estate illustrated a linear path, conscious or unconscious, in the evolution of Howe’s work towards Square Shadows.
Partnership with Lescaze

Although Square Shadows was credited to Howe alone, the dramatic shift in architectural expression of the house was provoked by his partnership with William Lescaze. The Lescaze version of Square Shadows exhibited similar characteristics exemplified by the Oak Lane Day School (1929), the first joint project by the partners. The simple plan composed geometric volumes without the use and order of corridors, and expressed hierarchy without the use of a formal axis or symmetry. (Figure: 2.3) Teacher and student spaces were clearly differentiated. Exterior space was defined between play area and service area. The entry portico created a sheltered exterior space and transparency of interior to exterior space. The school’s exterior was simple and unadorned, the interior clearly expressed in the articulation of the exterior. The structure was designed in accordance with what would come to be called the International Style, therefore assumed to exhibit a heavier hand of Lescaze.

Prior to his partnership with Lescaze, Howe designed several branch offices for the Philadelphia Savings Fund Society while with the firm Mellor, Meigs and Howe. These structures reflected his Beaux-Arts training, specifically Italian Renaissance and classical motifs. (Figure: 2.4) The branch banks were typically low heavy masonry structures. In 1926, Howe was commissioned to propose a scheme for a new PSFS building that would house banking and a tower of offices above. The implications of a skyscraper were beyond the scope of Howe’s previous work and knowledge in masonry construction. His first pass at the design reflected these limitations. (Figure: 2.5) The traditional tower was topped with
globe lights and statues of human figures. The project was delayed and did not go forward again until 1929. By this time, Howe formed a partnership with William Lescaze.

With the influence of Lescaze, more progressive, revised schemes featured simple lines and volumes expressed by the horizontality of the banded windows. However, the client, James R. Willcox, demanded that the building have a stronger vertical reading. He was unwilling to concede to a thirty two-story building without signs of vertical structure. Howe disagreed, and argued that the emphasis of verticality would be considered applied decoration, renounced in favor of expression of function in modern design. Howe and Lescaze eventually presented several iterations of the building with a vertical expression, from which the final form was realized in 1932.

Programmatically, the architects persuaded the client to accommodate the banking floor at the second level of the building, allowing the ground level to be open to retail and public activity. The building stood tall above the city once crowned by city hall and was heralded as the tallest building in Philadelphia at its completion. With the skyscraper, William Lescaze further implemented the departure from a traditional vocabulary. Though the building was lauded as the first skyscraper to be constructed in the International Style, it generated mixed reactions from architectural critics at its completion.

After the partnership of Howe and Lescaze had dissolved, Square Shadows was the first project Howe completed on his own and was thereby able to express his personal overlays of modernism and traditional design. Lescaze’s push towards the modern element influenced the formation of Howe’s philosophy of overlaying the rationale of the Beaux-Arts

13 Jordy, 66.
theory with the clean lines and geometry of the International Style. This philosophy was embodied by Square Shadows solidifying its significance in the evolution of the built environment.

Comparison to Mandell House by Edward Durell Stone

To further illustrate the character of Square Shadows, it is meaningful to compare it to buildings of similar typology and time. The Richard H. Mandel House by Edward Durell Stone was completed in 1935 located in Mount Kisco, New York. (Figure: 2.6) Stone described the house as the first in the United States designed in the International Style. Whether the Mandel house was the first house representing the American version of the International style remains debatable, but the transition to simple lines, banded windows, and rectilinear volumes was clear. The plan of the house was similar to that of Square Shadows in its long linear forms. (Figure: 2.7) The Mandel house plan was a pinwheel configuration, opening up to exterior terraces on the upper level. Both entries featured a grand stair. In the Mandel house, the stair drew the visitor upstairs to the living room, which exemplified the idea of the piano noble. Although the exteriors of the buildings were innovative, both buildings remained conservative and formal in their interior spatial flow.

The grand cantilevered stair in Square Shadows connected the upper and lower levels and served as a pivot point in the plan. Converse to the idea of the piano noble, the upper level was private retreat for the residents rather than a public space. Both the plans of Square Shadows and the Mandel House were composed from a parti that encouraged spatial overlap and flow from one room to the other. However, upon closer inspection, both plans

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were compartmentalized and lacked true spatial transparency. The spaces were formal and
dedicated to a specific function, rather than free flowing with multiple layers of geometries.

The use and dichotomy of the traditional and modern vocabulary in singular
structures categorized Square Shadows and the Mandel House as transitional. They clearly
reached away from tradition design exemplified primarily in the exteriors, but the interiors
remained rooted in traditional formalism and rationale. Although both buildings spoke in
geometric volumes, the expressions of the exteriors differed in their interpretation of
modernism. Stone chose to express the exterior with simple clean lines. The finish surface
of the building was a smooth, monolithic white surface with fenestration that consisted of
long banded windows. Howe expressed the material and construction of the exterior. The
structural and nonstructural components of the masonry wall were clearly expressed. The
stone and brick cladding created texture on the exterior composed with simple, geometric
planes.

The comparison of Stone and Howe’s works suggested that both architects were
eager to incorporate the ideologies of the International Style within their own ideas. Howe’s
Square Shadows became even more of an anomaly when placed next to the work of its
contemporaries. Howe’s interest in expressing the construction of the building represented
his own design philosophies and a clear departure from Stone’s interpretation of modernism.
The materials employed showed a clear sensitivity to the local vernacular while applying the
emerging theories. Square Shadows was exemplary of a moment in time within the broad
context of American architects adopting the International Style.
03. Building Evolution

Site Evolution and Existing Conditions

(See Appendix C, Table 1 for abbreviated chronology)

Square Shadows (1932-34) was designed as a country residence in Whitemarsh, Pennsylvania just northwest of Philadelphia by architect George Howe. The project is considered significant in the career of Howe as it represents his first solo project after his short partnership with William Lescaze. Additionally, the project exemplified Howe’s approach to humanizing and interpreting the austere language of modernism of which he wrote and spoke extensively. Architect, Robert A. M. Stern’s description and conjectures regarding Square Shadows in his biography of George Howe is used as a guide to examine the early evolution of the building.\textsuperscript{15}

William Wasserman, a Philadelphia stockbroker, first commissioned Howe to design a country home retreat for his family around 1927. Though no drawings remain, it is believed that Howe’s first take on the design was a typical Georgian mansion similar to Howe’s prior work for country residences.\textsuperscript{16} In 1929, Howe formed a partnership with William Lescaze, an advocate of what would become known as the International Style. With the influence of Lescaze, the design for the house was re-envisioned with modernist ideals consisting of geometric forms, banded windows, clean lines, and austere, hard finishes in the interior and exterior. (Figures: 3.1 and 3.2) The client’s reaction to the modern scheme was described in a letter from Wasserman to Stern,

\textsuperscript{16} Stern, 162.
“I was presented with a concrete structure that resembled a modern factory. Some of the interiors replete with marble walls and stainless steel reminded me of a bank, while other rooms looked like a modern brothel…”[17]

The reaction from the client suggested that the design did not meet his aesthetic expectations. The project was put on hold due to the economic depression in 1930. When the project continued in 1932, the Lescaze scheme was abandoned; the reason was noted as cost. Howe picked up the design alone, and redesigned the house adding two wings to the “L” shaped building incorporating traditional materials into the modernist exterior formulated by Lescaze. (Figure 3.3) The changes to the scheme were interpretative of Howe’s reaction to the modern movement as well as the client’s adverse reaction to living in an austere modern house.

