

Library : A Social Infrastructure

by
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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Architecture

Waterloo, Ontario, Canada, 2017

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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

For many centuries, the mission of the library as a civic institution has been seen as the collection and dissemination of information. Likewise, the library typology continuously responds to the dominant paradigm of information and communications technologies. Following the digital revolution of the late twentieth century, information has been transcoded into electronic signals, thus allowing its storage and distribution to take place independent of time and space. Today, with access to information so ubiquitous, is the library a redundant place?

In this thesis, I argue that by democratizing information, the library's fundamental mission has been overcoming physical, social, and economic disconnectedness. The library, therefore remains to be an essential civic institution. However, despite making information more accessible, the digital revolution has produced new types of disconnectedness. Telecommunication and transportation infrastructures have accelerated suburbanization and decentralization of urban centers. In the current digital age, spaces of flow are valued more than spaces of place, resulting in a loss of civic space and suppression of diversity. Moreover, the infinite and simultaneous nature of digital information has incited feelings of inundation and disorientation. To address these new types of disconnectedness, the library typology is compelled to recombine and calibrate its historical traditions with a new set of expectations in the digital age.

This thesis is sited in the suburban campus of Conestoga College, which is located on the border of Kitchener and Cambridge, adjacent to Highway 401. The specific and universal disconnectedness affecting this institution is investigated on three scales: suburban city planning, Conestoga's campus master plan and the library's design. Informed by these investigations, I have proposed an alternate design for the campus master plan and the library. The library itself is a manifesto for embodying the static character of containment and the dynamic character of flow. On a grander scale, by integrating the architecture of the library with a bridge infrastructure, we can expose the friction between the two spatial logics of flow and place, and provoke a multitude of movements and exchanges between the existing and new programmatic elements. This speculative intervention aims to reinforce the agency of architecture to counterbalance the consternations that are prevalent in the technocratic paradigm of today.

ACKNOWLEDGMENT

I would like to express my special appreciation and thanks to my supervisor, Dr. Anne Bordeleau. Thank you for your constant commitment and enthusiasm from the beginning of this thesis. Your thoughtful insights have deeply enriched this project and helped me to express my ideas more cogently.

To my committee members: Professor Rick Haldenby, thank you for sharing your remarkable knowledge of Waterloo Region, your insights added new layers of depth to my research. Professor Lola Sheppard, thank you for challenging me during the design process, your early feedback formed strong foundations for this project.

Thank you to my TRDII studio instructor, Adrian Blackwell. Your perceptive criticism, class readings and discussions was a tremendous assistance in shaping the argument of this thesis.

I would also like to extend a sincere gratitude to my external reader, Liana Bresler for her time and insight.

I would also like to acknowledge the staff at Conestoga College, WalterFedly Consultants, and Moriyama & Teshima Architects, who took interest in my work and provided me with data and information about the college. A special thank you to Patricia Weigel-Green and Connie Phelps for their time and correspondence.

I am very grateful to all the staff and students at University of Waterloo. Your sincerity and kindness is the foundation of our school community. Thank you for enriching my years at the school with interesting discussions and a supportive community. Also, thank you to my friends Pablo and Molly for your input throughout the various stages of this thesis.

I know that this thesis would not be possible without the support and encouragement of my wonderful family. Foremost, thank you to mom and dad, for your unconditional love, thoughtfulness and endless sacrifices. To my sister Sara, for helping me work through half-baked ideas and poorly written sentences. To my extended family, Hassan, Mahnaz and Yassi, for your kindness and confidence in my abilities when I felt otherwise.

Finally, a heartfelt thank you to my husband, Mohammad, for being compassionate and encouraging during the challenges of graduate school and life. Your ambition and courage is an inspiration to me.

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INTRODUCTION

At the end of the twentieth century, the third industrial revolution, also known as the electronic revolution, fundamentally altered the spatio-temporal dimensions of human life.¹ Information, or data, was to be communicated, stored, and accessed independent of space and time. This meant that information had become de-territorialized, instantaneous, and simultaneous. It could be found everywhere at once, but nowhere in particular.

