Static-to-Kinetic Solutions in Adaptive Reuse:

Mechanisms for Transformation

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

Public library branches stand as vital social infrastructure, yet their physical forms increasingly struggle to keep pace with technological, social, and environmental change. While their programs now support many different modes of making, learning, and gathering, the buildings remain static, limiting adaptability and user agency. Demolition and rebuilding are often treated as the only solutions, but such approaches are financially unsustainable and environmentally destructive, erasing buildings that embody local identity and collective memory.

This thesis explores an alternative path: the use of responsive architectural additions that extend existing libraries without compromising their structural integrity or cultural meaning. It argues that preservation today must move beyond maintaining appearance or form toward sustaining continuity through active use and adaptation over time. Building on William Zuk and Roger H. Clark's theory of kinetic architecture, the research explores a kinetic exhibition scaffold system composed of adjustable floors, walls, and furnishings as a way to achieve responsiveness and enable the public to shape and experience space.

The *Pleasant View Branch* (1975) in Toronto, Canada, serves as the test site. The proposal introduces a lightweight overbuild addition, a new structure that appears to hover above the existing library while remaining structurally independent. This approach allows the original building to remain operational during construction, maintaining community access as transformation occurs above. Together, the elevated addition and reconfigurable interior scaffolding establish a practical model of adaptive reuse, where space can expand, contract, and transform in response to evolving patterns of use. The result is an extendable strategy for renewing the functional, civic, and environmental lifespan of public library branches without sacrificing the histories they hold.

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I would like to dedicate this thesis to my father, Roger Farmer. Without your guidance and encouragement, this work would not exist, and I would not have embarked on such a meaningful journey into architecture. Thank you for pushing me toward this profession and continually inspiring me to go further within it. I will strive for more throughout my entire architectural career because of you.

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CHAPTER 1: INTRODUCTION

CHAPTER 1

1.1 Background

Public libraries are arguably the most important social infrastructure we have; some have even referred to them as "palaces for the people."[1] They are a public space where everyone is welcome regardless of whether they are a citizen, a permanent resident, or even a convicted felon, and above all they are free.[2] Their role today extends far beyond the traditional function of lending books or preserving knowledge. Libraries are no longer quiet sanctuaries for an educated elite; they have evolved into dynamic community hubs. They host diverse programs, workshops, cultural events, and countless other activities, but they are equally valuable as that essential "third place," a setting outside of home and work where people can gather, linger, or simply belong.

Yet even with this significance, libraries are facing ongoing pressures to do more with less as public needs continue to expand and governments overlook libraries in favor of infrastructure such as roads or bridges, whose benefits appear more immediate and tangible.[3] In Ontario, for example, the Provincial Library Operating Grant once covered 6.3 percent of the Toronto Public Library's budget in 1992, but by 2013 that share had fallen to just 2.4 percent and has since stagnated, effectively declining when adjusted for inflation leaving municipalities to shoulder roughly 90 percent of operating costs.[4] Because provincial funding has remained flat, suburban library branches which are typically located in municipalities with smaller tax bases and fewer discretionary funds are among the most affected and facing rising demand with comparatively fewer resources.[5] The expanding roles of libraries demand a level of flexibility and adaptability that static, traditional designs cannot easily accommodate.

Meeting these pressures requires architectural strategies that accept change as a constant condition. This thesis experiments with kinetic architecture as a method for achieving adaptability in public library branches, using scaffolding as the primary means of realizing transformation. Rather than relying on static plans with movable furniture, kinetic systems introduce architectural components such as floors, walls, or ceilings that can physically shift and reconfigure to accommodate evolving programs within a single space. In libraries, such responsiveness allows multiple functions to occur simultaneously or sequentially without expanding the building's footprint. Central to this exploration is the concept of user agency, the capacity for occupants to shape, reconfigure, and experience space directly through the adaptable scaffold framework. Granting this agency fosters a sense of ownership, belonging, and shared identity within the civic environment. This thesis argues that responsiveness and flexibility need not compromise craft or aesthetic integrity; rather, adaptability can become a new form of architectural expression, one where design quality emerges through participation and change.

1 Eric Klinenberg, *Palaces for the People* (Penguin Random House LLC, 2018).
2 Klinenberg, *Palaces for the People*, 30.
3 Klinenberg, *Palaces for the People*, 21.
4 Carolina Aragão, *Much More than Books - CCPA*, November 12, 2024, https://www.policyalternatives.ca/news-research/much-more-than-books/.
5 Aragão, *Much More than Books - CCPA*.

When funding does allow for physical renewal, however, the response has too often been a tabula rasa approach of demolishing and rebuilding from scratch. This thesis challenges that pattern. Demolition carries consequences that extend far beyond cost or environmental impact by erasing a piece of history and the cultural significance these buildings hold for their communities. The greater design challenge, then, is not replacement but respectful extension reimagining how to add to structures that were never designed to support additions while preserving their meaning and presence within the context.

1.2 Problem Statement

Public library branches remain central to civic life, yet their physical environments have not evolved to support the expanding social and programmatic roles they now serve. This is especially true for dated suburban branches with less funding. Most traditional libraries were not designed for flexibility, and as their roles diversify and user participation in public space becomes increasingly valued, their fixed layouts limit their ability to adapt to changing community needs. Conventional renewal strategies have largely failed to address this constraint and do not anticipate future needs. Demolition and rebuilding are expensive, carbon-intensive and erase cultural continuity, while minor renovations rarely produce meaningful transformation. Traditional additions constructed directly above existing buildings often cause structural interference and require the suspension of regular operations during construction, leading to financial loss and disruption of public access.

The challenge is how to adapt suburban library branches to evolving current and potential future community needs while preserving their structural, cultural, and environmental value and keeping them operational throughout renewal. As a possible strategy, this thesis explores the potential of a kinetic exhibition using a scaffold system integrated within overbuild additions.

1.3 Thesis Goals and Objectives

1. **To examine the evolution of public libraries:** tracing how their spatial and programmatic roles have transformed over time, and identifying emerging needs and directions for the future.
2. **To explore the potential of interior kinetic typologies:** using scaffolding systems as a way to enhance spatial experience and support adaptable, evolving library programs.
3. **To investigate form-balancing strategies:** studying how elevated overbuild additions that appear to hover above existing structures can renew library buildings while preserving their architectural integrity.
4. **To develop a comprehensive design proposal:** applying these research findings through a rectilinear overbuild addition at Toronto's *Pleasant View Branch* as the primary site of investigation.

1.4 Scope

This thesis investigates the potential of kinetic scaffolding within overbuild additions as a strategy for extending the life of Toronto Public Library branches. These additions are elevated above the existing structures without compromising their integrity, providing new spatial capacity for adaptable interiors. Within them, a layered scaffold system of adjustable floors, walls, ceilings, and furniture support simultaneous and changing functions like studying, making, meeting, and community events. The research focuses on suburban branch-scale interventions rather than central libraries, with an emphasis on adaptive reuse instead of demolition.

Toronto has recognized the need to modernize its aging network of public library branches, announcing renovation plans for ten across the city. Many projects incorporate new technologies, flexible furnishings, and multipurpose rooms to support changing patterns of use. However, they often fall short of achieving long-term adaptability or encouraging meaningful community participation in design. This thesis explores an alternative approach that focuses on architectural flexibility, adaptive reuse, and civic engagement.

Toronto's *Pleasant View Branch*, currently scheduled for renovation and expansion by Lebel & Bouliane Architects, serves as the pilot site for testing these ideas. Built in 1975, the branch is a modest 7,000-square-foot rectilinear building with a completely open plan, lacking defined program areas or spatial hierarchy. This branch was selected as the pilot site because it is both the smallest and most outdated suburban library within Toronto's planned renovation network. Site visits to multiple branches revealed that *Pleasant View* appears to face the greatest challenges in accommodating technological upgrades, spatial flexibility, and the evolving needs of its community.

Figure 1.01
Map of Toronto Public Library branches identified for future rebuild or renovation





1. Centennial Branch



2. Dawes Road Branch



3. Etobicoke Civic Centre Branch



4. Fairview Branch



5. Locke Branch



6. Malvern Branch



7. Parliament Street Branch



8. Perth/Dupont Branch



9. Pleasant View Branch



10. S. Walter Stewart Branch

Figure 1.02
Centennial Branch

Figure 1.03
Dawes Road Branch

Figure 1.04
Etobicoke Civic Centre Branch

Figure 1.05
Fairview Branch

Figure 1.06
Locke Branch

Figure 1.07
Malvern Branch

Figure 1.08
Parliament Street Branch

Figure 1.09
Perth/Dupont Branch

Figure 1.10
Pleasant View Branch

Figure 1.11
S. Walter Stewart Branch

1.5 Approach

This research employs a design-led methodology supported by a comprehensive literature review, case studies, site analysis, and iterative design exploration. The research begins by establishing the importance of public spaces as essential components of civic life. Public libraries are examined as vital forms of social infrastructure that support civic engagement and community resilience, as discussed by Eric Klinenberg in *Palaces for the People* (2018). The study traces the evolution of the library from an elitist institution to an inclusive and democratic model, highlighting the transformative impact of Andrew Carnegie's library movement in expanding access to knowledge and fostering civic equality. It also draws on Robert Jan van Pelt's historical analysis of libraries and their shifting architectural and cultural roles. The research then situates these ideas within the local context by examining the development of Toronto's public library system, with particular attention to the role and evolution of its smaller community branches. Finally, the review considers theories of preservation. Alois Riegl, in *The Modern Cult of Monuments* (1903), argued that value extends beyond artistic or historic significance to include *age value* and *use value*, which validate the preservation of "ordinary" or utilitarian buildings. This perspective underpins the thesis approach, recognizing mid- to late-twentieth-century library branches as culturally embedded and environmentally significant, even when they lack celebrated stylistic status.

Building on this foundation, the research investigates the potential of a kinetic scaffold system to enable users to actively shape and experience space, while allowing libraries to adapt to evolving programs and community needs. William Zuk and Roger H. Clark, in *Kinetic Architecture* (1970), argue that kinetic design offers a means of responding to unknown and changing pressures. Similarly, Cedric Price was one of the most radical architectural thinkers of the twentieth century and challenged the notion of static, finished architecture, instead advocating for systems that empower users to shape their own environments. This line of thinking informs the thesis exploration of scaffolding as a flexible and adaptable framework. Reports from the International Federation of Library Associations and Institutions (IFLA) further identify the contemporary pressures and programming needs facing twenty-first-century libraries, reinforcing the relevance of adaptable design strategies. The work of Ken Isaacs, particularly *How to Build Your Own Living Structures* (1974), provides practical guidance for modular and reconfigurable scaffold systems. The kinetic exhibition is further examined through precedents involving scaffold-based architecture, flexible interior partitions, adaptable furniture, and safety measures inspired by playground design to ensure accessibility and public usability. Once consolidated, this research concludes in a conceptual model of all the kinetic scaffolding layers combined and presented in the *Design Proposal* chapter.

The literature review then turns to theories of form balancing that underpin the overbuild design exploration. Rowena Reed Kostellow, a design educator at Pratt Institute, developed a pedagogy based on the relationship of dominant, subdominant, and subordinate forms, providing a framework for understanding the dialogue between new additions and existing structures. Francis D.K. Ching later expanded these principles in *Architecture: Form, Space, and Order*, translating them into rule-based methods for organizing space across scales. Building on this lineage, Anthony Di Mari and Nora Yoo's *Operative Design* introduces a procedural toolkit of spatial verbs, describing active operations such as shifting, merging, and layering that test how three-dimensional volumes can interact dynamically. Together, these perspectives trace a conceptual progression from proportion to composition to ordering systems, forming the basis for a massing matrix explored for suburban overbuild addition options. They also directly inform the final massing strategy developed for the *Pleasant View Branch*.

To strengthen the practical grounding of this research, both expert and community perspectives are integrated throughout the process. A consultation with architect Raymond Wan, designer of the Pembina Hall Residence at the University of Manitoba which is a key precedent for overbuild additions, provided professional insight into the technical and spatial challenges of bridging new structures above existing ones. Other precedents of overbuild projects that are examined is the Environmental 3 Building at the University of Waterloo and Hespeler Public Library. Precedents about balancing or contrasting materiality in additions are also studied.

Complementing this, the Toronto Public Library's community engagement process for the proposed *Pleasant View Branch* renovation by Lebel and Bouliane Architects provides valuable insight into programmatic priorities and spatial needs identified by local residents and library staff. Community needs were further examined through an ethnographic approach involving multiple site visits at different times to observe patterns of use and engage in informal discussions with visitors and librarians. As the primary users of the space, community members and staff serve as the true experts in evaluating how the library functions in practice. These combined forms of input ensured that the proposed design strategies remained contextually responsive, socially informed, and grounded in real user experience.

To conclude, a design proposal for the *Pleasant View Branch* site is developed, synthesizing the insights gathered throughout the research. This proposal is also examined and evaluated in relation to key precedents and informed by expert opinions to assess its architectural, social, and contextual implications.

1.6 Limitations

This thesis works within several limitations that shape the scope and feasibility of its proposals.

First, zoning and building code requirements for public spaces restrict additions. Standards for egress, accessibility, fire separation, and occupancy set strict boundaries on design freedom.

Second, the physical conditions of the *Pleasant View Branch* pose constraints. Setbacks, lot sizes, and fixed structural systems limit the placement and scale of additions, while compact footprints restrict how much programmatic flexibility can realistically be accommodated.

Third, introducing kinetic scaffold systems presents challenges in both design and acceptance. These systems depart from conventional static buildings, and public institutions or communities may resist unconventional solutions in civic contexts.

Fourth, safety is a key concern. Adjustable interiors raise issues related to height, structural movement, and public interaction, all of which must be carefully considered to ensure reliable use.

Fifth, climate introduces further limits. In Toronto, cold winters, heavy snow loads, and long seasonal cycles restrict the durability and practicality of kinetic systems. Because of this, the kinetic typology must be contained indoors during the fall and winter, which make up most of the year.

Sixth, there are few precedents for kinetic systems in library design. As such, the proposals are exploratory and will remain at a conceptual level.

Seventh, long-term maintenance and durability present challenges. A kinetic scaffold system with multiple moving components and attachments can increase operational complexity and repair costs.

Finally, funding and political priorities remain a constraint. While Toronto recognizes the need to modernize libraries, investment often favors higher-profile infrastructure such as housing, transit, or roads.

1.7 Assumptions

Several assumptions are established in this thesis to maintain feasibility within a conceptual design framework. These parameters allow the research and design exploration to progress without being constrained by variables beyond its scope.

1. Shared Site Access: It is assumed that the *Pleasant View Branch* will continue to share its existing parking lot and vehicular circulation with the adjacent community centre, without requiring major reconfiguration of access routes or traffic flow.
2. South Setback Condition: The proposed addition will align with the existing south wall setback of approximately 3 metres from the property line. Given this limited distance, the south facade is assumed to have no windows or glazed openings.
3. Interior Renovations: While interior upgrades to the existing library are anticipated, it is assumed that these would occur concurrently with the final construction phase. For the purposes of this thesis, such renovations are acknowledged but fall outside the scope of detailed design development.

1.8 Organization

This thesis is organized into four chapters, each building upon the previous to move from research context to design application and reflection.

Chapter One: Introduction outlines the background, problem statement, research goals and objectives, methodology, scope, limitations, and assumptions. Together, these elements establish the overall framework and direction of the study.

Chapter Two: Literature Review examines the evolution of public space, narrowing its focus to libraries and their changing programmatic needs. It then explores kinetic scaffolding layers as a strategy for addressing adaptability in library design. The chapter concludes with research on form-balancing principles and their relevance to additions over existing structures.

Chapter Three: Design Proposal presents the design intervention for the *Pleasant View Branch*. It applies the principles and theoretical findings identified in the literature review to test their effectiveness in shaping an adaptive architectural addition. The chapter integrates both the design process and its critical assessment, examining how the proposal responds to structural, spatial, and social objectives. Comparisons to key case studies and expert opinions are included to situate the results within broader architectural discourse.

Chapter Four: Conclusion summarizes the key findings and reflects on their wider architectural and civic implications. It highlights how kinetic and overbuild strategies can extend the functional, cultural, and environmental lifespan of library branches.

CHAPTER 2: LITERATURE REVIEW

2.1 PUBLIC SPACES

A public space is open and accessible to all, serving as a place where people gather, interact, and engage with their surroundings. They can be physical, like parks, plazas, and libraries, or digital, like online forums. But more than simple infrastructure, public spaces shape how communities connect, grow, and thrive. A successful public space is not defined by its cost, size, or architectural spectacle. It is judged by how well it serves its users: whether it invites people in, encourages them to stay, and fosters interactions that enrich everyday life. Spaces that remain rigid while communities evolve will ultimately fall short in the long run.

Building upon the significance of public space design, sociologist Eric Klinenberg argues that social infrastructure, especially libraries, is the backbone of resilience, safety, health, economic mobility, and democracy.[6] Today, more than ever, people feel isolated, distrustful, and afraid.[7] The number of people living alone is higher than at any point in history, and research shows that social isolation and loneliness are as harmful as smoking or obesity.[8] Social infrastructure provides the physical spaces and institutions that foster relationships, mutual support, and collaboration, which are all crucial in addressing loneliness. Klinenberg distinguishes social infrastructure from social capital, explaining that while social capital refers to the relationships and networks people build, it cannot thrive without the right physical conditions to support it.[9] Social infrastructure naturally encourages connections, even when people don't actively seek them.

Social infrastructure is essential for public safety. Research shows that neighborhoods with well-maintained parks, libraries, and active street life have lower crime rates, as they foster community bonds and provide positive spaces for youth.[10] When social infrastructure deteriorates or fails to evolve, the consequences like rising crime, increased mortality rates, and deeper social division are severe. Investing in social infrastructure is not optional; it is essential for building resilient communities and repairing our fractured societies. Other strategies, such as economic development, technocratic approaches like enhanced security systems and the circulation of people and goods, as well as civic initiatives like voluntary associations, are often prioritized.[11] While these are important, they are only partial solutions. Social infrastructure remains the missing puzzle piece that is too often taken for granted.

Klinenberg's research following the 1995 Chicago heat wave revealed this. Neighborhoods with strong social infrastructure including walkable streets, active storefronts, and places for people to gather were dramatically more resilient than those where abandonment and disinvestment had eroded everyday social life.[12] In areas like Auburn Gresham, residents checked on one another and shared resources, while nearby in Englewood, with vacant lots and few

6 Eric Klinenberg, *Palaces for the People* (Penguin Random House LLC, 2018).
7 Klinenberg, *Palaces for the People*, 31.
8 Klinenberg, *Palaces for the People*, 32.
9 Klinenberg, *Palaces for the People*, 5.
10 Klinenberg, *Palaces for the People*, 69.
11 Klinenberg, *Palaces for the People*, 11.
12 Klinenberg, *Palaces for the People*, 4.

social institutions experienced a death rate more than ten times higher.[13] Klinenberg concluded that the key difference between these communities lay in the quality and access to physical places and organizations that shape how people interact and care for one another.[14]

Klinenberg's argument about the value of social infrastructure finds clear expression in the Canadian context. While its necessity is most visible in times of crisis, its importance is equally evident in everyday civic life. In Toronto, this civic role is embodied in the city's library network. Over 12 million people visited public library branches in 2023 which is more than the combined annual attendance of the CN Tower, Royal Ontario Museum, Art Gallery of Ontario, Casa Loma, and the Distillery District.[15] Ninety percent of residents consider the Toronto Public Library an important community resource, and 81 percent actively use its services.[16] Each dollar invested in the system generates an estimated $5.63 in public value and contributes over $1 billion annually to the city's economy.[17] These figures demonstrate that libraries are not passive repositories of books but active civic spaces that anchor social connection, learning, and collective resilience.



Figure 2.01
Number of in-person visits, Toronto Public Library vs. major tourist attractions.

13 Klinenberg, *Palaces for the People*, 4.
14 Klinenberg, *Palaces for the People*, 5.
15 Carolina Aragão, *Much More than Books - CCPA*, November 12, 2024, https://www.policyalternatives.ca/news-research/much-more-than-books/.
16 Aragão, *Much More than Books - CCPA*.
17 Aragão, *Much More than Books - CCPA*.

2.2 PUBLIC LIBRARIES

As society changes, traditional social infrastructure struggles to keep up. Libraries are an essential type of social infrastructure that embody both the challenges and opportunities of this shift. Andrew Carnegie, who built twenty-eight hundred libraries around the world, called them "Palaces for the People."[18] Klinenberg adds, "The library really is a palace. It bestows nobility on people who otherwise couldn't afford a shred of it."[19]

2.2.1 A Brief History of the Public Library: From Control to Freedom

The idea of gathering and protecting knowledge dates back to the ancient Library of Alexandria, founded around 295 BCE.[20] The goal of the library was to gather in one place all the knowledge of the world (as it was known to the ancient Greeks), and to create a central hub for research, learning, and cultural exchange.[21] Though the library was eventually lost to war, fire, and neglect, its vision of universal knowledge lived on.[22] Unlike other libraries of its time, which focused on local knowledge, this one aimed to be truly global in scope. However, it wasn't open to the general public; access was limited to scholars, writers, and scientists from across the world.[23]

During the Renaissance, people in Europe began to understand how fragile cultural and religious heritage could be, and this fear grew with the expansion of the Ottoman Empire.[24] In 1526, Turkish troops invaded Budapest, the capital of Hungary, and attacked the *Royal Corviniana Library*, which was one of the largest in Europe.[25] This event deeply shocked Renaissance humanists. They believed that the height of civilization had already been reached by the ancient Greeks and Romans, and that moving forward meant recovering the knowledge those societies left behind.[26] Since the main way to access that lost knowledge was through texts, libraries became essential.

Concerned about the threat of further Turkish conquests, Swiss humanist Conrad Gesner set out to protect knowledge by creating a literary archive.[27] Without wealth or power, he knew he couldn't physically gather all of ancient Greek, Roman, and Hebrew literature in one safe place.[28] So instead, he compiled *Bibliotheca Universalis* in 1545, a massive bibliography listing around 3,000 authors and 10,000 books.[29] Gesner had three main goals: to preserve the intellectual heritage of the West by spreading knowledge across distant places; to ensure that if Christendom fell and libraries were destroyed, a single surviving copy could remind future generations of what was lost and inspire them to rebuild; and to help readers manage the overwhelming number of books by offering a clear structure that could guide the creation of any library, whether small or universal.[30]

In the early 17th century, libraries were seen as overwhelming and began to lose their perceived value. People became focused on architectural beauty, art, and decorative display rather than content. Many people saw libraries as dangerous places.[31] Some librarians removed entire collections, while others locked away so-called "bad books" written by heretics or non-Christian authors.[32]

Building on the philosophies of Michel Foucault and Gilles Deleuze, the emergence of public libraries in North America during the 18th and 19th centuries coincided with what Foucault described as the peak of the disciplinary society, a system of control enforced through institutions like schools, prisons, and libraries.[33] By the time of World War II, this model began to decline, giving way to what Deleuze later termed the society of control, characterized by decentralized, continuous regulation through technology and fluid systems rather than fixed institutions.[34]

Early public libraries in North America were designed as tools for shaping civic behavior, reinforcing dominant moral and intellectual norms.[35] For example, women faced significant restrictions during this period, and libraries reinforced gender norms by curating collections that prioritized male-dominated perspectives while limiting literature that challenged traditional roles.[36]

People began to push for greater freedom within these institutions, questioning whether early public libraries were truly democratic.[37] Critics argued that they were controlled by the upper class, designed to maintain social order, uphold the status quo, and serve the interests of conservative and religious groups.[38] The Public Libraries Act of 1850 in Britain, marked a shift by permitting tax-supported libraries.[39] However, this legislation was still driven by concerns over social stability and a desire to integrate the working class into respectable civic life, rather than a pure commitment to intellectual freedom.[40]

18 Klinenberg, *Palaces for the People*, 27.
19 Klinenberg, *Palaces for the People*, 53.
20 Sascha Hastings et al., *Logotopia : The Library in Architecture, Art and the Imagination* (Cambridge Galleries Design at Riverside, 2007), 12.
21 Hastings et al., *Logotopia : The Library in Architecture, Art and the Imagination*, 12.
22 Hastings et al., *Logotopia : The Library in Architecture, Art and the Imagination*, 14.
23 Hastings et al., *Logotopia : The Library in Architecture, Art and the Imagination*, 12.
24 Robert Jan Van Pelt, *Logotopia: The Universal Library* (Cambridge Galleries Design at Riverside, 2007), 15.
25 Van Pelt, *Logotopia: The Universal Library*, 15.
26 Van Pelt, *Logotopia: The Universal Library*, 16.
27 Van Pelt, *Logotopia: The Universal Library*, 16.
28 Van Pelt, *Logotopia: The Universal Library*, 16.
29 Van Pelt, *Logotopia: The Universal Library*, 16.
30 Van Pelt, *Logotopia: The Universal Library*, 16.
31 Van Pelt, *Logotopia: The Universal Library*, 18.
32 Van Pelt, *Logotopia: The Universal Library*, 18.
33 Natasha Gerolami, "Taming the Mob: The Early Public Library and the Creation of Good Citizens," *Partnership: The Canadian Journal of Library and Information Practice and Research* 13, no. 1 (2018): 4, 1, https://doi.org/10.21083/partnership.v13i1.3985.
34 Gerolami, "Taming the Mob," 4.
35 Gerolami, "Taming the Mob," 4.
36 Gerolami, "Taming the Mob," 4.
37 Gerolami, "Taming the Mob," 2.
38 Gerolami, "Taming the Mob," 2.
39 "The Cambridge History of Libraries in Britain and Ireland," in *The Cambridge History of Libraries in Britain and Ireland*, 1st ed., ed. Alistair Black and Peter Hoare (Cambridge University Press, 2006), 21, https://doi.org/10.1017/CHOL9780521780971.001.
40 "The Cambridge History of Libraries in Britain and Ireland," 38.

CHAPTER 2

In the early 19th century, Mechanics Institutes were established to regulate the working class and provide opportunities for self-education, as formal education was largely out of reach. Andrew Carnegie's use of the Mechanics Institute library in Allegheny, Pennsylvania, inspired his lifelong commitment to free access to knowledge and the funding of thousands of public libraries worldwide between the late 19th and early 20th centuries. Andrew Carnegie's funding of thousands of libraries around the world further expanded library access, but with strings attached. While his libraries expanded public access, the requirement of local tax support meant that they were bound by municipal oversight, preventing them from being fully independent institutions of public knowledge.[41] Carnegie and other sponsors viewed libraries as a means to instill self-discipline, loyalty to capitalist ideals, and compliance with social hierarchies.[42] Carnegie, once a working-class man himself, believed deeply in self-education and saw free libraries as the best agencies for improving the masses. His own success stemmed from access to books, and the libraries he funded offered others the same opportunity when formal education was out of reach.

Despite early constraints, public libraries gradually evolved into more democratic spaces, especially through state-funded initiatives in the early 20th century that expanded access to rural communities and children.[43] While originally tools of social conditioning, libraries also emerged as platforms for intellectual freedom, civic engagement, and public discourse.[44] Deleuze's society of control describes a shift from rigid institutional discipline to more decentralized forms of regulation in the mid-20th century.[45] While libraries historically served as mechanisms for shaping "good citizens," the society of control disperses power through continuous networks rather than fixed institutions. Early libraries primarily served the upper and middle classes, with access and content carefully curated to maintain social order.[46] Instead of libraries acting as gatekeepers of knowledge, digital platforms now regulate access and visibility through algorithmic control, data collection, and surveillance. Unlike the disciplinary society, where exclusion was enforced through explicit institutional barriers, the society of control operates through subtler, more pervasive means. By the late 20th and early 21st century, public libraries began to shed their elitist foundations, transforming into dynamic community hubs that emphasize multiculturalism, digital inclusion, and accessible programming.

41 Gerolami, "Taming the Mob," 10.
42 Gerolami, "Taming the Mob," 8.
43 "The Cambridge History of Libraries in Britain and Ireland," 96.
44 "The Cambridge History of Libraries in Britain and Ireland," 22.
45 Gerolami, "Taming the Mob," 11.
46 "The Cambridge History of Libraries in Britain and Ireland," 32.

LITERATURE REVIEW

Even though many libraries are working to become more inclusive and responsive, their role is still shaped by political, economic, and social forces. Libraries have always balanced control and access, shaping who gets to learn and how. This history raises a key question: how can architects help reshape libraries? Not just as repositories of information, but as adaptive, user-driven environments that respond to evolving pressures and truly reflect the communities they serve?

Figure 2.02
Timeline of Public Libraries from Antiquity to the Present.

Ancient Library of Alexandria



295 BCE

Preserved documents of the attacked Royal Corviniana Library of Hungary



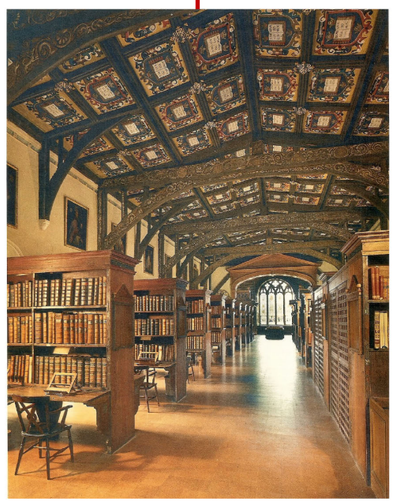
1526

Bibliotheca Universalis



1545

Duke Humphrey's Reading Room
Bodleian Library in Oxford



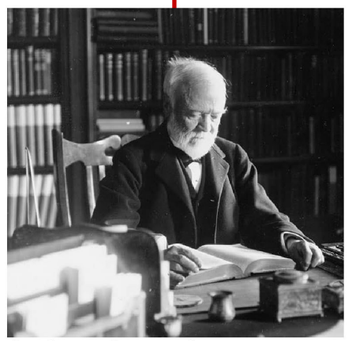
Early 17th C.

Toronto Mechanics Institute



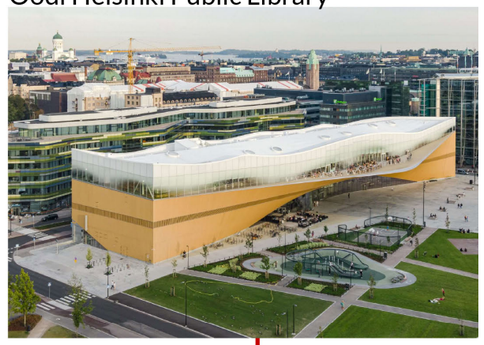
Early 19th C.

Late 19th C. &
Early 20th C.



Andrew Carnegie

Oodi Helsinki Public Library



21st C.

2.2.2 Contemporary Precedents of Libraries

Oodi Helsinki Central Library

Oodi Helsinki Central Library represents a new model for public libraries as civic and cultural infrastructure. Designed by ALA Architects and completed in 2018, the 17,250 m² building sits prominently opposite the Finnish Parliament, symbolizing the dialogue between civic authority and public life.[47]

Rather than functioning solely as a repository for books, *Oodi* reimagines the library as a multifunctional public hub that supports creativity, social connection, and everyday life. Its three-tiered organization embodies this shift: the open and transparent ground floor extends the public plaza inward, hosting gatherings and events; the middle floor contains workshops, studios, and meeting rooms for making and collaboration; and the upper level, known as "Book Heaven," provides a calm, light-filled reading hall beneath a large curved roof punctuated with skylights.[48]

Oodi's program redefines the balance between reading and participation. Books occupy only one-third of the total floor area, allowing space for diverse public facilities such as a café, restaurant, cinema, public terrace, audio-visual recording studios, and a makerspace.[49] This programmatic shift emerged from consultations with library users, reflecting how people engage with culture and learning in contemporary society.[50] The approach also aligns with broader experimentation in Finnish library design, where buildings serve as active civic platforms offering social and creative opportunities beyond book lending.[51]

Architecturally, *Oodi* combines technical innovation with civic generosity. A bridge-like steel frame spans a large central void, keeping the ground level column-free and adaptable.[52] The building's curved facade, clad in Finnish spruce and glass, expresses warmth and transparency while maintaining strong visual connections between interior activity and the surrounding cityscape. Oodi demonstrates how the modern library can operate as a public living room. Its diverse programming and user-informed design make it a benchmark for future libraries that aim to foster inclusivity, participation, and cultural vitality.

47 María Francisca González, "Oodi Helsinki Central Library / ALA Architects," ArchDaily, December 14, 2018, https://www.archdaily.com/907675/oodi-helsinki-central-library-ala-architects.
48 Francisca González, "Oodi Helsinki Central Library / ALA Architects."
49 Francisca González, "Oodi Helsinki Central Library / ALA Architects."
50 Francisca González, "Oodi Helsinki Central Library / ALA Architects."
51 Francisca González, "Oodi Helsinki Central Library / ALA Architects."
52 Francisca González, "Oodi Helsinki Central Library / ALA Architects."



Figure 2.03
Oodi Exterior Entrance Plaza



Figure 2.04
Ground Floor Cafe

Figure 2.05
Reading Nook



Figure 2.06
“Book Heaven”



Figure 2.07
Study Room

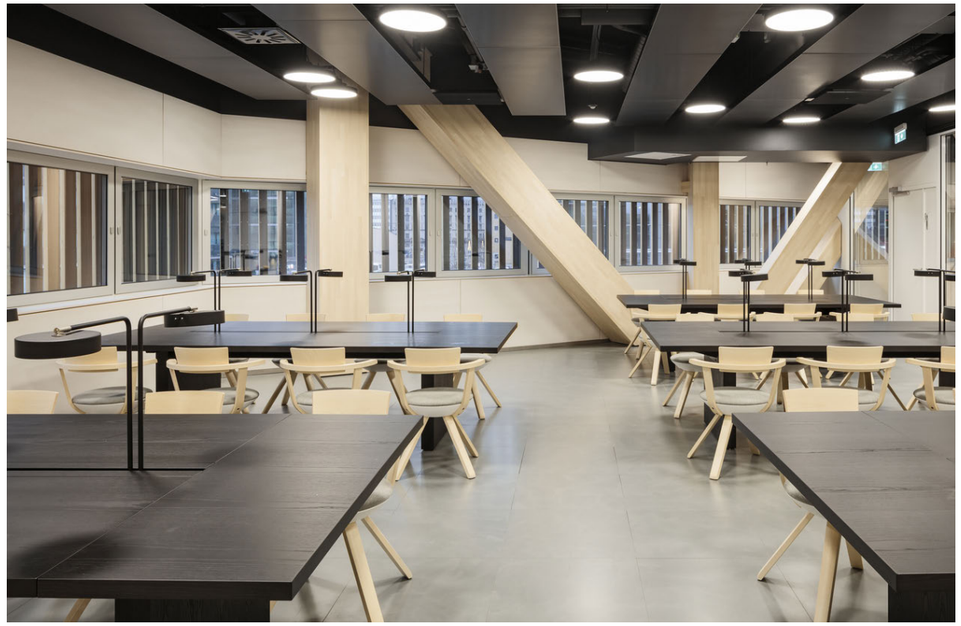


Figure 2.08
Reading Room



Watney Market Idea Store

Completed in 2013, the *Watney Market Idea Store* in East London was designed by Bisset Adams for the London Borough of Tower Hamlets as part of a wider initiative to combine library, learning, and council services within local neighbourhoods.[53] The 1,300 m² building replaces the former Watney Market Library and forms part of a regeneration strategy aimed at revitalizing the surrounding commercial area.[54]

The building organizes its functions across three levels: the ground floor acts as a "marketplace of information," integrating library functions with a shared service desk for local council support, while the upper floors provide spaces for adult and family learning, reading, and community activities.[55] The integrated service centre broadens the library's function beyond education and leisure, providing access to public programs related to housing and benefits, job training, health and wellbeing, and civic documentation. This combination allows residents to access civic support within a familiar and informal setting.

Architecturally, the transparent glazed facade and vibrant green staircase give the library a strong street presence, drawing activity from the surrounding market into the building. The open ground level allows visitors to move easily between services, creating an environment that feels approachable and socially connected rather than formal or institutional.

While Oodi Helsinki Central Library operates at a national civic scale, the Watney Market Idea Store demonstrates how a smaller, neighbourhood-oriented branch can achieve inclusivity through proximity and everyday engagement. Where Oodi embodies a monumental expression of public culture, Watney prioritizes integration with local life merging civic services, education, and social support into a single, accessible environment.

53 "Watney Market Idea Store / Bisset Adams," ArchDaily, October 11, 2013, https://www.archdaily.com/436612/watney-market-idea-store-bisset-adams?ad_source=search&ad_medium=projects_tab.
54 ArchDaily, "Watney Market Idea Store / Bisset Adams."
55 ArchDaily, "Watney Market Idea Store / Bisset Adams."



Figure 2.09
Idea Store Street View



Figure 2.10
Work Stations

Sendai Mediatheque

Completed in 2001, the *Sendai Mediatheque* in Japan, designed by Toyo Ito & Associates, is an iconic cultural building that redefines the relationship between structure, circulation, and transparency.[56] Developed as a clear, layered volume, the building makes its internal systems visible to the surrounding city.

The project functions as a cultural and media center combining galleries, film studios, reading areas, and civic event spaces within a single open framework. This redefinition positions the building as a shared civic platform rather than a singular program type, reflecting a new era where access, participation, and visibility shape the identity of public architecture.

The design organizes the program as a stack of open horizontal floor plates supported by sixteen vertical steel "tubes."[57] The tubes are made of lattice-like columns that contain elevators, stairs, and mechanical systems, performing both structural and infrastructural roles.[58] By housing the building's vertical services within these transparent tubes, Ito transforms what is typically hidden into a central architectural feature. The result is a space where structure and circulation are visually intertwined, creating a sense of continuity between the interior and the city outside.

Through its exposed structure and transparent facade, *Sendai Mediatheque* blurs the line between building and infrastructure. It demonstrates how architecture can communicate honesty, openness, and civic life through the visibility of its own structure and the activities within, embodying a new model of public building that is both honest and socially responsive.

56 Megan Sveiven, "AD Classics: Sendai Mediatheque / Toyo Ito & Associates," ArchDaily, March 9, 2011, https://www.archdaily.com/118627/ad-classics-sendai-mediatheque-toyo-ito.10,18
57 Sveiven, "AD Classics."10,18
58 Sveiven, "AD Classics."10,18



Figure 2.11
Sendai Mediatheque
Exterior View



Figure 2.12
Interior view of multi-use space and vertical "tubes"

2.2.3 The Toronto Public Library

The Toronto Public Library (TPL) system has evolved in step with the city's social and spatial growth, expanding from a single downtown institution into an extensive network of neighbourhood branches that define civic life across Toronto. The city's earliest libraries began as private subscription collections and later as Mechanics' Institutes aimed at educating the working class.[59] The transition to a free public library system marked a major shift in civic philosophy. Established in 1883 under Ontario's Free Libraries Act, the Toronto Public Library began as a modest collection intended to make reading and education accessible to all residents, free from the barriers of class or membership fees.[60] Its first central library opened in 1884 at the corner of Church and Adelaide Streets, serving as both a reading room and the administrative heart of the new system.[61]

As Toronto urbanized through the early and mid-twentieth century, library development followed population movement outward from the downtown core. Neighbourhood branches were established to serve emerging residential districts, often occupying modest storefronts, community halls, or purpose-built structures that reflected the optimism of civic expansion. These local libraries became cultural anchors within suburban neighbourhoods, offering safe, inclusive, and accessible spaces where residents could learn, meet, and participate in civic life.