According to Stern’s description of Square Shadows, Howe utilized local stone and brick to express the weight and mass of the exterior bearing walls as opposed to the expression of free façade, typical of modern exteriors.[18] The construction of the rectilinear plan was clearly expressed through materials that transcend their use. Bearing walls were articulated as such, while non-bearing exterior walls were expressed in a brick bond pattern declaring its function as non-structural enclosure.

Square Shadows was the first residence known to utilize high velocity air conditioning, which maximizes the capacity of cooling with minimally sized air ducts. Interior details were carefully thought out in order to integrate the system into the architecture. The presence of the mechanical system was not denied; the intrusion was


treated as purposeful. Interior finishes were also carefully selected. Fine woods and marble were utilized to accentuate formal spaces such as the entry hall and adjacent dining room; both lined in teak wall panels. The oversized mantel in the living room was constructed of light travertine accented with a set back wide dark band. (Figure 3.4)

Changes in occupation

In 1955, the Wassermans vacated the house and sold it to Rosabelle and Stephen Deichelmann. The Deichelmann’s purchased the property in an unsuccessful attempt to develop it for profit. One development proposal included turning the building into a research facility for Temple University. The proposal was rejected by the Whitemarsh planning board. A second proposal to turn the building into four apartments was approved by the planning board, but never realized. 19

In the fall of 1955, the Gloria Dei Lutheran Church purchased the building for a new congregation and school. The congregation met in the living room and used several of the bedrooms as offices. The remainder of the building served as a school run by the church and consisted of classrooms and faculty living quarters. The office for Mr. Wasserman, located at the top of the south facing three-story tower, was used as a lounge for the older middle school students. 20 In 1970, the growing congregation created an addition consisting of an eight-sided polygonal chapel connected to the main building with a linear passage. The addition covered the windows on the west side of the informal living room and required the demolition of the north wall of the main living room. (Figures: 3.5 and 3.6)

20 Reverend Townsend is the current pastor of the Gloria Dei Lutheran Church, personal interview by author 22 Sept 06.
The church-run school expanded for several years but closed in 1977 due to decreased enrollment. The church considered several options for new tenants, including renting the space to a charitable organization, before deciding to lease the space to a local Montessori elementary school.21

**Current state of the site**

Currently, the congregation maintains the use of the chapel addition and utilizes the original living room as a meeting space and the study as an office. (Figures: 3.7 and 3.8) The remainder of the main building is used for classrooms and offices for the elementary school, day care and after school program. The school has outgrown its current space and has attempted to fulfill its spatial needs by enclosing outdoor balconies and terraces and housing additional classrooms in a one story structure resembling a trailer on a concrete pad (1988). (Figures: 3.9 and 3.10) The enclosure of the rear terrace overlooking the garden north of the entry hallway created the connecting corridor to this addition from the main building. The enclosure disrupts the view to the rear lawn from the main entry hallway meant to create a spatial connection from interior to exterior. The entry hall also suffered from a roof leak (late 1970’s). The subsequent water damage led the church to replace the original teak panels running the full height of the double story space with a lesser grade wood. (Figure: 3.11)

The original teak panels lining the south wall of the corridor from the entry hall to the dining room remain. However, the open dining room has been divided by a full height angled partition forming a public corridor to the north and an enclosed classroom to the

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south. Additionally, the open garage at the east end of the plan is enclosed with unsympathetic materials to form a nursery. (Figure: 3.12)

In the summer of 2006, the original black steel windows, subsequently painted beige, were replaced with aluminum double hung thermally glazed units painted a neutral taupe. The replacement windows have a thicker profile, a different proportion, configuration, and operation from the original. (Figures: 3.13 and 3.14) The resulting appearance of the fenestration is clumsy and lacks rhythm and rigor detracting from Howe’s original design intent. One original steel window in fair condition remains on the second floor above the entry foyer.

Approach to the site

The house is set back over 280 feet from the two-lane road, Butler Pike, and is hidden from street by trees and natural growth. The visitor enters the site by the driveway approaching the house towards the west edge of the structure. When rounding the driveway turnabout, the entry and north elevation of the house is gradually revealed beginning with the chapel addition obscuring the original west facade. The north elevation is formal in its expression of fenestration and geometry (Figures: 3.13 and 3.14), whereas the rear (south) of the building is looser and more playful. On the south façade, concrete floor slabs extend beyond the building envelope forming balcony and terraces that reach towards the landscape. The building reveals its form, language and presence in the south elevation. Additionally, this elevation was typically featured over other views of the house when the building was published at its inception. (Figure: 3.15)
Landscape

Like many suburban outcroppings, the township of Whitemarsh has evolved from sprawling, grassy hills dotted with country homes to a denser built environment to accommodate a growing population and their lifestyles. The area surrounding the house currently consists of industrial plants, a large cemetery, retail areas and residential enclaves. Despite the evolving environment, the property associated with Square Shadows remains relatively untouched. The building is hidden from the main road, overlooks a grassy hill, and is isolated from neighboring properties by open land and vegetation.

The Wasserman’s purchased up to ten acres of land toward the end of their occupancy of the house. The Church continues to own the entirety of the ten acres. Additional small structures have appeared on the site including a small residential bungalow and garage, constructed in the late 20th century, for the church’s founding pastor and his wife. (Figure: 3.16) The widow of the late pastor currently occupies the house. The school playground consisting of play equipment surrounded by a chain link fence lies adjacent to the southeast end of the building facing the south lawn. The south lawn is gently rolling grassy landscape culminating at a creek at the bottom of the hill. The creek flows from the west edge of the site and follows the south lawn downward across the property line where it reconnects with the Wissahickon Creek, a branch of greater stream system of Philadelphia. The view of the creek from the house is obscured by the growth of trees lining the south edge of the site. (Figures: 3.17 and 3.18)
Building – exterior

Though Square Shadows is a significant building in the work of George Howe and the project represents a distinctly American response to the International Style, the structure has been largely overlooked. The building is not recognized on local or national register.

The building has experienced numerous alterations; however, the primary components of the original fabric remain. Additionally, the majority of the alterations are reversible if desired. The greatest loss is the replacement of original steel casement windows. The windows were replaced (2006) by the elementary school in order to improve the performance of the thermal envelope by minimizing air infiltration at the windows. Though replacement is sometimes a viable approach in the rehabilitation of a historic building, the new windows in this case were unsympathetic to the original design. Without documentation of the original configuration and details, it is difficult to replicate the original form with a replacement unit. The loss of the original windows presents the question of whether the new windows should be left in place, replaced with a window unit that is presumed to resemble the original, or replaced in its entirety with a distinctly contemporary configuration? If a contemporary window were utilized, the ideal design would evoke the rhythm and style of the original without replication.

Further irreversible loss includes the intersection of the original building and the chapel addition. The construction of this structure included partial demolition the original west façade consisting of a large steel window and a portion of the limestone exterior wall. The material loss is irreplaceable. This situation raises a similar issue to that of the windows. Should the addition (1970) remain in place with the argument that it has become integral to the overall structure? If the addition is removed, should the void in the original west façade
be replaced with material similar to that of the original or contemporary materials clearly indicating an alteration to the original fabric?

**Building – interior spatial flow**

Howe diagramed the circulation of Square Shadows as a flowing curvilinear sequence rather than a formal linear approach. Spatial overlaps occurred in entry, south terrace and living room. However, the layout of the remaining spaces remain formal and rectilinear despite Howe’s intention of spatial overlap and curvilinear sequences. The wings of the building were composed of compartmentalized spaces and single loaded corridors. The two stair tower ties the building together vertically.