The transformation of data structure from a centralized model to a distributed model also prompted alternative models of urban governance, capital growth, and surveillance. The 1964 diagram of *Centralized, Decentralized, and Distributed Networks* by Paul Baran is exemplary of the paradigm shift that gained prominence during the most aggressive phase of the Cold War. Baran proposed shifting from a centralized model of communication to a distributed model. While the centralized network, such as the telephone circuit, relied on a single line of communication, the distributed network was dispersed over multiple links between redundant nodes. Therefore, the network could withstand attacks without collapsing as a system. Baran explained the potentials of the distributed network in his paper, *On Distributed Communications*:

This simple simultaneous learning and forgetting mechanism implemented independently at each node causes the entire network to suggest the appearance of an adaptive system responding to gross changes of environment in several respects, without human intervention. . . . Each node sees its environment through myopic eyes by only having links and link status information to a few neighbors. There is no central control; only a simple local routing policy is performed at each node, yet the overall system adapts.²

This description shows how the distributed network has a flexible and complex infrastructure, enabling it to redefine its own productive capacity perpetually. Although Baran's model was created to secure military communication, it pio-

1 Manuel Castells, *The Informational City: Information Technology, Economic Restructuring, and the Urban-Regional Process* (Oxford, UK ; New York, NY, USA: B. Blackwell, 1989), 1.

2 Paul Baran, *On Distributed Communications* (Santa Monica, CA: Rand, 1964), 31-32, accessed May 15, 2016, http://www.rand.org/content/dam/rand/pubs/research_memoranda/2006/RM3420.pdf.

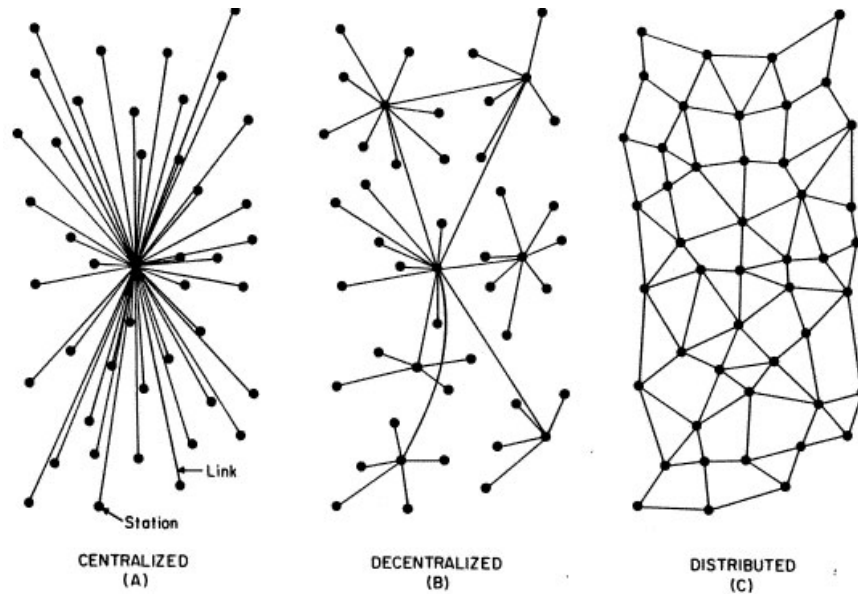


Fig.1-Paul Baran's seminal diagram of distributed communications networks in 1964

neered the organizational logic of internet based on packet switching communication, as opposed to the existing circuit switching communication.

This achievement was a significant advancement over the telegraph of the first industrial revolution and the telephone of the second industrial revolution. Moreover, the intermingling of cybernetic and social sciences propagated networks of different kinds. The diversity of information types (e.g., Text, graphics, audio, video) that could be transcoded into electronic signals allowed different operations to be executed via telecommunication. Institutions and corporations could therefore translate their functions into information-processing activities that would flow electronically through fiber optic cables, invisible in the subterranean layer of our cities.