Following municipal amalgamation in 1998, the previously independent library systems of Etobicoke, North York, Scarborough, East York, and York were unified with Toronto's central system to form a single city-wide network.[62] This consolidation brought greater equity and standardization to library services, ensuring that every community (urban or suburban) had access to the same level of resources, technology, and programming. Today, with more than one hundred branches, TPL is the largest and most heavily used urban public library system in North America.[63]

In recent decades, the role of the suburban branch has expanded well beyond the lending of books. Renovations and new designs have transformed many into multi-purpose community hubs that integrate digital learning labs, maker spaces, flexible event areas, and cultural programming responsive to local demographics. Branches such as Albion, Fort York, and Scarborough illustrate how library design in Toronto now prioritizes openness, accessibility, and adaptability.

59 "History of Toronto Public Library," Toronto Public Library, accessed October 17, 2025, https://www.torontopubliclibrary.ca/about-the-library/library-history/.
60 Toronto Public Library, "History of Toronto Public Library."
61 Toronto Public Library, "History of Toronto Public Library."
62 Toronto Public Library, "History of Toronto Public Library."
63 Toronto Public Library, "History of Toronto Public Library."



Figure 2.13
York Mechanics' Institute (1867)



Figure 2.14
York Mechanics' Institute Interior View

Figure 2.15
Albion Branch
Entrance



Figure 2.16
Albion Branch Multi-
Use Space





Figure 2.17
Fort York Branch
Exterior View



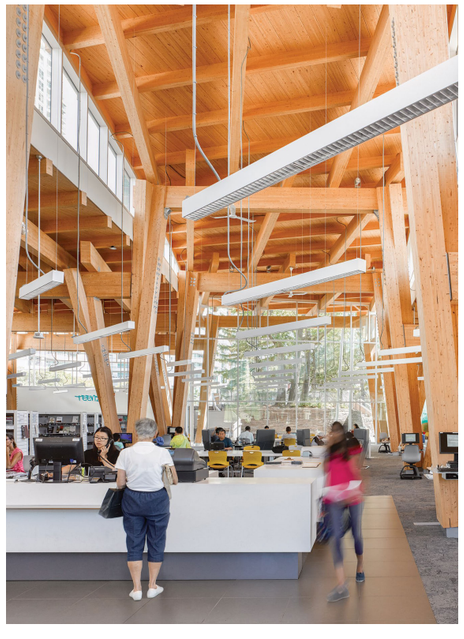
Figure 2.18
Fort York Branch
Multi-Use Space

Figure 2.19
Scarborough Civic Centre Branch



Figure 2.20
Scarborough Civic Centre Branch Multi-Use Spaces





The Toronto Public Library's evolution from its first downtown facility in 1884 to a distributed network of neighbourhood branches exemplifies how civic architecture can sustain social infrastructure. Each branch, particularly in suburban areas, functions as a shared civic living room. Yet even with their continual renewal, many branches still struggle to meet the full range of community needs or anticipate the pace of social and technological change. As public expectations evolve, the challenge lies in developing architectural frameworks that can support not only present programs but also future forms of learning, gathering, and participation.

2.2.4 The Case for Preserving the Ordinary

The common response to aging buildings is demolition and replacement. Today, however, sustainability demands a different mindset. We cannot afford to erase and rebuild every structure that appears outdated. Beyond their functional lifespan, even ordinary buildings without celebrated architectural style embody cultural and material value that merits preservation and thoughtful adaptation, as Klinenberg's work demonstrates. Historian Alois Riegl's *The Modern Cult of Monuments* (1903 and translated in 1989) supports this idea by showing that monuments are important not because they fit a certain style, but because people's perceptions of them change over time. He explained that values such as age and use make heritage more democratic, since any building can gain worth simply by surviving and continuing to serve a purpose.[64] [65] Later scholars emphasize that the emotional resonance of age value, the way traces of time evoke memory and meaning, renders even "ordinary" or stylistically unfashionable structures significant.[66] Unlike historic value, which is grounded in a scientific assessment of a building's place in the continuum of history, age value appeals directly to human perception and feeling.[67] Moreover, as the earlier discussion of the *Royal Corviniana Library* illustrates, buildings act as documents of cultural history. Their destruction erases evidence of construction methods, urban transformations, collective memory, and time period architectural style.[68] Contemporary reinterpretations of Riegl's typology expand these categories to include social value, reflecting how communities attach identity, belonging, and everyday meaning to aging buildings, regardless of architectural style.[69] For example, Andrew Carnegie's library model of the early 20th century may seem outdated today but its enduring presence continues to embody ideals of collective access, public trust, and social infrastructure that extend far beyond

64 Alois Riegl, "The Modern Cult of Monuments: Its Character and Its Origin," in *Gesammelte Aufsätze (Collected Essays)* (Institute for Architecture and Urban Studies; Cambridge, MA: MIT Press., 1903), 72, 79.
65 Michele Lamprakos, "Riegl's 'Modern Cult of Monuments' and The Problem of Value," *Change Over Time* 4, no. 2 (2014): 420, https://doi.org/10.1353/cot.2014.0011.
66 Carolyn Ahmer, "Riegl's 'Modern Cult of Monuments' as a Theory Underpinning Practical Conservation and Restoration Work," *Journal of Architectural Conservation* 26, no. 2 (2020): 152, https://doi.org/10.1080/13556207.2020.1738727.
67 Ahmer, "Riegl's 'Modern Cult of Monuments' as a Theory Underpinning Practical Conservation and Restoration Work," 152.
68 Camila Burgos Vargas and S. Mora Alonso-Muñoyerro, "About the Validity of Alois Riegl's The Modern Cult of Monuments," *Journal of Architectural Conservation* 28, no. 3 (2022): 183, https://doi.org/10.1080/13556207.2022.2045807.
69 Burgos Vargas and Mora Alonso-Muñoyerro, "About the Validity of Alois Riegl's The Modern Cult of Monuments," 188.

its aging architectural form. Decisions about their future, therefore, demand sensitivity to both their cultural resonance and their ongoing social role. Far from passive relics, such buildings remain vital when adapted through thoughtful additions. This perspective on preserving the "ordinary" forms the foundation for analyzing Toronto's suburban *Pleasant View Branch*, a modest 1970s library whose cultural significance lies less in its style than in the everyday ways people continue to use and value it.

2.2.5 Pleasant View Branch Community Needs

Observations of daily activity at the *Pleasant View Branch* reveal distinct patterns of use that inform the design proposal. The library operates as a continuously adapting civic environment, with its atmosphere and spatial needs shifting throughout the day according to the rhythms of its users.

Morning – Social Refuge
During the early hours, the library functions as a social sanctuary for caregivers with young children and for elderly visitors. Programs such as *Baby Time* (10:00–10:30 a.m.) draw caregivers who gather around children's play areas, socializing on the periphery while remaining engaged in the program. Seniors participate in book clubs, computer and digital skills workshops, language and newcomer support sessions, group games such as bingo, and wellness activities like meditation. Although some activities occur later in the day, most senior participation takes place in the morning. The environment supports comfort, visibility, and informal interaction which are qualities that reinforce the library's role as a safe and welcoming "third place."

Afternoon – Energy and Transition
Around midday, the atmosphere shifts as high school students arrive from across the street during their lunch breaks. Activity becomes concentrated around shared tables and open seating areas where conversation, group work, and social exchange dominate. Noise levels rise, and staff often intervene to maintain a balance between active and quiet areas. Students use this time to socialize and decompress, particularly during the colder months, while others attend tutoring sessions. This pattern highlights the need for flexible communal zones that can accommodate short, high-energy use and incorporate acoustic separation to manage sound.

Evening – Overlap and Diversification
In the late afternoon and evening, the user base diversifies. University and college students occupy quieter corners with access to power and comfortable furniture for extended study. Families arrive for scheduled programs such as reading clubs and craft sessions, while tutoring continues into the evening. Caregivers often use the corner reading nooks during children's programs, drawn to the daylight and street views they offer being the only significant visual connection to the outdoors within the current building. Many visitors also seek secluded areas for meetings, virtual interviews, or private conversations, but the open floor plan does not

adequately support these needs.

Summary

Despite the branch's strength as a community hub, several spatial and functional gaps persist. Community members consistently expressed a need for more diverse spaces and improved access to technology and power. The library has very few accessible outlets, limiting laptop use, device charging, and the integration of new digital tools. It also lacks the creative production areas now standard in newer branches, such as maker labs with 3D printers, laser cutters, and sewing machines, as well as media studios for podcasting, recording, and digital storytelling. There is no dedicated space for exhibitions or presentations that could display community projects, host educational events, or celebrate local culture. The absence of STEM-focused areas further restricts opportunities for contemporary, hands-on learning.

The existing open-plan layout constrains programming flexibility, as simultaneous activities often disrupt quiet study zones. Without movable partitions or reconfigurable areas, the space cannot easily adapt to changing community needs or event types. These shortcomings were reinforced through feedback collected during the community consultation sessions for the proposed addition and renovation led by Lebel & Bouliane Architects.

Across the day, the library transitions from a quiet social refuge into a lively intergenerational hub. Its success lies in accommodating diverse activities within a compact footprint, yet its current layout lacks the flexibility to support emerging programs and technologies. These findings directly inform the design proposal, which introduces adaptable spatial frameworks, improved power access, acoustic zoning, and reconfigurable elements capable of supporting both solitude and collaboration within a single, evolving environment.

Consultation

The design will deliver what was asked for during consultation

What you asked for	Existing	New branch	Achieved
More space	7,000 sq ft	10,000 sq ft	✓
Quiet study rooms	None	2 group study rooms.	✓
More study and reading spaces with power	One table with power and 12 study seats	Additional study and reading spaces throughout the branch with access to power.	✓
More and better technology	8 computer workstations	A Neighbourhood tech kit, and a Play and Learn STEM Kit.	✓
Better program space	Oversized program room	1 large multipurpose program room.	✓
Increased washrooms	Single accessible washroom	Inclusive and Universal washrooms.	✓
More collections	33,745 item collection	More adult and children materials	✓
Water bottle filling station	None	Water bottle filling station.	✓
Better lighting and more windows	Fluorescent lighting	New LED lighting with lots of natural light.	✓
Better acoustics	Limited zoning and acoustic treatment	Zoned areas for children's and teens. Acoustical treatment throughout.	✓

Figure 2.21
Summary of community feedback and design responses from the public consultation for the Toronto Public Library renovation by Lebel & Bouliane Architects

2.3 KINETIC EXHIBITION SCAFFOLD SYSTEM

2.3.1 Pressures and Response

Civil engineer William Zuk, and architect Roger H. Clark, argued in their 1970 book *Kinetic Architecture*, that kinetics should be the solution to architectural design for unknown, changing pressures. "Architecture can be described as a three-dimensional form-response to a set of pressures," or put more simply, form is a response to pressure.[70] Primitive architecture understood this well. It had a close relationship with form, shaped directly in response to physical, spiritual, social, and environmental needs.[71] Primitive settlements were often a physical expression of an evolving social structure. For example, the mud-built settlements in Northern Ghana. As Architect Labelle Prussin describes, "If a son leaves, his room will be abandoned. If he returns, a new structure will be built. If he marries, his new family will either extend the existing compound or break away to form a new cluster of kinship compounds."[72] Yet over time, we've come to see this kind of building as unsophisticated. Once we gained the technology to create static, permanent structures, we did. But not every building should be fixed in place or designed to last forever, especially as the pressures it responds to continue to shift. In nature, this idea still holds true. Forms are living, ever changing; take a river, for instance. It shifts course over time, eroding banks, depositing silt, and responding to seasonal flows. In contrast, in a complex man-made system like architecture, change is much harder to achieve, especially in colder climates. Architects face many types of pressures when designing, but it's impossible to account for all of them fully. Some pressures are invisible, others evolve over time, and many continue to influence a building long after it's completed. According to Zuk and Clark, the forces within a society that are in constant flux include technological, sociological, and biological changes.[73] Because these forces are always shifting, architecture must be adaptable. This is where kinetic architecture, design that can physically respond to change, becomes essential.

2.3.2 Kinetic Precedents

Fun Palace

Cedric Price was one of the most radical architectural thinkers of the 20th century. He rejected the idea that buildings should be static, precious, or complete. Price believed that architecture should empower people to shape their own environments.[74] His most well-known and unbuilt project, the *Fun Palace* (1961), developed with avant-garde theatre director Joan Littlewood, put these ideas into action. Rather than a conventional building, the *Fun Palace* was imagined as a giant mechanized shipyard. Cranes could move modular components around to create flexible spaces for learning, performance, leisure, and play.[75] By removing the divide between work and play, it aimed to give everyone access to spaces for culture and self-development.

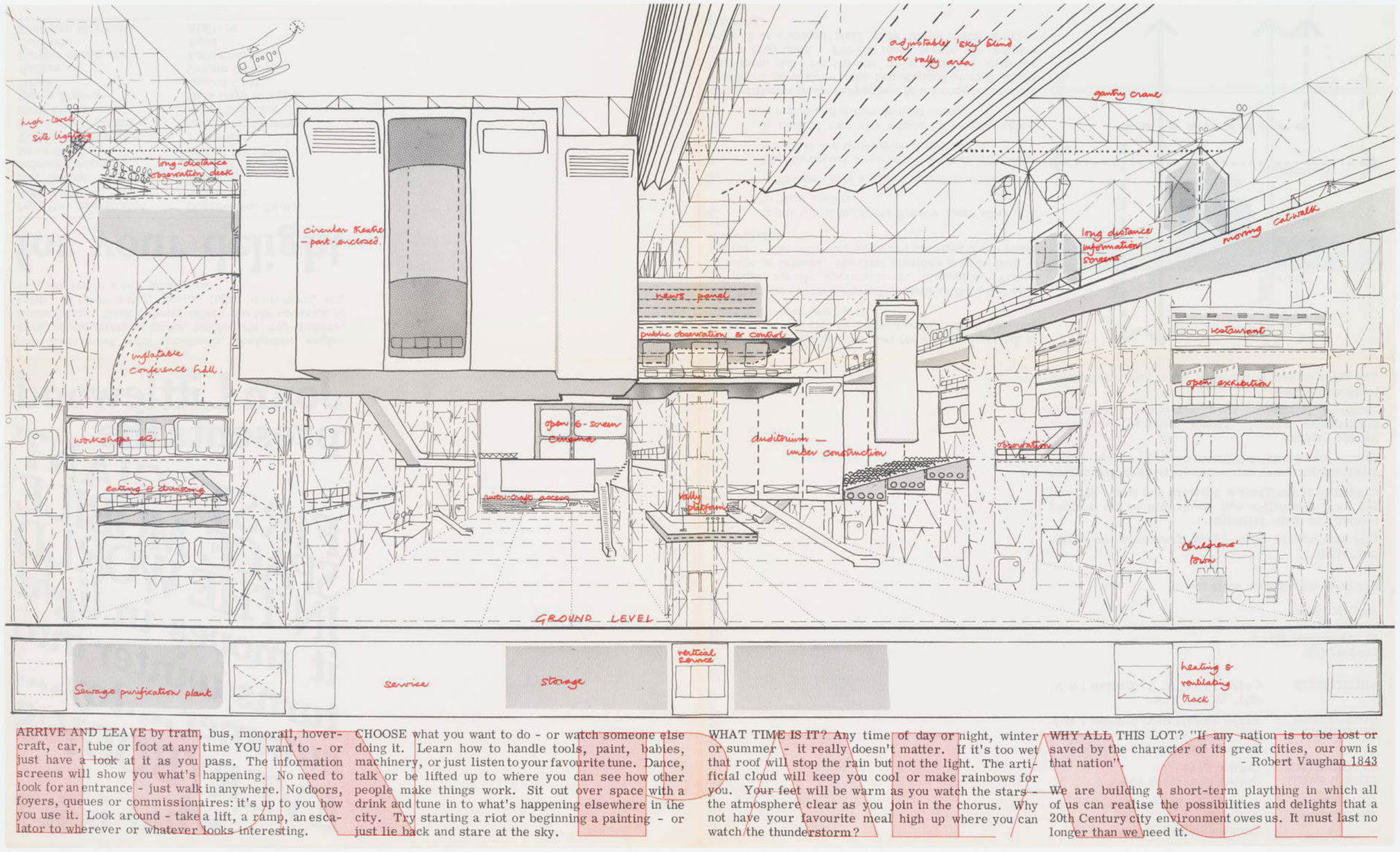
70 William Zuk and Roger H. Clark, *Kinetic Architecture* (Litton Educational Publishing Inc., 1970), 5.
71 Zuk and Clark, *Kinetic Architecture*, 4.
72 Zuk and Clark, *Kinetic Architecture*, 4.
73 Zuk and Clark, *Kinetic Architecture*, 7.
74 José Hernández, "From the Fun Palace to the Generator," *SANTIAGO: Pontificia Univ Catolica Chile, Escuela Arquitectura* Vol.90 (2015): 50.

To make the building truly responsive, Price brought on cybernetician Gordon Pask in 1963. Pask developed a control system that could track user behavior and respond in real time. One of his proposals was a "cybernetic theatre," where audience input could shape the performance space using lights, sensors, and simple controls.[76] The Fun Palace became more than a structure; it was a system designed to evolve through interaction.[77] While Pask handled the technical design, it was Price who redefined architecture as something open-ended and shaped by its users.

Many critics were uncomfortable with this approach. Price's work was often seen as chaotic or even ugly. The exposed scaffolding, cranes, and off-the-shelf materials went against traditional ideas of beauty and architectural control.[78] But this rawness was intentional. Price saw conventional aesthetics as a barrier to flexibility. He believed buildings should be measured by their ability to change and support different uses, not by how they looked. This thesis builds on Price's commitment to user agency and spatial transformation, but also takes a different position. It argues that responsive design can support flexibility while still offering thoughtful, well-crafted, and aesthetically rich spaces.

75 Hernández, "From the Fun Palace to the Generator," 50–51.
76 Hernández, "From the Fun Palace to the Generator," 53.
77 Hernández, "From the Fun Palace to the Generator," 52–53.
78 Hernández, "From the Fun Palace to the Generator," 56.

Figure 2.22
Fun Palace
fund-raising brochure
(1964)



ARRIVE AND LEAVE by train, bus, monorail, hovercraft, car, tube or foot at any time YOU want to - or just have a look at it as you pass. The information screens will show you what's happening. No need to look for an entrance - just walk in anywhere. No doors, foyers, queues or commissionaires: it's up to you how you use it. Look around - take a lift, a ramp, an escalator to wherever or whatever looks interesting.

CHOOSE what you want to do - or watch someone else doing it. Learn how to handle tools, paint, babies, machinery, or just listen to your favourite tune. Dance, talk or be lifted up to where you can see how other people make things work. Sit out over space with a drink and tune in to what's happening elsewhere in the city. Try starting a riot or beginning a painting - or just lie back and stare at the sky.

WHAT TIME IS IT? Any time of day or night, winter or summer - it really doesn't matter. If it's too wet that roof will stop the rain but not the light. The artificial cloud will keep you cool or make rainbows for you. Your feet will be warm as you watch the stars - the atmosphere clear as you join in the chorus. Why not have your favourite meal high up where you can watch the thunderstorm?

WHY ALL THIS LOT? "If any nation is to be lost or saved by the character of its great cities, our own is that nation". - Robert Vaughan 1843

We are building a short-term plaything in which all of us can realise the possibilities and delights that a 20th Century city environment owes us. It must last no longer than we need it.

While few projects have realized Cedric Price's full mechanical ambition, several built works have explored kinetic systems, mechanized floors, and reconfigurable frameworks that embody his ideas of adaptability, participation, and machine-like responsiveness. Most examples of kinetic architecture, however, focus on environmental modulation such as facades that adjust to control daylight, shading, or ventilation rather than spaces that transform for human occupation. Others employ movement as spectacle, designed to impress rather than to empower users to create or reconfigure space themselves.

Substrate Factory Ayase

The *Substrate Factory Ayase* by Aki Hamada Architects extends the discussion of kinetic architecture into a modest, real-world setting. Completed in 2017 in Kanagawa, Japan, the project transforms part of an existing circuit-board factory into a multipurpose community space that can be reconfigured for exhibitions, workshops, and social gatherings.[79] Within the retained steel frame of the factory, a series of lightweight wood and polycarbonate partitions, which allow light to pass through, are mounted on floor and ceiling tracks, enabling them to slide and overlap to create different spatial arrangements.[80] This system allows the interior to expand, contract, or open entirely depending on the program, transforming the former industrial shell into a continuously adaptable environment.

Unlike Cedric Price's *Fun Palace*, which remained theoretical, Substrate Factory Ayase demonstrates how flexibility can be achieved through simple, low-tech adaptability rather than complex mechanical systems. Instead of automated movement, change occurs through the manual rearrangement of panels, furnishings, and fittings within a visible and legible frame. However, this openness introduces new challenges. The same hard surfaces and exposed materials that enable transformation also create acoustic difficulties when the space hosts overlapping activities. Sound reverberates across the open plan, suggesting that true spatial adaptability must balance flexibility with sensory comfort. This issue could be mitigated through the use of sound-absorbing materials within the sliding partitions or through strategic space planning that separates quieter and more active areas.



Figure 2.23
Closed Partitions



Figure 2.24
Open Partitions

79 "Substrate Factory Ayase / Aki Hamada Architects," ArchDaily, May 24, 2017, https://www.archdaily.com/872046/substrate-factory-ayase-aki-hamada-architects.
80 ArchDaily, "Substrate Factory Ayase / Aki Hamada Architects."

Story Pod

A project that operates at a more tactile, inhabitable scale of transformation is the *Story Pod* in Newmarket, Ontario, a compact public reading pavilion whose operable walls physically expand and contract to define space, encouraging public interaction and shared use. Designed by Atelier Kastelic Buffey and completed in 2015 for the Town of Newmarket, the Pod functions as a small, open-access library and gathering space situated along a civic plaza in the town's historic core.[81]

When closed, the Pod reads as a sculptural, cedar-clad volume that protects its contents after hours. During the day, its walls pivot open like the covers of a book, revealing built-in shelves and seating that extend outward into the public realm. This simple movement transforms the Pod from a secure enclosure into an open pavilion, creating a sheltered reading nook that invites curiosity and casual gathering.

The rhythm of the vertical wood slats modulates between opacity and transparency, allowing daylight to filter softly into the interior while maintaining a sense of warmth and enclosure. The design's manual operability makes the act of transformation tangible so that users can physically participate in shaping the space, reinforcing a sense of shared ownership and community stewardship through interaction rather than construction.

At night, the Pod closes into a glowing lantern that marks its presence in the square. The Story Pod demonstrates how kinetic principles can foster engagement and connection at a small scale, illustrating that architectural adaptability need not be complex or mechanical. Instead, it can emerge from simple gestures.



Figure 2.25
Story Pod Open Position



Figure 2.26
Story Pod Closed Position

81 "Story Pod / Atelier Kastelic Buffey," ArchDaily, January 12, 2020, https://www.archdaily.com/777711/story-pod-atelier-kastelic-buffey.

2.3.3 Design Pressures and Library Impacts

The network of pressures a designer faces today is more complex than ever before. Zuk and Clark suggest that these pressures can be divided into two broad categories: physical and nonphysical.[82] Physical pressures include functional demands such as activities, their sequence, and their spatial relationships. They also encompass man-made networks and environmental forces that exist independently of human influence. Environmental pressures that shape form include various types of energy such as heat, sound, and light, as well as natural systems and conditions.[83] These range from ecological processes and climate patterns to landforms, bodies of water, and the atmospheric envelope surrounding the Earth.[84] The nonphysical category of pressures refers to how people react to the shapes and structures around them. It's well-established that the design of a space can influence a person's mental state, physical health, social behavior, and cultural identity.[85] Zuk and Clark spoke about the potential of this in 1970, and today their insights have been confirmed through research, including studies by architect and neuroscientist Tye Farrow. In his book *Constructing Health*, Farrow explores how the design of a space influences mental, physical, and social well-being. He emphasizes how factors like natural light, spatial layout, and material choices can affect mood, stress levels, and social behavior. Farrow advocates for a heterogenic approach to design that focuses on creating spaces that promote health and well-being rather than just addressing causes of disease. This supports the idea that the form of the built environment plays a crucial role in shaping our health and interactions.

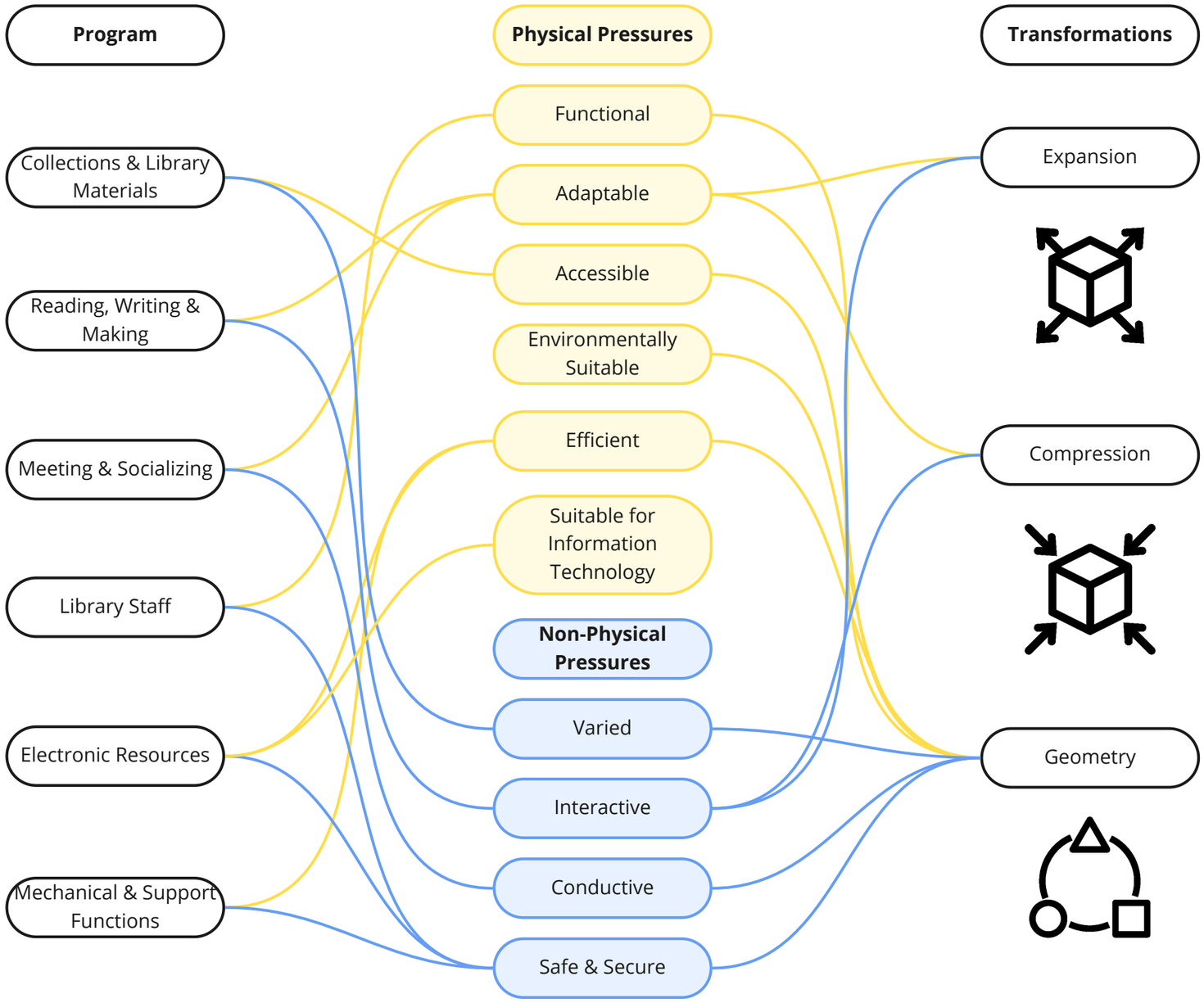
Public library branches face a wide range of pressures on form due to their open access to all members of the community. The program requirements of libraries today go far beyond just reading and storing physical books. Klinenberg's research shows that libraries now function as truly hybrid spaces, offering an endless variety of programs that shift over time. For example, he remembers a community room in the basement of an East New York library was transformed into a virtual bowling alley for elderly visitors, illustrating how libraries continue to evolve to meet the shifting needs of their communities.[86]

The International Federation of Library Associations and Institutions and professor Andrew McDonald have determined that a well-designed library space must have ten important qualities: it should be functional, adaptable, accessible, varied, interactive, conducive to learning, environmentally suitable, safe and secure, efficient, and equipped to support information technology.[87] These qualities also act as design pressures, shaping the form and performance of the space to meet the complex needs of its users. Each of these pressures can be addressed through specific transformations that kinetic architecture can support, enabling the space to

82 Zuk and Clark, *Kinetic Architecture*, 7.
83 Zuk and Clark, *Kinetic Architecture*, 7.
84 Zuk and Clark, *Kinetic Architecture*, 7.
85 Zuk and Clark, *Kinetic Architecture*, 7.
86 Klinenberg, *Palaces for the People*, 27.
87 Karen Latimer and Hellen Niegaard, *IFLA Library Building Guidelines: Developments & Reflections* (K.G. Saur Verlag, 2007), 14.

transition between pressures and adapt to changing needs. Examples of these transformations can include expansion, compression, and changing geometry. Further, thoughtful library design should include these ten qualities but kinetic architecture can aid and extend any shortcomings and adapt for future changes in pressures. Kinetic building shells are often designed to respond to environmental factors like sunlight or to transition between open and enclosed conditions. However, these systems are typically expensive and technologically complex, making them prone to maintenance issues or failure. In colder climates, they are also difficult to implement and often remain unused for much of the year. A more practical alternative is to focus on interior kinetic strategies, after first designing a strong form that is environmentally suitable and offers adequate space to accommodate both current needs and anticipated future pressures.

Figure 2.27
Program, Pressure, Response Diagram



2.3.4 Kinetic Exhibition Scaffold Layers

This next portion of the literature review will explore each level of an interior kinetic typology suitable for meeting the programmatic pressures of libraries.

2.3.4.1 Layer 1: Scaffold Frame

The first layer is the ringlock scaffolding system, which operates as the base structural framework. Fabricated in steel for strength and adaptability, scaffolding can be seen as a temporary and something to be concealed until the "finished" architecture is revealed. Yet in the context of adaptive reuse, this perception must be rethought. Its raw, modular logic offers precisely the kind of flexibility that allows buildings to remain useful as their programs evolve. This quality resonates with Riegl's distinction between "age value," which privileges the traces of permanence and historical continuity, and "use value," which emphasizes the relevance of adapting structures to present needs. By elevating scaffolding from a provisional support to a legitimate architectural layer, the design embraces a practical yet transformative typology.

Power is distributed externally along the scaffold using extension cords and power bars secured with cable ties and modular clips. This surface-mounted system keeps all wiring accessible, allowing cords to be repositioned easily whenever the scaffold is adjusted or expanded. Power bars mounted at key points provide outlets for lighting, digital devices, and equipment used in workshops or exhibitions. Mobile power trolleys with built-in outlets could also be incorporated to extend reach across the space, supplying power where needed without increasing the amount of cabling attached to the frame.

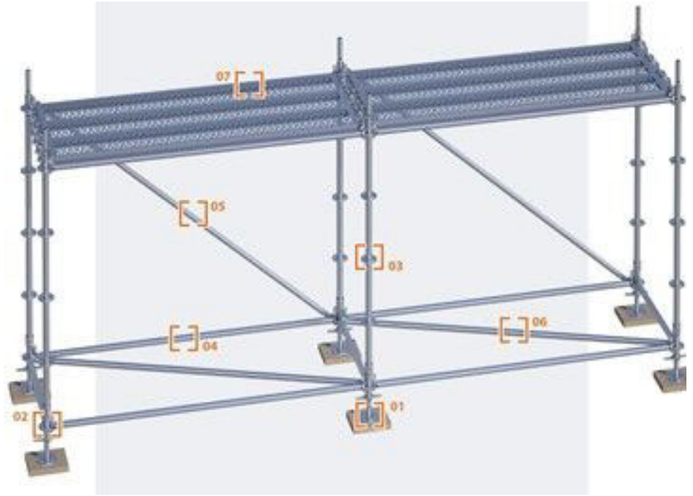
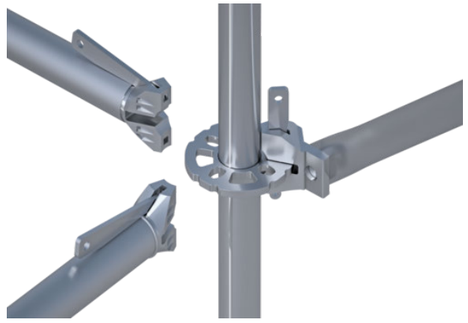
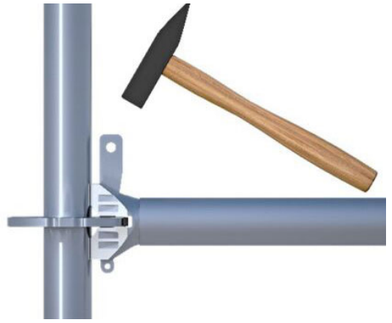


Figure 2.28
Typical ringlock scaffolding system components and connection details

01 Base jack
02 Base collar
03 Standards with rings
04 Horizontal ledger
05 Vertical diagonal
06 Horizontal diagonal
07 Decks





The steps for attaching the ledgers and diagonals to the connection point are simple and always the same:

1. Position the ledger or diagonal
2. Insert the wedge
3. Hit the wedge with the hammer to create a load-bearing connection

Ken Isaacs' book *How to Build Your Own Living Structures* (1974) provides a useful precedent for reconsidering the architectural potential of such frameworks. Isaacs proposed modular systems composed of lightweight grid-frames that could be configured into sleeping pods, raised platforms, storage walls, shelving, desks, or communal lounges, with each element attachable, adjustable, and replaceable within the same skeletal frame.[88] To make these systems universally adaptable, Isaacs established a standard 4 ft (48") cubic module as the foundation for all of his structures. The choice of 4 ft was deliberate: it was large enough to accommodate basic human activities such as sleeping and sitting while remaining compact and efficient, and it aligned precisely with readily available construction materials like 4' × 8' plywood sheets and dimensional lumber.[89] Larger structures could be created by multiplying this base unit, with two cubes forming an 8 ft span and three cubes a 12 ft span, without disrupting the proportional logic. Isaacs expanded this idea into a modular field, a repeatable grid that could be extended in any direction and infilled with interchangeable elements such as beds, desks, partitions, or communal platforms.[90] This approach elevated the cube from a simple building block to a flexible ordering system that offered both structural clarity and open-ended adaptability. In effect, the framework functioned as a living scaffold, capable of growing or contracting in response to shifting spatial or programmatic needs.

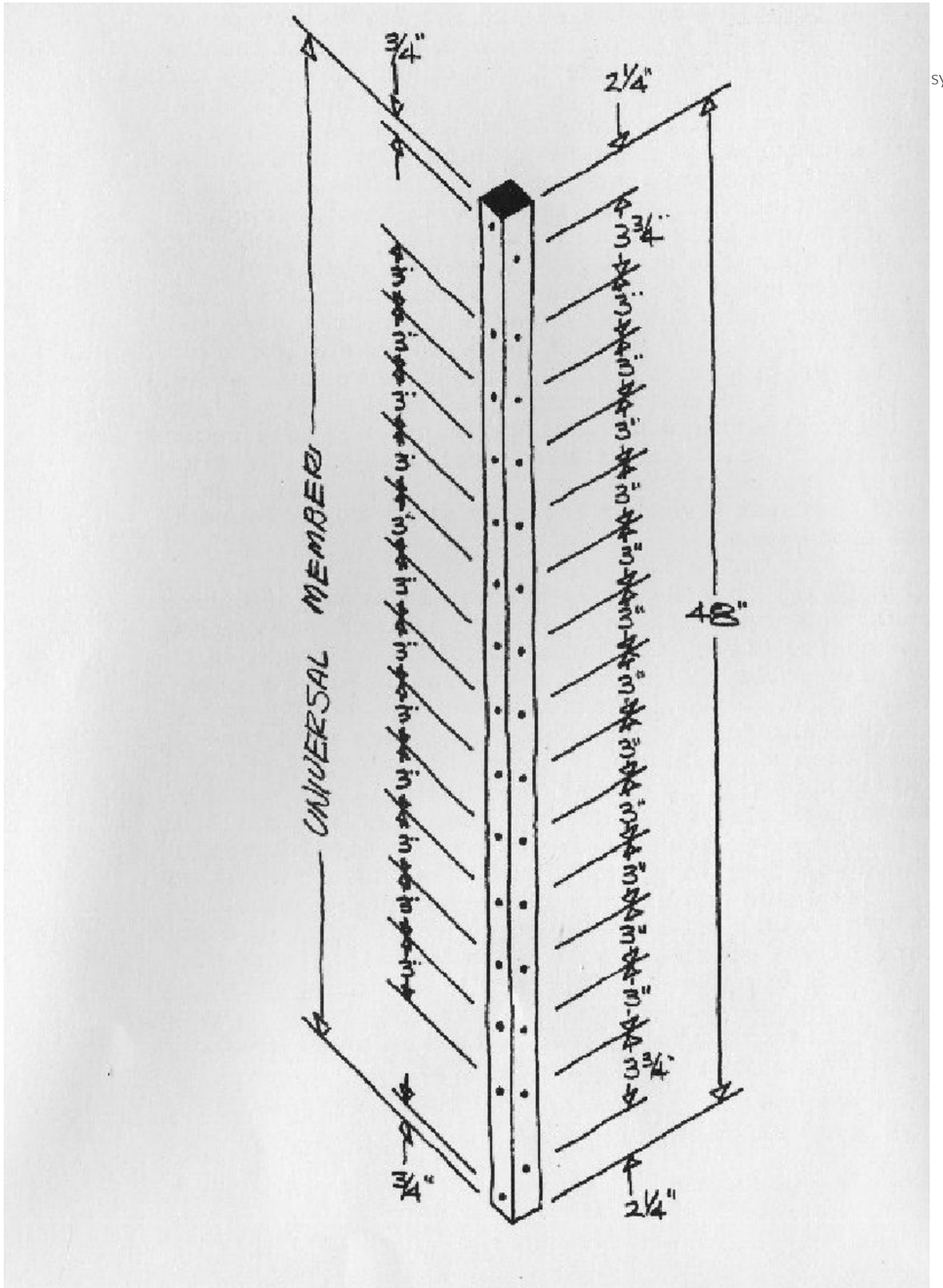


Figure 2.29
Ken Isaacs, sketch of 4 ft (48") modular system with perforated members allowing attachments at multiple heights for universal adaptability

88 Isaacs Kenn, *How to Build Your Own Living Structures* (Harmony Books a division of Crown Publishers, Inc., 1974).
89 Kenn, *How to Build Your Own Living Structures*, 27.
90 Kenn, *How to Build Your Own Living Structures*, 27.