**Landscape**

In a plot plan that was produced in conjunction with the Lescaze scheme, a more encompassing vision of the site was rendered than what is seen today. (Figure 3.19) Two entrances from the main road, Butler Pike, were shown. One entry was rendered as a driveway leading to a circular drop off similar to what remains today. The other entry appeared to be a pedestrian path located south of the driveway. Though this path was not realized, the form suggested the intent of connecting the building with the surrounding natural environment. The path meandered along the winding creek bordering the south edge of the site and terminated at the terraces surrounding the building. The intended path integrated multiple parts and users on one site having the potential to inform the future development of the land.
04. Occupants

Architecture and the Occupant

“The humanist instinct looks in the world for physical conditions that are related to our own, for movements which are like those we enjoy…It looks, therefore, for certain masses, lines, and spaces, tends to create them...” 22

- Geoffrey Scott

Humans have the tendency to position themselves within a given space in order to achieve comfort and balance. A person standing on a subway platform tends to stand near a column, perhaps because it represents stability. Similarly, children tend to hide under the dining room table during a large gathering, perhaps because this space is scaled exclusively to them. For that reason, this thesis is concerned with the creation of form for human occupation and comfort. In order to achieve that goal, the functions, requirements, and instincts of the occupant is considered. The primary occupants of the proposed addition will be Montessori school children attending Whitemarsh Elementary School, which currently occupies the most of the original structure of Square Shadows.

The Montessori method was developed by Maria Montessori in the early 20th century as a way of reaching students with learning disabilities. Since then, it has developed into an effective technique of teaching all types of students at the grade school level. Rather than the sole use of formal instruction, the students learn through repetitive actions, mimicking their peers and teachers, and the absorbing from their environment. (See Appendix C, Table 2 for example of a daily schedule) Emphasis is on community and social engagement.

Multiple ages occupy one classroom. At Whitemarsh Montessori there are two classroom types: 18 months to three years old and three to six years old. Each age group occupies its own classrooms. Nursery, daycare, and after-school children are housed in classrooms separate from the Montessori students. The Montessori school and daycare are separate entities but overlap in function, staff, and building use. For example, a student can attend Montessori School during the day and attend after-school care in a separate classroom. All students utilize the same outdoor play space, assembly rooms, and special classrooms such as art and music. Children who do not attend Montessori School may also be admitted into daycare or after school care.

In the multiple age classrooms, children can learn and excel at their own rate without waiting for the teacher to move on to the next lesson. In addition, students who have mastered a skill have the opportunity to instruct their younger peers. The child can select his or her own material to work with and follow personal interests, proceeding from one level of complexity to the next. (Figure 4.1 and 4.2) Unlike a traditional school system, students stay in one classroom for the majority of the day and do not move from room to room.

Movement

The ideal space for the Montessori approach allows the student to achieve at his own pace. The building should encourage free circulation from one space to the next, from socializing in a gathering space to finding solitude in a quiet corner. Children should not remain seated in their desks. Nonetheless, young students need boundaries and their teachers need to be able to supervise the actions of many curious hands. Teachers only intervene when the student poses danger to himself or their surroundings or engage in
disruptive antics. The students tend to lose themselves in a project for hours until the skill is mastered or a conscious decision is made to move to another activity. An overall yet unimposing view of the room is ideal in order to endorse the philosophy of independence, while recognizing the need for adult guidance.

Scale

Students are encouraged to move freely and independently. The design of the classrooms should consist of child-size movable desks, light enough that the children can move without assistance, and cupboards that children can access on their own. (Figure 4.3) Additionally, the Montessori method is based on a learning environment that is built to the scale of a student, so that the child feels comfortable in the space. Furniture, countertops, sinks, and toilets are specific to the size of the child. The main occupants of the building are children from age 18 months to six years old. The scale of these children is of a diverse range, and are all at least half the size of an average adult. (Figure 4.4)

A Sensory Environment

A study of Montessori teaching, Montessori in Contemporary American Culture, suggest that children react to their surroundings at face value. They have limited past experiences to draw from, and tend to respond instinctively to their environment. Children assess their impressions by using taste, touch, sight and sound. At a young age, children are said to experience “sensory periods,” where they have absorbent minds.23 They are primarily engaged in absorbing sensory impressions and information from their environment. The period of the absorbent mind is from age one to three. The child’s brain is said to function

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23 Margaret Howard Loeffler, Montessori in Contemporary American Culture. (Portsmouth: Heinemann Educational Books. 1992), 50
unconsciously and learn and respond to environmental stimuli. In the later phase ages three to six, the child is conscious and directive of his or her environment.\textsuperscript{24}

To that end, the construction of the building should not be hidden, but rather revealed in layers. The stability of the beams as it meets bearing points is similar to a lesson in assembling a series of building blocks. Architecture has multiple layers of experience to draw the natural curiosity of a child to look further. Mundane building features such as air infiltration with the opening of a window, the warmth and penetration of sunlight, and the path of draining rain inform the student of natural phenomena. These events overlaid with the textures of materials such as brick, stone and wood render a space that engages an occupant. The environment should have order but not be restricting. The occupant should have the ability to change his environment. The students are encouraged to open and close vents and shades in the window units in order to change the feeling of their environment. Through trial and error, the student begins to understand the nature of wind and sunlight. The natural movement of the sun to distinguishes cardinal directions, east, west, north and south.

In a language lesson, Montessori students are encouraged to trace repetitively the shape of a letter to begin to learn how to replicate and recognize the form. The letters are made out of sandpaper mounted on a smooth piece of wood. The child runs his fingers over the roughness of the sandpaper to feel the form of the letter. (Figure 4.5) Surfaces that render rough, smooth or warm create different perceptions from the users. Details such as a door knob can be crafted to respond the human form. The sense of touch may be the most transparent for children, as they possess the tendency to reach for objects that awaken their

\textsuperscript{24} Loeffler, 51.
interest. To that end, the design will consider the composition of surfaces from rough stone to smooth travertine to the softness of carpet.

**Ecology and Built form**

Views to the exterior and landscape bring the environment and nature into the building. Outdoor space becomes an extension of indoors with deep overhangs and layering of space. Reactivating the site creates a holistic relationship of nature and man that teach valuable lessons in science and cooperation. Montessori students are encouraged to care for the plants and animals in order to nurture concern for life and lessons in science.

The site under study is currently underutilized. The landscape is not maintained. The vegetation is overgrown. The site consists of a gently rolling south lawn surrounded by a small stream with various trees and brush. To utilize the site for learning, walking paths from the classroom through the landscape are proposed to encourage students to explore. Students have the opportunity to float objects in the stream, collect leaves and rocks, and observe the changes in season in their immediate environment.

**Program**

The existing program (Appendix C, Table 3) is to be retained and expanded with the additional needs of the Montessori school / daycare. (Appendix C, Table 4) Existing space will be reallocated to order to revive and reintegrate the original design intent with the current program, and streamline the functions of the multiple users of the building. The classroom addition and other additive features that detract from the original design will be reassessed, and removed or altered accordingly.
05. Case Studies

Precedent is examined in order to decipher what works and what doesn’t. Architecture is not fully understood until it is realized in its final built form. It is not until the space is occupied that the building begins to communicate or fail to communicate its intentions. To that end, completed contemporary additions to historic structures are examined in order to understand the philosophies of adding. The case studies include: The Museum of Modern Art in New York, The McCormick Tribune Center in Chicago, PSFS in Philadelphia, and Cranbrook Academy of Art in Bloomfield Hills, Michigan.