At the same time, the emergence of electronic communication coincided with the explosion of urban sprawl, particularly in United States. Amongst other factors, mass automobile ownership, government economic stimuli, and the promise of individual prosperity through a capitalist logic quickly proliferated dispersing patterns of urbanization. A reciprocal relationship between suburban construction, infrastructural expansion and automobile ownership continued a perpetual economical cycle. To this day, this cycle has persisted and has been further accelerated by telecommunication. Sprawl has become a globally adopted method of

urbanization for the contemporary city. Sprawl and telecommunication operate towards a similar logic of efficient exchange of information and expansion of the network. They benefit from a mutualistic relationship; telecommunication facilitates further decentralization and consequently generates more demand for advanced methods of telecommunication.

From this technological paradigm emerged a new spatial logic that Manuel Castells calls the *space of flows*. The space of flows is a space where simultaneous social practices are produced, transmitted, and processed. The operations of this space is independent from time and place. Telecommunication and high-speed transportation infrastructure are the material dimensions of space of flows. The space of flows stands opposite to the historical experience of space, where social practices are bound to time and place. The complex relationship between these two disjoined spheres of human experience is, indeed, the defining feature of the contemporary city.

In a new rendition of Hugo's "this will kill that"³, the emergence of space of flows displaces the meaning of the space of place. Once social and economic practices of a society have been displaced from their physical locale and liberated from the rigidity of time, the space of place is no longer of functional significance. The compositions of classical building typologies tied to history and tradition must unravel either to be reinvented or to be completely obliterated. In his book, *City of Bits*, Bill Mitchell discusses multiple circumstances where the electronic revolution will render the function of classical institutions redundant:

Increasingly, telecommunication systems replace circulation systems, and the solvent of digital information decomposes traditional building types. One by one, the familiar forms vanish. Then the residue of recombinant fragments yields up mutants.⁴

Mitchell postulates that institutions could no longer be only supported by buildings and their furnishings, but also by telecommunication systems and computer software. Institutions such as the bank, the theater, the school and the library could now function by software acting through personal hardware. Consequently, architecture will no longer be the main public interface; the virtual homepage will become the primary place of interaction.

The abstraction of all institutions and activities of civic life to their utilitarian functions would also radically reform the urban space. Although one might not lament the loss of the bank and happily celebrate the instant access to personal finances, in this context, the library as a physical place becomes a contentious

3 "Ceci tuera cela": is a famous quote from Victor Hugo's *Notre-Dame de Paris*, translated to "this will kill that". It meant that the printed book will replace the cultural influence of the architecture.

4 William J. Mitchell, *City of Bits Space, Place, and the Infobahn*, ed. Inc NetLibrary (Cambridge, Mass.: MIT Press, 1995), 50.