Beach Matrix

One of Isaacs' most relevant projects for this thesis is the *Beach Matrix*, a modular steel frame proposed for assembly directly on sand and open to the horizon.[91] Within this grid, platforms, seating, and partitions could be freely arranged, showing how the structure functioned less as a fixed object and more as a flexible framework for use and change. For this thesis, the *Beach Matrix* serves as an important precedent, demonstrating how scaffolding can be reinterpreted to host a range of programs.

In a library context, the same logic suggests that desks, bookshelves, or partitions might be directly supported and rearranged within a scaffold framework. Yet unlike conventional construction scaffolding, this project redefines the scaffold as an intentional architectural system that is simple in structure but refined in expression. The framework is conceived as a clean steel grid, while its infill elements, such as shelving, partitions, and flooring, employ warmer materials like wood or fabrics to create a tactile, welcoming environment. In this way, the scaffold is not an eyesore or symbol of incompletion, but a visible structure of adaptability: honest, legible, and aesthetically deliberate.

91 Kenn, *How to Build Your Own Living Structures*, 76.

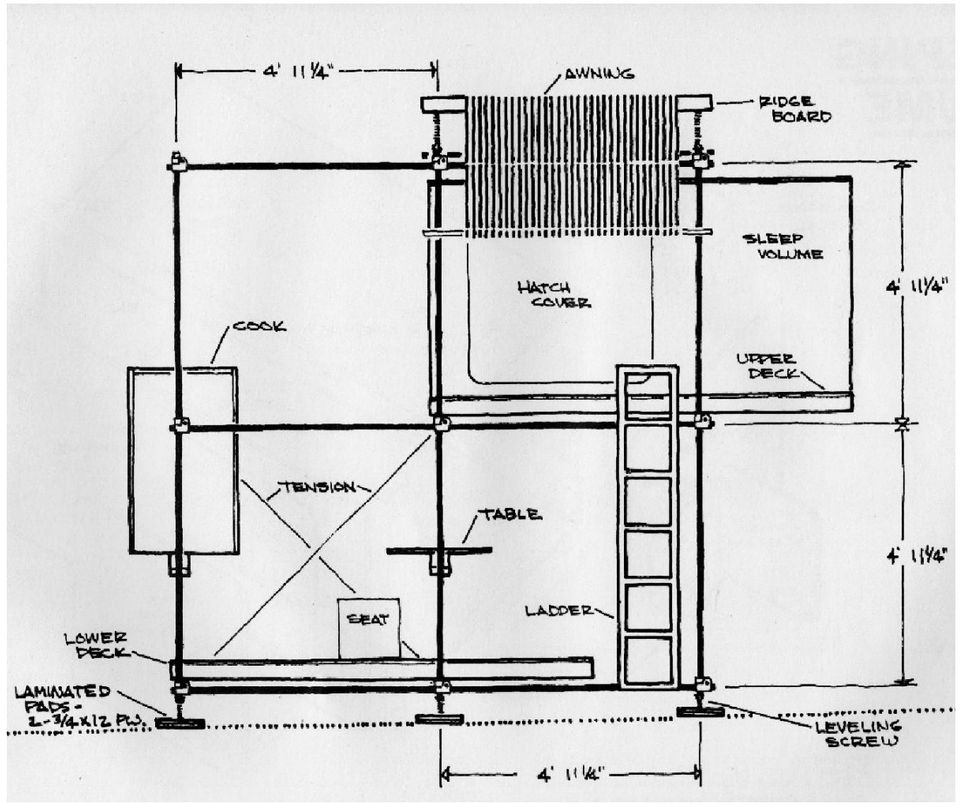


Figure 2.30
Ken Isaacs, Beach Matrix, sketch showing a grid-frame proposal to be assembled directly on sand with approx. 4' (48") modular units



Figure 2.31
Ken Isaacs, Beach Matrix, installation in Westport, Connecticut (1967)

Level Up

The project *Level Up*, a student installation built during the European Architecture Students' Assembly in Rijeka, Croatia in 2018, demonstrates how lightweight frameworks can generate flexible social programs within an existing urban shell.[92] The installation transformed the roof-top of a disused industrial building into a stepped pavilion of platforms and terraces, offering seating, circulation, and gathering spaces in one layered frame.[93] Constructed with simple timber and steel scaffolding, the design foregrounded adaptability rather than permanence, allowing the same system of steps and partitions to serve as stage, furniture, or circulation depending on use.[94] Its bare-bones skeleton of the rigid grid came to life only through occupation, as users fluidly adapted it by tying hammocks and swings to the bars, hanging plants from the frame, and appropriating its openness for play, rest, and informal gathering.



Figure 2.32
Level Up(2018)
Installation view



Figure 2.33
Level Up (2018)
Interior perspective

92 Paula Pintos, "Level Up / Brett Mahon, Joonas Parviainen, Saagar Tulshan, Shreyansh Sett," ArchDaily, February 22, 2019, https://www.archdaily.com/911991/level-up-brett-mahon.
93 Pintos, "Level Up / Brett Mahon, Joonas Parviainen, Saagar Tulshan, Shreyansh Sett."
94 Pintos, "Level Up / Brett Mahon, Joonas Parviainen, Saagar Tulshan, Shreyansh Sett."

Power Station Configurator

Power Station Configurator is a scaffolding installation by Atelier Anonymous at the Power Station of Art in Shanghai. Built in 2023, it transformed a three-story platform along the riverfront into a flexible exhibition space. Covering about 140 m², the project relies on steel scaffold modules, each forming a regular bay that can be shifted, joined, or adjusted depending on what is being shown.[95] Exhibitions often need spaces of varying sizes because a single large installation may demand openness, while smaller objects, texts, or films work better in enclosed and intimate settings. To allow for this range, each scaffold cell can be left open or wrapped with curtains, while wooden inserts form display walls, shelving, or partitions.[96] A raised platform at the edge adds a place for pause and reflection, linking the adaptable exhibition grid to its exterior waterfront context.



Figure 2.34
Power Station Configurator (2023) interior display view



Figure 2.35
Power Station Configurator, Shanghai (2023) elevated platform view

95 HAN Shuangyu, “Power Station Configurator / Atelier Anonymous | ArchDaily,” ArchDaily, accessed September 21, 2025, https://www.archdaily.com/1003351/power-station-configurator-atelier-anonymous.
96 Shuangyu, “Power Station Configurator / Atelier Anonymous | ArchDaily.”

2.3.4.2 Layer 2: Partitions

The second layer consists of interchangeable, movable partitions that provide varying levels of privacy. These range from fully enclosed conditions, both visually and acoustically, to open and permeable configurations that maintain connection across the space. The partitions define program zones and allow flexible subdivision within the scaffold framework. The system includes solid panels that function as whiteboards, chalkboards, or projection surfaces, and fabric panels that can be rolled or stretched between scaffold bays to form temporary enclosures or soften visual boundaries. To support newer technologies, rollable TV screens can attach to the scaffold's vertical columns, providing adaptable access to digital content for workshops or presentations.

Together, these components make it possible to reconfigure the space quickly for study areas, collaborative work, or community events. The writable, digital, and tactile surfaces extend the role of the partition beyond enclosure, turning it into an active tool for communication, learning, and display. The design also considers acoustic and spatial modulation inspired by the work of *Molo*, a Vancouver-based design studio founded by Stephanie Forsythe and Todd MacAllen, known for its expandable textile structures that combine elements of architecture, art, and furniture.[97] Their soft wall products are accordion-like partitions made of paper or textile that can expand into sweeping freestanding walls and then compress back into compact bundles for storage. The honeycomb geometry of the pleated structure not only provides flexibility but also absorbs and dampens sound by trapping and diffusing sound waves within its cellular form, reducing reverberation and creating quieter, more comfortable environments.[98] This acoustic quality is especially valuable in a library setting, where adaptable enclosures must also balance openness with spaces of concentration and reduced noise. Just as importantly, the tactile materiality and flowing curves of these partitions provide softness and contrast to the rigid, industrial character of the scaffolding framework, tempering its hardness with a more inviting and atmospheric quality.

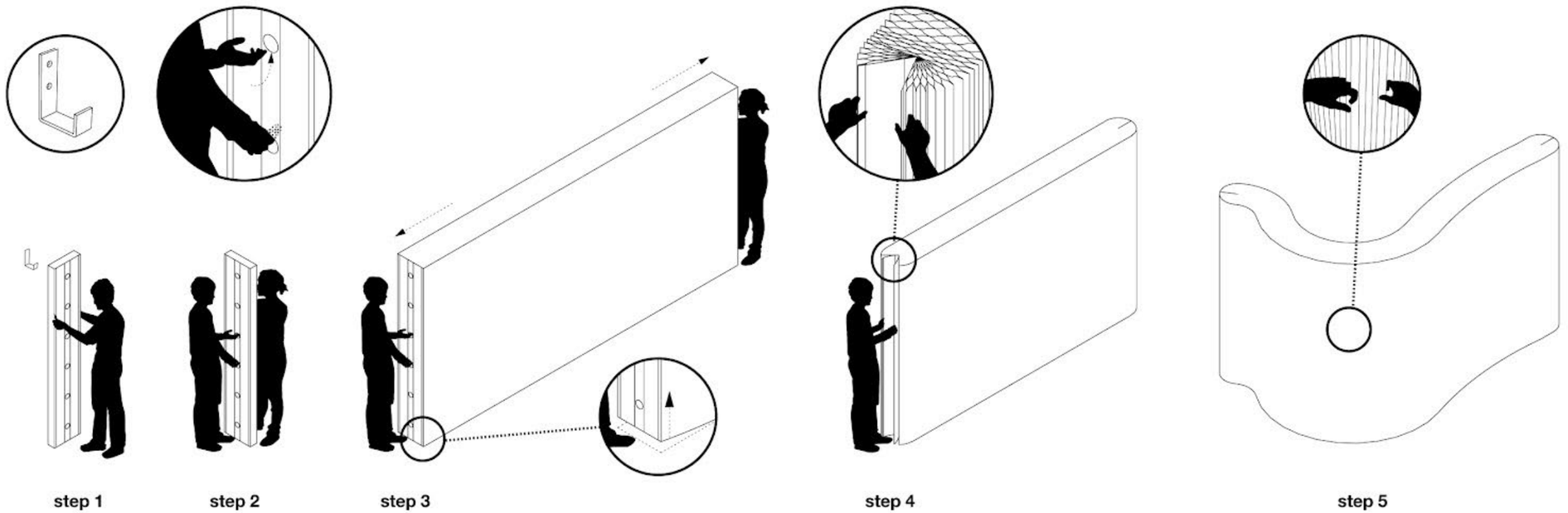
97 "Studio Molo," Space Partitions | Modern Acoustic Room Dividers, 2025, https://molodesign.com/collections/space-partitions/.
98 Space Partitions | Modern Acoustic Room Dividers, "Studio Molo."





Figures 2.36 & 2.37
Paper softwall, folding partition

Figure 2.38
Paper softwall, assembly diagram showing the expansion and connection method



2.3.4.3 Layer 3: Furniture

The third layer of the kinetic typology begins with the scaffold itself, which doubles as a furniture base. Its rigid skeleton can be clipped into, hung from, or extended with attachments, turning the frame into a support for hammocks, swings, and netting that invite rest, play, and informal gathering. The same system can also be adapted to carry bookshelves, allowing storage to be built directly into the grid rather than added as separate, freestanding pieces. Tables and work surfaces can also be assembled using the same scaffold language, reinforcing material consistency and enabling furniture to be added, removed, or reconfigured.

The previously mentioned precedent, *Level Up*, displayed students using the scaffolding to hang furniture off. Alongside these scaffold-based elements, the design incorporates Studio Molo's family of flexible furniture, which expands the idea of adaptability at the scale of seating and tables. Their soft seating collection includes folding paper or textile stools, benches, and loungers that expand into round or linear forms and then compress flat for storage.[99] The honeycomb structure distributes weight evenly while remaining lightweight and durable. Other pieces, like the cantilever table and high-backed Benchwall, blur the line between furniture and partition by serving simultaneously as seating and spatial dividers.[100] Together, these elements bring a dual quality to the furniture layer through the raw scaffold base for improvised attachments and built-in bookshelves, while the Studio Molo pieces add tactility and comfort.

99 "Studio Molo," Folding Furniture | Made from Paper and Textiles, accessed September 21, 2025, https://molodesign.com/collections/furniture/.
100 Folding Furniture | Made from Paper and Textiles, "Studio Molo."





Figures 2.39 & 2.40
Level Up
furniture integrated
into the scaffolding
structure



Figures 2.41 & 2.42
Folding paper lounger







Figure 2.43 & 4.44
Folding paper
benchwall



Figure 2.45
Folding paper
benchwall and
hightable

2.3.4.4 Layer 4: Safety & Accessibility

The fourth layer of the kinetic typology is safety, which extends beyond the inherent strength of the steel scaffold frame. This layer draws inspiration from playground design, where protective systems allow for freedom of movement without sacrificing security. Within the scaffold grid, safety is reinforced through guards made of netting or simple pieces of wood and rubber flooring. Suspended netting woven into or alongside the framework prevents falls, creates soft boundaries, and can even double as surfaces for reclining. Suspended netting woven into or alongside the framework prevents falls, creates soft boundaries, and can even double as surfaces for reclining. Companies such as InCord specialize in custom safety netting, producing systems designed for fall protection in industrial, maritime, and public environments.[101] Their nets are fabricated from high-tenacity synthetic fibers like polyester and nylon, making them durable and resistant to abrasion while remaining lightweight.[102] Because each system is custom fabricated, the netting can be designed to fit directly into a scaffold grid, providing protection without undermining openness or adaptability.

The ground plane is treated with resilient flooring that absorbs impact and reduces noise, creating an additional layer of protection. Companies like Dinoflex, a Canadian company based in British Columbia, manufacture recycled rubber flooring designed for architectural applications, offering surfaces that combine durability, slip resistance, and acoustic comfort with finishes suited to public interiors.[103] Unlike brightly colored playground or gym tiles, Dinoflex products are available in muted tones and subtle patterns, allowing safety to be integrated without compromising the aesthetic character of a library setting. Together, netting and flooring transform the scaffold framework from a potentially hazardous skeleton into a secure, inhabitable environment where experimentation and adaptability can unfold without risk.

Accessibility remains a critical consideration within this layered, transformable system. Vertical circulation is achieved through dedicated elevator or lift access to the upper scaffold levels. The primary scaffold frame is assembled and maintained by professionals, while public interaction occurs through the freestanding partitions, clip-on modules, and reconfigurable furnishings that define everyday use. Larger transformations or event-based reconfigurations are carried out by trained staff after hours, maintaining both user safety and the system's long-term flexibility. This balance between professional assembly and public participation allows the scaffold to function as an inclusive and responsive civic framework while maintaining public safety.

101 "InCord," InCord Custom Safety Netting Solutions, accessed September 21, 2025, https://incord.com/.
102 InCord Custom Safety Netting Solutions, "InCord."
103 Dinoflex, "Recycled Rubber Flooring," Dinoflex- Rubber Reimagined, 2025, https://dinoflex.com/.



Figure 2.46
Playground netting system for parks and play areas



Figure 2.47
Commercial rubber flooring



Figure 2.48
Vertical platform lift

2.4 FORM BALANCING

Massing is a fundamental consideration when adding to an existing building. The new volume must balance functional requirements with aesthetic sensitivity, carefully negotiating its relationship to the host structure. Additions that dominate or overwhelm risk erasing the cultural and architectural value of the original, while overly timid gestures may fail to support contemporary needs. The challenge lies in creating a composition where old and new coexist, each distinct yet mutually reinforcing, rather than one consuming the other.

2.4.1 Rowena Reed Kostellow

The work of Rowena Reed Kostellow, an influential design educator at Pratt Institute in the mid-20th century, provides a useful framework for understanding relationships of form. Her teaching emphasized spatial clarity and the sculptural qualities of design, focusing on how volumes interact rather than on surface detail. In her principles, the establishment of form between volumes relies on the careful selection of 3 elements:

1. Dominant
2. Subdominant
3. Subordinate

This hierarchy creates balance, guides perception, and ensures that no single part of a composition overwhelms the whole. The dominant volume is identified as the largest element, possessing the most interesting and dramatic character, and it is positioned to occupy the most prominent place within the grouping.[104] The subdominant volume serves to complement the character of the dominant form.[105] For a successful integration, the addition of the subdominant should improve the dominant's character by at least twenty percent, otherwise, more experimentation is needed.[106] This relationship is often enhanced when the axes of the forms are not parallel. Kostellow defines an axis as an imaginary line that passes through the longest dimension of a form, indicating its strongest movement and defining its position in space.[107] Finally, the subordinate element or elements are introduced to further enrich the design by adding a third visual component and axis.[108] Its purpose is to enhance the three-dimensionality of the design, complement the existing forms, and ensure the overall unity of the composition. The subordinate is less independent than the dominant or subdominant; it must provide contrast while remaining sensitive to the other forms, effectively filling any gaps left by the initial two elements.[109]

104 Gail Greet Hannah, *Elements of Design: Rowena Reed Kostellow and the Structure of Visual Relationships*, Design Briefs (Princeton Architectural Press, 2002), 50.
105 Hannah, *Elements of Design*, 50.
106 Hannah, *Elements of Design*, 50.
107 Hannah, *Elements of Design*, 54.
108 Hannah, *Elements of Design*, 50.
109 Hannah, *Elements of Design*, 50.

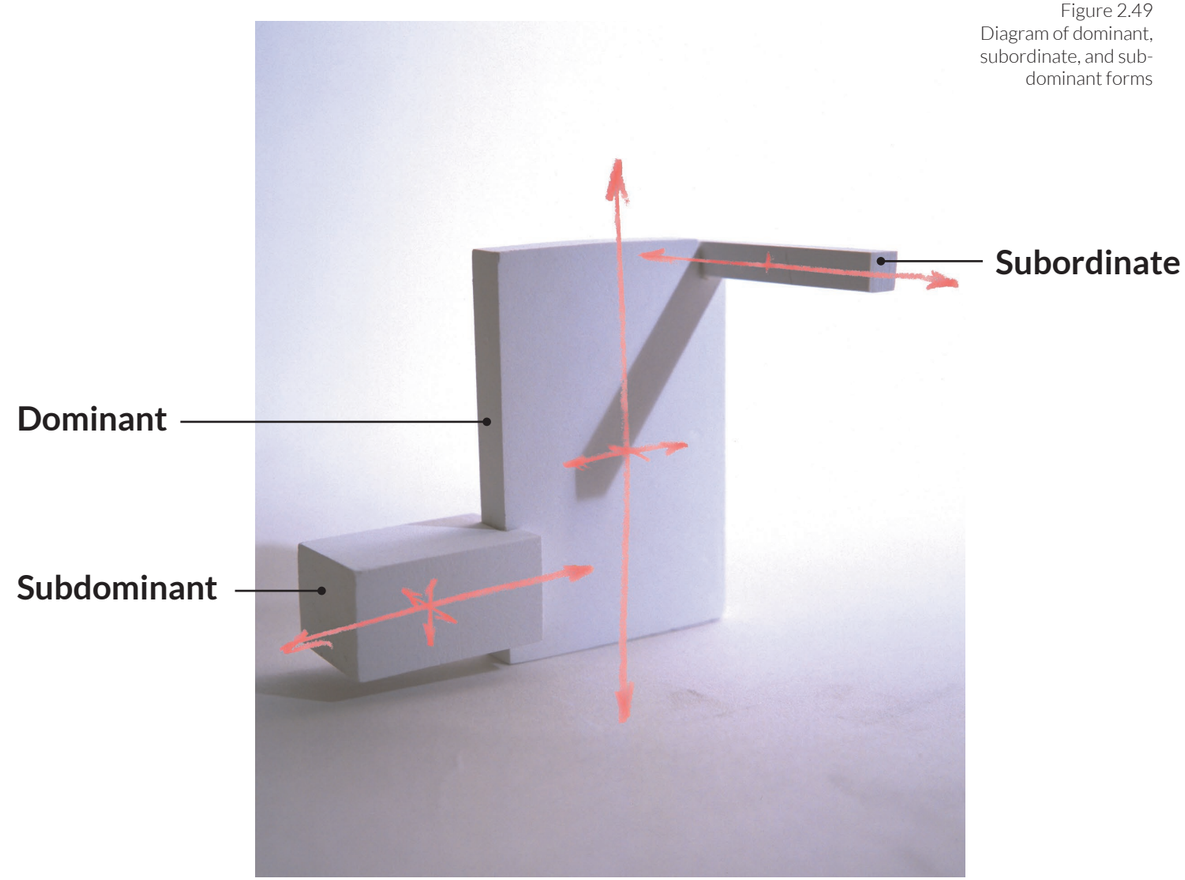


Figure 2.49
Diagram of dominant, subordinate, and subdominant forms

Drawing on Kostellow's design principles, volumes are commonly joined through piercing, wedging, or cradling.[110] As noted previously, this thesis takes a different approach: the additions do not cut into or rest on the library but instead hover just above the original mass. They appear to latch on visually while remaining structurally independent. This strategy preserves the historic fabric intact, yet still establishes a strong spatial dialogue between old and new.

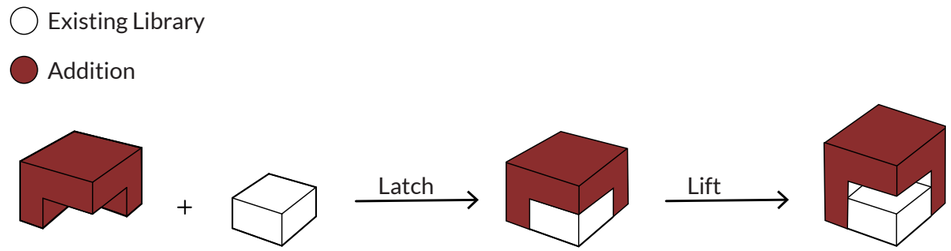
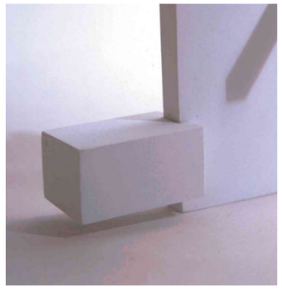


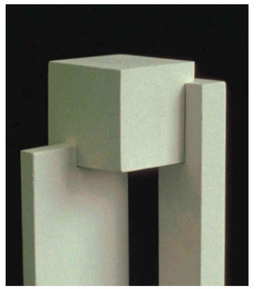
Figure 2.50
Latch on & lift above existing form

110 Hannah, *Elements of Design*, 54.

Wedging



Cradling



Piercing

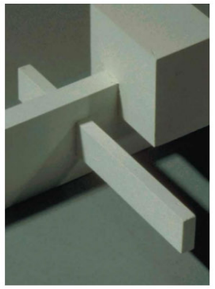


Figure 2.51
Diagram showing Kostellow's methods of joining volumes

2.4.2 Francis D.K. Ching

Kostellow emphasized the perception of balance through the hierarchy of dominant, subdominant, and subordinate forms. While her exercises often employed axes, planes, and spatial relationships as organizing devices, the goal was primarily perceptual: to train students to see and feel harmony, tension, and unity through hands-on model-making. Her method was qualitative and rooted in studio pedagogy.

American Architect, Francis D.K. Ching, writing later in *Architecture: Form, Space, and Order* (2007), extended these same concerns into a systematized architectural framework. Where Kostellow used axes, planes, and the hierarchy of forms as pedagogical tools for visual training, Ching translated similar ideas into a textbook that generalized them as ordering principles for architectural composition beyond the studio.

Both thinkers addressed the challenge of balancing forms, but from different directions: Kostellow developed a language of form hierarchy to sharpen designers' visual judgment, while Ching codified compositional strategies into a neutral, rule-based toolkit. Ching explains form as shape, size, colour, texture.[111] But he also explains that form can have relational properties that govern the pattern and composition of elements such as position, orientation, and visual inertia.

111 Francis D.K. Ching, *Form, Space and Order*, third edition (John Wiley & Sons, Inc., 2007), 34.

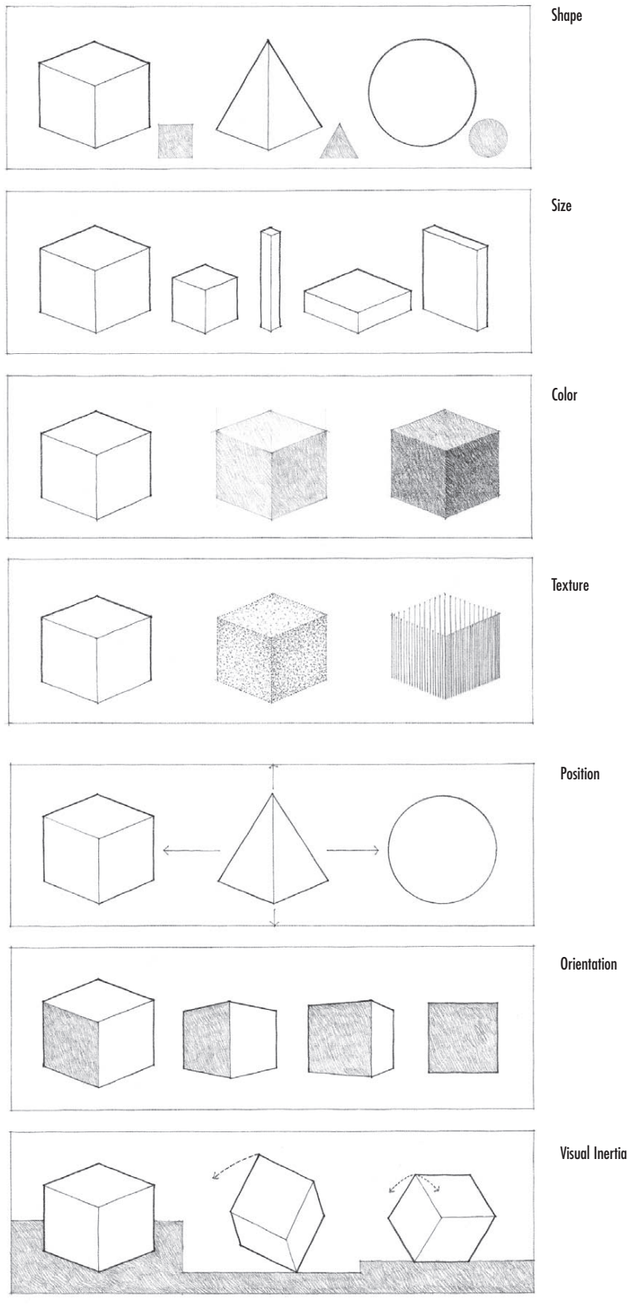
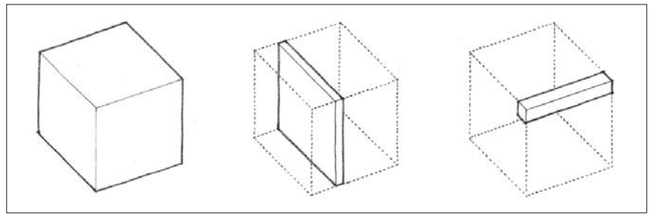


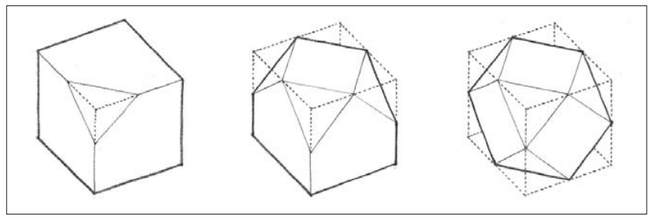
Figure 2.52
Types of Form and Properties

Ching then explains how forms can also be transformed from their primary solid through dimensional, subtractive, and additive transformation shown in the following illustration:

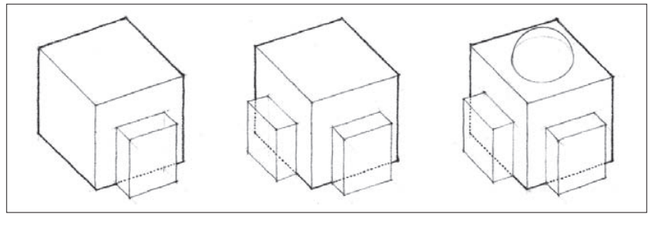
Figure 2.53
Types of Form
Transformations



Dimensional
Transformation



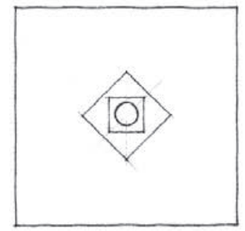
Subtractive
Transformation



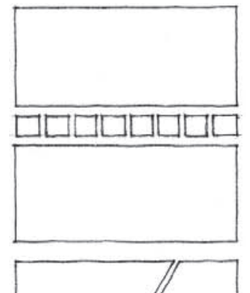
Additive
Transformation

Spatial organization methods are influenced by formal characteristic, spatial relationships, and contextual responses. The following include centralized, linear, radial, clustered, and grid organization.

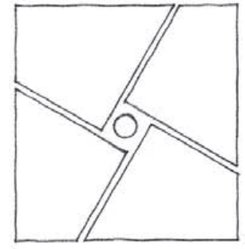
Figure 2.54
Spatial Organization
Methods



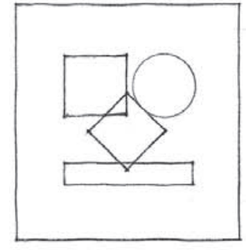
Central Organization



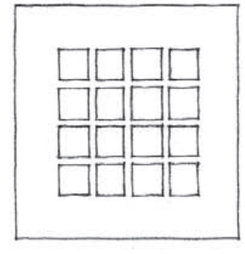
Linear Organization



Radial Organization



Clustered Organization



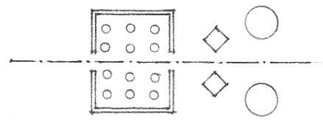
Grid Organization

To create overall order in an architectural composition, Ching identifies six key ordering principles: axis, symmetry, hierarchy, rhythm, datum, and transformation. An axis establishes alignment and direction, organizing forms and spaces along a central line.[112] Symmetry creates visual balance by arranging equivalent elements evenly on either side of an axis or plane.[113] Hierarchy introduces emphasis, highlighting one element over others through differences in size, shape, or placement to establish a focal point.[114] Rhythm produces unity and movement through repetition or patterned variation of forms and motifs.[115] A datum provides a continuous reference such as a line, plane, or volume that relates and organizes diverse elements within a composition.[116] Finally, transformation allows a concept or form to evolve through change while maintaining its fundamental identity and coherence.[117] Together, these principles provide a framework for achieving harmony, structure, and clarity across scales of design.

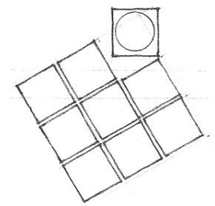
112 Ching, *Form, Space and Order*, 339.
113 Ching, *Form, Space and Order*, 339.
114 Ching, *Form, Space and Order*, 339.
115 Ching, *Form, Space and Order*, 339.
116 Ching, *Form, Space and Order*, 339.
117 Ching, *Form, Space and Order*, 339.

Figure 2.55
Six Ordering Principles

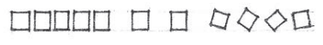
Symmetry



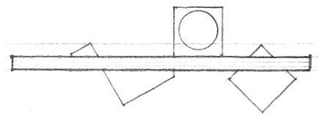
Hierarchy



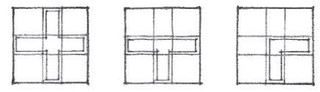
Rhythm



Datum

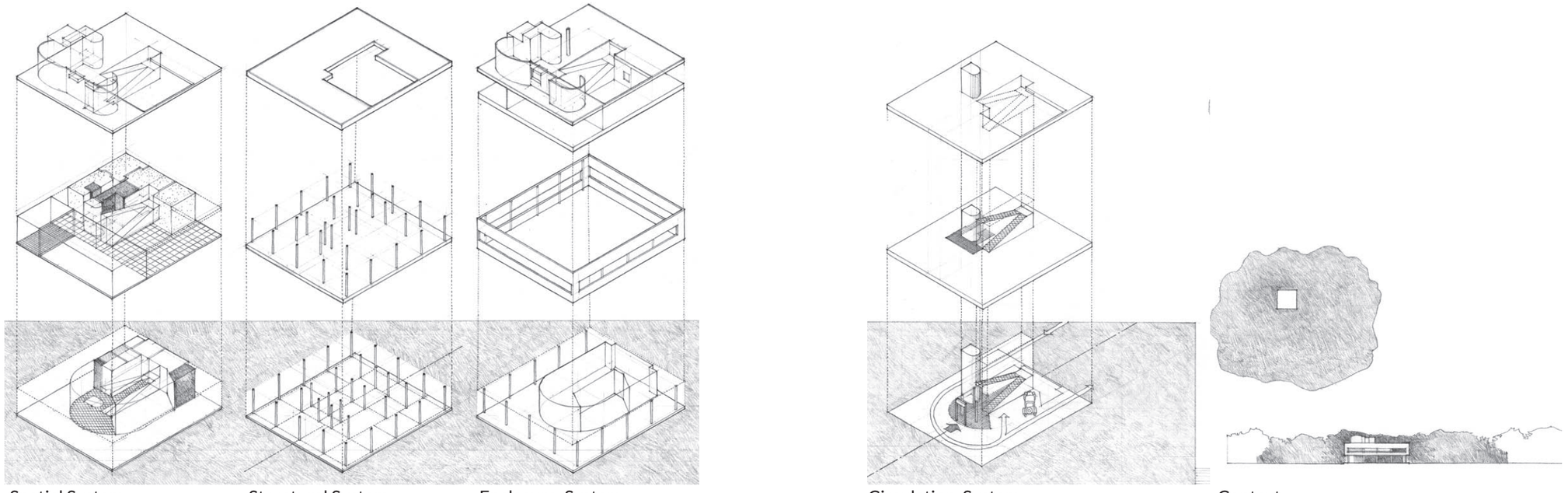


Transformation



Ching illustrates how in any building balance emerges from the interaction of several primary systems. The spatial system organizes program elements into a three-dimensional hierarchy of dominant, supporting, and connective spaces. The structural system establishes order through a grid of vertical and horizontal supports, providing proportional fields that guide how spaces are defined. The enclosure system shapes the volumes and planes that contain and articulate those spaces, mediating between interior and exterior. The circulation system penetrates these volumes, stitching the building together through paths, stairs, and ramps that give legibility and flow. Finally, the context influences orientation, openings, and the building's relationship to its surroundings.

Figure 2.56
Exploded axonometric of Villa Savoye, Poissy, France (Le Corbusier, 1929), illustrating the harmonious integration of interrelated parts into a unified whole

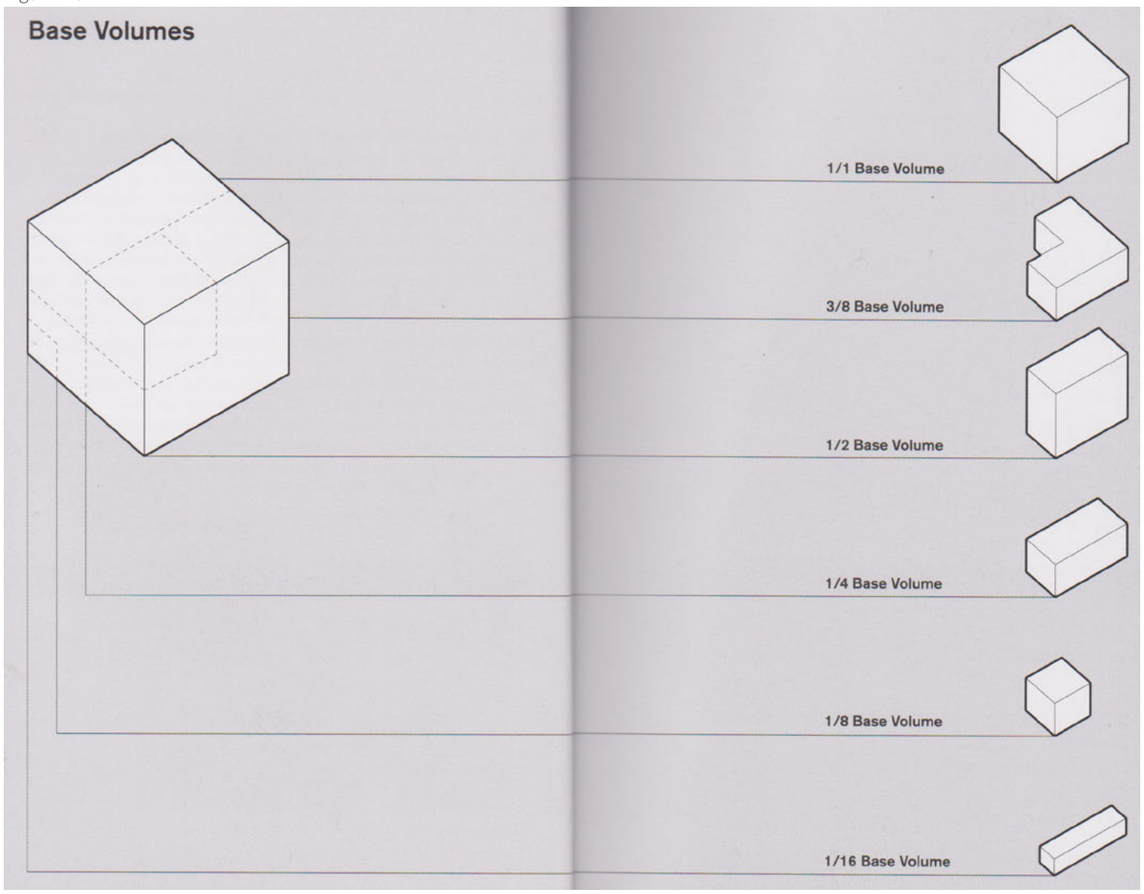


Spatial System | Structural System | Enclosure System | Circulation System | Context

2.4.3 Anthony Di Mari and Nora Yoo

Building on Ching's general ordering principles, Anthony Di Mari and Nora Yoo expand spatial reasoning into an active design process in *Operative Design* (2012). Their framework introduces a catalog of spatial verbs that describe how base volumes can be transformed through sequential operations. The process begins with simple forms, such as the cube, which can be subdivided into fractional units (½, ¼, ⅛, etc.) to establish starting geometries.