**Understated Intervention: Museum of Modern Art- New York, NY**

*1932: Original Building- Edward Durell Stone and Phillip Goodwin*

*1963-68: Philip Johnson*

*1984: Cesar Pelli*

*2004: Addition- Yoshi Taniguchi*

The Museum of Modern Art was reformed and regenerated by multiple hands ever since the original construction by Edward Durell Stone and Phillip Goodwin (1932). The most recent addition and expansion by Yoshi Taniguchi (Figure 5.1) manages to unify the original building and subsequent additions without detracting from the character of the components. (Figures 5.2 and 5.3.) The sequence through the galleries evoke a sense of calm and solitude while offering glimpses and shelter from noise and chaos of the city below. Taniguchi’s success is rooted in the ability to create emotive space while providing functional and flexible galleries.
The expansion of the MoMA has transformed the museum into a world class exhibition space almost tripling the amount of gallery space. (Figure 5.4) The Taniguchi addition does not make a sweeping statement but rather speaks in gentle coherent gestures. The most considerable intervention is the grand atrium that serves as a vertical link to the multi levels of gallery space. At ground level, the atrium touched down above the grand lobby, which serves as a public passage extending from 53rd to the south and 54th to the north (Figure 5.5). When asked to comment on the addition, the director of the museum, Glenn Lowry commented that the work is “ethereal and elegant yet forceful and beautiful.”25 The motivation of this description is apparent from all points of the museum experience.

Along 54th Street, Taniguchi’s additions are located on both sides of Philip Johnson’s sculpture garden. The eight-story education building occupies the east side and six stories of galleries topped with a small office tower sit to the west. The office tower is set back in order to remain discreet and unseen from the street. Both buildings are clad in smooth black stone facing the street, rendering the street side elevation as clean and seamless bookends to the sculpture garden. (Figure 5.6) The garden facades are simple curtain wall construction finished in light colors allowing the surfaces to blend and read as a neutral background to the adjacent Goodwin and Stone garden elevation. Additionally, the sculpture garden was reinstated to the grandeur of Philip Johnson’s scheme (1965) and reactivated by allowing the café to open directly onto the space. A light corrugated metal protects the north side of the garden from the street, while appearing to be temporary solution from the exterior it provides a neutral and pleasing backdrop while experiencing the garden from within the museum.

The Pelli office tower was added in the middle of the site in the 1980’s. The bland and utilitarian structure interrupted the continuity of the original structure. In order to integrate the structure to the context, the first six stories of the tower were reclad in dark materials where it faced the sculpture garden. (Figure 5.7) In this case, the original glass was replaced by black glass retaining the structure and pattern of the original Pelli grid. The dark glass read with the vocabulary of the new black stone clad surfaces. Where the Pelli tower becomes an interior wall of the museum, these surfaces are again clad in dark material, this time a smooth granite surface, which extends the new vocabulary into the interior. The architecture made the obtrusive tower seem to disappear at the human scale.

Circulation

The multistory atrium penetrates the building and is used as a unifying element. Skylights at the top level of the museum allow natural light to wash the vertical surfaces of the atrium down to the ground floor. The visitor begins at the bottom of the space occupied by a singular asymmetrically placed red Calder sculpture. The visitor then wanders deep into the galleries loosing sight of the sculpture, but is offered glimpses of the form as the sequence continues. The visitor eventually reemerges in the space in which they started.

The addition to the MoMA illustrates that a renovation does not need to be audacious in order to be forceful. The building is still recognized by its iconic features: the Stone and Goodwin façade and the Johnson sculpture garden. The majority of the addition blends with the original and made a statement only where necessary as if only to reassure the visitor that something has changed. The addition of the atrium and grand lobby are as functional as they were spatially important. The interiors of the building are successful as a silent backdrop to the art. Some critics feel that the architecture disappeared, that in fact
there is no architecture. However, as a museum, the function of the building is primarily to
show off the art and secondarily to make a show of itself. The original building by Goodwin
and Stone was a sleek, rational, simple form that does not seek undue attention. In order to
respect the original form it is only right that the addition almost disappears, though not
completely.

Architecture of Oppositions: IIT Campus Center –Chicago, Illinois

1953: Original Building- Mies Van der Rohe
2005: Addition- Rem Koolhaas

On the austere modern paradigm of the Illinois Institute of Technology, Rem
Koolhaas’s McCormick Tribune Center systematically broke every rule set forth by Mies Van
der Rohe. What would Mies think to see a rendition of his pure glass box crushed under
the weight of the Chicago L? There is no attempt to copy Mies, but instead to honor his
strong, clear vision by stating the opposite. The addition is slick, shiny, loud, and the
students love it- perhaps because today’s student can be described with the same audacity.

The iconic campus of The Illinois Institute of Technology was made up of boxy
glass structures supported by skinny steel I-beams painted jet black. The buildings were
simple and unadorned. The Koolhaas addition radiates orange. Surfaces coated in orange
finishes reflected off the corrugated and smooth metallic surfaces. Oversized iconic cartoon
figures mimicking student activities, such as typing on a laptop or kicking a soccer ball, are
laminated onto the curtain wall of the building. The architectural vocabulary is a distinct
contrast to the lack of color on campus, clearly marking the building to its time and place.
Program

The purpose of the addition was to expand the campus student center, locally referred to as the Commons, completed in 1953 by Mies van der Rohe (Figure 5.8). Today’s students demand more amenities having outgrown the original space, which was primarily used for dining. The addition includes space for: pool tables, computer terminals, an auditorium, a café, and a conference center (Figure 5.9).

Confronting the Chicago “L”, the elevated train that runs through the center of the site, was a primary issue in the competition for proposals for the campus center addition. The train is loud and obtrusive. Most design proposals chose to stand away from the train and suggested a small tower at the far end of the site. Koolhaas took the opposite approach and embraced the “L.” by wrapping the tracks in a stainless steel and concrete tube (Figure 5.10). The concrete enclosure serves the functional purpose of considerably lowering the decibel of the passing trains. The strong physical presence of the “L” dominates the interior of the building as the steel columns that support the train tracks penetrate the building to form a strong orthogonal axis (Figures 5.11 and 5.12). Additionally, the bottom of the concrete tube clad in corrugated metal and becomes a portion of the ceiling as it breaks through the monotony of the gypsum board grid.

Koolhaas and his firm Office for Metropolitan Architecture (OMA) studied their audience. A team was assigned to track the diagonal movement of students cutting through the empty site as they went about their daily business. These diagonal paths were replicated in the building as primary circulation arteries and over laid with an orthogonal grid. (Figure 5.13) Students enter the building through glass doors silk screened with an oversized portrait

of Mies, literally walking though his face. (Figure 5.14) The emphasis on iconography is meant to capture the insatiable attention of harried students. In a time where technology and information is constantly accessible, today’s student upon entering the building feel an immediate connection.

**Materiality**

Mies van der Rohe worked in simple and pure forms emphasizing the materials inherent qualities. Steel and glass were his materials of choice as they offered simple lines and neutral texture. He did not employ decoration in his buildings as it distracts from the true nature of the material. The campus of IIT exemplified Mies’ belief in simple and pure forms. In response to Mies’ conviction, Koolhaas expresses his addition in contemporary materials stripped to its purist form. Glass and steel make up the exterior envelope while corrugated metal and dry wall clad the interior. The dry wall ceiling is left unpainted. The pattern of the ceiling grid is determined and expressed by the standard size of the gypsum wallboard dotting with white spackle used to cover the fasteners. (Figure 5.10) Though the idea of using the pure form of materials respects Mies’ values, contemporary materials such as drywall are intended to have a finish coat. Leaving the dry wall bare takes the idea of purity of form literally, without consideration of the limitation of the properties of the material.

Four points of intersection are made between the old and the new with various degrees of contact. (Figure 5.14) The first consists of the concrete “Z” shaped roof of the loading dock that extends over the Mies building. The utilitarian function and thoughtless nature of this gesture denigrates the façade and entry to the Mies building. The roof ends abruptly as if it had been cut off in mid air. (Figure 5.15)
The circulation passage between the old and the new is a circular vestibule that creates a joint and pivot point. The joint serves as directional change from the strictly orthogonal Mies building to the chaos of the Koolhaas addition. The points of intersection beyond the joint were less sensitive. The corner of the Koolhaas building comes to a point on the surface of the Mies façade abruptly interrupting the simple plane of the surface.