Figure 2.57



These are then manipulated through three primary operations of add, displace, and subtract which each expressed through verbs such as *expand*, *extrude*, *merge*, *skew*, *twist*, *interlock*, *notch*, *taper*, *inscribe*, and *puncture*. Applied to this thesis, the existing library serves as the fixed base condition. A simple form is then latched onto the existing structure and tested through an iterative process using Di Mari and Yoo's operations and spatial verbs to explore how the new mass can respond to, balance, or contrast the existing building and its context. This method provides a structured yet experimental framework for generating compositions for the over-build addition.

In the *Design Proposal* chapter, four operations – interlock, lift, carve, and puncture - are applied. *Interlock* is reinterpreted here as latch, describing the act of attaching a new volume to the existing building. *Lift* displaces the volume to elevate the latched-on addition above the existing structure. *Carve* subtracts mass to create openings that respond to important moments of the original building, such as entrances and windows, while also introducing dimensionality, daylight, and airflow to the new addition. *Puncture* further refines the form, piercing the gap between the connective cores and the addition to articulate the sense of hovering. Through these operations, the resulting form evolves beyond a simple block placed above the library, becoming an integrated and responsive composition that both preserves and transforms the existing building. The following excerpts from Di Mari and Yoo illustrate the methods of transforming mass through these spatial operations.

Figure 2.58
Catalog of spatial verbs

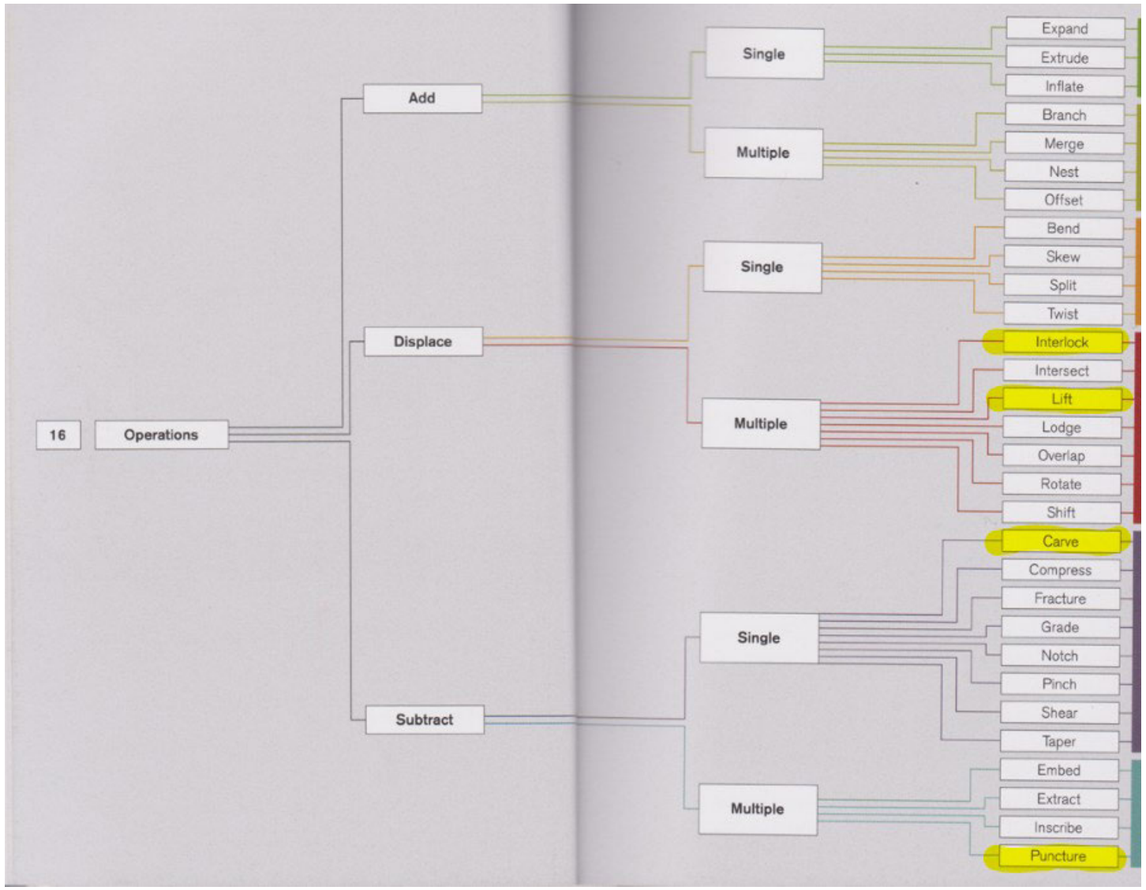
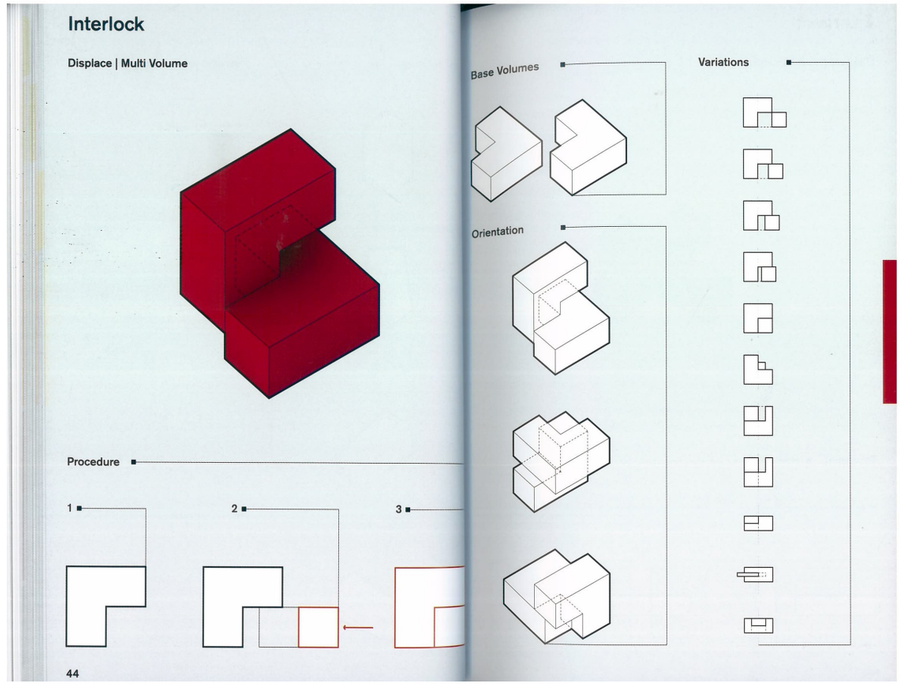


Figure 2.59
Operations Exerpts



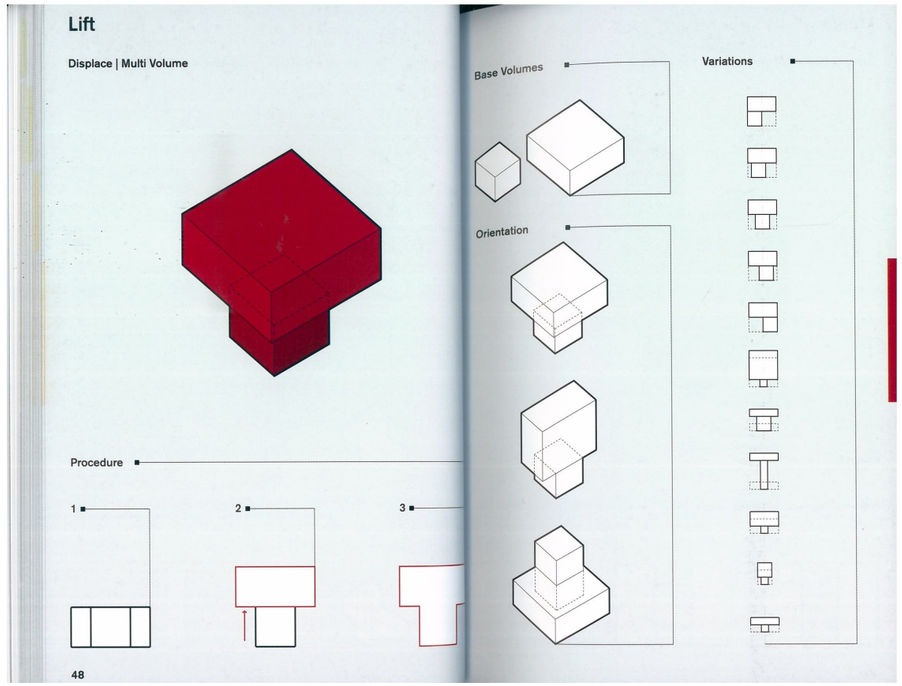
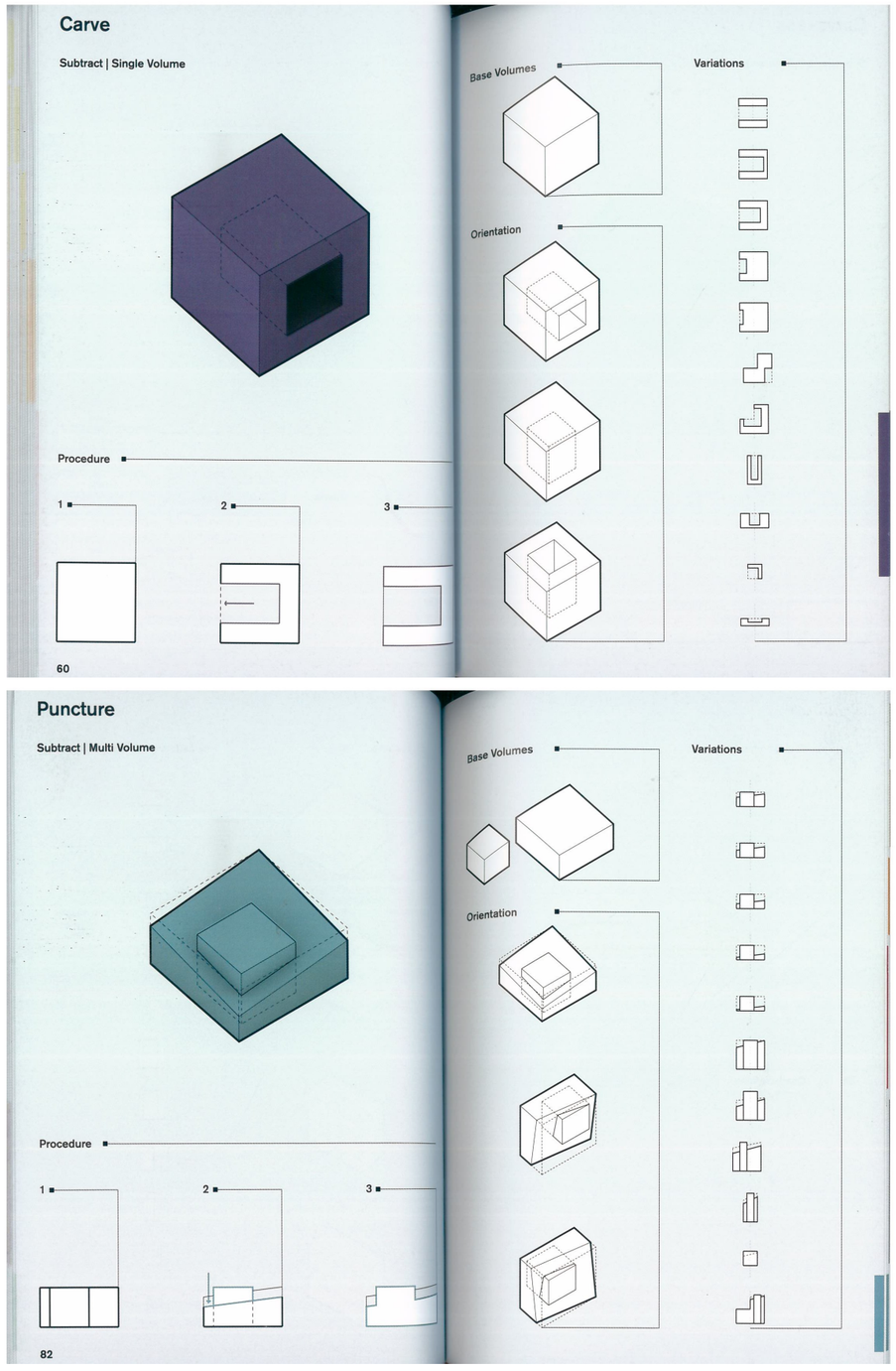


Figure 2.60
Operations Exerpts



2.4.4 Technical and Structural Requirements

The final form of the addition is shaped as much by building code and structural logic as by architectural intent. Because the 1975 library structure was never designed to support additional floors, the new volume must hover above it, preserving the existing building while allowing the new mass to operate as an independent architectural layer.

Several distinct egress provisions in the Ontario Building Code influence the geometry of this elevated floor. First, the number of exits is established in Article 3.4.2.1, which requires that every floor area intended for occupancy be served by at least two exits, each providing an independent means of egress. This immediately anchors the hovering volume to two separate vertical circulation cores that run uninterrupted to grade.

Second, travel distance is defined in Article 3.4.2.4 as the distance from any point in the floor area to an exit, measured along the actual path of travel. This definition determines how the most remote locations within the exhibition plate are identified and measured in plan and ensures that circulation is evaluated as it would actually be experienced by occupants.

Third, the location of exits is constrained by Article 3.4.2.5. When more than one exit is required, this Article requires exits to be placed so that the travel distance to at least one exit does not exceed the limits specified for the occupancy and condition of the floor area. For floor areas containing an occupancy other than high-hazard industrial, the relevant limits are 30 m in a floor area not sprinklered throughout and 45 m in a floor area sprinklered throughout. In practice, these values determine how far the most remote points of the hovering exhibition level may be from an exit and influence the spacing and placement of the stairs.

A distinct requirement concerns the distance between the exits themselves. Under Article 3.4.2.3, the two required exits must be far enough apart so that a single fire is unlikely to block both egress paths. The minimum required separation is one-half of the floor's maximum diagonal dimension and not less than 9 m, measured as the shortest path smoke would travel between exits. In an L-shaped plan, this naturally positions the exits at opposite extents of the floor, aligning with the design strategy used in this project.

Additional Part 3 provisions for Group A2 occupancies govern the configuration of the exit stairs. Exit widths must satisfy occupant-load calculations while providing a minimum clear width of 1 100 mm between handrails (OBC 3.4.6.8.(1)), maintaining a minimum headroom of 2 050 mm (OBC 3.4.6.6), and incorporating landings at least as deep as the stair width at changes in direction or door swings (OBC 3.4.6.9). Because these egress shafts must be enclosed, fire-rated, and continuous to grade, a perfectly "weightless" hovering volume is neither structurally nor code-feasible.

The design resolves these constraints through a bridging configuration, in which the hovering floor spans between connector cores. By minimizing the footprint of these cores, the addition

maintains its language of lightness and transparency while satisfying the requirements for the number, separation, and location of exits. Large steel floor-to-ceiling trusses allow the elevated level to bridge over the existing roof and between the cores, transferring loads to new columns independent of the original structure. These trusses are both structurally necessary and architecturally expressive, articulating a dynamic framework that remains fully compliant with Articles 3.4.2.3, 3.4.2.4, and 3.4.2.5.

2.4.5 Form Balancing Matrix

Building on the technical and structural requirements outlined earlier, this stage develops a series of massing experiments that test how form balancing principles can guide the design of bridged, overbuild additions. These studies merge architectural theory with practical constraints, using composition, structure, and code compliance as parallel design drivers.

Drawing from the frameworks of Rowena Reed Kostellow, Francis D.K. Ching, and Anthony Di Mari with Nora Yoo, the experiments explore how new volumes can "hover" above existing library buildings while maintaining compositional balance and structural independence. The focus is on modest suburban branches, where additions must remain contextually appropriate, scaled to fit within low rise neighbourhoods while enhancing civic presence.

This stage operates as an exploratory massing study, testing the potential of adding a bridged overbuild structure to an existing suburban library form. It is intentionally abstract and does not yet incorporate detailed site considerations such as orientation, setbacks, or surrounding context. These factors would need to be considered simultaneously in a comprehensive design proposal.

Both rectilinear and curved base forms are tested to examine how geometry affects balance and tension between old and new. Each iteration establishes hierarchies of dominant, subdominant, and connector volumes, where the new addition may assert visual prominence, or the existing building may remain primary. Here, what Kostellow termed *subordinate forms* are reinterpreted as *connectors*, aligning compositional hierarchy with Ontario Building Code requirements for exits and circulation.

Procedure:

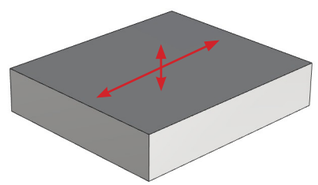
1. Fix the Base
   Identify the existing volume (rectilinear or curved) as the base form for the study.
2. Add the Overbuild
   Introduce a bridged overbuild addition positioned above the existing structure.
3. Set Axes and Constraints
   Establish the primary and secondary axes of all forms (length, width, height) to define

orientation and proportion.

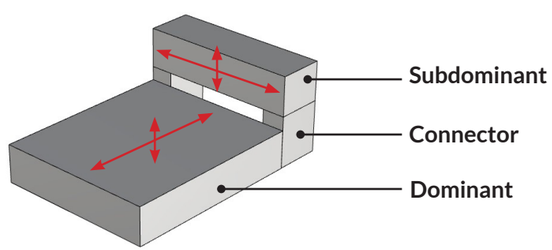
4. Assign Hierarchy
   Define the relationship between dominant, subdominant, and connector forms:
   - Dominant: the element (either existing or new) that takes visual or spatial prominence through scale, position, or orientation.
   - Subdominant: the counter-mass that stabilizes the composition and reinforces balance.
   - Connector: the bridging element linking the forms, providing structural and circulatory continuity to grade.
5. Define Options Based on Hierarchy
   From the initial massing experiments, develop a matrix of configurations that explores dominant vs. subdominant relationships between the existing building and the new addition.
6. Evaluate Each Option
   Assess every configuration using a consistent checklist:
   - Environment: in a comprehensive design proposal the massing should respond to the site analysis
   - Composition: clarity of hierarchy, balance, and spatial tension
   - Structure: legibility of spans and supports
   - Operation During Works: ability for the library to remain open and accessible
   - Code: compliance with egress, stair/lift placement, and fire separations
   - Program Fit: adequate space for kinetic scaffold and clear exhibition edge
7. Select and Refine
   Identify the configuration that best balances hierarchy, structure, and public experience. Refine this option using targeted spatial operations to respond to site conditions and programmatic requirements in the next design proposal stage.

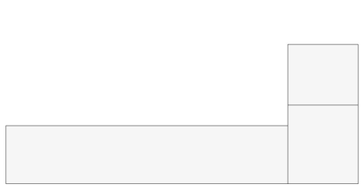
Figure 2.61
Rectilinear Form
Balancing

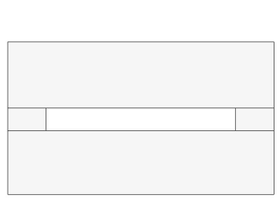
Rectilinear Base Form



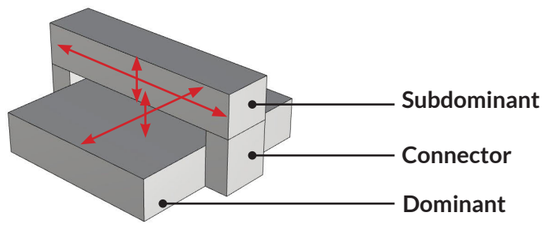
Rectilienar Option 1

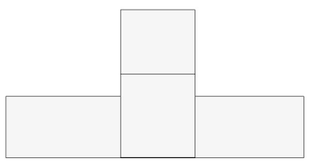






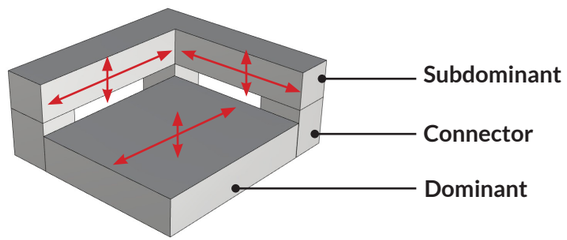
Rectilienar Option 2







Rectilienar Option 3







Rectilinear Option 1

Description:
A secondary volume added asymmetrically on one side of the base form, creating a stepped condition.

Pros:

- Establishes a clear visual hierarchy between old and new
- Provides structural clarity because columns or trusses can be concentrated on one edge, minimizing interference with the existing roof.
- The offset allows daylight to penetrate between volumes
- Creates opportunities for an outdoor terrace above existing

Cons:

- The asymmetrical mass may appear unbalanced within a suburban streetscape context.
- Interior circulation could become linear and constrained to one side.
- Narrow space for interior configurations.

Rectilinear Option 2

Description:
Two rectilinear volumes overlap in a more compact interlocking form with a stronger bridge condition.

Pros:

- Best expression of “hovering”
- An ideal configuration for spanning above the existing roof with minimal contact points
- Balanced proportions create a stable composition, visually reinforcing continuity with the original library’s horizontal emphasis
- Central connector zone is well-defined, providing clear locations for vertical circulation.

Cons:

- Limited articulation along the edges restricts visibility of the interior from the exterior.
- Narrow space for interior configurations
- The bridge mass could overshadow the existing roofline

Rectilinear Option 3

Description:
An L-shaped addition wrapping around two sides of the base form, defining a courtyard-like void or “carved” space between old and new.

Pros:

- Strong compositional balance: the base form remains legible while the new addition reads a lightweight frame.
- Offers the largest surface area for interior space.

- Provides multiple orientations for connections to the site

Cons:

- Structurally more complex due to spanning two directions and maintaining continuous support at corners.
- Requires careful detailing at junctions to avoid visual heaviness where volumes meet.
- May require additional fire-rated egress and circulation points due to increased perimeter complexity.

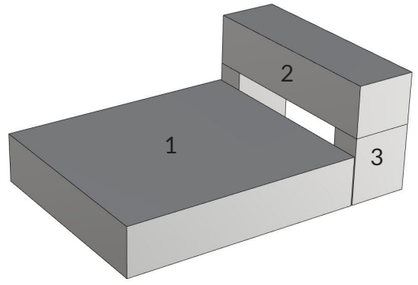
Summary: Alignment with Thesis Goals

- Option 1: Strong contrast and visual hierarchy, but inefficient circulation between forms.
- Option 2: Balanced and technically efficient, ideal for bridging logic but narrow for interior configurations.
- Option 3: Best aligns with thesis goals. Expresses lightness, adaptability, and layered interaction between old and new with more space for interior configurations.

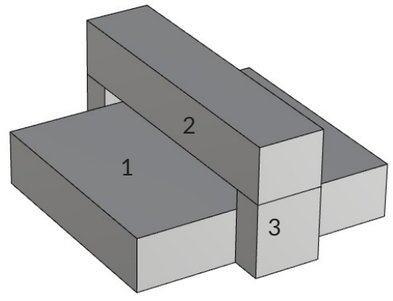
1 = Dominant
2 = Subdominant
3 = Connector

Rectilinear Base Form as Dominant

Option 1



Option 2



Option 3

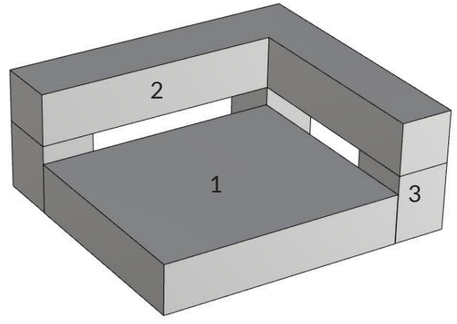
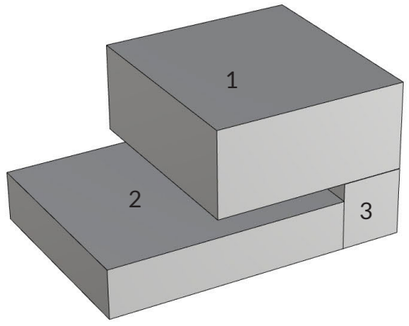


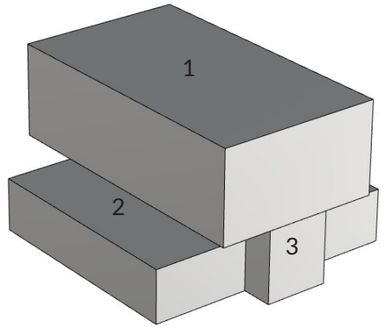
Figure 2.62
Rectilinear Form
Balancing

Rectilinear Base Form as Subdominant

Option 1



Option 2



Option 3

Chosen option to explore further in design proposal on *Pleasant View Branch*

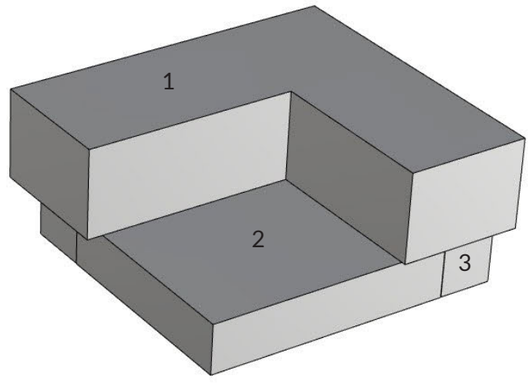
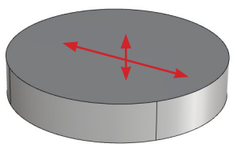
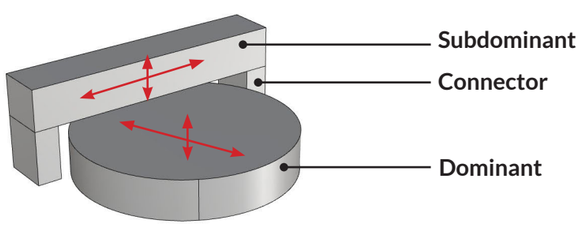


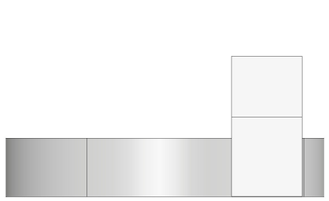
Figure 2.63
Combination Form
Balancing.

Curved Base Form



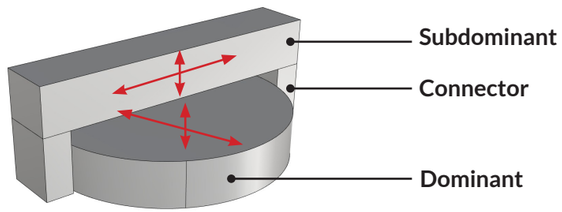
Curved Option 1

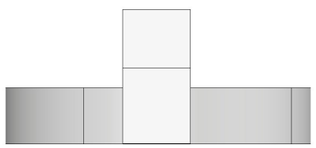


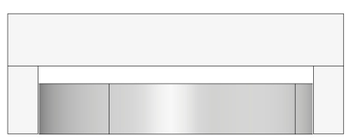




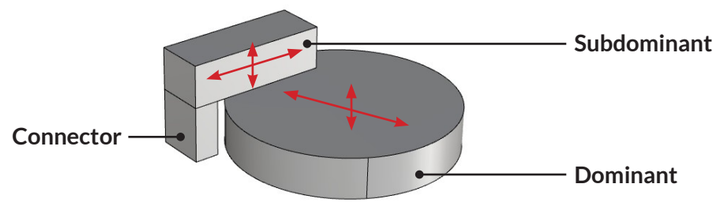
Curved Option 2

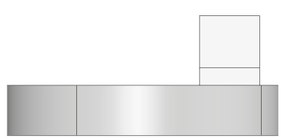






Curved Option 3







Curved Option 1

Description:
A rectilinear addition is offset toward the edge of the curved base.

Pros:

- Establishes a clear visual hierarchy between old and new
- Provides structural clarity because columns or trusses can be concentrated on one edge, minimizing interference with the existing roof.
- The offset allows daylight to penetrate between volumes
- Creates opportunities for an outdoor terrace above existing

Cons:

- The asymmetrical mass may appear unbalanced within a suburban streetscape context.
- Interior circulation could become linear and constrained to one side.
- Narrow space for interior configurations.

Curved Option 2

Description:
A rectilinear volume spans directly over the centre of the curved base, creating a strong horizontal datum that contrasts with the round form below.

Pros:

- The contrast between curved and rectilinear geometries emphasizes the addition as a distinct yet complementary layer.
- An ideal configuration for spanning above the existing roof with minimal contact points
- Visually frames the curved base
- Best expression of “hovering”
- Central connector zone is well-defined, providing clear locations for vertical circulation.

Cons:

- The sharp geometric contrast can appear abrupt and overpower the curved base
- Narrow space for interior configurations
- Structural complexity increases due to the mismatch of geometries at connection points

Curved Option 3

Description:
A compact rectilinear bar intersects perpendicularly with the curved base, forming a cantilever.

Pros:

- Clear visual hierarchy: the existing curved form remains dominant while the addition reads as a additional component.

- Minimal footprint allows the base’s geometry to remain fully legible.
- Clear independence from the curved roof

Cons:

- Provides limited interior area
- Structurally expensive and dangerous to cantilever above the existing
- Only one vertical circulation volume
- Less expressive of hovering or bridging qualities central to the thesis concept

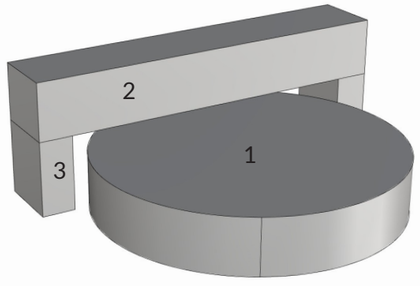
Summary: Alignment with Thesis Goals

- Option 1: Strong contrast and visual hierarchy, but inefficient circulation between forms.
- Option 2: Balanced and technically efficient, ideal for bridging logic but narrow for interior configurations.
- Option 3: Clear visual hierarchy and minimal footprint, but spatially limited, costly to construct, and inefficient for circulation and program layout.

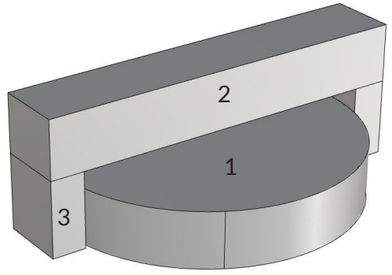
1 = Dominant
2 = Subdominant
3 = Connector

Curved Base Form as Dominant

Option 1



Option 2



Option 3

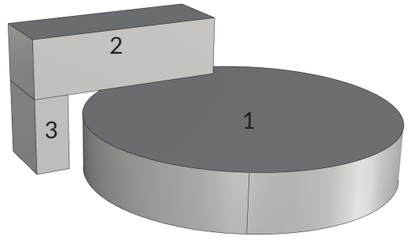
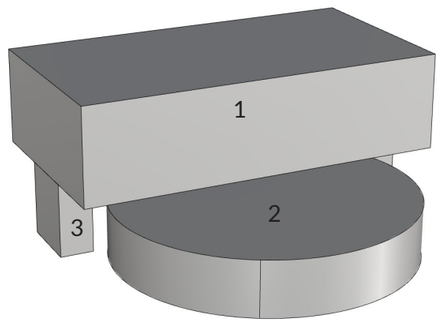


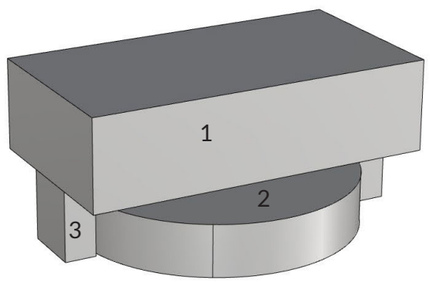
Figure 2.64
Combination Form
Balancing

Curved Base Form as Subdominant

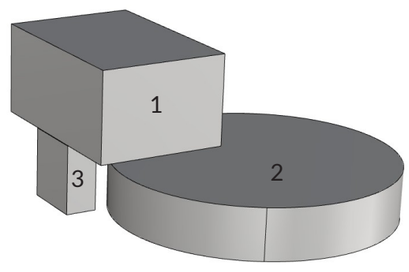
Option 1



Option 2



Option 3



2.4.6 Overbuild Addition Precedents

Pembina Hall, University of Manitoba

Pembina Hall at the University of Manitoba is an exemplary project, featuring a new addition above the existing building while maintaining structural independence between the two. The design is recognized for its engineering innovation, refined aesthetic, and functional clarity.

I was fortunate to meet with the architect, Raymond SC Wan, who offered valuable insight into the intentions and challenges behind Pembina Hall. The decision to elevate a new residence above the existing 1964 hall was shaped by cultural and economic considerations: preserving prized river views, maintaining the hall's social role as a student gathering place, and avoiding the prohibitive cost of demolishing or building behind the site. Students embraced the cafeteria for its panoramic views and atmosphere of release, reinforcing the building's cultural and social value as more than just infrastructure. Additionally, Wan observed that the building's overall architectural character, defined by its distinctive folded plate concrete roofline and full height south facing windows, embodied a Brutalist institutional style that was both unique and worth preserving.

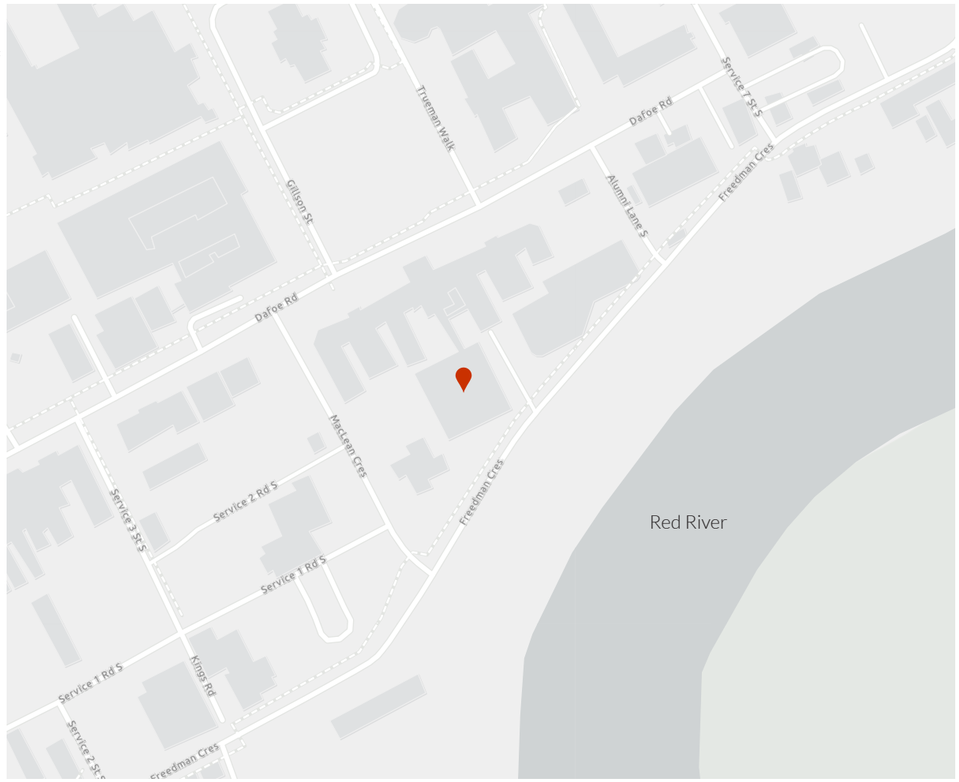


Figure 2.65
Context plan of Pembina Hall, University of Manitoba



Figure 2.66
Exterior view

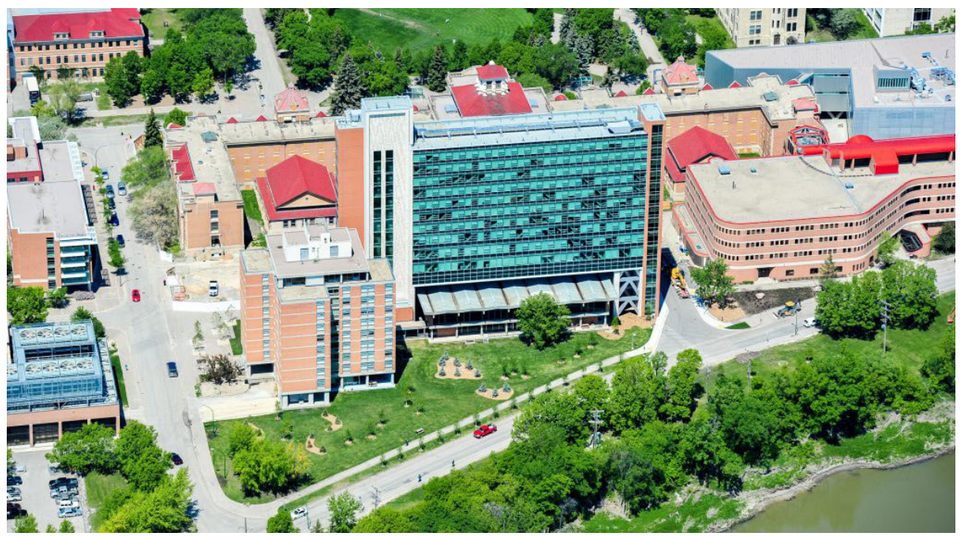


Figure 2.67
Bird's-eye view showing the building overlooking the Red River



Figure 2.68
Original Mary Speechly Hall (1960) showing the folded plate concrete roofline

Structurally, the project demanded unprecedented solutions. At the time of its design in 2009, there were virtually no precedents for spanning and supporting a high-rise residence directly above an occupied building at this scale. Most consultants initially dismissed the proposal as impractical, since the scheme required a ten-storey, 360-unit residence to clear-span 50 metres without columns intruding into the cafeteria below. The architectural concept was relatively straightforward: build two slender 14-storey towers with sufficient strength to carry a ten-storey residence block, incorporating 36 rooms per floor, and have the block span 50 metres across the existing Pembina Hall.[118] Wan explained that the solution was to develop the addition as a rigid structural box, mobilizing the entire building height through a reverse truss strategy: each floor load hangs from the upper truss chords, with two 10-storey interior trusses embedded in corridor walls and two massive exterior trusses exposed at the glazing line. Wan also noted that steel was chosen not only for its structural performance but because, at the time of construction, many aspects of the project were still being resolved, and steel offered the flexibility to adapt if changes had been required on such a complex undertaking. The residence was further stabilized by its floor slabs, which acted like horizontal plates tying the interior and exterior trusses together.[119] Because the 50-metre steel spans were prone to sagging, the engineers built a slight upward curve, or camber, into each level and carefully sequenced the concrete pours so that the slabs would harden in place and help keep the structure level over time.[120] Connections were also left partly loose until four floors had been erected, allowing the frame to settle before being locked in.[121] This sequencing was necessary not only to control deflection but also to account for temperature changes; overnight drops of 10 °C could shorten the long trusses by about 6 millimetres.[122]

Building services and circulation were concentrated in the end towers and the first few floors, keeping the span as light as possible. Foundations were equally innovative: caissons socketed deep into limestone countered uplift forces from wind, while battered piles anchored lateral drift. In effect, the residence behaves like a sail, requiring not only vertical support but also tie-downs to hold it in place.[123]

The project illustrates how elevated additions can create new programmatic density without erasing the architectural or cultural identity of the host building. Here, the dining hall remained operational throughout construction, shielded by protective platforms, while the new residence defined a striking profile above it. The project also reflects Rowena Reed Kostellow's principles of balanced form. The new residence asserts itself as the dominant volume, while the 1964 Pembina Hall remains subdominant, and the two slender towers function as subordinate elements. In this way, the addition complements rather than overpowers the original building, maintaining clarity between old and new while reinforcing the identity of both. Pembina Hall

118 Crosier Kilgour & Partners Ltd., *The University of Manitoba Pembina Hall Residence*, May 2012, 2.
119 Crosier Kilgour & Partners Ltd., *The University of Manitoba Pembina Hall Residence*, 2.
120 Crosier Kilgour & Partners Ltd., *The University of Manitoba Pembina Hall Residence*, 15.
121 Crosier Kilgour & Partners Ltd., *The University of Manitoba Pembina Hall Residence*, 15.
122 Crosier Kilgour & Partners Ltd., *The University of Manitoba Pembina Hall Residence*, 15.
123 Crosier Kilgour & Partners Ltd., *The University of Manitoba Pembina Hall Residence*, 15.

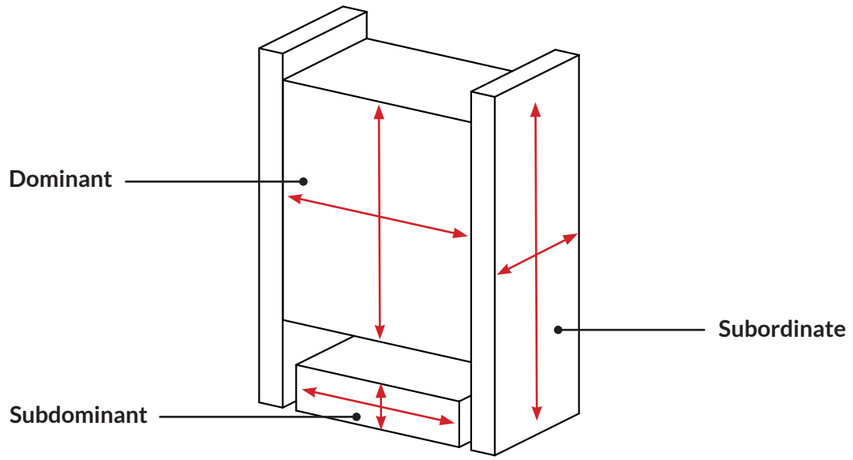


Figure 2.69
Form Hierarchy Analysis

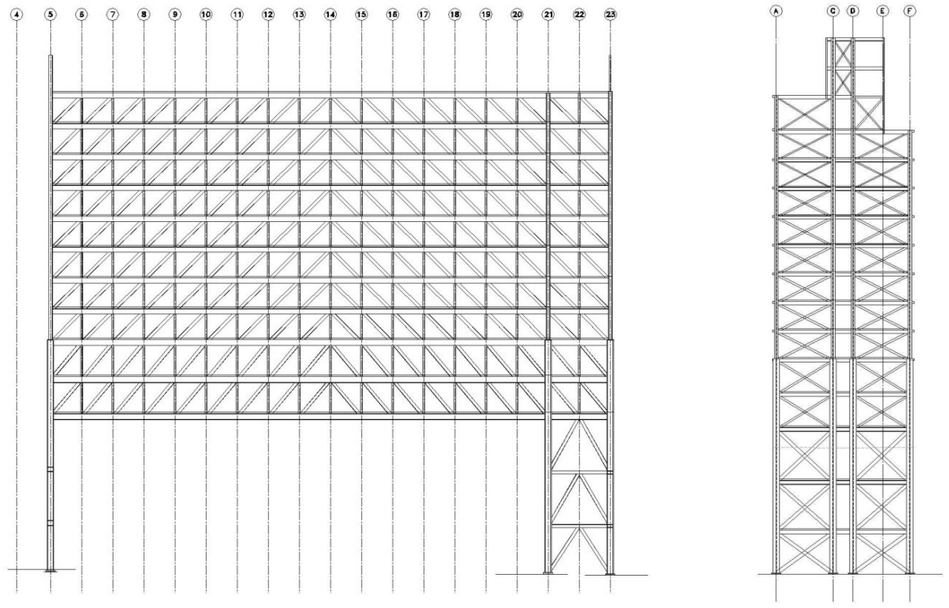


Figure 2.70
structural trusses in elevation

demonstrates how a new intervention can respect layered values: maintaining the hall's use and social meaning while adding contemporary form.

For this thesis, Pembina Hall's strategy of elevating a structurally independent volume above an existing building offers a powerful precedent for designing adaptive library additions. Its approach demonstrates how new layers can coexist with old. By applying a similar logic, a library addition can "hover" above the existing structure, maintaining the integrity and civic presence of the original while introducing new, transformable interiors supported by a lightweight structural framework. Like Pembina Hall, this strategy balances respect for the existing with the capacity for change, embodying the thesis's central argument that architectural growth can occur without erasure.



Figure 2.71
Construction process

Environment 3 Building, University of Waterloo

The Environment 3 (EV3) building at the University of Waterloo is another example of an innovative approach to building over existing structures, rather than demolishing them or sprawling outward. Designed by Akitt, Swanson & Pearce Architects and completed in 2011, the project added 5,295 square metres of new space above and around the existing two-storey EV2 building, while also carrying out renovations within it.[124] The decision to place EV3 above EV2 was shaped by the physical limits of the campus, where the ring road and surrounding development left little room for expansion. Instead of displacing EV2, the design team made use of the vertical airspace above, minimizing the project's footprint and preserving land for future growth. This strategy avoided the expense and waste of demolition while also acknowledging the embedded value of the earlier building.

Figure 2.72
EV3 Context Plan

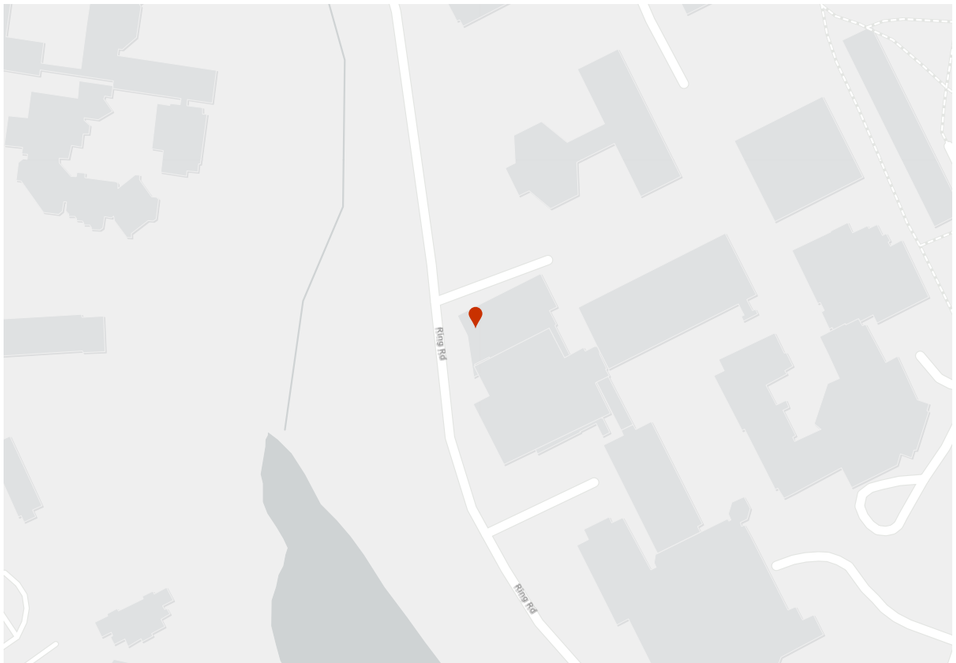


Figure 2.73
Addition supported by columns and cross-bracing, with a vertical concrete fire-exit mass on the side



124 Canadian Sheet Steel Building Institute, "EV3 Building, University of Waterloo," *CSSBI*, Lightweight Steel Cladding Case Studies CS 72-12, 2012, 1.

The structural challenge was to create a large addition that would sit above EV2 without relying on its frame for support. This was achieved through two parallel, two-storey steel trusses that span 47 metres across the older building, carried on columns placed clear of EV2's footprint.[125] The third floor is suspended from these trusses while the fourth floor rests on top, forming a stacked system of interdependence.[126]

In terms of architectural form and appearance, EV3 maintains a clear rectangular massing but avoids heaviness through its varied facade treatments. Neutral corrugated steel siding, curtain wall glazing, aluminum composite panels, and brick are balanced by bold lime-green aluminum and glass elements that identify the Faculty of Environment. The contrast between the neutral materials and the vibrant panels gives the building a confident presence on campus while preventing the hovering addition from appearing monolithic.

Functionally, EV3 is defined by its interconnectedness. The new structure does not simply float above the old but is woven into it. A skylit atrium runs east to west, separating student spaces from faculty offices while also connecting them visually and spatially. The atrium exposes the red brick wall of EV2 and incorporates it into the new interior, while a cantilevered glass and steel stair dramatizes the vertical connections between levels.

125 Canadian Sheet Steel Building Institute, "EV3 Building, University of Waterloo," 1.
126 Canadian Sheet Steel Building Institute, "EV3 Building, University of Waterloo," 1.



Figure 2.74
Atrium with greenwall and exposed cross bracing separating new and old

Although the addition is structurally independent, it is integrated through circulation and building services, with EV3 connecting into the existing EV1–EV2 complex for mechanical and electrical systems. The design team retrofitted EV2's mechanical and electrical infrastructure and extended it so that the new EV3 spaces could be serviced by a coordinated network rather than by an isolated plant.[127] Circulation was also deliberately intertwined: EV3 links into EV1 and EV2 with shared corridors, stairs, and elevators, creating functional continuity across the Faculty of Environment's buildings.[128] The skylit atrium not only provides daylight and social space but also acts as a spine for vertical service distribution and circulation between old and new.

This approach contrasts with Pembina Hall at the University of Manitoba, where the new residence was deliberately kept structurally and mechanically separate from the 1964 dining hall. Pembina emphasizes separation, hovering above without physical or infrastructural reliance, while EV1 emphasizes dialogue and interconnection, weaving its new spaces and services directly into the existing fabric. Together, the two projects illustrate different strategies for elevated additions: one prioritizing autonomy and preservation, the other integration and continuity. In a library expansion, an elevated addition like Pembina Hall offers a practical and sensitive approach to preservation. It allows a new layer to be added without interfering with the existing structure which is particularly important when the original building was never designed to support an addition. This strategy not only protects a community-significant building but also provides a financially viable alternative to demolition or extensive structural alteration.

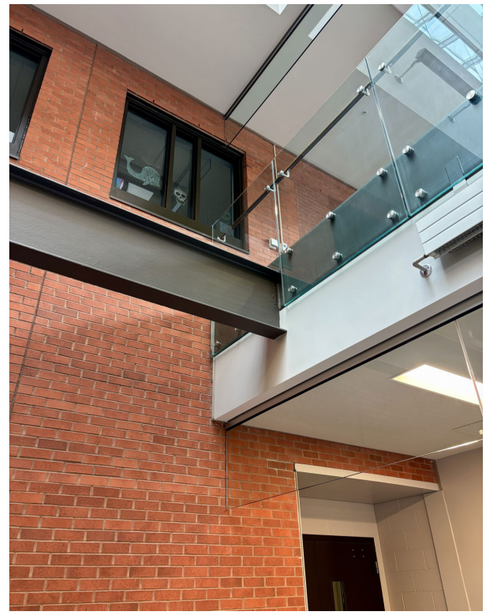


Figure 2.75
Building during construction

127 Nigel Thompson, *Environment 3 - Canadian Consulting Engineer*, Buildings, December 1, 2013, https://www.canadianconsultingengineer.com/features/environment-3/.
128 Thompson, *Environment 3 - Canadian Consulting Engineer*.



Figure 2.76 & 2.77
Joined access path connecting old and new



Hespeler Public Library

The Hespeler Library renovation, completed in 2007 by Kongats Architects, is located at the prominent corner of Tannery and Adam Streets in Hespeler, now part of Cambridge, Ontario. The project exemplifies how contemporary interventions can preserve historic character while accommodating modern needs. The original building, a 1923 Carnegie Library, was a modest 7,000-square-foot brick structure that had become inadequate for a growing community.[129] Rather than demolish it or append a conventional wing, the architects proposed a radical approach: enveloping the existing library within a new glass "wrapper" that expanded it to 14,000 square feet and redefined it as a civic landmark.[130]

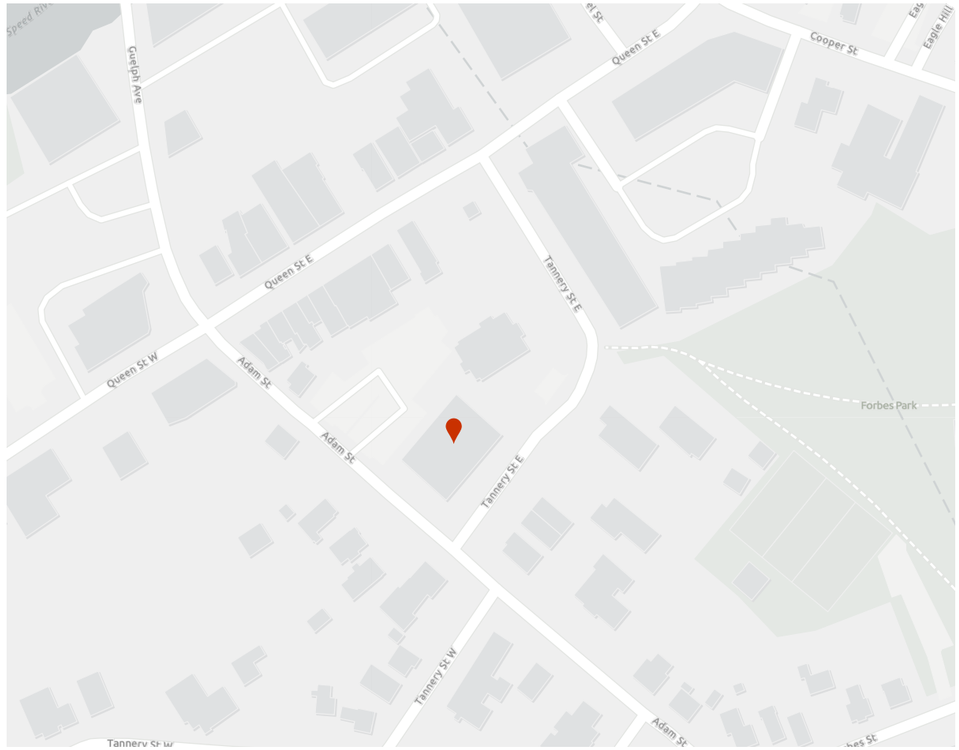


Figure 2.78
Hespeler Library Context Plan

129 "Hespeler Library," Kongats Architects, accessed September 8, 2025, https://www.kongatsarchitects.com/hespeler-library.
130 Architect, "Awards of Excellence 2004 - Hespeler Library," *Canadian Architect*, December 1, 2004, https://www.canadianarchitect.com/awards-of-excellence-2004-hespeler-library/.



Figure 2.79
Exterior View

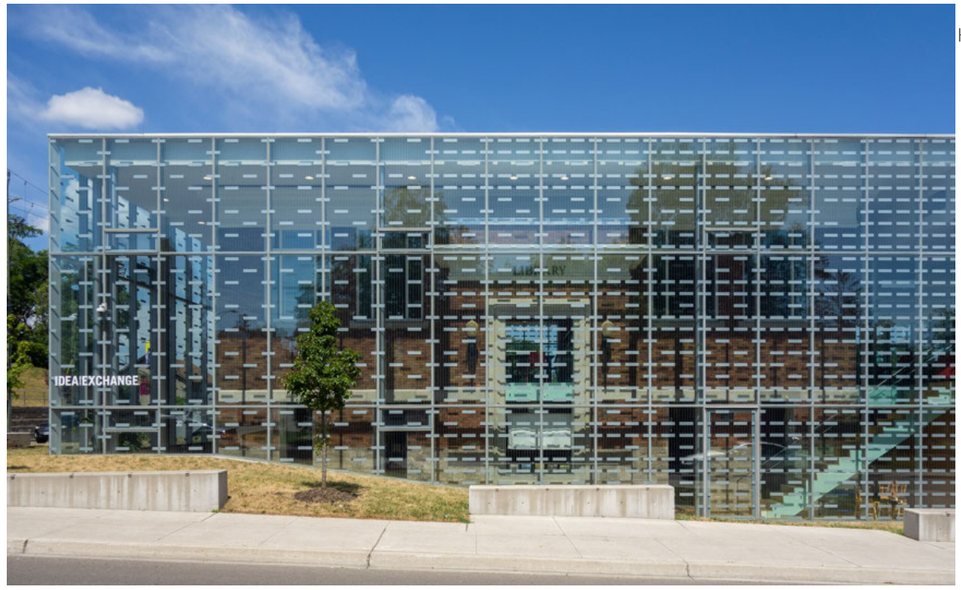


Figure 2.80
Historic Carnegie brick entrance and new fritted veil-like glass curtain wall

Figure 2.81 Access corridor between new and old



The decision to build over and around the existing Carnegie building was rooted in respect for its symbolic role as a civic anchor. The historic library was preserved in its entirety and treated almost as an artifact at the heart of the new project. The contemporary addition frames the old structure rather than erasing it, leaving its facade visible from the street through layers of glass. In this way, the project situates the past within a broader contemporary context while retaining the continuity of place.[131]

Materiality was key to balancing old and new. The glass envelope is patterned with ceramic frit and woven wire, producing a surface that recalls the textures of Hespeler's textile-mill heritage.[132] Transparency and opacity are varied across the facades: the glass is more open at the front to reveal the historic brick walls and more opaque at the sides to control glare, privacy, and energy performance.[133] This produces a dialogue between the solidity of the 1920s brick and the shimmering, fabric-like qualities of the new facade.

The expansion also reorganized the library's spatial and functional core. A new double-height circulation space and stair wrap around the Carnegie structure, linking the original and the new. This integration enabled the expansion of collections, creation of study and community spaces, and improvement of accessibility. Significantly, the double-skin envelope cut the library's energy use in half while doubling usable floor area.[134]

Critics praised the project for its sensitivity to context. American Architect and award juror, Adam Yarinsky, described it as "a clear, elegant solution" whose wrapper "defers to the character of the existing building" while asserting a contemporary presence.[135] Similarly, Lola Sheppard, a professor at the University of Waterloo School of Architecture, noted that it is "an uncompromising modern building" that, through its scale, material palette, and reflective qualities, "respects yet invigorates the surrounding historic fabric."[136]

Sheppard also emphasized the project's broader urban role. While a single building cannot single-handedly reverse downtown decline, the library represents a civic commitment to remain in the core rather than relocating to a suburban site. This parallels how the University of Waterloo School of Architecture helped revitalize nearby Galt. In Hespeler, the library's expansion demonstrates faith in the continuing relevance of the town's historic main street.

The architectural articulation supports this civic role. The second floor cantilevers northward, sheltering the entrance below and defining a sculptural reading room above. Large butt-jointed glass panels, some operable, allow for natural ventilation, while the fritted rectangular pattern recalls the geometry of the Carnegie's brickwork.[137] Depending on light conditions, the facade alternately reflects surrounding historic structures, like the fire hall and church, or becomes

131 Architect, "Awards of Excellence 2004 - Hespeler Library."
132 Kongats Architects, "Hespeler Library."
133 Architect, "Awards of Excellence 2004 - Hespeler Library."
134 Kongats Architects, "Hespeler Library."
135 Architect, "Awards of Excellence 2004 - Hespeler Library."
136 Lola Sheppard, "Redressing Urbanity," *Canadian Architect*, October 1, 2007, https://www.canadianarchitect.com/redressing-urbanity/.
137 Sheppard, "Redressing Urbanity."

transparent to reveal the library within.[138]

Internally, the architects used materials with restraint and precision. Oak veneer recycled from offcuts sheathes walls, floors, and built-in furniture, giving the interior warmth and texture.[139] A striking feature is the veil-like curtain that wraps the two-storey circulation space. As Sheppard explains, the curtains "recall the textile history of the city."[140] Designed by Lesley Armstrong and Anke Fox of Armstrong Fox Textiles in Nova Scotia, they are woven on a hand loom from a Japanese yarn of nylon and linen paper, then dyed to create their gossamer quality.[141] Functionally, the curtain acts as a semi-transparent veil filtering light and views; symbolically, it extends the region's textile heritage into the fabric of the library's daily life, serving as both architecture and public art.[142]

Sheppard also offers a measured critique of the project. One missed opportunity, she argues, lies in the in-between spaces of the Carnegie core and the new glass skin. While these voids effectively maintain circulation and diagrammatic clarity, they could also have been developed into smaller, more intimate pockets for reading or reflection.[143] This suggests the untapped potential of in-between spaces in adaptive reuse projects: not just connectors, but places of new inhabitation that extend the library's social role. Sheppard further notes that the building's minimalism integrates best with the hard-scaped forecourt, marked by a row of birch trees that define an elegant entry. By contrast, the grassy side edges feel unresolved, highlighting how adaptive reuse must consider not only the architectural envelope but also the ground plane it occupies.[144]

138 Sheppard, "Redressing Urbanity."
139 Sheppard, "Redressing Urbanity."
140 Sheppard, "Redressing Urbanity."
141 Sheppard, "Redressing Urbanity."
142 Sheppard, "Redressing Urbanity."
143 Sheppard, "Redressing Urbanity."
144 Sheppard, "Redressing Urbanity."



Figure 2.82
Untapped potential of in-between spaces

2.4.7 Materiality

The Hespeler Library demonstrates how materiality can mediate the relationship between historic preservation and contemporary intervention. By wrapping the 1923 Carnegie building in a fritted glass and wire skin, Kongats Architects created a dialogue between the solidity of brick and the translucency of modern curtain wall construction. The new material does not mimic or erase the old; instead, it frames it, allowing the past to remain legible while asserting the presence of the new.

This thesis proposes that successful additions built over existing structures rely on three layers:

1. Massing that balances forms
2. Functionality of the forms
3. Balancing materiality of the forms

Massing establishes how new volumes relate spatially to the old; functionality ensures that the relationship between old and new supports contemporary use-value; and materiality negotiates the visual and cultural balance between past and present. At Hespeler, all three layers converge: the massing of the glass wrapper clearly distinguishes new from old, the functionality doubles the library's usable space while maintaining circulation clarity, and the material dialogue between brick and glass unites them as a single lived environment. Importantly, materiality can operate in two directions; it can provide harmony between new and old through resonance and continuity, or it can spark productive contrast that underscores difference while preserving identity.

The following precedents demonstrate how materiality can either create harmony or assert contrast. While both strategies preserve the identity of the historic structure, they differ in how they balance the three layers of massing, functionality, and materiality.

This literature review demonstrates that library branches, as essential social infrastructure, must evolve through design approaches that are both responsive and respectful. The convergence of preservation values, kinetic adaptability, and form-balancing principles defines a framework for architectural growth without erasure. The next chapter applies these principles through thorough site analysis and responsive design exploration.



Figure 2.83 & 2.84
Max Gluskin House
exterior views

Max Gluskin House, University of Toronto (Hariri Pontarini Architects, 2009)
A three-storey addition that balances old and new by respecting the proportions of the neighbouring houses and using Corten steel to echo the warmth of their brick. Glazing adds a modern openness while keeping the historic facades prominent.

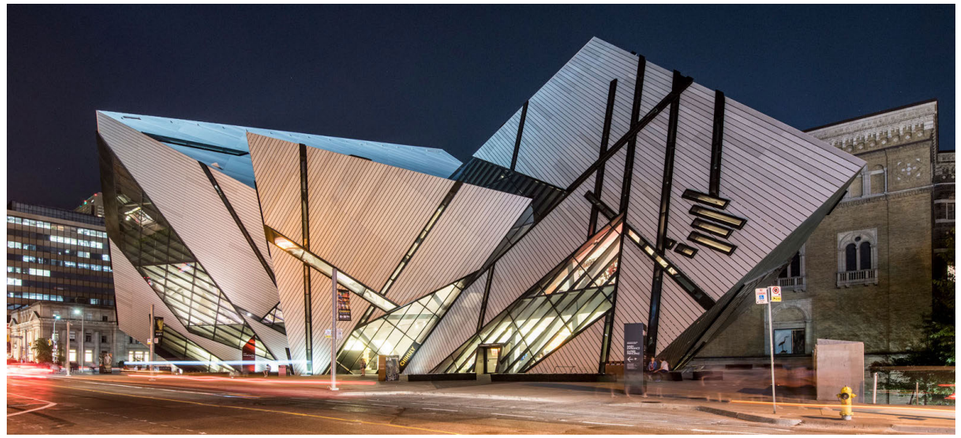
Figure 2.85 & 2.86
Kitchener Public
Library exterior views



Kitchener Central Library, Ontario (LGA Architectural Partners with WalterFedy and Phillip H. Carter Architect, 2014)
First built as a Carnegie library in 1904 and expanded in the 1960s, the building was renewed through a major renovation and addition. A black granite base recalls the original plinth, while a new high-performance glass curtain wall wraps around the existing structure and rises above it in key areas. The mullions of the curtain wall align with and overlap the stone below, creating a transitional harmony that visually ties the old foundation to the new volume above.

Figure 2.87 & 2.88
Royal Ontario Museum
street views





Royal Ontario Museum, Toronto - “Michael Lee-Chin Crystal” (Studio Libeskind, 2007)
The addition grafts onto the 1914 limestone masonry museum building with a jagged glass-and-aluminum volume that now dominates the original structure. Its sharp, angular planes use light, reflective materials in direct contrast to the heavy stone, emphasizing the tension between historic fabric and contemporary form.

Figure 2.89
OCAD Sharpe Centre for Design connector shaft



Sharp Centre for Design, OCAD University, Toronto (Alsop Architects with Robbie/Young + Wright, 2004)
A dominant elevated steel-and-aluminum volume hovers above the existing brick building, supported on multicoloured steel columns. Connector shafts pierce through the old structure to link the new studios above, cutting into the historic fabric. The addition asserts itself as a bold, dominating form, contrasting sharply in both scale and materiality with the masonry base.

Figure 2.90
OCAD Sharpe Centre for Design Wire-frame-to-Real



CHAPTER 3: DESIGN PROPOSAL

3.1 Design Criteria

The criteria established in Chapter 2 provides a framework for evaluating how the design proposals respond to both the pressures acting upon libraries and the formal and technical principles guiding architectural composition. Each principle drawn from the literature review including Zuk and Clark's Pressures and Responses, the IFLA Programmatic Requirements, and applicable code references serve as a measure against which the *Pleasant View Branch* design proposal is developed and assessed.

The following is a summary of the design criteria:

Pressure-Response:

Library Program Requirements (IFLA)

- Collections and library materials
- Reading, writing and making
- Meeting and socializing
- Library staff
- Electronic resources
- Mechanical and support functions

Physical Pressures (Zuk and Clark)

- Functional
- Adaptable
- Environmentally suitable
- Efficient
- Suitable for information technology

Non-physical Pressures (Zuk and Clark)

- Varied
- Interactive
- Conductive to learning
- Safe and secure

Kinetic Transformations to Meet Program and Pressures

- Expansion
- Compression
- Changes in geometry

Form:

Rowena Reed Kostellow (*Design Elements*)

- Hierarchy of forms:
    - Dominant is the largest, most dramatic, in the most prominent position
    - Subdominant must enhance the dominant by at least 20 percent, often achieved by shifting its axis so it is not parallel to the dominant
    - Subordinate introduces a third component and axis, enriches three-dimensionality, fills gaps, adds contrast, and supports unity

Francis D.K. Ching (*Form, Space, and Order*)

- Six ordering principles: Axis, Symmetry, Hierarchy, Datum, Rhythm, and Transformation.
- Balance emerges through clear spatial and structural relationships.
- Form is stabilized by orientation, proportion, and visual rhythm.

Anthony Di Mari & Nora Yoo (*Operative Design*)

- Begin with base volumes, then add, subtract, or displace them.
- Apply spatial verbs (expand, extrude, merge, skew, puncture) to test transformation.
- Focus on iterative change rather than fixed form.

Applicable Code References:

- Type of building: OBC 3.2.2.26. Group A, Division 2, up to 2 Storeys, Increased Area, Sprinklered
- Minimum 2 Exits (OBC 3.4.2.1)
- Location of Exits (OBC 3.4.2.5)
    - Exits must be positioned so that the travel distance to at least one exit does not exceed 45 m in a fully sprinklered floor area
- Distance Between Exits (OBC 3.4.2.3)
    - Required exits must be separated by at least one-half the floor's maximum diagonal dimension, and not less than 9 m.
- Exit Stair Requirements - Part 3, Group A
    - Minimum 1 100 mm clear width between handrails.
    - Minimum 2 050 mm headroom.
    - Landings equal to or greater than stair width at turns and door swings.

3.2 Overview

Pleasant View Library Branch occupies a prominent corner within a residential neighborhood, positioned beside a community center and across from Pleasant View Highschool. Together, these institutions form an active civic cluster. The site's most defining quality lies along its eastern edge, where a gentle rise in the landscape, mature trees, and open views create a natural backdrop with strong spatial and visual potential. Community feedback and site observations revealed a shared appreciation for the library's glazed reading corners, spaces that capture daylight and create a sense of openness, qualities the new design seeks to preserve and reinterpret.

Building on these insights, the proposal introduces a lightweight bridged overbuild addition that extends toward the east, maintaining the library's rectilinear order while expressing a renewed sense of lightness and permeability. Unlike the original brick base, the new structure appears to "hover" above it, supported by a system of floor to ceiling trusses and slender steel columns offset just beyond the existing perimeter. This separation allows the existing building to remain visually and structurally independent while opening uninterrupted sightlines toward the park and eastern horizon.

Along this eastern edge, the kinetic exhibition scaffold becomes the defining spatial and experiential feature. Positioned where the landscape rises, it places movement, adaptability, and public participation on display, turning the library's most visible elevation into an architectural showcase for community engagement.

The addition follows a modular four-foot grid, adaptable to eight-foot spans for primary trusses and reduced to four feet for the interior kinetic scaffolding. This modular system draws from Ken Isaacs's research on Living Structures, which identified the four-foot unit as an ideal human scaled framework: efficient, flexible, and aligned with standard material dimensions such as plywood and scaffold systems.

Through these strategies, the proposal reimagines Pleasant View Branch as a renewed civic landmark that preserves the existing structure while extending its life and connection to light and landscape. The integration of kinetic systems allows the library to adapt to changing community needs, enabling its spaces to shift and respond over time.

3.3 Site Analysis

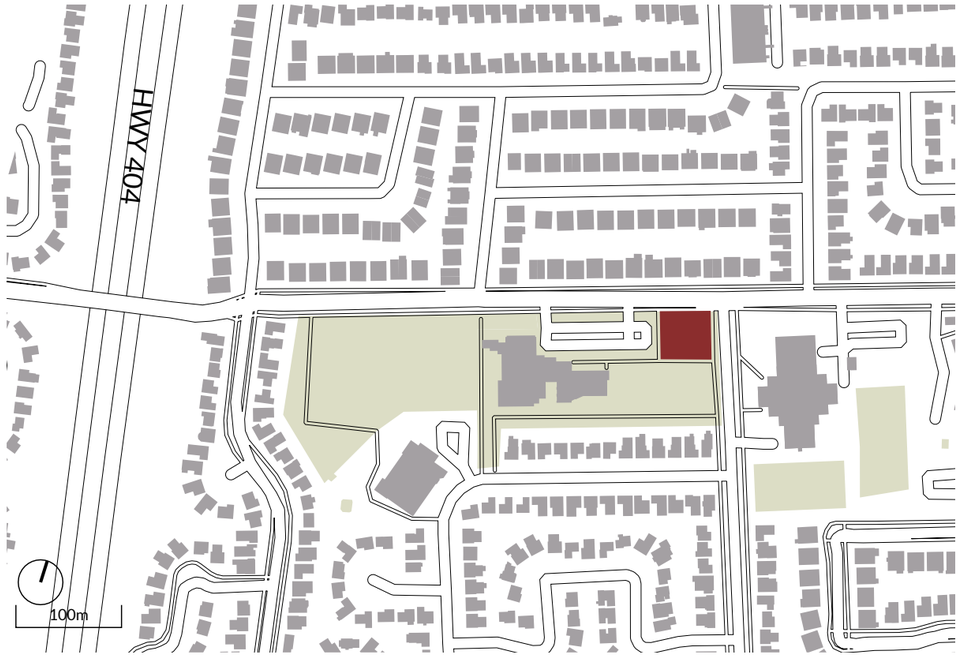


Figure 3.01
Exterior View of Pleasant View Branch



Figure 3.02
View of Entrance

Figure 3.03
Context Plan



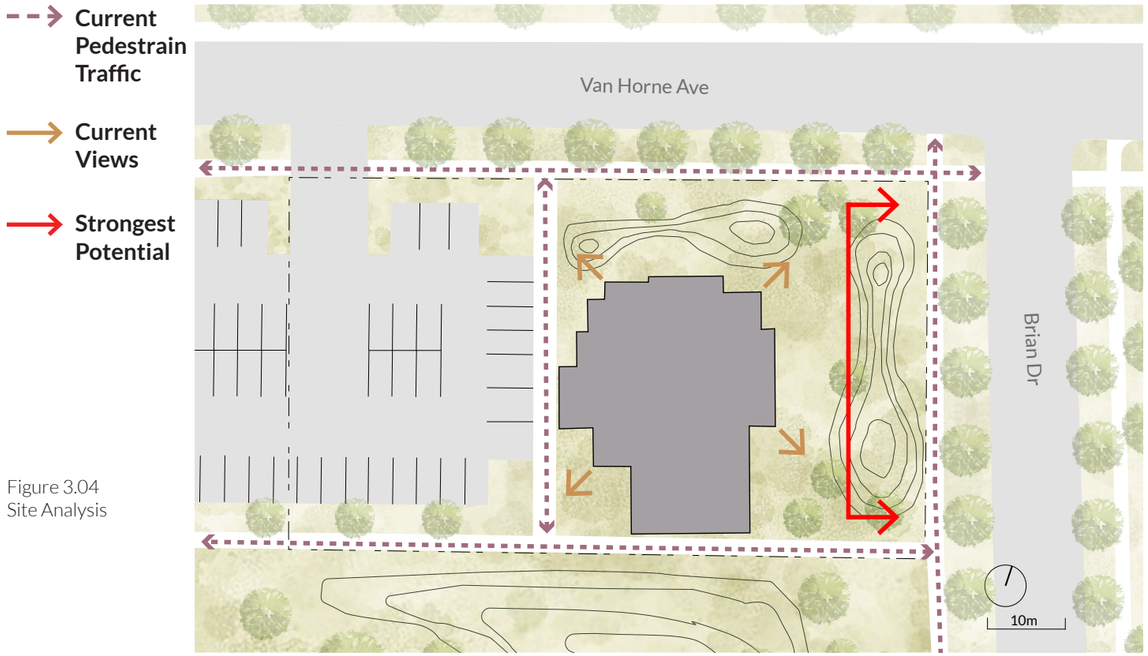


Figure 3.04
Site Analysis

Figure 3.05
Site & Surrounding Context Views



Pleasant View Community Centre



Shared Parking Lot



East Edge Hills



East View of Pleasant View Middle School Accress the Street



Residential Homes on Van Horne Ave



Surrounding Streets

Figure 3.06
Site & Surrounding Site Analysis



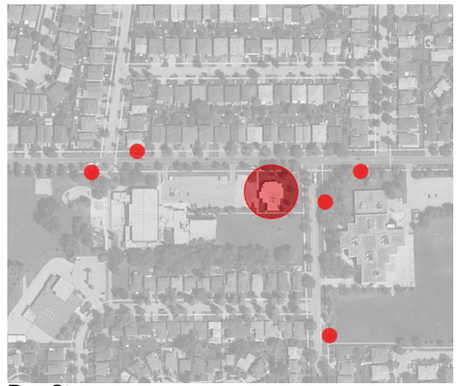
Site



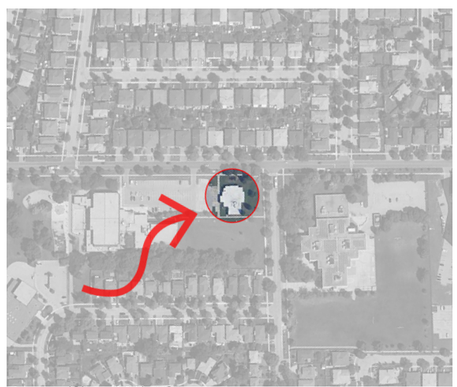
Surrounding Buildings



Major Streets



Bus Stops



Prevailing Winds



Sun Path

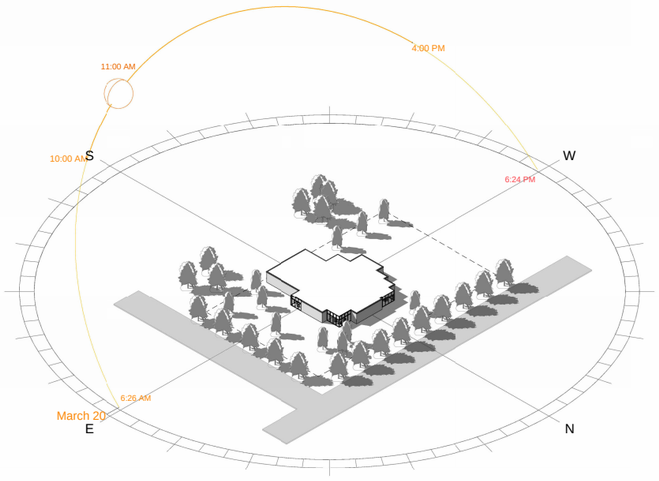
Major Streets
The library is framed by a local street network connected to two collector roads running east–west and north–south. This dual orientation gives the site strong visibility and convenient pedestrian and vehicular access. The east–west corridor links directly to Don Mills Road, a key arterial route, supporting both neighbourhood and city-wide connectivity.

Transit Access
Though the site is not located in downtown Toronto with subway and street car access, multiple bus stops are located within a short walking distance of the site. This accessibility strengthens the branch's role as a community hub, particularly for nearby students who use the library during lunch breaks and after school.