Two exterior surfaces of the Mies commons face two exterior elevations of the Koolhaas addition, which forms an exterior courtyard. This space allows the old and the new to coexist in harmony. The juxtaposition of the old and the new is viewed from the double volume dining room. The fourth point of intersection makes direct contact to the original building, face of façade to face of façade, a functional and respective gesture.

The student center addition overwhelms the original building in scale, but its clarity in distinguishing itself from the original makes the addition successful. Some gestures honor the original while others moments stand distinctive indifferent to the existence of its neighbor.

Expansion of an Icon: PSFS- Philadelphia, PA

1929-1932: Howe and Lescaze
2000: Bower Lewis Thrower and Daroff Design

The Philadelphia Saving Funds Society by architectural firm Howe and Lescaze is considered nationally to be the pioneer skyscraper designed in the International Style. (Figure 5.16) The building was in danger of demolition until the $115 million initiative for renovation and transformation of the structure into the Loew’s hotel. In the design process of the 2000 addition and renovation led by Bower Lewis Thrower and Daroff Designs, it
was imperative for the architects to examine the intentions of the original design. (Figure 5.17, 5.18) In designing for the future, the design team considered it requisite to consider the past. The designers attempted to create the new without detracting from the monumentality of the old.

Because of the change and occupancy from office to hospitality, some areas of the building were compromised in order to meet building code. For example, the bank vault was removed in order to create a continuous fire stair to ground level. Additionally, an intermediate floor was added in the two-story office lobby in order to provide public access to the second floor ballroom. In the effort to sustain essential elements of the building, four areas were considered preservation zones: the lobbies facing Market and 12th Streets, the second floor banking hall, and the 33rd floor director suite. The lobbies continued to serve street level entries while the banking floor was converted into the ballroom floor and the director’s suite was used for catered events.

The interiors were an important part of the original design as Howe and Lescaze’s approach to the design was to treat it as complete work of art, each detail purposeful. The finishes, included granite, stainless steel, wood, and marble were sleek and luxurious. Grand Cartier clocks that served as a focal point of the lobbies were refurbished and put back into place. The first floor houses a restaurant in keeping with the idea of a public ground level. The second floor banking level now serves as the ballroom with an additional partition dividing the ballroom from the main entry. These new functions respect the hierarchy and openness of the original design. The addition succeeds as it respectfully takes a secondary role to the original building.
The plan of the addition mirrors the constructs of the original almost exactly. The second floor ballroom occupies the center of the plan with circulation to the east and west, extending the original parti rather than modifying it. (Figure 5.19) The renovation succeeds in part because the spatial requirements of the new occupants fits swiftly to the existing building envelope with minor alterations. The seventy foot wide office tower easily converts into a double loaded corridor flanked by hotel rooms.

The exterior of the building was cleaned and rehabilitated to its original elegance. The addition situated quietly behind the main building is barely noticeable as the three story structure is dwarfed by the original tower. (Figure 5.20) This solution is suitable as the purpose of the addition is to supplement the main building where space is strained. The addition holds two ballrooms and additional mechanical equipment necessary for the operation of the hotel.

**Crafting a Future: Cranbrook School - Academy of Art - Detroit, MI**

*1938-1942 Eliel and Eero Saarinen, Cranbrook Museum and Library*

*2002 Rafael Moneo’s studio addition for the Academy of Art*

The evolution of the design of Cranbrook School over four decades (1924-1942) is a paradigm of architectural styles beginning with the influence of the arts and crafts movement, followed by modernism, and continues today with contemporary design. Though the architectural styles evolved with time, the philosophy of design remains consistent unifying the expanse of the campus as a contiguous whole. The additive process relies on Saarinen’s strong and eternal philosophy of art, architecture and the occupants. The school centers on a philosophy of craft and making by hand, and creating an
environment that encourages learning. Students learn from working with artists in residence and from their classmates. Teachers at the school teach by interaction with students rather than formal instruction.

The unique philosophy of teaching is reflected in the architecture at Cranbrook School. The school was founded by George Booth who commissioned Eliel Saarinen to develop teaching methods and create a built environment for learning. Saarinen was a Finnish architect first recognized the United States with his influential, though never built, entry to the Chicago Tribune tower competition (1922). The first building for the campus, the school for boys, developed under Saarinen during 1924-1925, and was completed in 1927. Saarinen was concerned with creating space that was humane. Scale, vistas, and axial alignments were important as the masterplan developed.

Booth and Saarinen’s innovative spirit and belief in making by hand, created a unspoken unity within the many structures of Cranbrook. In 1938, planning for the Cranbrook Museum and Library began under the hand of both Eliel and Eero Saarinen though the building that resulted shows a heavier hand by Eliel. The structure was situated at the apex of dominant north-south axis of the Cranbrook campus. The building had classical undertones with a monumental entry and implied symmetry. However, the building took a modern approach in using these vocabularies. (Figure 5.21)

The addition by Rafael Moneo (2002) works because it respects the existing prominence and monumentality of the original building. The primary north-south axis running through Saarinen’s propylea remains the focal point of the parti and of the approach. The addition finds its place at the back door of the Saarinen building, but does not shy away from making a statement of its own. (Figure 5.22, 5.23, 5.24) The “L” shaped
addition is two stories tall on the south side and three stories to the north sitting slightly lower in the landscape than its elder half. The façade of the new building responds to its program of studios and exhibition space. The studios are clad in three stories of curtain wall and zinc/titanium panels. These contemporary cool hued materials contrast the warm tones of Cranbrook’s typical colors. In plan, the addition simply grows out of the existing spatial implications but faces the opposite direction. (Figures 5.25 and 5.26) The “L” of the addition faced north while the “L” of the original faced south. The plan of the addition is respectful to the scale of the original, long and lean albeit shorter and wider. (Figures 5.28)

**Case Studies: Lessons Learned**

What can contemporary architects take away from these case studies? And what is left to art, sensibility, and instinct? A successful addition begins with a program that does not force the building to become something that it cannot achieve. A successful addition strives to strike a balance between disappearing and overwhelming the original structure. The buildings discussed in this discourse, MoMA, the IIT Student Center, PSFS and the Academy of Art are all iconic buildings in their respective time and place.

The additions to the museum and the student center both more than double the scale of the original building. In the case of Taniguchi, the collective memory makes a good story. In the case of Koolhaas, manipulated memories make a good story. Though the approaches are distinctly different, both Taniguchi and Koolhaas’ additions succeed in understanding the intent of the original design, then interpreting the architectural vocabulary to contemporary design.
In contrast, the addition to PSFS stands away from the original building neither presenting a bold statement nor embracing the original building. However, the addition takes on a more important role of allowing the building to remain an integral character in the skyline of Philadelphia by permitting the building to function once again. The addition does not give the building a new identity but instead stands silently in support.

The Academy of Art balances the original building in size, scale and language. It does not overwhelm the original. It does not disappear. Instead Moneo employs contemporary materials in a form that grows from the parti of the original building. The addition draws attention without taking focus from the Saarinen structure.
In the preliminary stages of the design and interpretation of the site, I walked the property under investigation multiple times physically, and again mentally at home. What struck me as moments of importance were: the approach to the building, the landscape beyond, and the language of the exterior. The interest of the approach stemmed from the unassuming placement of the building set back from the main road, and the gradual unveiling of the façade. This sequence was apparent as I entered the site and followed the curve of the driveway that at once slowed down the vehicle and also reoriented the view. The interest of the landscape occurred upon discovery of the south façade. It was clear that the expanse and tranquility of the south lawn was what inspired the open configuration of the south elevation and orientation of the building. The interest in the exterior expression stemmed from the juxtaposition and tactility of the materials, which communicated a strong concern for the true nature of the beauty and function of materials.