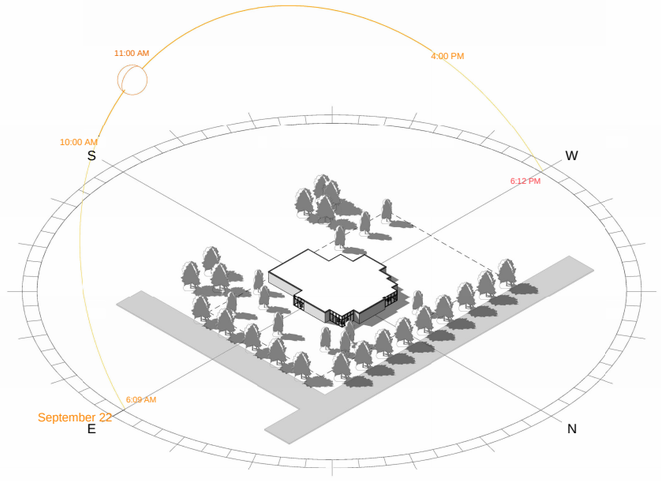
Prevailing Winds
Prevailing winds originate primarily from the west and southwest, creating opportunities for passive cross-ventilation through an east–west axis.

Sun Path
The site has unobstructed solar exposure on all sides. Although the high school and community centre sit nearby, they are far enough away that they do not block sunlight or views. The surrounding area consists mostly of low-rise residential buildings, and the gentle rise in the landscape to the east and south enhances access to light rather than limiting it. As a result, the library benefits from steady daylight throughout the day, with the strongest morning and mid-day light entering from the east. This informed the placement of the kinetic exhibition along the eastern edge, where sunlight accentuates its visibility and activates the library's most public face.

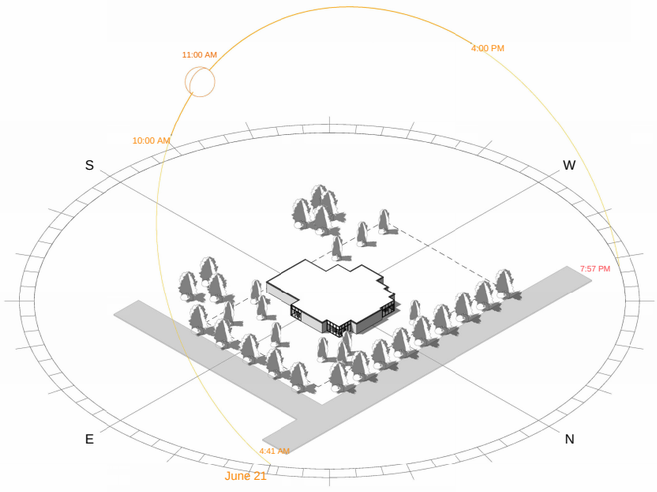
Figure 3.07
Year Sun Study



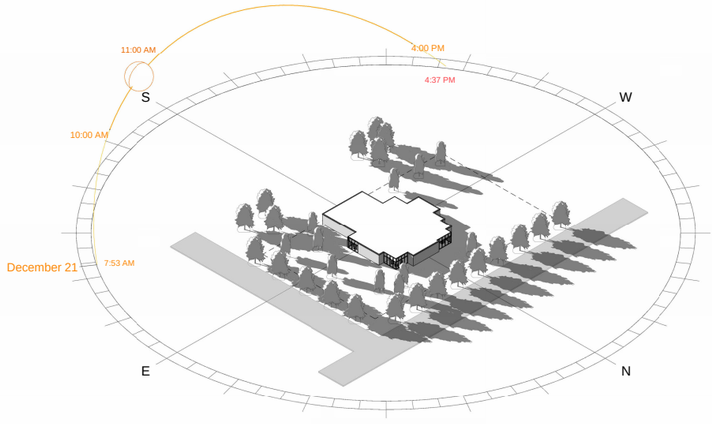
Spring Equinox



Fall Equinox

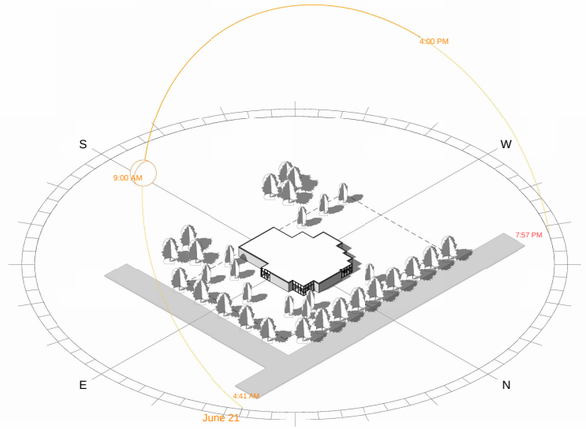


Summer Solstice

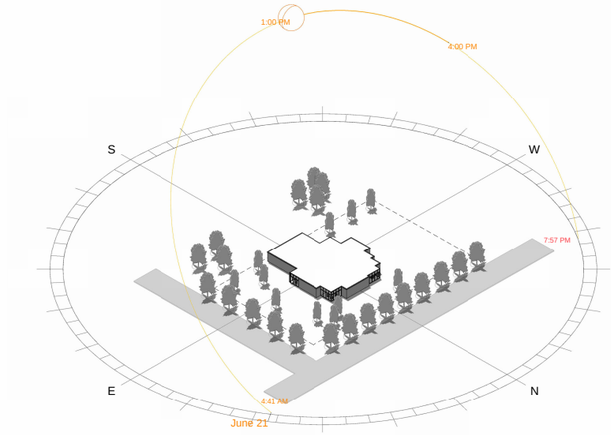


Winter Solstice

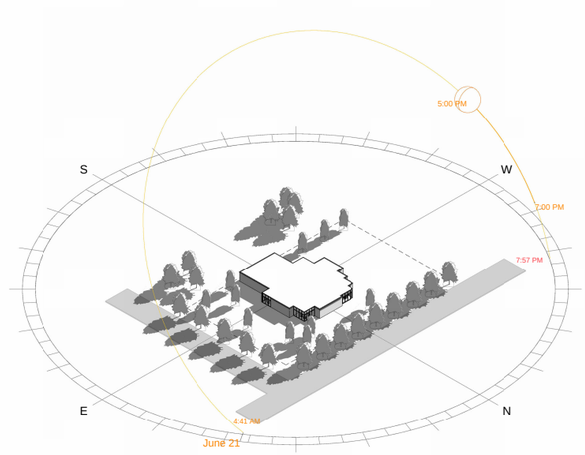
Figure 3.08
Day Sun Study



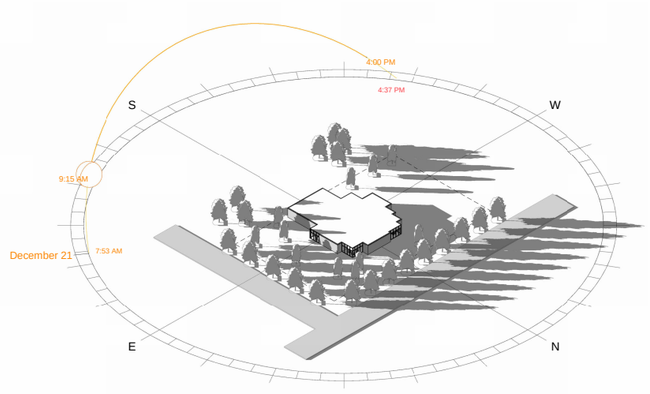
Summer Morning



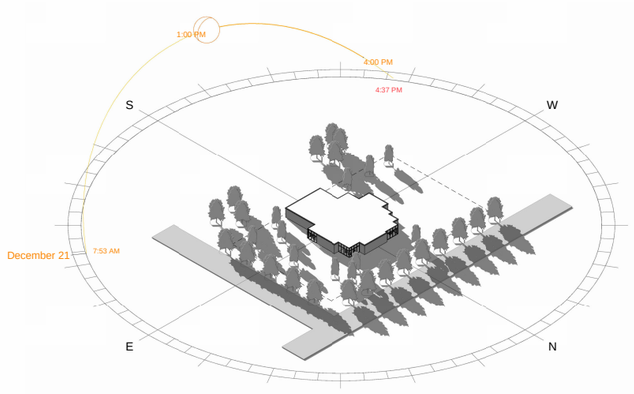
Summer Afternoon



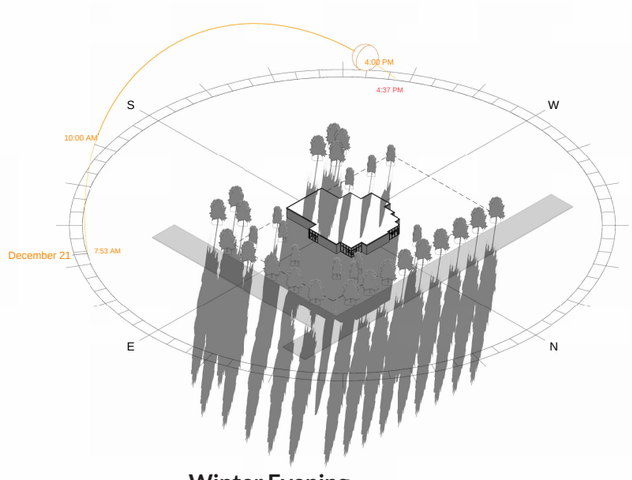
Summer Evening



Winter Morning



Winter Afternoon



Winter Evening

3.4 Existing Layout

Upon entering *Pleasant View Branch*, the reception desk is positioned to the left, while the remainder of the floor unfolds as a single open concept space. The layout provides minimal spatial distinction between programs: bookshelves line the perimeter, with a small cluster of computers at the center. Additional tables are scattered throughout the floor for individual and group work, while the teen and children's zones occupy corner areas that are only loosely defined by furniture placement and signage. Despite their intended functions, these zones remain visually and acoustically exposed to the rest of the library, limiting privacy and program flexibility.

At the south end of the building, a small auditorium provides space for community events and presentations. The library sits directly on the three-metre south property setback, leaving no room for exterior openings along this facade. As a result, the auditorium has no windows and relies entirely on artificial lighting, creating a darker, more enclosed atmosphere compared to the rest of the library. Adjacent to it are two single serve washrooms and a modest coat hanging area, both reflecting the limited amenities typical of the branch's original design.

The branch's overall interior character reflects its age. Finishes and furnishings are outdated, with worn carpeting, painted red structural columns, a blue ceiling, and old wooden bookshelves. Upholstered sofa chairs, likely original to the building, show clear signs of wear. Together, these dated elements reinforce a sense of visual clutter and a lack of cohesion across the space.

The most valued features of the existing branch are the four glazed corner conditions, which serve as the only sources of natural light and views to the hilled landscape condition outside. Users frequently gravitate toward these corners, as they are comfortable and inviting, like public living rooms that offer views, warmth, and a sense of calm. The southwest corner has developed a natural vine growth along its glazing, creating a soft green filter to the sunlight and a visual connection to the landscape outside. These glazed corner conditions are important to the community, and the design proposal seeks to maintain and enhance them.

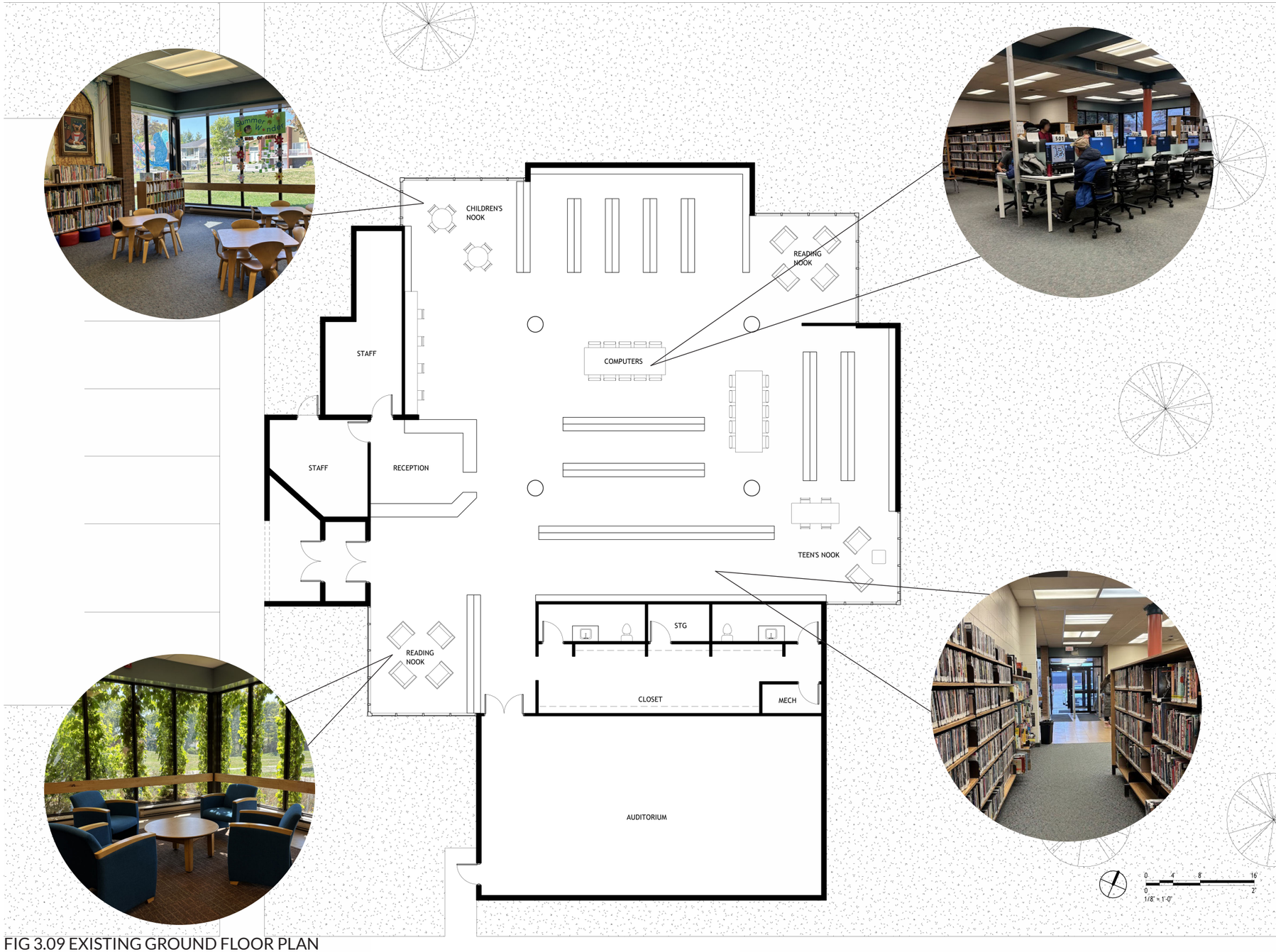
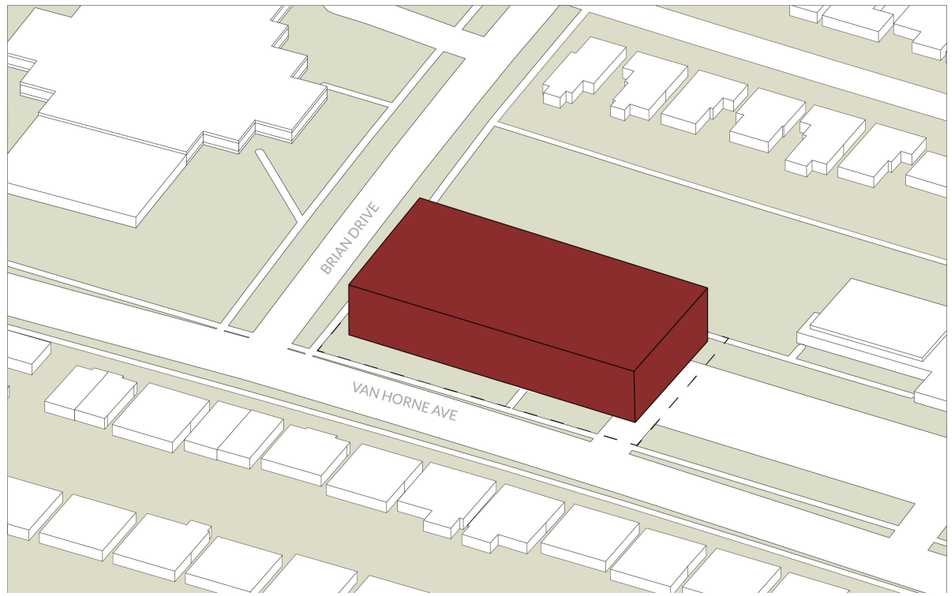
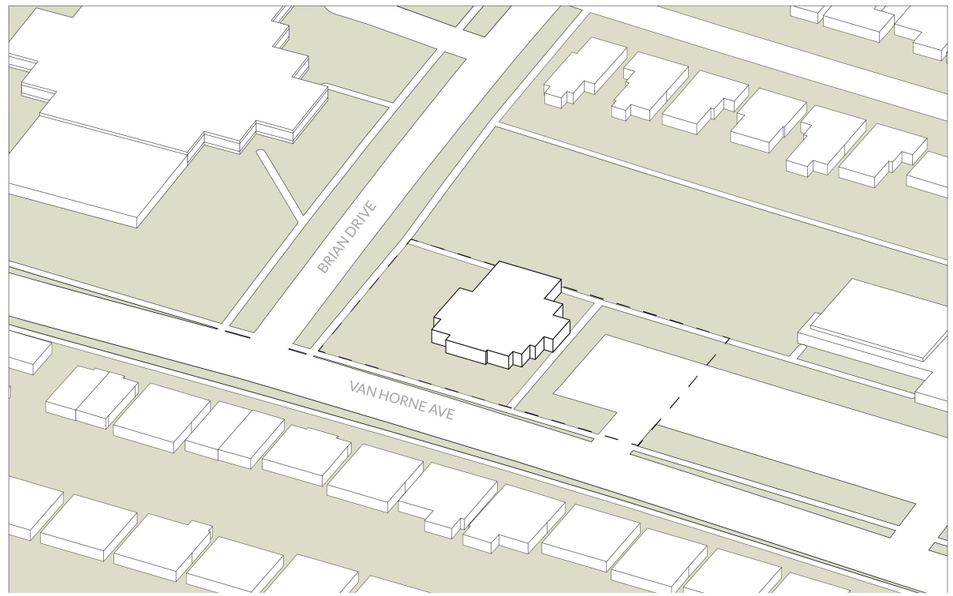


FIG 3.09 EXISTING GROUND FLOOR PLAN
Scale 1/8" = 1'-0"

Figure 3.11
Zoning envelope and existing building on-site



1. ZONING ENVELOPE



2. EXISTING BUILDING

Figure 3.10
SWOT Analysis

SWOT



STRENGTHS

- Approx. 40 000 sq ft corner lot
- Quiet residential street
- Large shared parking lot
- Mature trees
- Interesting views of surrounding hilled topography
- Glazed corner reading nook with outward views



WEAKNESSES

- Limited public transit access (only TTC buses)
- Outdated, small (7000 sq ft) current building
- Aging facility
- Lower foot traffic than downtown Toronto



OPPORTUNITIES

- East side offers potential for outdoor activation due to sloped terrain, mature trees, and open corner condition.
- Youth engagement from nearby schools
- Adjacent community Centre increases potential site activity and shared use.



THREATS

- City budgets
- Construction impact on residential neighbors
- Existing building footprint
- Setbacks
- Existing south facade sits on the lot line, restricting window openings and natural light.

3.5 Massing Process

The following sequence illustrates the massing process developed using Anthony Di Mari and Nora Yoo's *Operative Design* framework of base volumes and spatial verbs. Each step applies a specific operation (latch, lift, carve, and puncture) to explore how a new overbuild addition can be formed in direct response to the existing Pleasant View Library and its site context.

Step 1: Base Volume
The existing library acts as the fixed base condition. Its low rectilinear form defines the starting geometry and establishes the scale and footprint for the addition.

Step 2: Latch
A new volume is "latched" onto the existing form along the side opposite the main entrance. This placement allows the existing library to remain operational during construction while responding to the site's orientation and maintaining public access from Van Horne Avenue.

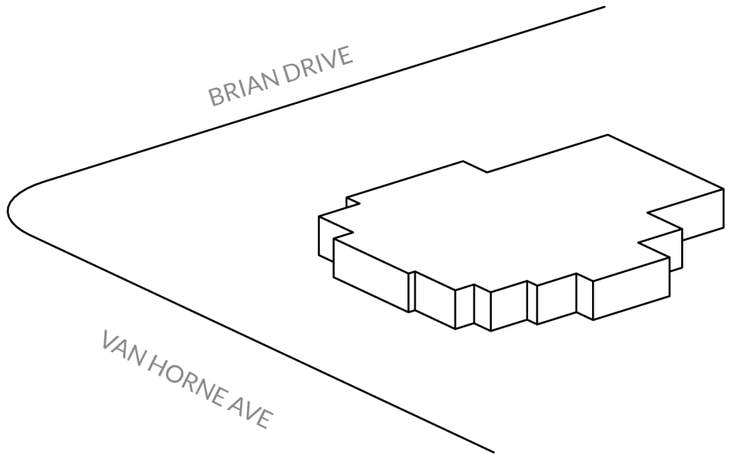
Step 3: Lift
The latched volume is lifted above the existing structure to form a bridged overbuild addition. This creates a clear visual separation between old and new while preserving daylight and circulation at grade. The lifted mass establishes the framework for a lightweight structural system that appears to "hover" over the existing roofline.

Step 4: Carve
Portions of the new volume are carved away to refine its relationship to the site. The eastern edge is preserved to frame views toward the open landscape and park, while the carve maintains the existing front facade's street presence. This operation enhances daylight penetration and airflow between the two levels. The resulting L-shaped configuration establishes a clear spatial hierarchy: the longer eastern wing supports more dynamic, public-facing activities, while the shorter southern wing accommodates spaces requiring greater stability and enclosure.

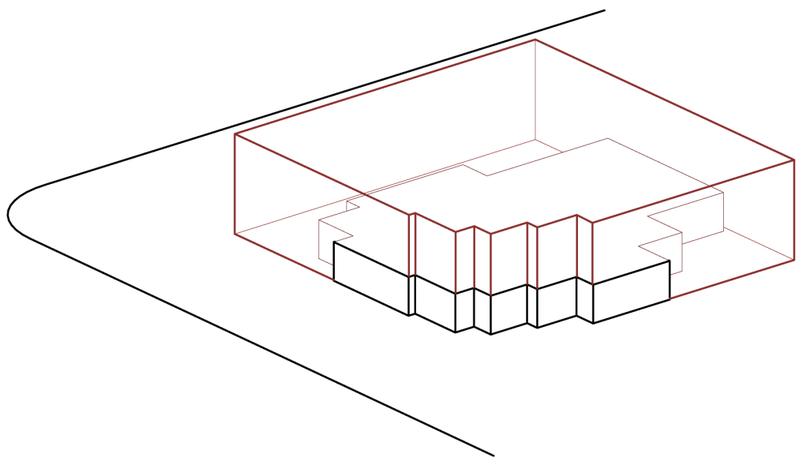
Step 5: Puncture
Finally, rectangular punctures are introduced where the new addition meets the existing roof. These voids create shallow crawl-space openings of approximately 1 meter, ensuring superstation between the volumes. The punctures occur on both arms of the L-shaped addition.

Figure 3.12
Massing Process

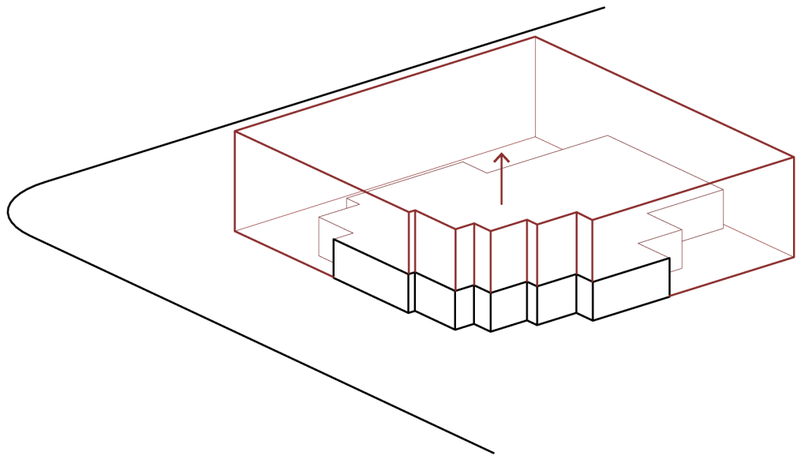
STEP 1: BASE VOLUME



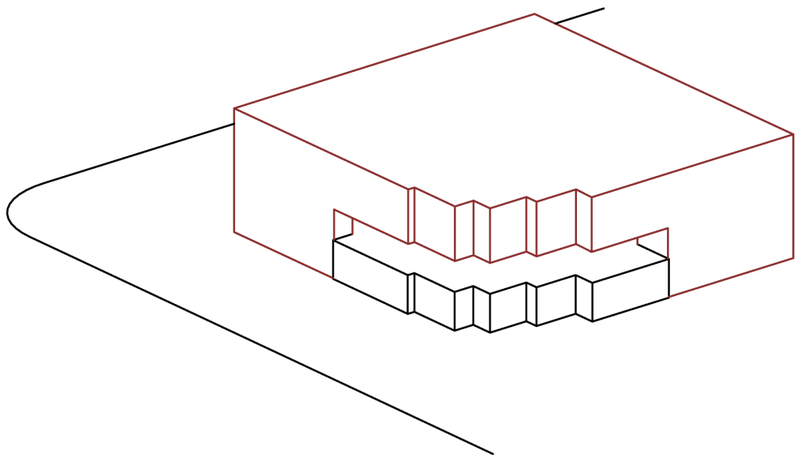
STEP 2: LATCH



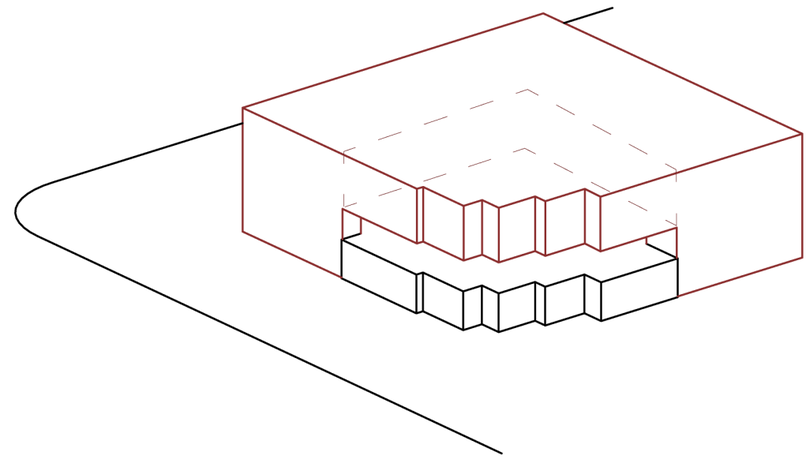
STEP 3a: LIFT



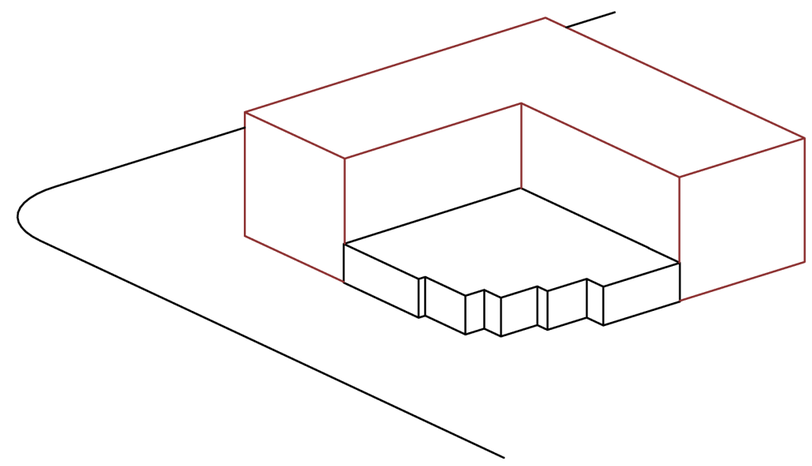
STEP 3b: LIFT



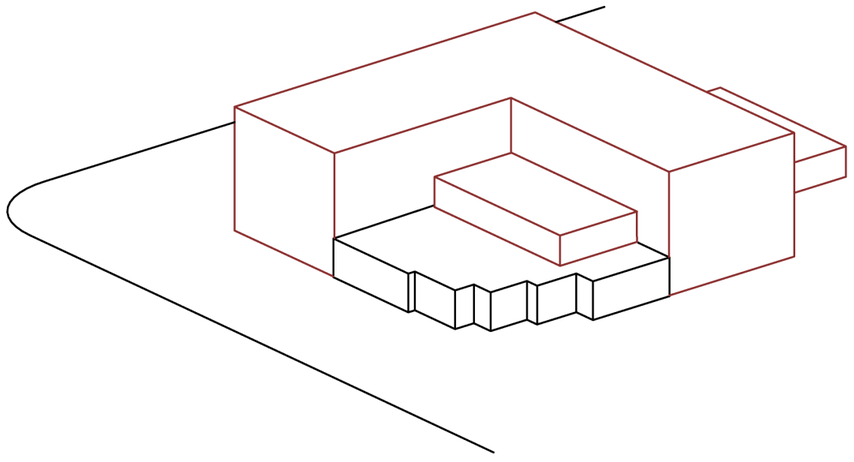
STEP 4a: CARVE



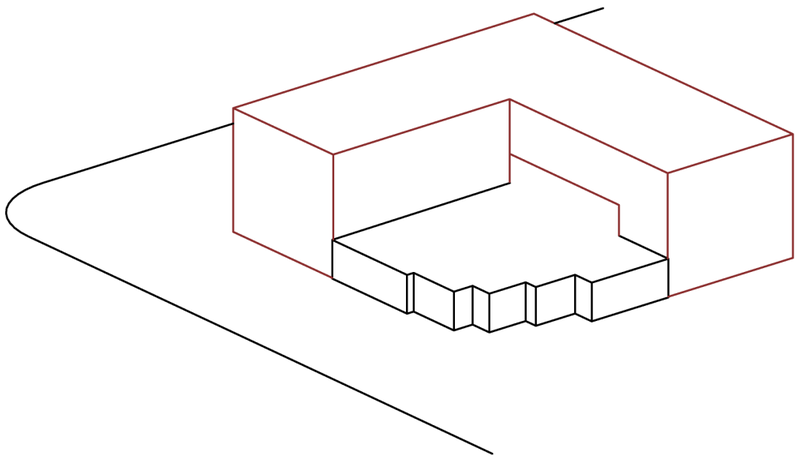
STEP 4b: CARVE



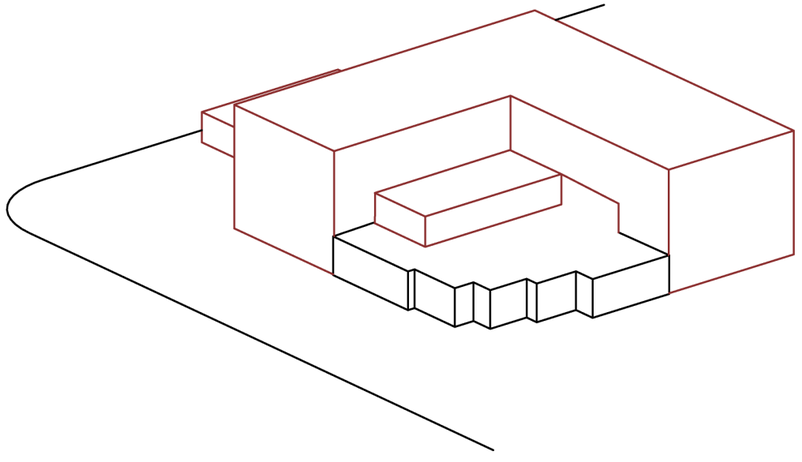
STEP 5a: PUNCTURE



STEP 5b: PUNCTURE



STEP 6a: PUNCTURE



STEP 6b: PUNCTURE

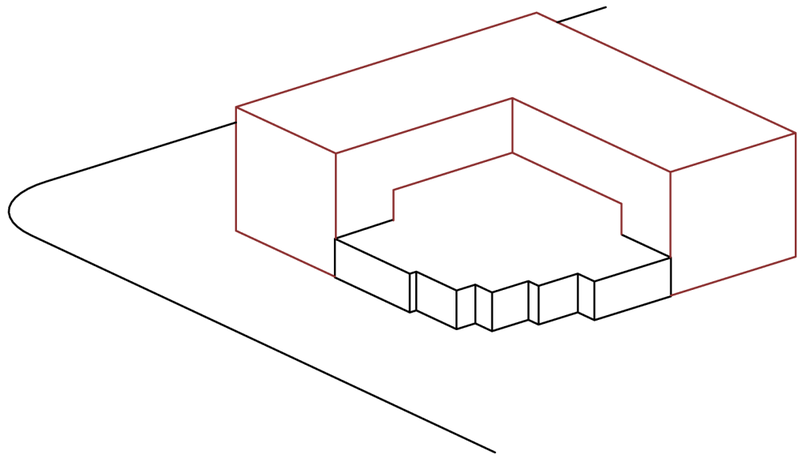
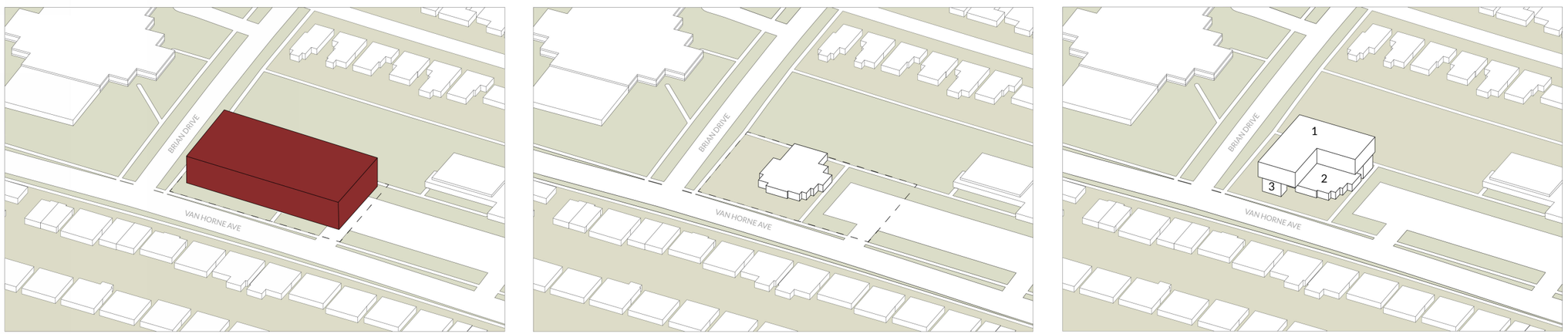


Figure 3.13
Massing process on-site



1. ZONING ENVELOPE

2. EXISTING BUILDING

3. MASSING HIERARCHY

1 = Dominannt Form
2 = Subdominant Form
3 = Connector Form

3.6 Design Proposal

SITE STATISTICS	By-Law No. 569-2013)
ZONE	OPEN SPACE (OR)
LOT AREA	43,200 ft² (4,013 m²)
LOT COVERAGE	NA
GFA	EXISTING: 7,000 ft² (650 m²) PROPOSED: 18,605 ft² (1,728.6 m²)
MAX BUILDING HEIGHT	PERMITTED: 49 ft (15m) PROPOSED: 34 ft (10m)
FRONT SETBACK	PERMITTED: 20 ft (6m) PROPOSED: 20 ft (6m)
REAR SETBACK	PERMITTED: 10 ft (3m) PROPOSED: 10 ft (3m)
INTERIOR SIDEYARD SETBACK	PERMITTED: 10 ft (3m) PROPOSED: 112 ft (34m)
EXTERIOR SIDEYARD SETBACK	PERMITTED: 10 ft (3m) PROPOSED: 40 ft (12m)

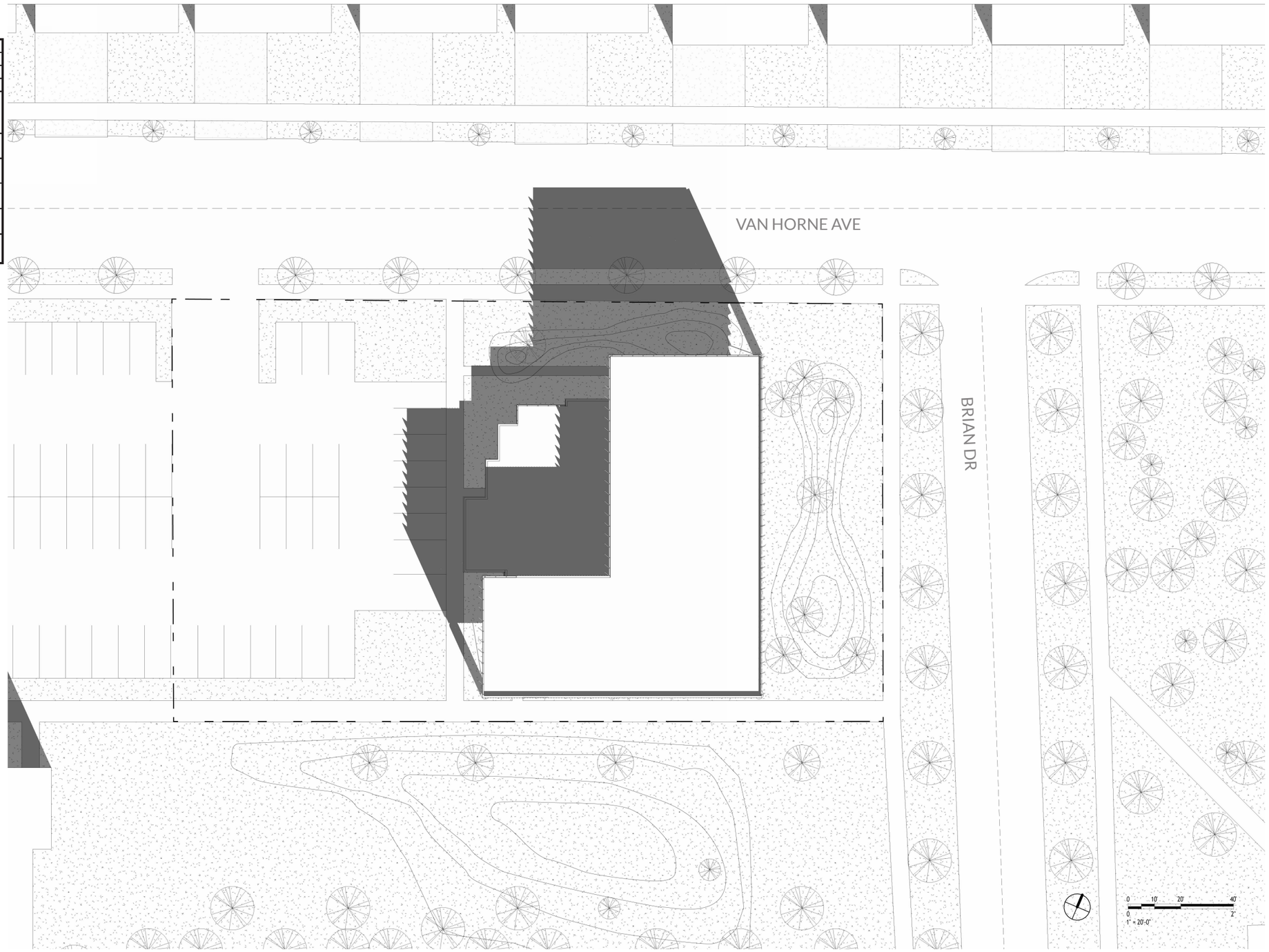


FIG 3.14 PROPOSED SITE PLAN
Scale 1” = 20’-0”

3.6 Design Proposal

The proposed layout establishes a strong visual connection between the existing library and the new overbuilt addition. As soon as visitors enter the library from the west side, their view extends directly toward a celebratory connection stair located at the far eastern edge. Although positioned at the end of the plan, the stair occupies a central place in the spatial experience, acting as a visual anchor that draws the eye through the length of the building. This connection point leads to the new elevated addition, symbolizing the library's vertical and programmatic expansion.