The purpose of this chapter is to discuss the design process that led to the decisions that shaped the proposed addition presented at the end of this thesis. (Appendix B, Drawings) The design process is discussed in order to gain a better understanding for the present condition as well as inform future additions, the continuing narrative of the building. A design based on the past sets the stage for the present and continues to inform the future.

As buildings experience alterations with changes of use, the original function and form becomes lost. This is the nature of time. The context of the original construction cannot possibly be recreated nor is it necessarily desirable to do so. It is then desirable to
discover a new equilibrium for the site rather than reinvent the past. Cesare Brandi in his seminal writings on the theory of restoration posits that stratifications of time leave impressions that become a part of the building history. Rather than erase these stratifications, these fragments can be reinterpreted as an overlay to the fragments of the original forming a new equilibrium. While this new equilibrium is not a replica of the original, it is a true basis on which to invent a future. Further, Brandi states that the new must bear clear distinctions from the old. When looking at a piece of art from afar, the new should not be noticeable. Upon closer examination, the restoration should be obvious.27

In applying this position to architecture, it is understood as the necessity to blend the new with the original at a larger scale in the language of form and volume, while holding a clear position of new construction. Brandi encourages the return to the original as it relates to contemporary context.

“We would not have a monument of the old but a monument that emerges anew- a independent architectural expression, even if fragmentary, that respects the basic integrity of what the past has handed down to us”28

- Cesare Brandi

Square Shadows as completed in 1934 is the form that represents the building’s significance, which reflects a dichotomy of traditional and modern styles. Because that moment cannot be recreated, the primary objective is to establish a new equilibrium through subtractions, and to continue narrative through additions. To accomplish this, it is first necessary to remove additions and alterations, which interrupt the continuity of the object. To that end, the classroom addition (1988) and the extension to the chapel (1970) are

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28 Ibid, 239.
removed in order to revive the characteristic geometries and reopen the essential views of the landscape framed from the interior spaces.

The polygonal chapel remains in place with a dedicated addition for auxiliary spaces relocated from the demolition of the connection. By removing the church functions from the house, programmatically the church and the school become clear separate entities. The school as the sole occupant of the original structure and proposed addition serves as the focal point of my thesis. Due to the constraints of time, the church serves as a secondary design component.

Three parti schemes were formulated in order to investigate options for an intervention. Each scheme explored opportunities and levels of intervention according to material fabric, implication of the landscape, vistas, and user sequence. Each scheme considered the revitalization of the original building as well as the addition.

Scheme A :  (Figures 6.1 – 6.4)

Upon entering the site, the house appears in its original volume but upon further exploration the addition is discovered through both exterior and interior experiences. The long and linear school addition is placed remotely from the main entry as extension of the east wing. This part of the original building is utilitarian and hidden from the main approach to the house. Further, the location of the addition provides an eastern boundary for the three-sided frame of the south lawn. The length of the original building serves as the northern boundary while the projection of the living room serves as a western edge. The addition asymmetrically mirrors the original north wing enforcing the existing pin-wheel effect of the plan.
**Scheme B:** (Figures 6.5-6.8)  
In this scheme, two existing rectilinear bars are thickened in order to allow the original parti to remain the same. The thickening of the bars suggests that the two of the existing exterior walls will become interior and the addition of an exterior shell will become the new face of these bars. The original facades will be covered by a contemporary shell touching down on the original form at the roof and ground level of the original building. This allows the building as an object to remain intact without penetrations to the built fabric under protected shed. Programmatically the thickening of the bars will allow for expanded classroom and the opportunity for double loaded corridors.

**Scheme C:** (Figures 6.9-6.11)  
Scheme C continues the idea of the previous scheme extending the original parti and thickening the existing north extension. An additional form is placed at the west side of the building to balance the first bar. A third bar is placed adjacent to the chapel to welcome the congregation on the north side of the building. A long linear horizontal cornice is suggested to tie the new into the old.

**Chosen Scheme:**  
Scheme A was chosen for further development. The proposed extension of the parti is a natural growth to the original building. Additionally, the location and position of the extension is the most sensitive to the historic fabric and original design intent. Although this scheme suggests an interruption of the existing elevation, the intervention will occur with the least possible destruction of original fabric. (Figure 6.12)
**Revitalization**

The original fabric of Square Shadows has been vastly altered. However, the components that defined the building form and dictate patterns of movement and circulation remain. These essential remaining components include the expanse of land of which the building is situated, elements of the exterior expression, as well as primary interior spaces. Interpretation, as revitalization and new construction, include considerations towards the vital components.

**Landscape**

Although the landscape is largely ignored in the current use of the building, the south lawn remains a prominent vista for the occupants of the house. A creek lined with trees features a stone foot bridge occupy the south edge of the gently sloping lawn. The addition proposes to create elements in the landscape, which encourage interaction between the students and surrounding nature. A chain link fence that encloses the southern boundary of the playground will be removed to eliminate the physical and psychological barrier towards the south. Subsequent features that have been sensitively placed and contribute to the continual use of the site such as the parking lot and pastor’s house and garage will remain.

**Exterior Expression**

The entry hall featured an axial view and direct axis from the front of the house to the south lawn. This relationship will be reestablished with the removal of the classroom addition of 1988. While the removal of insensitive additions will recover the object volumetrically, the language of the fenestration has been negatively altered with the replacement of the windows in the summer of 2006. In an effort to reestablish the whole, steel casement windows matching the configuration of the original windows are suggested.
where aluminum replacement windows were installed. Thin mullion steel casement windows were expressed as primarily as punched openings on the north façade and as continuous banded windows on the south façade. The material of the windows showed continuity while the style they employed showed the Howe’s intent in framing vistas and offering privacy.

George Howe dedicated the south elevation of the second floor to the use of the family. All the bedrooms faced south and had sole or shared access to an outdoor balcony. Servant bedroom were remotely located in the north wing. The balconies that have been enclosed will be reopened to allow for the interplay of interior and exterior spaces.

**Interior Spaces**

The Wasserman’s penchant for entertaining and Howe’s inclinations toward modern design led to the creation of public spaces that were the most meaningful interior spaces in the house. (Figures 6.13 and 6.14) This included the entry hall, the living room, and dining room. The dining room featured a movable partition that separated the children’s dining area from the adult dining room. When the partition was not in place, the room was a singular grand dining space. The kitchen is an enclosed unit, clearly separating the servant space and the public space.

The dining room will be reopened as a singular grand space removing a subsequent diagonal partition interrupting the space. The kitchen will remain intact with its original cabinetry as the atmosphere of the kitchen and central location is symbolic of the comforts of home. Programmatically, the kitchen will serve as space for simple food preparation for as bake sales, assemblies, and simple lessons in cooking and cleaning. The original living room, currently used primarily for storage, will be reactivated as a special classroom. With
the removal of the chapel extension and classroom addition, the room will receive natural light once again.

**The Addition**

The two-story addition is constructed of a steel frame structure and poured concrete slabs. The connection to the main building penetrates the original south façade at the east end of the rectilinear bar at existing windows. (Figure 6.15) At both levels, the connection ties into the existing circulation spine running along the north elevation.

The addition will house daycare and after school care children. Although the majority of their day will be spent in the addition, these students utilize special classrooms and assembly areas within the main building. Students from the Montessori school can also attend after or before school care. The addition can also act as a singular entity as it can be closed off from the main building for Saturday event or summer events where the use of the entire building is not necessary.

*Exterior Expression*:

The elevations of the proposed additions reflect the rectilinear shapes and overlapping geometries that were employed in the Howe elevations. Howe expressed stone and brick in their true nature and finish. The stone represents bearing walls while the brick was utilized for non-structural elements. (Figure 6.16) Thin steel columns were utilized to support the far end of a terrace and to create wide openings, such as the garage. The materials are playfully and functionally placed. (Figures 6.17- 6.19)
The addition also utilizes materials in their natural finishes. (Figure 6.20) The steel structure is expressed honestly while a thin section steel curtain wall act as enclosure. Terra cotta panels in a warm tone are coursed similar to the rhythm of brick. Concrete floors warmed with radiant floor heating are finished in a clear coat expressing the true color, warmth, and imperfections of concrete. Cor Ten steel panels are integrated with the curtain wall where a solid enclosure is preferred to void. The Cor Ten panels will patina over time providing a visual lesson in weathering and science. Openings in the façade respond to the height of a child. Hopper windows are located throughout the elevations to utilize the natural movement of the air for interior ventilation. The hoppers within reach of the children are purposefully small to encourage and allow students to operate the windows.

Rainwater is collect from roof runoff along the west façade and empties into a large wood barrel to promote green design while introducing a simple lesson in science. This water is used by the students for projects, experiments, and watering their own garden located at the south end of the addition. The process of collection can be viewed from the south lawn.

**Interior Spaces**

The location of the addition allows the circulation to flow seamlessly through the original house to the extension of the addition. Classrooms occupy the majority of the first and second floors. The older students (3-6 years old) are housed at the first floor and the younger students (18 months – 3 years old) occupy the upper floor. The primary original public spaces are kept in tact. However, interior partitions are removed as necessary to create open classrooms. Each classroom provides the amenities of a toilet room, kitchenette and storage as the majority of the day is spent in the student’s home classroom.
Landscape

Early drawings of the house include a south-facing terrace leading down to the lawn. The terrace, never realized, was accessible from the dining room, living room and entry vestibule. The playground currently occurs the space where the terrace was once proposed. The addition of the south terrace is proposed with access from the original points of access from the main house and from the addition. The terrace will serve as an outdoor play area looking out towards the lawn. The students are encouraged to occupy the natural landscape their playground. To that end, a small hideout, playhouse, will be placed as an object in the landscape with a paved path leading to it provoking the student to explore.

Summary

In order to demonstrate that something is big, place something small next to it. In order to understand the historical significance of a structure, place a contemporary structure next to it. Howe’s use of traditional materials overlaid on a modern form is made further apparent by the juxtaposition of structure that speaks in a contemporary language. It is with these differences that a meaningful dialogue is established between the past and the present. This dialogue allows memories and emotions to form in the mind of the occupant allowing them to take a something meaningful away. The proposed addition stands proudly different but understands its secondary nature to the original. The scale, placement and volume are derived from the scale, placement and volume of the original. An addition is just that, an additive to a whole, which by the nature of the process stirs some commotion prodding and penetrating that which already exists before resettling as a new object.
A simple gesture mistranslated into an overriding scheme, an uncoordinated building component misunderstood as purposeful action could easily make more of a detail, which meant to be left alone. For this reason, the endless process of design and redesign may still get it wrong. The architecture of additions runs the risk of creating a statement that has an equal probability of success or failure. The success of the addition is often indiscernible until years after completion, where the question of how it has adapted to its environment can finally be answered. However, architects have the opportunity to create something that can enhance the past and inform the present. This circumstance implores the designer to consider to the past. The evolution of cultural, economic and social trends force architecture to change with it. The challenge of additions is a requirement in valuing continuity and evolution of the built environment.


**Case Studies:**

**Cranbrook School**


**IIT- Campus Center**


Hawthorne, Christopher. “ABC’s of Mies + IIT: Koolhaas’s new student center is both a tribute to the master and a challenge.” *Metropolis* 23. no. 6 (Feb 2004) : 76-81.

**MoMA**


**PSFS**


Archival Collections

Columbia University Avery Library: George Howe Papers
1172 Amsterdam Avenue
New York, NY 10027

Springfield Township Historical Society and the Chestnut Hill Historical Society
8708 Germantown Avenue
Philadelphia, PA 19118

Syracuse University Fine Arts Archives: William Lescaze Archives
Bird Library, Room 600
Syracuse University
Syracuse, NY 13244-2010

University of Pennsylvania Architectural Archives: George Howe Archives
220 South 34th Street
Philadelphia, PA 19104-6311

Whitemarsh Township Zoning Department
616 Germantown Pike
Lafayette Hill, PA 19444

Whitemarsh Montessori and Gloria Dei Lutheran Church
6042 Butler Pike
Blue Bell, Pa 19422
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Source: Stern, Towards a Modern American Architecture

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Source: Avery Library George Howe papers

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Source: Avery Library George Howe papers
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Figure 6.4- Scheme A: Study Model, Source: Author
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Figure 6.6- Scheme B: Study Model, Source: Author

Figure 6.7- Scheme B: Study Model view from the north, Source: Author
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Figure 6.15: Structural diagram: existing building illustrated in black; addition illustrated in green
NTS Source: Author
Figure 6.16: Diagram of Original South Elevation showing geometries, spatial overlays, and placement of materials; blue shading denotes areas of Chestnut Hill limestone. Yellow shading denotes brick. Dashed lines denotes areas of glass. NTS  Source: Author

Figure 6.17: Diagram of original north elevation showing geometries, spatial overlays, and placement of materials; NTS  Source: Author
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Figure 6.19: Diagram of original west elevation (above) and east elevation (below) showing geometries, spatial overlays, and placement of materials; NTS Source: Author

Figure 6.20: Diagram of west elevation (above) and diagram of east elevation (below) illustrating the juxtaposition of materials NTS Source: Author
FIRST FLOOR PLAN

SCALE: 1/32" = 1'-0"

LEGEND

1. ENTRANCE HALL
2. COAT ROOM
3. LOUNGE
4. LIVING ROOM
5. TERRACE
6. DINING ROOM
7. CHILDREN'S DINING RM
8. PANTRY
9. KITCHEN
10. SERVANT'S DINING ROOM
11. PLAYROOM
12. LAUNDRY
13. GARAGE

ORIGINAL USE - 1934          EXISTING CURRENT USE

ENTRANCE HALL
STORAGE
CHURCH OFFICE
CHURCH MEETING ROOM
CLASSROOM
CLASSROOM
CLASSROOM
KITCHEN
CLASSROOM
FACULTY/STAFF ROOM
NURSERY

ADDITIONS

- CHAPEL - 1970
- CLASSROOMS - 1988

A-2 EXISTING CONDITIONS: FIRST FLOOR PLAN
LEGEND

<table>
<thead>
<tr>
<th>ORIGINAL USE - 1934</th>
<th>EXISTING / CURRENT USE</th>
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<tbody>
<tr>
<td>DRESSING ROOM</td>
<td>FACULTY OFFICE</td>
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<tr>
<td>BATHROOM</td>
<td>BATHROOM STORAGE</td>
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<tr>
<td>MASTER BEDROOM</td>
<td>FACULTY OFFICES</td>
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SECOND FLOOR PLAN

SCALE: 1/32" = 1'-0"
EXISTING CONDITIONS: NORTH AND SOUTH ELEVATION
A-6 EXISTING ELEVATIONS

1. WEST ELEVATION
   SCALE: 1/32" = 1'-0"

2. EAST ELEVATION
   SCALE: 1/32" = 1'-0"
Table 1: Square Shadows: Dates of Significance
Chronology was annotated from HABS building survey\(^1\)

1927: William Wasserman commissions George Howe for the design of the country house outside of Philadelphia. Howe’s first pass at the design resembles a Georgian Mansion.