On the main level, the program continues to support the branch's core functions: collections, computer stations, study areas, corner reading nooks, the auditorium, staff offices, and reception. The existing glazed corner conditions are retained, with the most valued eastern corners expanded to capture more daylight and views. This preserves the library's familiar atmosphere while improving comfort, visibility, and connection to its surroundings.

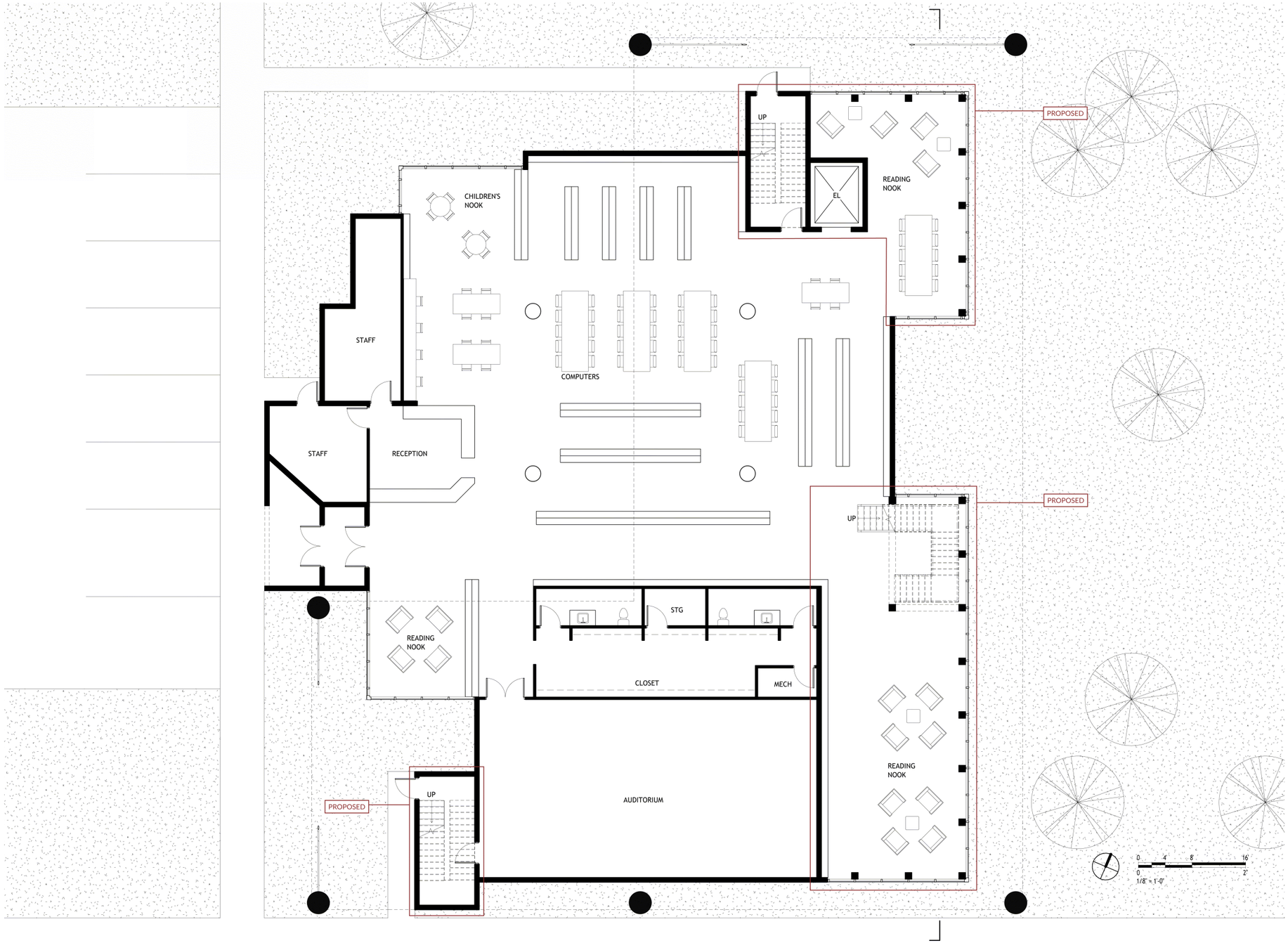


FIG 3.15 PROPOSED FIRST FLOOR PLAN
Scale 1/8" = 1'-0"

The second level forms the overbuild addition, organized around the kinetic exhibition. This level operates on a modular four-by-four-foot grid, allowing spaces to transform according to user needs. The framework can be rearranged for reading, socializing, meeting, studying, playing, or learning, giving users direct agency in shaping the environment. The scaffold structure also serves as a functional platform, capable of supporting shelving, stages, suspended furniture, netting or fabric surfaces.

Along the eastern edge, the exhibition occupies the larger of the two rectangular bays formed by the floor-to-ceiling trusses within the L-shaped addition, oriented toward the landscape and positioning activity visibly on display for the surrounding community. The western arm of the L-shaped addition contains the support functions, including washrooms, storage for scaffold components, and a maker lab within the corner glazed end. This area accommodates more fixed technologies and workshop equipment, complementing the dynamic, reconfigurable nature of the exhibition space.

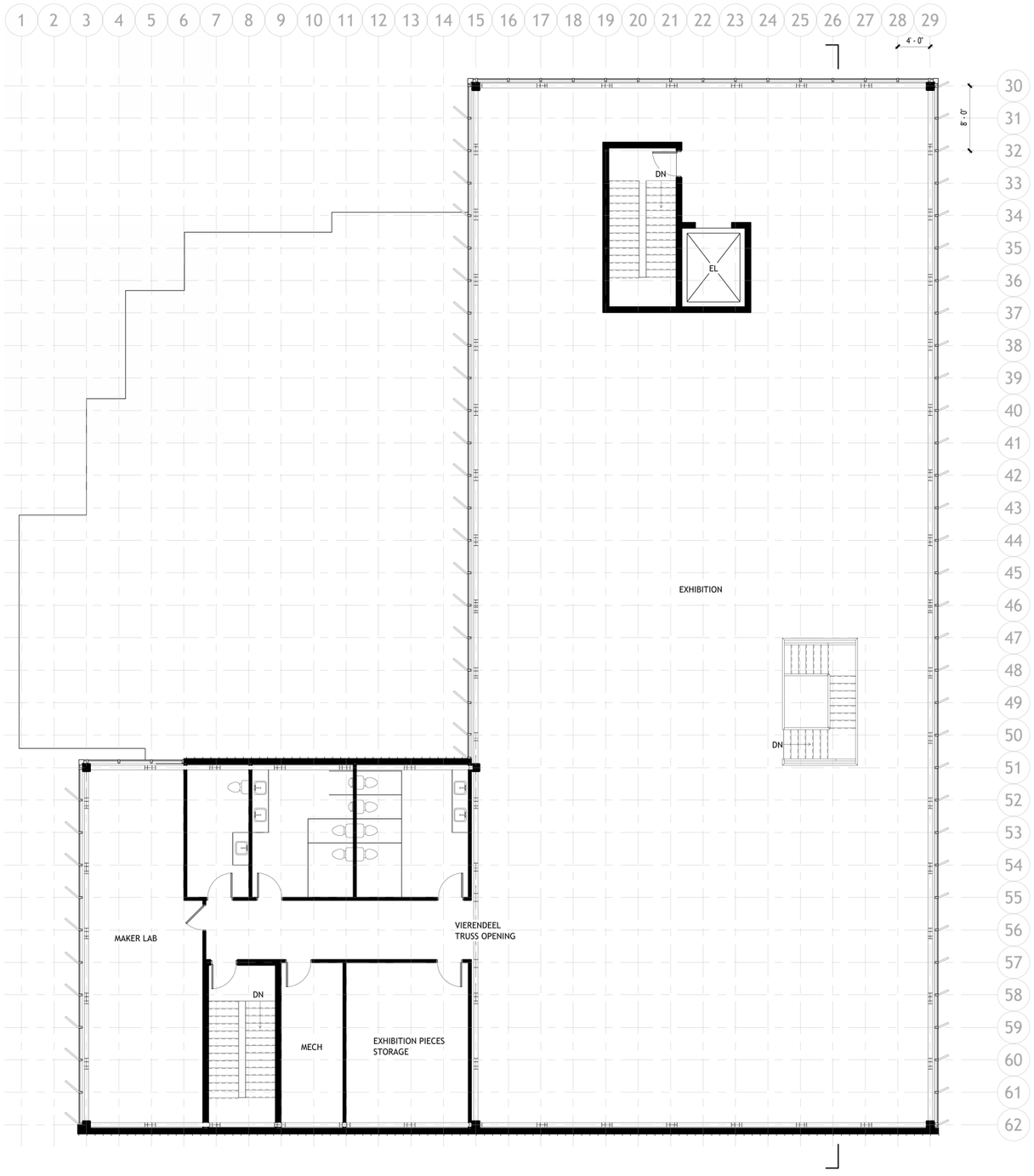
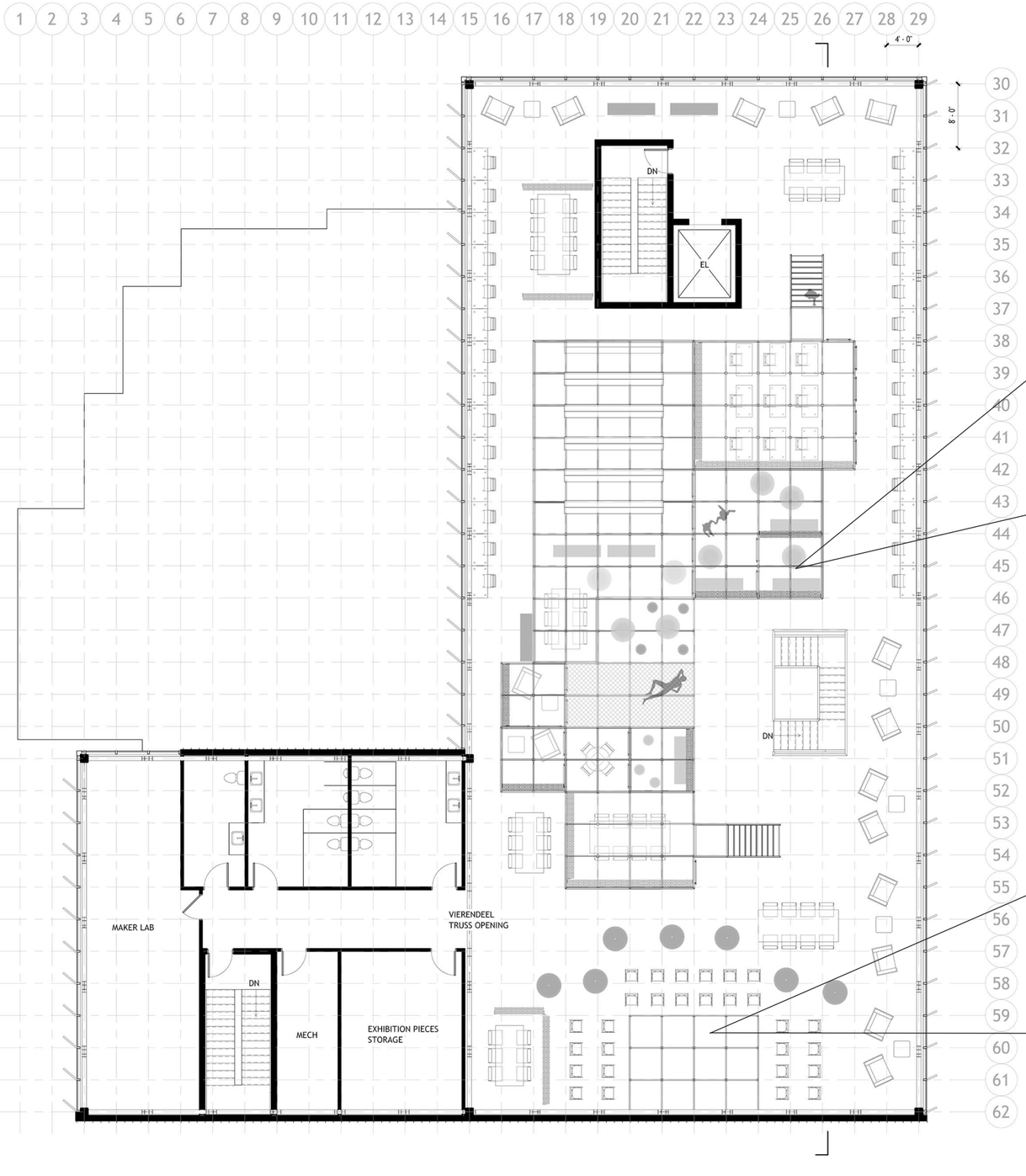


FIG 3.16 PROPOSED SECOND FLOOR PLAN
Scale 1/8” = 1’-0”



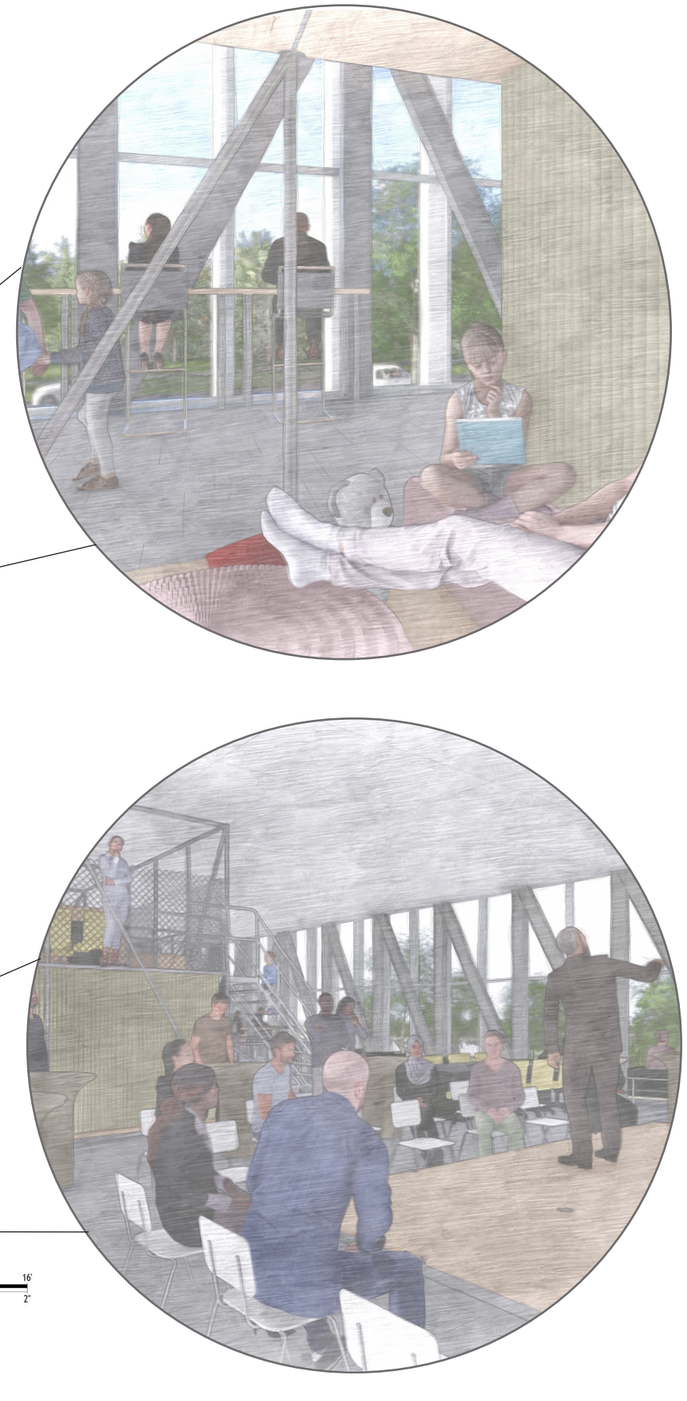
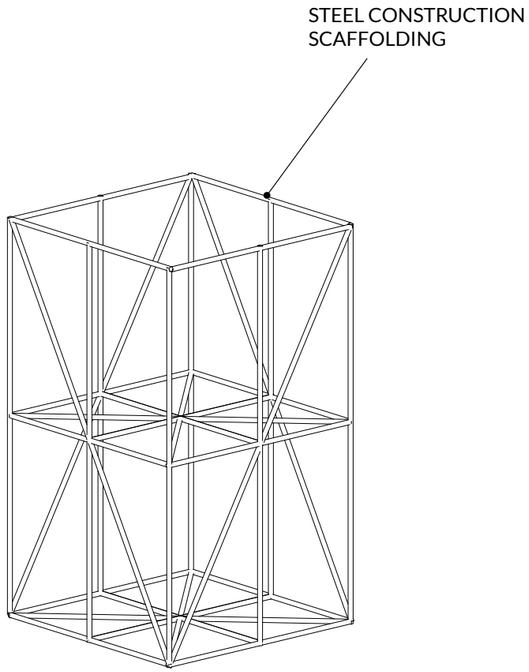


FIG 3.17 POTENTIAL EXHIBITION LAYOUT
Scale 1/8" = 1'-0"

Figure 3.18
Exhibition Axonometric. Base and Safety Layers.

BASE LAYER



SAFETY LAYER

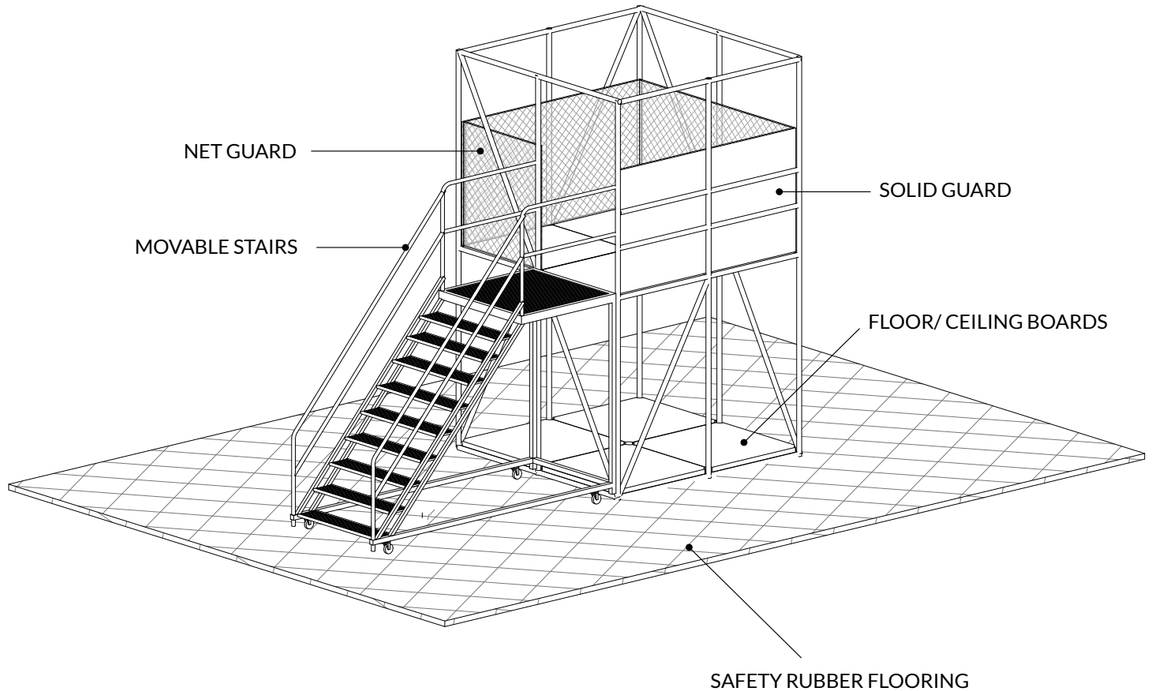
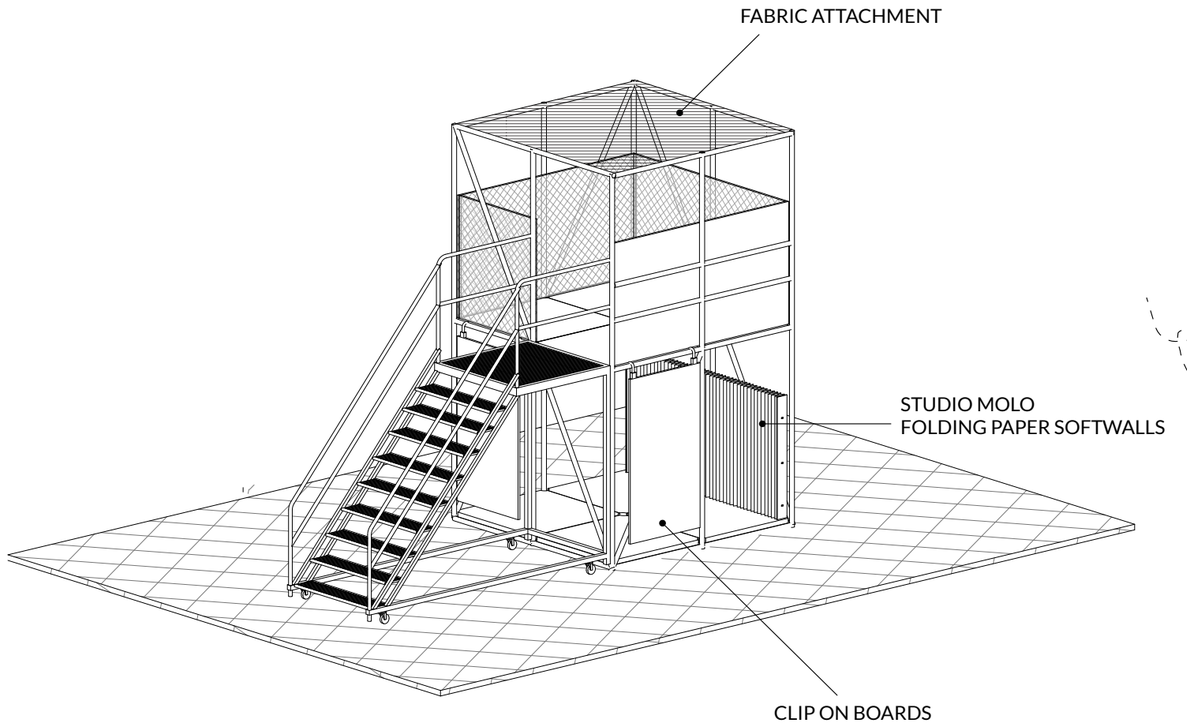


Figure 3.19
Exhibition Axono-metric. Partitions and Furniture Layers.

PARTITIONS



FURNITURE

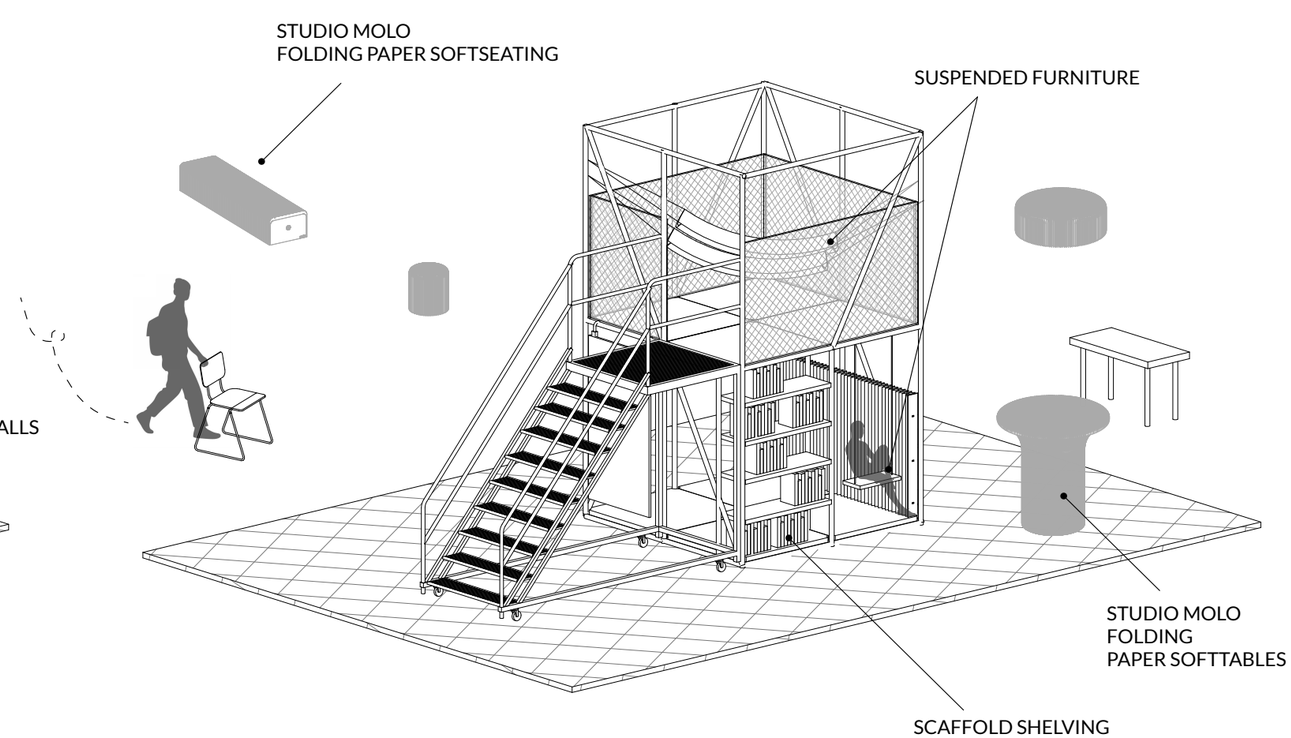


Figure 3.20
Section
Perspective

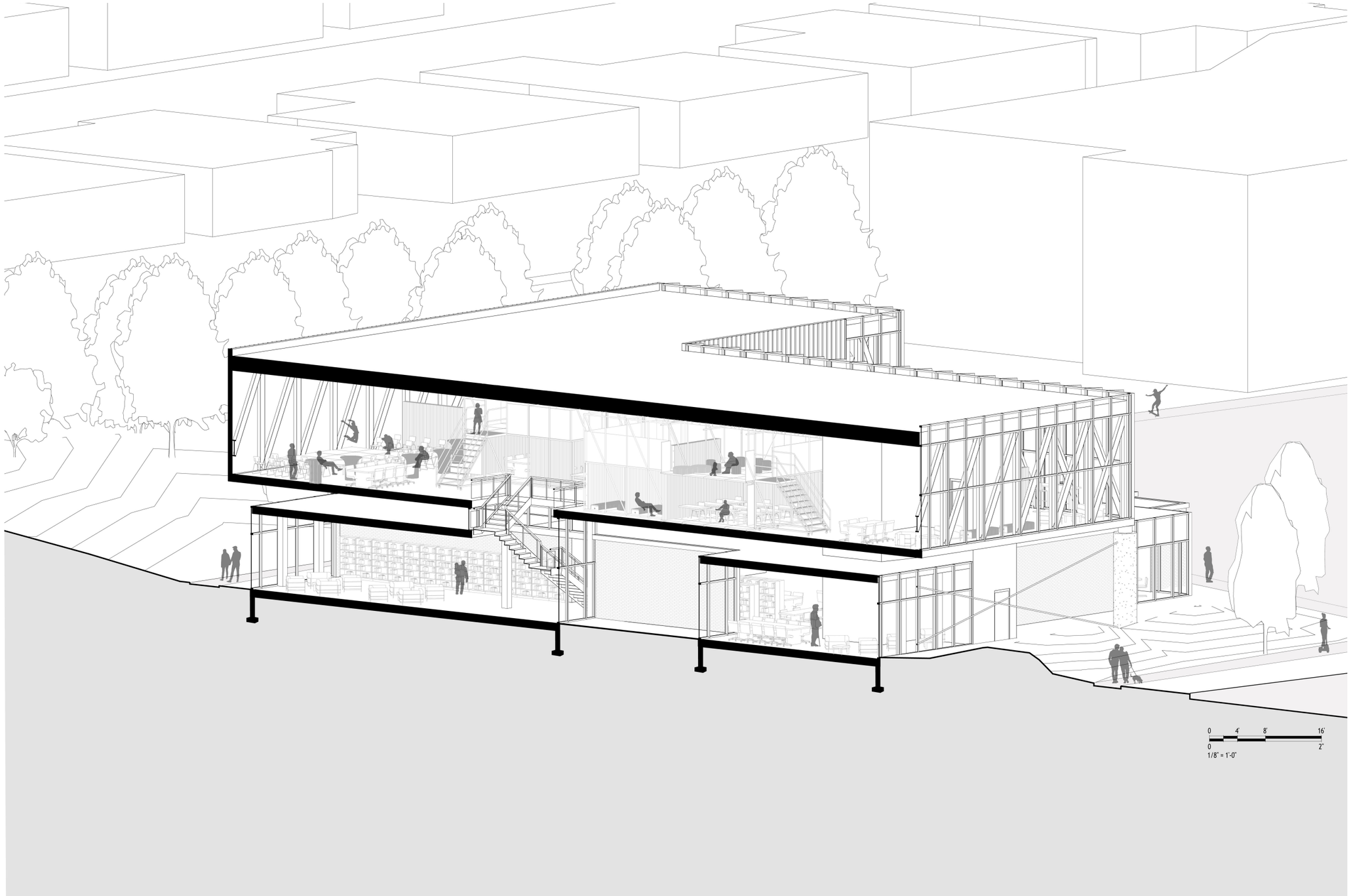
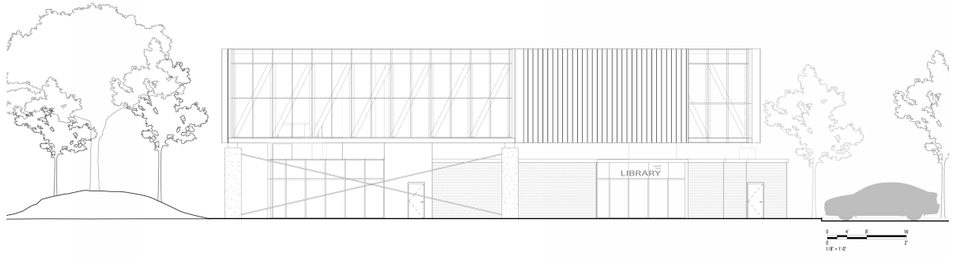
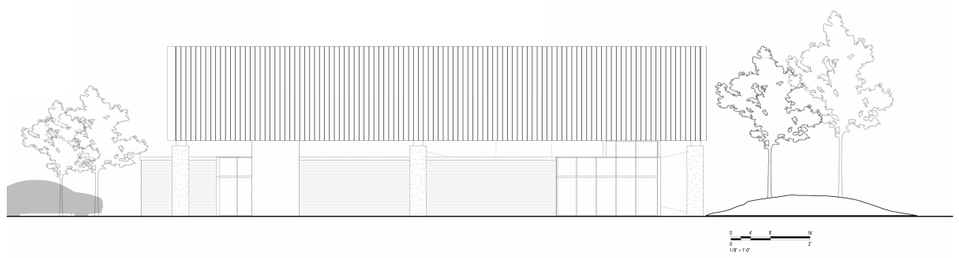


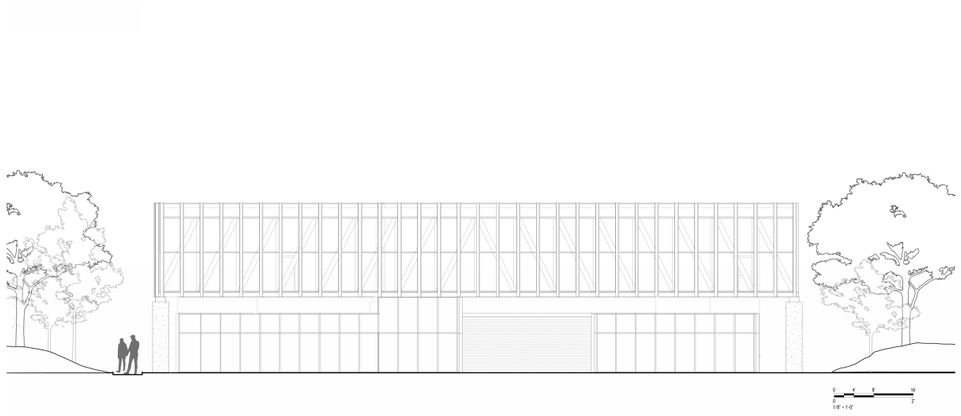
Figure 3.21
Elevations



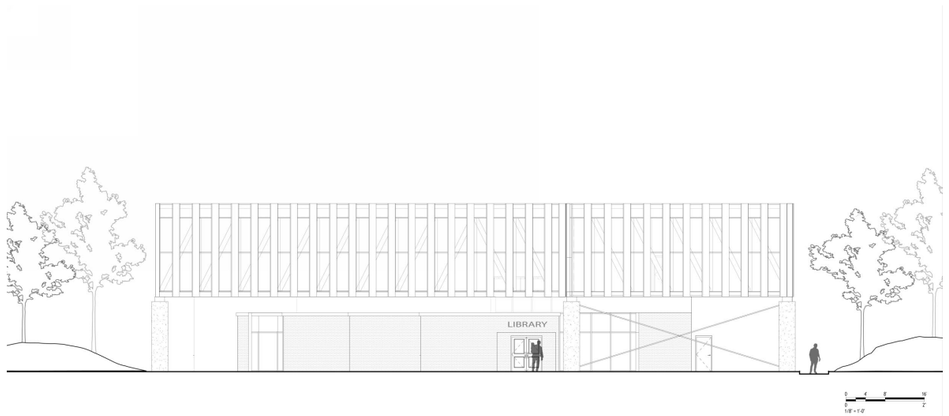
NORTH ELEVATION



SOUTH ELEVATION

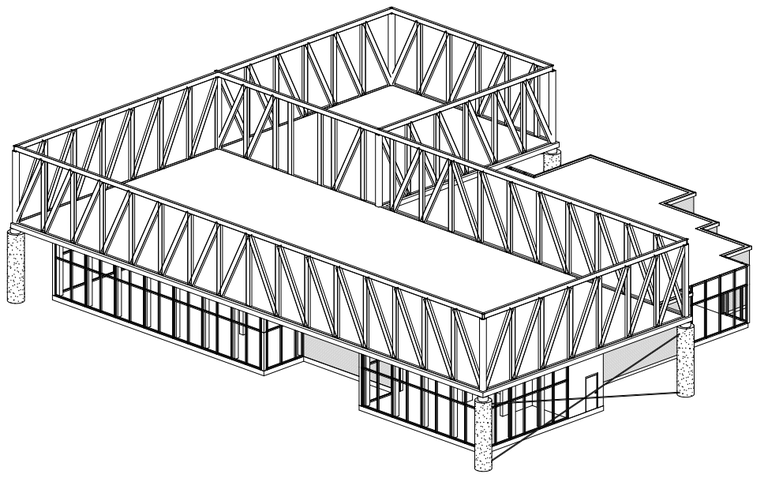


EAST ELEVATION

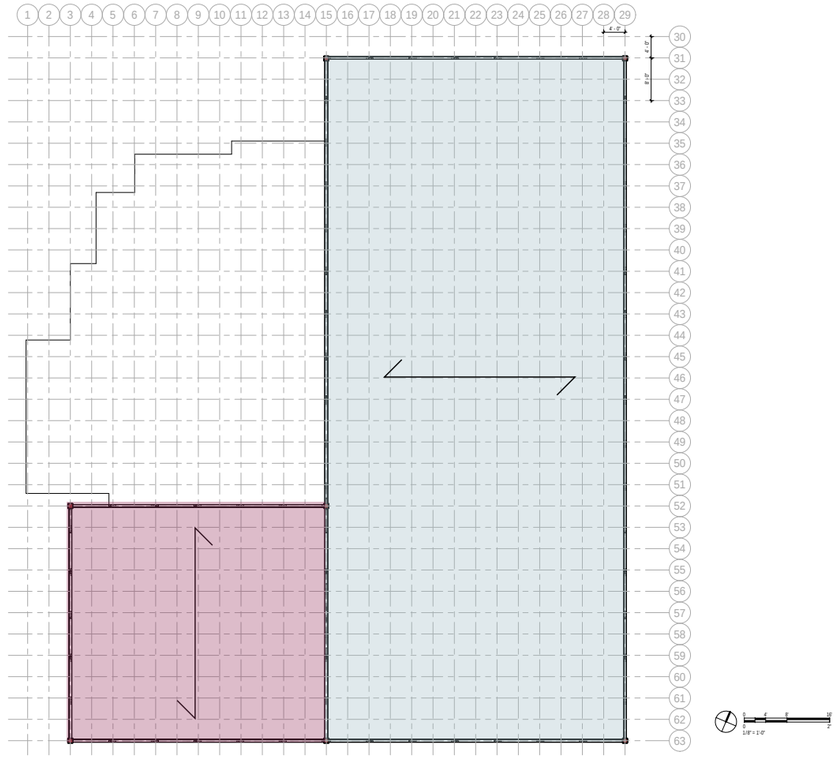


WEST ELEVATION

Figure 3.22 & 3.23
Structural Axonomen-
tric & Layout



STRUCTURAL AXONOMETRIC
Scale 1/8” = 1’-0”



STRUCTURAL PLAN
Scale 1/8” = 1’-0”



Figure 3.24
Exterior Perspective
from Van Horn Avenue



Figure 3.25
Exterior North-East
Perspective



Figure 3.26
Exterior East Side Elevation from Brian Drive

3.7 Evaluation

The analysis evaluates *Pleasant View Branch* against the established criteria:

1. Response to the Site and Community
2. Balancing Forms
3. Organization
4. Balancing Materiality
5. Applicable Code Compliance

Response to the Site

The Pleasant View Branch occupies a suburban site characterized by sloped topography and mature vegetation. Sharing a parking lot with the adjacent community centre and situated opposite Pleasant View High School, the library anchors a civic cluster within the neighbourhood. The 1975 building is positioned at the southwest corner of the property, leaving a generous open area to the northeast that holds the greatest ecological and visual significance. The design proposal strategically orients the new addition toward this landscape, preserving the existing tree canopy and natural slope while reinforcing the library's civic presence along the street and its relationship to the school beyond.

Rather than cutting into the hillside, the new structure is elevated above grade, maintaining the existing topography and tree root systems. This strategy allows the landscape to flow uninterrupted beneath the addition, reinforcing organic concepts that architecture should grow naturally from its environment.

Because the existing south facade is situated near the rear lot line setback of 3 metres, the proposed addition aligns with this boundary. Glazing was intentionally omitted along this elevation to satisfy fire separation and limiting distance requirements. Instead, natural light is introduced from the north, east, and west facades, with solar control provided by vertical aluminum fins that modulate sunlight on the east and west elevations.

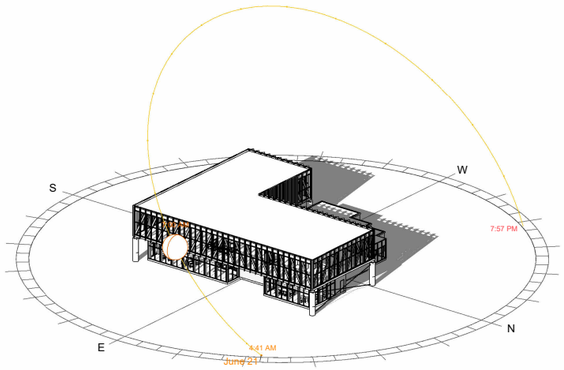
On the east facade, fins are angled 25° away from the south to filter low-angle morning sunlight from the southeast while maintaining outward views through the mature trees along Brian Drive. This orientation softens early glare and diffuses light evenly across the interior areas.

On the west facade, fins are angled 40° away from the south to intercept the low, intense afternoon sun from the southwest during summer months when the sun is higher. In winter, when the sun remains much lower in the sky, these same fins allow sunlight to penetrate deep into the space, maximizing passive heat gain and natural illumination during colder seasons.

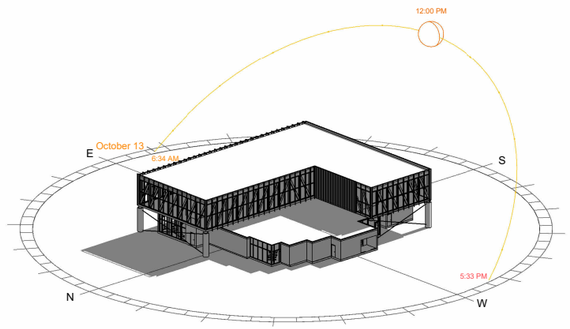
These fin orientations were validated through a solar study conducted on the Pleasant View site. The study analyzed sun paths and shadow behavior during the summer and winter solstices to assess daylight performance and the effects of the building's massing. The results confirmed that fins rotated approximately 25° away from south on the east facade effectively filtered early morning sunlight without noticeably reducing interior daylight levels. On the west facade, the analysis showed that the southern leg of the L-shaped building shades the facade during winter, blocking the low sun almost entirely, while in summer, the higher solar altitude clears the mass, allowing sunlight to reach the glazing. In these conditions, the vertical fins rotated about 40° away from south provide critical shading control reducing glare and overheating from late-afternoon sun while maintaining the facade's visual rhythm. This combination of massing and fin geometry creates a seasonally responsive balance between shading, daylight access, and structural expression.

Together, the facade system establishes a balanced daylighting strategy capturing soft morning light from the east and warm winter light from the west, while mitigating summer overheating. The fins are precisely aligned with the building's structural grid, corresponding with the truss and mullion lines to maintain a consistent rhythm between structure, enclosure, and light.

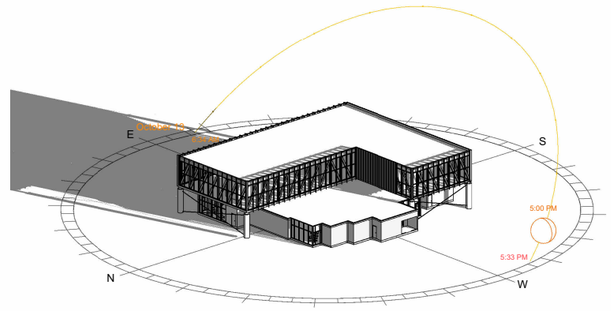
Figure 3.27
Sun Study on Proposed Building



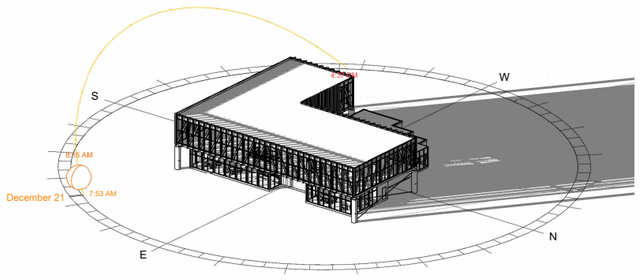
Summer Morning



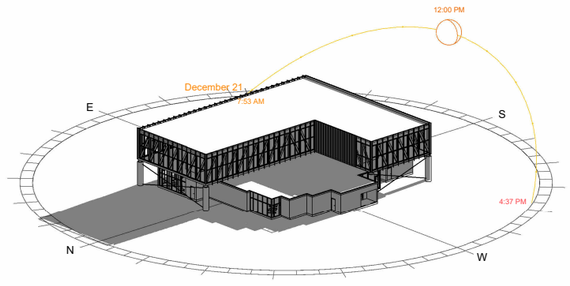
Summer Afternoon



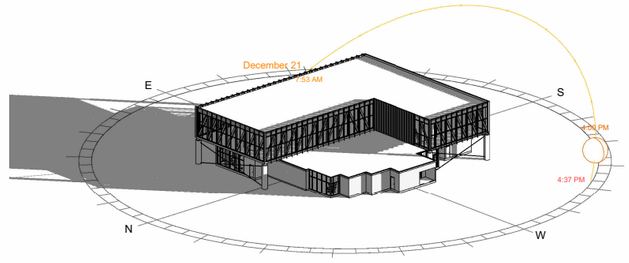
Summer Evening



Winter Morning



Winter Afternoon



Winter Evening

Response to the Community

The design exploration demonstrates how the kinetic scaffold directly responds to the main finding of the ethnographic research at the Pleasant View Branch: the need to easily separate and adapt spaces for different uses throughout the day. The framework integrates a fixed structural frame with modular attachments, partitions, and surfaces that can be rearranged to accommodate shifting programs and user groups.

Morning use by caregivers and seniors is supported through calm, accessible zones with seating and open gathering areas that maintain clear sightlines and daylight access, improving comfort and supervision. The design retains and enhances the glazed corner nooks appreciated in the existing building, using them as daylight anchors and visual connections to the exterior, while introducing full glazing along the east wall of the addition to extend natural light and outdoor views.

Midday use by students is accommodated through flexible, high-energy zones that can transition between study and social activity. These spaces support short, intensive periods when students gather to socialize, play, relax, or prepare for tests during lunch breaks. Lightweight acoustic partitions and soft furniture provide adjustable separation, allowing active use without disrupting adjacent quiet areas. Evening use by families, students, and professionals is supported through acoustically buffered study rooms, power-accessible desks, and multipurpose areas that can host tutoring, reading clubs, or community events.

The system directly addresses issues identified in community meetings, including noise management, lack of private areas, and the limited adaptability of the existing open plan. It also introduces new functions absent from the branch. A maker lab is located at the southwest corner, where a static workspace is most appropriate. The lab includes 3D printers, laser cutters, CNC milling and engraving machines, vinyl cutters, sewing and embroidery machines, electronics stations for robotics and coding, and general fabrication tools for model making and prototyping. These facilities support hands-on learning, fabrication, and digital production. Adjacent to this, the kinetic exhibition area within the modular scaffold provides a flexible environment for displaying and presenting community-made projects. The exhibition space can expand or contract through movable partitions to support workshops, demonstrations, and public presentations.

Together, the maker lab and kinetic exhibition establish a continuous link between making and showing, transforming the library into an active civic space for production, collaboration, and shared learning. By improving daylight access and preserving the valued glazed corner conditions, the design strengthens users' connection to the exterior landscape while maintaining comfort and visibility inside. Overall, replacing the static open plan with a modular, scaffold-based system enables multiple programs to operate simultaneously without conflict. The scaffold functions as an organizational framework that supports user control, spatial reconfiguration, and the coexistence of quiet and active uses within a single civic environment.

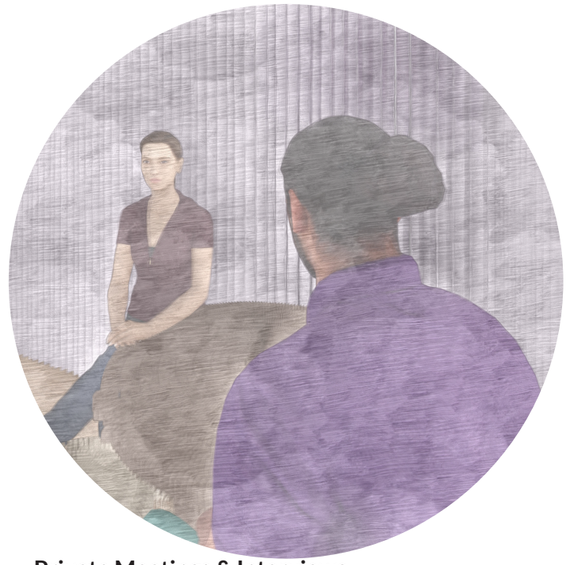
Figure 3.28
Kinetic Exhibition
Vignettes



Collaboration & Group Meetings



Reading Nooks



Private Meetings & Interviews



Private Study

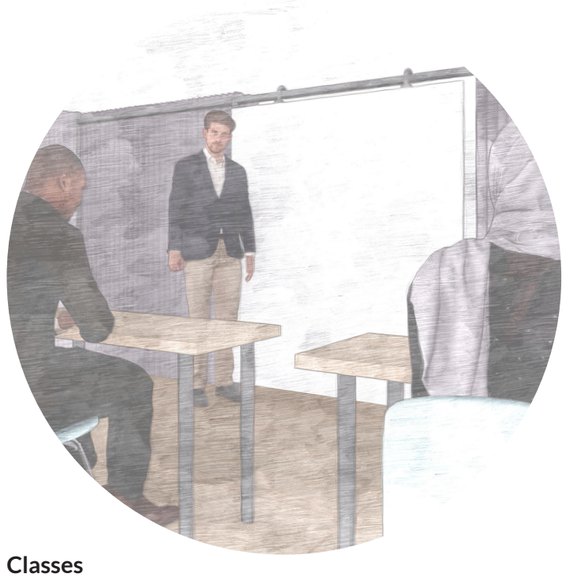


Presentations



Teens Socializing on their Lunch Break

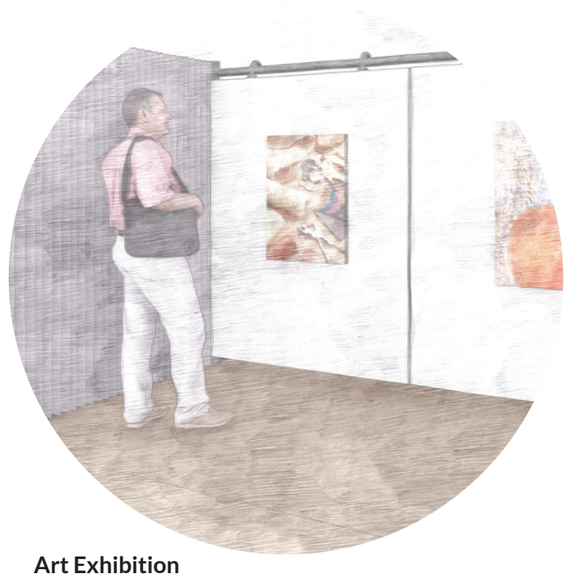
Figure 3.29
Kinetic Exhibition
Vignettes



Classes



Arts & Crafts



Art Exhibition



Seniors Socializing



Children Story Time



Children Playtime

Balancing Forms

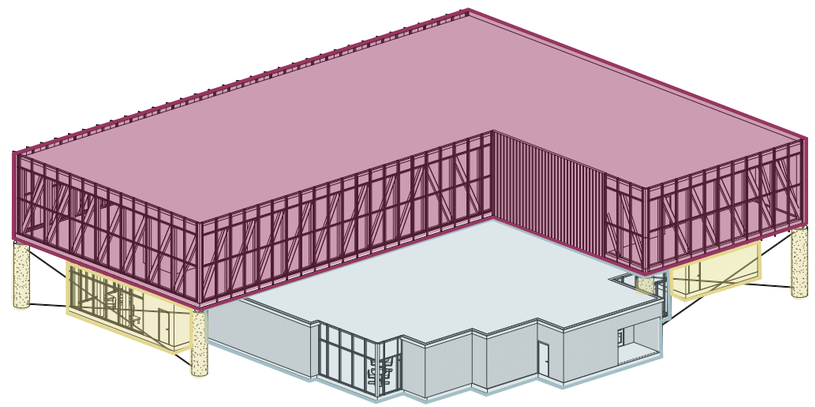
Formally, the addition establishes a dialogue between the grounded solidity of the existing library and the lightness of the new structure above. The new volume's horizontal form reinforces its relationship to the ground plane and surrounding topography, while its slender vertical access shafts, exposed steel trusses, and bands of glazing convey transparency and weightlessness. The design contrasts the heaviness of the 1970s red brick mass, anchored to the slope, with the elevated and refined addition, whose structure and surface articulation express both suspension and openness. The expressed gap between old and new further emphasizes independence while admitting daylight between the two volumes. The light metallic cladding and reflective glazing capture the color of the sky, enhancing the perception of lift against the earthy brick base.

The composition follows Rowena Reed Kostellow's hierarchy of dominant, subdominant, and subordinate forms:

- The dominant form is the new elevated rectilinear volume, visually prominent yet restrained in scale.
- The subdominant form is the existing brick structure, grounding the composition within its site.
- The subordinate elements include the glazed celebratory stair connection, slender fire access shafts, and concrete support columns that carry the elevated form. These elements are exposed rather than concealed, revealing the structural logic and the dialogue between support and suspension.

This arrangement achieves balance through contrast, applying Kostellow's and Ching's principles of hierarchy, axis, and rhythm, ensuring that the addition enhances rather than overwhelms the existing architecture.

Figure 3.30
Proposed Massing
Hierarchy



Organization

The project is organized on a 4’ structural grid that governs both the elevated addition and the kinetic interior framework. This grid serves as the primary ordering system structurally, spatially, and proportionally establishing coherence between circulation, program, and structure. It reflects the modernist lineage of Mies van der Rohe, Walter Gropius, and Le Corbusier, each of whom emphasized clarity through geometry, proportion, and repetition as a means of achieving architectural order.

Within the kinetic interior, the grid defines a system of modular panels, partitions, and adjustable floor segments that can be reconfigured to support changing uses from quiet study zones to collaborative workspaces or open exhibition areas without requiring physical reconstruction. The 4 ft module derives from Ken Isaacs’s research, which identified 4 ft as an optimal dimensional unit for human-scaled comfort, reach, and efficiency within transformable architectural systems. This dimension aligns with typical human spatial perception and standard lumber and panel dimensions, reducing material waste and simplifying fabrication.

Structurally, the 4 ft grid can be scaled to larger increments, such as 8 ft for steel truss spacing, while maintaining proportional logic across both fine and coarse structural layers. Elements like the mullions and kinetic scaffolding align with the 4 ft module, reinforcing visual rhythm and modular continuity throughout the design. In this way, the grid operates not only as a spatial organizer but also as a unifying system, linking the building’s kinetic adaptability with its formal and structural discipline.

The introduction of structural columns and bracing draws inspiration from the Environment 3 Building at the University of Waterloo, which similarly employs a disciplined grid with floor to ceiling trusses and exterior periphery support columns with cross bracing. However, the building conceals this along the less visible facade and presents a continuous dominant form along the main entrance and street frontage to visually mask the older brick building beneath it. Only from the secondary elevations, such as the parking lot side, can one perceive how the addition is truly supported. This thesis takes the opposite stance, celebrating structure as a visible and expressive framework. The exposed trusses and bracing articulate the building’s logic and adaptability, making the structural grid not merely a background system but a defining architectural language. In doing so, the project transforms what was once hidden into a civic expression of openness, adaptability, and structural honesty, positioning the framework itself as a mediator between preservation and innovation.



EV3 Building West facade facing Ring Road



EV3 Building South facade facing the parking lot

Figure 3.31 & 3.32
EV3 Building front versus side facade showing hidden over-build columns

Balancing Materiality

The proposal retains the textured red brick of the existing library while introducing a glazed truss addition above that conveys lightness and modernity. The material palette establishes visual hierarchy and continuity: the heavy masonry base grounds the building, while the new addition expresses transparency and elevation. Copper-clad fire exit shafts reinterpret the tone and durability of the original brick in a contemporary form, and large 3-foot-diameter concrete columns support the glazed steel truss and mullion system above. The upper volume is wrapped in reflective tin cladding that captures changing light and sky conditions, reinforcing the sense of a lightweight structure hovering over a solid base.

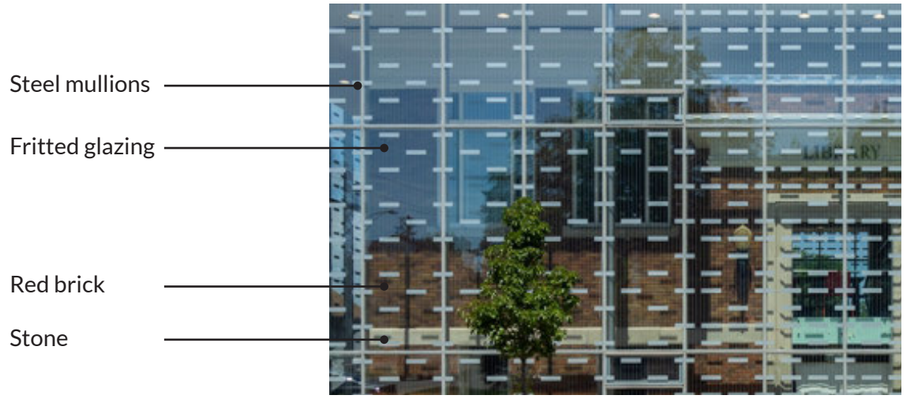
The junction between the two volumes is expressed through a literal lift of the new structure above the existing roofline. The addition hovers just clear of the original building, supported only by concrete columns and the vertical fire-route shafts that pierce the gap. This structural offset creates a visible void of light that defines the separation between old and new.

This approach parallels strategies seen in the Hespeler Library and Pembina Hall precedents, where transparency and structural clarity express transformation without erasing history. At Hespeler, glazing acts as a protective curtain around the original brick Carnegie library, while at Pembina Hall, the exposed steel truss and glass envelope achieve visual suspension above the existing masonry. Similarly, the Pleasant View addition employs structural precision and contrasting material weight to achieve an elevated composition that respects and renews the original building.

Figure 3.33
Design Proposal Material Palette

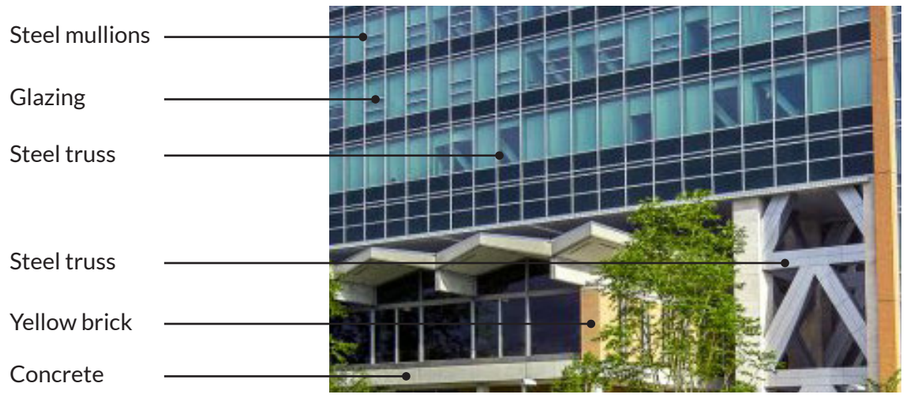


Pleasant View Branch Design Proposal Material Palette



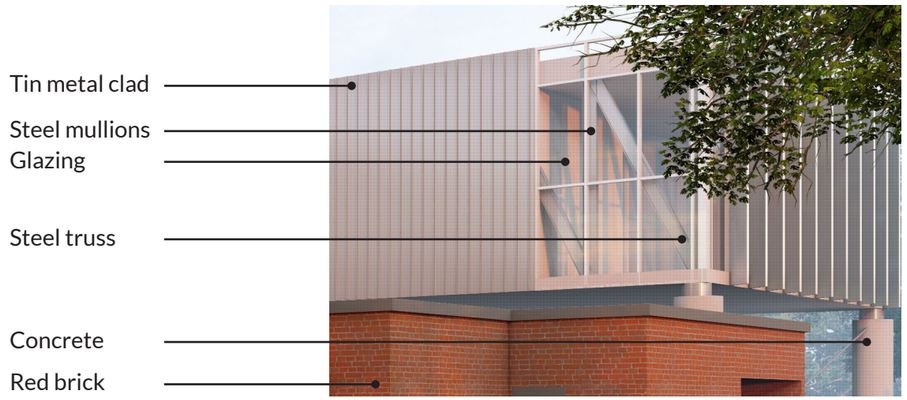
Hespeler Library Material Palette

Figure 3.34
Hespeler Library
Material Palette



Pembina Hall Material Palette

Figure 3.35
Pembina Hall
Material Palette

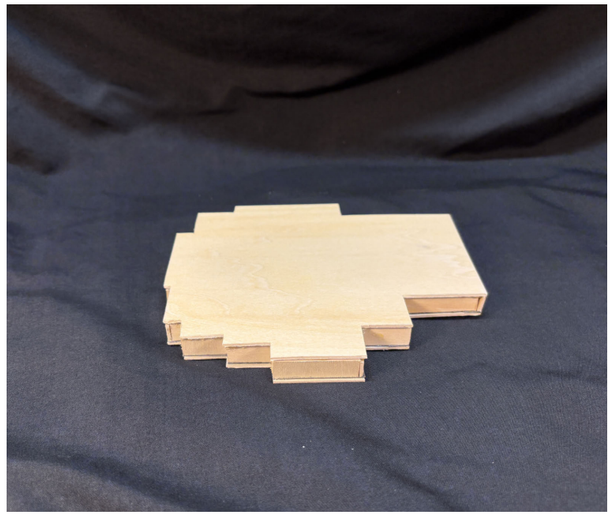


Pleasant View Material Palette

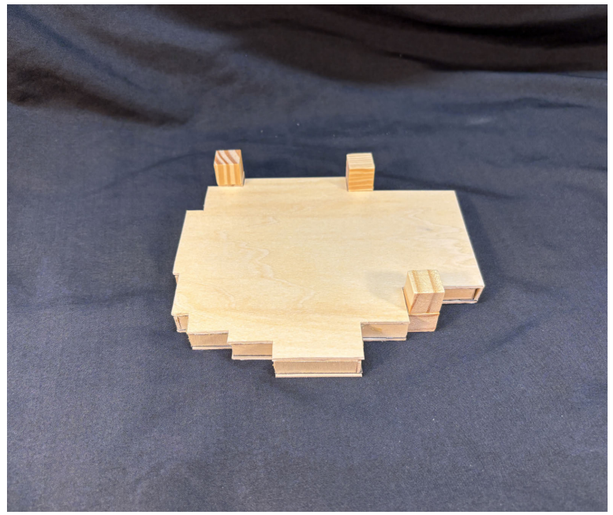
Figure 3.36
Pleasant View
Proposal
Material Palette

Figure 3.37
Materiality Massing Model

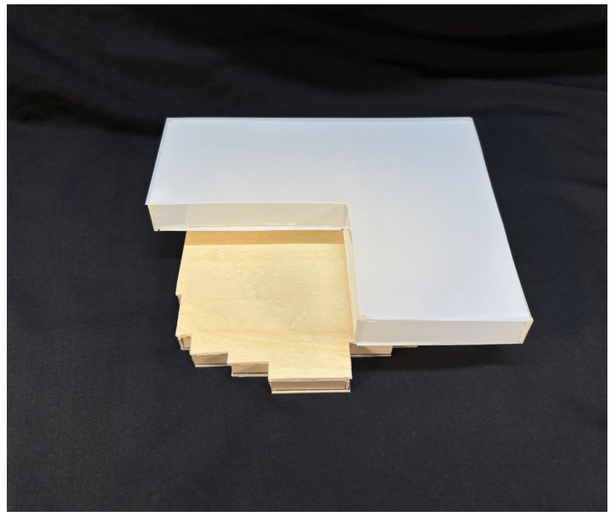
Existing Library



Connector Forms



Overbuild Addition



Heavy Below → Light Above

Pleasant View Materiality Massing Model
Scale 1:200

Ontario Building Code Compliance

The following plan illustrates compliance with some key Ontario Building Code (OBC) requirements related to overbuild additions.

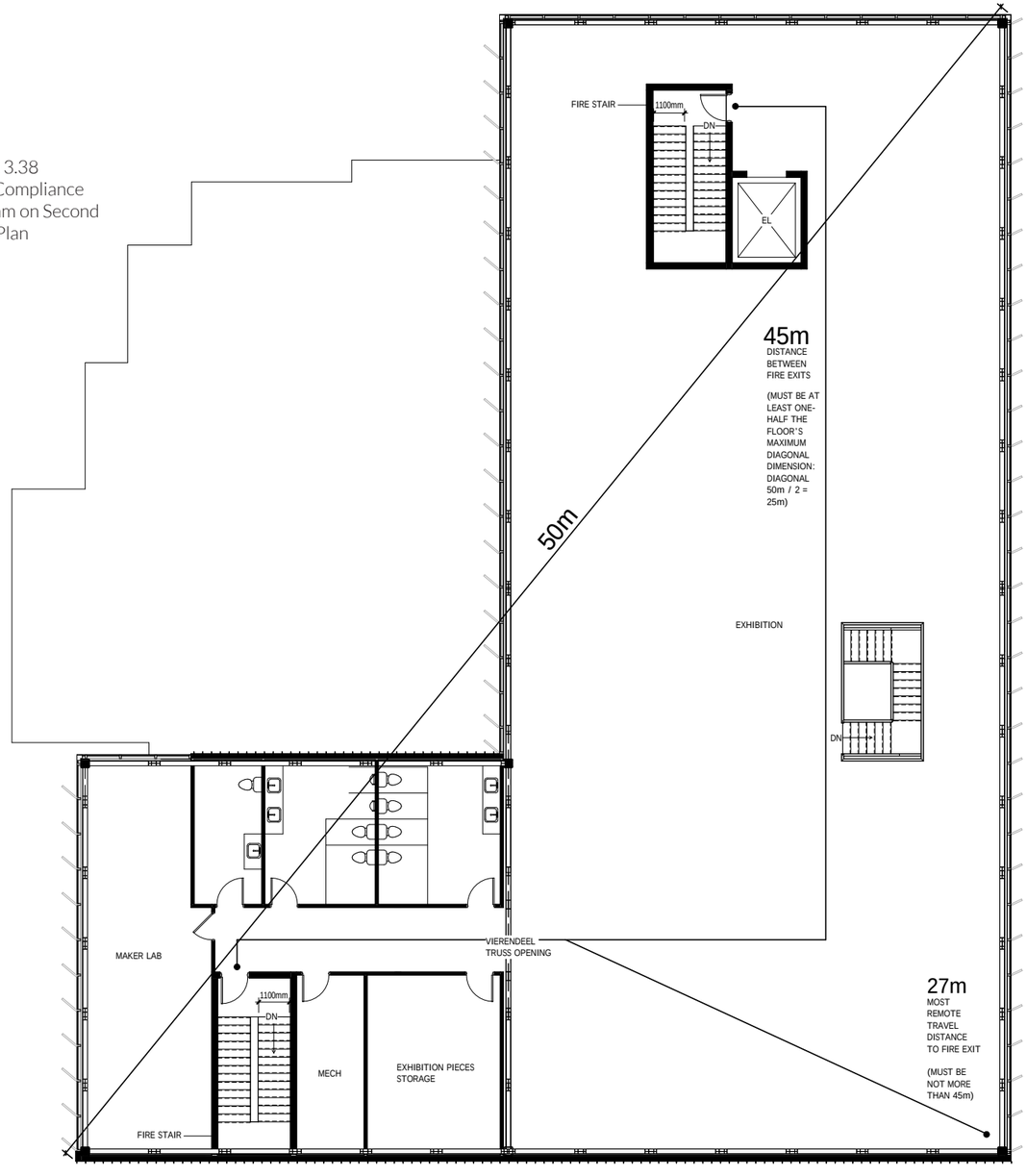


Figure 3.38
OBC Compliance Diagram on Second Floor Plan

3.8 Discussion

At its core, this thesis explores the scaffold kinetic system of the Exhibition Space as an experiment in how public architecture can provide user agency and support continuous change. It investigates how space can be both created and experienced by the public, and how civic buildings can remain responsive to evolving pressures, programs, and social uses. The role of the architect is to frame and reveal this experiment, designing a massing that elevates the system and positions it visibly at the corner of the site, oriented toward the most public edge.

The results demonstrate that integrating modernist design logic with a kinetic scaffold framework can renew aging civic buildings while maintaining continuity with their architectural language. The *Pleasant View Branch* illustrates that proportion, modularity, and material clarity remain effective tools for mediating between old and new. At the same time, the kinetic interior introduces adaptability as a structural condition rather than a temporary feature, allowing the library to physically and socially respond to changing community needs.

The system is professionally assembled and engineered to meet structural, accessibility, and safety requirements. Safety guards and lifts ensure safety and accessibility. The scaffold is not a temporary installation but a durable, maintainable framework designed for long term civic use. Its modular components can be replaced or reconfigured as programs evolve, ensuring that the space remains flexible and relevant over time.

While unconventional for a public library, this approach demonstrates how adaptability and user participation can be embedded directly into the architecture itself. The framework challenges static conventions of civic buildings, proposing an alternative model where flexibility, engagement, and renewal are fundamental qualities of design.

Ultimately, this research positions the kinetic scaffold system as both a spatial and social experiment one that tests how architecture can sustain relevance by empowering the public to shape, occupy, and experience space. It suggests a direction for future work in developing adaptable public frameworks that can evolve with the communities they serve.

CHAPTER 4: CONCLUSION

Chapter 4: Conclusion

This thesis began from the recognition that public libraries, as essential civic buildings, must continue to evolve to remain relevant amid technological, environmental, and social change. It asked how architecture can sustain this continuity while respecting what already exists, particularly within Toronto's aging suburban branches. Confronted with limited funding, static spatial models, and the risk of demolition-driven renewal, the research proposed an alternative: to explore kinetic architecture and overbuild additions as methods for extending and adapting library branches rather than erasing them.

The early research examined the evolution of public libraries and revealed how their spatial and programmatic roles have shifted dramatically over time. Early libraries functioned as elite institutions, repositories of knowledge accessible primarily to scholars and the upper class. Their architecture often emphasized grandeur and permanence, prioritizing symbolic beauty and material richness over everyday functionality. The library was a monument to learning rather than an active space for it.

This began to change in the nineteenth century with the rise of the Mechanics' Institutes and the public library movement, which sought to make education accessible to all. Libraries gradually evolved into democratic civic spaces, reflecting a growing belief in learning as a public right rather than a privilege. Despite this ideological shift, their spatial layouts remained largely static for much of the twentieth century, organized around fixed collections and silent reading zones.

Only in recent decades have libraries transformed into active community hubs that host diverse programs, workshops, and digital learning environments. This transition has been driven by technological advancement and changing social needs, expanding the library's purpose beyond housing physical books. The contemporary library now serves as a space for creation, connection, and participation, requiring an adaptable form of social infrastructure that continues to evolve alongside technology and community expectations. This research therefore concludes that the library model must meet current needs and anticipate the unknown pressures of the future.

4.1 The Kinetic Exhibition as Architectural Inquiry

The investigation used the *Pleasant View Branch* as a testing ground to evaluate how these methods could renew existing civic buildings while maintaining their social and environmental value. The proposal to elevate a new structure above the existing library and introduce a kinetic scaffold system examined how architecture might evolve without losing memory and how public space could remain active and responsive over time. Through iterative design and observation of community use, the research tested how movement, structure, and participation could coexist as part of a coherent architectural framework.

4.2 Findings and Implications

The findings suggest that adaptability can exist as a lasting design value rather than a temporary feature. The kinetic scaffold system demonstrated that reconfigurable architecture can be both practical and refined, enabling spaces to adjust to different programs while maintaining proportion and craft. The overbuild addition preserved the existing building's modest character and community familiarity while introducing new possibilities for spatial and social interaction. Together, these strategies showed that preservation and innovation can coexist as parts of a single architectural act.

However, the experiment also revealed that the success of such systems depends on addressing safety and regulatory challenges. The moving and reconfigurable elements of kinetic interiors require new approaches to structural testing, fall protection, and maintenance procedures. These spaces operate outside the parameters of traditional code classifications and suggest a future need for regulatory frameworks that define acceptable tolerances, materials, and operational safeguards for adaptive civic environments. The raw scaffold aesthetic, which exposes structural function, may also require a shift in public perception and institutional acceptance. What appears unfinished or temporary must come to be understood as an intentional design language that celebrates openness, honesty, and participation in the life of a building. Social acceptance of this aesthetic will be essential for kinetic spaces to be fully integrated into public infrastructure.

4.3 Social and Future Implications

The kinetic scaffold system developed in this thesis remains an early-stage experiment, yet its social and educational potential is significant. Allowing users to influence and reconfigure their environment promotes belonging, participation, and collective learning. Such spaces could foster a culture of shared stewardship, where architecture becomes a medium for public engagement and collaboration. The ability to reconfigure, assemble, and adapt space offers hands-on exposure to principles of design, construction, and engineering for people who may not otherwise have access to them. This potential makes kinetic civic architecture an important tool for inclusion, especially for groups historically underrepresented in technical and construction fields.

Moving forward, the success of this typology will depend on collaboration among architects, engineers, code officials, and policymakers to establish safety standards and operational guidelines. Accessibility, durability, and maintenance must be integral to design development, ensuring that adaptive structures are both secure and publicly trusted. Demonstration projects and pilot programs could help communities experience and evaluate this kind of environment firsthand, promoting broader understanding and acceptance.

Integrating movement with building services also presents opportunities for environmental performance. Spaces that can open, close, or condense could reduce energy consumption by aligning heating, cooling, and lighting systems with real-time occupancy. Linking spatial adaptability to operational efficiency connects architectural flexibility to sustainability, ensuring that the kinetic scaffold typology contributes not only to social innovation but also to ecological resilience.

As cities face increasing social and environmental pressures, buildings that can physically and programmatically adapt will represent both practical resilience and a renewed civic trust in architecture's ability to evolve responsibly.

4.4 Form Balancing

The research examined how to introduce an overbuild addition capable of housing the kinetic typology while maintaining the integrity of the existing form. Compositional principles derived from Rowena Reed Kostellow's framework were used to evaluate proportion, hierarchy, and visual weight, clarifying how a new structure could be added without overpowering the original library. This required distinguishing conditions of dominance and subordination in the overall composition and determining where the new mass should assert itself or recede. Methods from Anthony Di Mari and Nora Yoo were then applied to shape the massing in response to site constraints, program requirements, and alignment with the spatial logic of the existing building. Their catalogue of spatial operations provided a systematic means to test how the addition could be manipulated through lifting, carving, puncturing, and interlocking. These operations were not used arbitrarily; each was evaluated for how effectively it clarified circulation, framed views, and organized the relationship between the existing structure and the new kinetic framework.

Iterative massing studies tested symmetrical, offset, and bridged configurations to assess how the new volume could hover above the existing building while maintaining visual and structural clarity. Several options proved unsuccessful: symmetrical configurations overwhelmed the modest scale of the existing library, and offset volumes introduced unnecessary imbalance or awkward spatial transitions. The bridged configuration emerged as the most effective because it minimized direct load on the existing structure, preserved sightlines, and created the clear rectangular span required for the kinetic scaffold typology.

The final overbuild addition uses three connector forms to anchor the elevated volume while keeping the main span visually light and structurally independent. This approach maintains legibility of the original library and avoids the visual heaviness often associated with rooftop expansions. More importantly, the structural logic produces an unobstructed interior bay sized to accommodate the four-foot scaffold grid, a requirement for the kinetic system to function

as intended.

In this way, the form balancing strategy does more than reconcile new and old; it establishes the structural and spatial conditions necessary for the kinetic typology to operate. The addition's final form is therefore not a stylistic gesture but the outcome of a critical evaluation of proportion, structural independence, program need, and the operational demands of the kinetic exhibition.

4.5 Closing Reflections

This thesis asked how architecture can respect what is already in place while still preparing buildings to support and anticipate future change. We are living in a time of rapid technological and social transformation, and most buildings are not designed to adjust to these shifts. Architecture must therefore move away from fixed layouts and occasional renovations toward systems that can adapt physically and operationally as needs evolve.

The research shows that renewal can happen within existing structures when adaptability is treated as a core design requirement. Drawing from ideas of use and age value, the participatory work of Cedric Price, the modular thinking of Ken Isaacs, the compositional strategies of Rowena Reed Kostellow, and the spatial operations of Anthony Di Mari and Nora Yoo, the kinetic exhibition offers a way to build on what already exists instead of replacing it. The overbuild addition at *Pleasant View Branch* supports new uses while allowing the original library to remain intact and functional.

Cost now plays a major role in the future of public buildings. Full replacements or large renovations are often too expensive and disruptive. The overbuild approach reduces structural interference with the existing building and allows the library to stay open during construction. The kinetic scaffold further adds value by reusing what is already there, reducing material waste, and lowering the need for future major upgrades. Because it can respond to unknown changes in technology, community needs, or the environment, this system also protects against long term financial risk. Adaptability becomes both a design strategy and a form of economic responsibility.

The kinetic exhibition demonstrates that resilient civic architecture depends on flexibility, efficiency, and ongoing relevance. The scaffold operates as both a structural system and a social framework that can evolve with its users. The strength of civic buildings today lies not in being fixed or permanent, but in their ability to adjust while maintaining purpose, identity, and public trust. Buildings that can adapt intelligently will remain useful and meaningful over time.

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