May 1, 1929: Howe and Lescaze become partners

1929-1930: The design of Square Shadows is revised under the influence of William Lescaze.

1930: The design of Square Shadows is abandoned due to the great depression.

December 1932: Howe and Lescaze are no longer working together although the partnership remains as a legal bond.

1932: Design of Square Shadows continues under Howe alone.

1934: Square Shadows is completed (1932-1934), and Wasserman family occupies the house.

March 1, 1935: The legal partnership of Howe and Lescaze dissolves.

1953: The Wasserman family vacates the house and sells it to Rosabelle and Stephen Deichelmann

1955: The Deichelmann’s sell the house to the Gloria Dei Lutheran Church, also known as the Missouri Synod Lutheran Church for a new congregation and school

1970: The Gloria Dei Church and school expands with the extant chapel addition.

1977: The Gloria Dei School closes and leases the house to Whitemarsh Montessori School.

1988: Whitemarsh Montessori School commissions and completes the construction of a classroom addition.

2007 - present: The Gloria Dei church occupies the chapel addition and the living room and study of the original house. Whitemarsh Montessori School occupies the remainder of the house and the classroom addition.

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Table 2: An example of a daily schedule and activities

Partial schedule edited from the full daily schedule.²

9-10 am: entrance, greeting, inspection of personal cleanliness, taking off outer wear and changing into aprons, children give account of events from the day before. Religious exercises

10-11am: intellectual and sense exercises including tracing geometric shapes and insets, stimuli by repeated motions and exercises

11-11:30am: simple gymnastics, walking, marching in line, salutations, placing of objects gracefully

11:30- 12: luncheon and short prayer

12- 1: free games

2-3: manual work- clay modeling, design etc.

3-4: collective gymnastics and songs, if possible in open air, visiting and caring for the plants and animals

### Table 3: Existing Program

*Gloria Dei Church*

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapel</td>
<td>2890 net sq ft</td>
</tr>
<tr>
<td>Pastor’s Office</td>
<td>315 sf</td>
</tr>
<tr>
<td>Community Room</td>
<td>1000 sf</td>
</tr>
<tr>
<td>Meeting Room</td>
<td>740 sf</td>
</tr>
<tr>
<td>Women’s Room</td>
<td>120 sf</td>
</tr>
<tr>
<td>Men’s Room</td>
<td>120 sf</td>
</tr>
<tr>
<td>Storage</td>
<td>180 sf</td>
</tr>
</tbody>
</table>

Church total: **5,365 net sf**

*Whitemarsh Montessori School*

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom 1 (3-6 years old)</td>
<td>510 sf*</td>
</tr>
<tr>
<td>Classroom 2 (3-6 yrs)</td>
<td>750 sf*</td>
</tr>
<tr>
<td>Classroom 3 (3-6 yrs)</td>
<td>350 sf*</td>
</tr>
<tr>
<td>Classroom 4 (18 months - 3 yrs)</td>
<td>250 sf*</td>
</tr>
<tr>
<td>Classroom 5 (18 months - 3 yrs)</td>
<td>260 sf*</td>
</tr>
<tr>
<td>Classroom 6 (18 months - 3 yrs)</td>
<td>350 sf*</td>
</tr>
<tr>
<td>Faculty Office (shared)</td>
<td>400 sf</td>
</tr>
<tr>
<td>Faculty toilet room</td>
<td>170 sf</td>
</tr>
</tbody>
</table>

Montessori school net: **3,100 net sf**

*Whitemarsh Daycare/After School Care*

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom 7 (18 months – 6 yrs)</td>
<td>630 sf*</td>
</tr>
<tr>
<td>Classroom 8 (18 months – 6 yrs)</td>
<td>340 sf*</td>
</tr>
<tr>
<td>Nursery</td>
<td>700 sf</td>
</tr>
<tr>
<td>Kitchenette</td>
<td>70 sf</td>
</tr>
<tr>
<td>Staff lounge/ toilet room</td>
<td>110 sf</td>
</tr>
<tr>
<td>Daycare Addition</td>
<td>1900 sf (total)*</td>
</tr>
</tbody>
</table>

Daycare net: **3,750 net sf**

* classroom area includes toilet room and storage
Table 4: Proposed Program

The existing program is to be retained and expanded with the additional needs of the Montessori school / daycare. Existing space will be reallocated to order to revive and reintegrate the original design intent with the current program, and streamline the functions of the multiple users of the building. The classroom addition and other additive features that detract from the original design will be reassessed, and removed or altered accordingly.

Existing Program to remain

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</thead>
<tbody>
<tr>
<td>Church total:</td>
<td>5,365 net sf</td>
</tr>
<tr>
<td>Montessori school</td>
<td>3,100 net sf</td>
</tr>
<tr>
<td>Daycare net:</td>
<td>3,750 net sf</td>
</tr>
</tbody>
</table>

Total existing program to remain: 12,215 sf

Additional Program: Montessori school and day care

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<tr>
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<tbody>
<tr>
<td>Multipurpose Room</td>
<td>1000 sf</td>
</tr>
<tr>
<td>indoor play and assemblies</td>
<td></td>
</tr>
<tr>
<td>Infirmary/ nurse’s office</td>
<td>200 sf</td>
</tr>
<tr>
<td>Art Room</td>
<td>400 sf</td>
</tr>
<tr>
<td>Music Room</td>
<td>400 sf</td>
</tr>
</tbody>
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Additional Program net: 2,000 sf

Total Proposed Program

12,215 sf program to remain
+ 2,000 sf proposed additional program

14,215 sf total proposed program
Approximated gross area required for the addition

The size of the addition is approximated assuming that the 1980's classroom addition will be removed. The original house will be rehabilitated to its original form. Terraces and balconies that have been enclosed will be reopened and will not be included as programmable area. The chapel and church program will retain the existing gross square footage in a structure independent of the original house, then:

Existing Square Footages

\[
\begin{align*}
5,365 \text{ sf} & \quad \text{(Church)} \\
+ 3,100 \text{ sf} & \quad \text{(Montessori School)} \\
+ 3,750 \text{ sf} & \quad \text{(Daycare)} \\
\hline
= 12,215 \text{ total net square footage} \\
13,200 \text{ sf (first floor) +} \\
5,800 \text{ sf (second floor)} \\
\hline
= 19,000 \text{ total gross square footage}
\end{align*}
\]

36% of the gross square footage is accounted for in circulation, wall thickness and mechanical requirements.

Proposed Square Footages

\[
\begin{align*}
5,365 \text{ sf} & \quad \text{(Church)} \\
+ 3,100 \text{ sf} & \quad \text{(Montessori School)} \\
+ 3,750 \text{ sf} & \quad \text{(Daycare)} \\
+ 2,000 \text{ sf} & \quad \text{(Additional Program)} \\
\hline
= 14,215 \text{ proposed total net square footage} \\
14,215 \text{ total net sf (x 36% = 5,117)} \\
+ 5,117 \text{ sf} \\
\hline
= 19,332 \text{ total proposed gross square footage}
\end{align*}
\]

Note: proposed gross square footage (utilizing 36% from the existing plan) Existing mechanical and electrical rooms to remain in the basement.

\[
\begin{align*}
19,332 \text{ total proposed gross sf} \\
-12,000 \text{ total gross sf of original house} \\
-4,510 \text{ total church related gross sf} \\
\hline
= 2,822 \text{ total gross sf proposed addition}
\end{align*}
\]
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