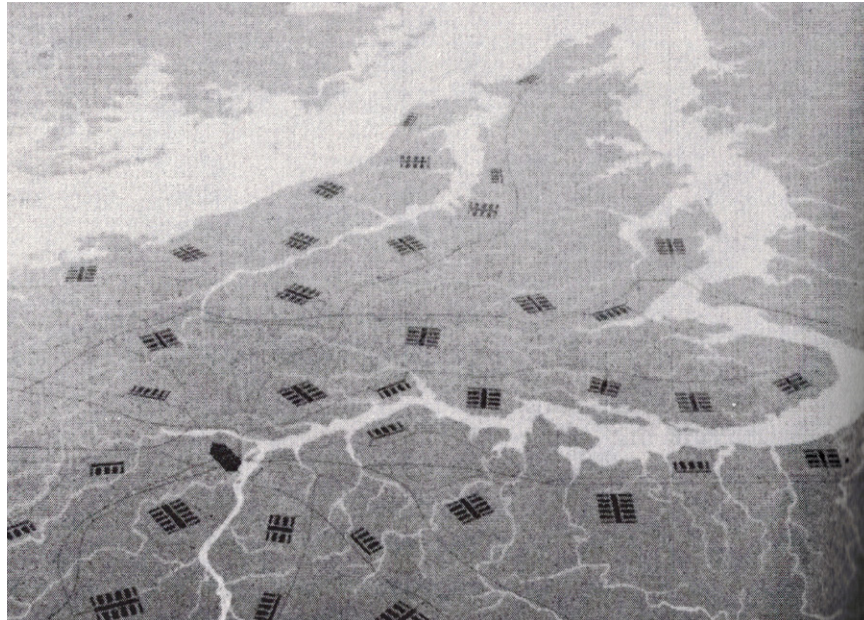


Fig.2-Diagram of dispersed urban planning by Ludwig Karl Hilberseimer in 1955

subject. For many centuries, the primary function of the library has been the collection and dissemination of information. As the medium of information evolved throughout history, the typology and organization of the library evolved with it. The typology of library was refined over the centuries to correspond to the changes in technology and policies regarding access and surveillance of information.

The design of the library has been inseparable from how a society sees its relationship to knowledge. Through the circulation of information, social programs, and act of research, the library provides the means to make connections to a fragmented world.⁵ The book as a physical object, offers a direct correlation between the information content and the package, reinforcing a sense of permanence and familiarity for the reader. In the same manner, finding a book amongst the library's collection offers a tangible experience of orientation and association. However, electronic content has a temporary and limitless nature. It has no specific spatial connection to the screen it appears on. The content is digested in fragments; therefore, it can never be grasped in its entirety. Through digitization access to information is no longer limited by operation hours or location; in many ways, acquisition of knowledge has become easier and more flexible with the electronic library. However, what is sacrificed here is not the nostalgia for the tactile relationship to books, but more importantly the loss of a civic entity. The

5 Brian Edwards, *Libraries and Learning Resource Centres*, ed. Bidy Fisher (Oxford; Boston: Architectural Press, 2002), 252.

library's function reaches beyond the pragmatic exchange of information. One of the hallmarks of the library is to provide an appearance of cultural affinity and permanence.

The concurrence of daily activities and functions in cyberspace, delivered mostly to the domestic space, collapses the spatial and temporal separations of those activities. As Mitchell explains, "it will no longer be straightforward to distinguish between work time and "free" time or between the space of production and the space of consumption."⁶ In the contemporary city, the domestic space has been transformed into "electronic cottages"⁷, while the urban centers and city boundaries have become indiscernible.

The contemporary city, distributed over a vast landscape, is reminiscent of Baran's diagram of the distributed network. The urban infrastructure connects nodes of autonomous enclaves and creates formless interstitial voids. The overall structure of the urban network is totalizing and powerful, yet locally the nodes are weak. Nodes are highly depended on global infrastructural links for survival. A suburban house, for example, is only functioning when it is connected to utility, communication and transportation networks, And the redundancy of nodes make each one insignificant to the overall function of the network.

The inhabitants of the sprawling city suffer from the same myopia that Baran described in his analysis of nodes in *On Distributed Communications*. Capsular spaces in form of private automobiles, houses, and gated communities distance the masses from each other and fortify personal truths. Telecommunication technologies offer the illusion of public discourse, yet personal filters and preferences can help sustain hyper-individualization and denial of otherness. The fear of becoming insignificant coupled with mass estrangement eventually worsens social divisions and leads to a crisis. Unless alternatives are found to reinstate social meaning in space of places, as a counterbalance to the one-sided logic of the space of flows, our societies will become further disconnected and alienated, ultimately resorting to destructive violence.⁸

One should not criticize the adverse social consequences of globalization and technological development without acknowledging its merits. In an overly simplistic assessment, global networks have increased productivity and innovation, which has undoubtedly improved quality of life for many. The network of global economy, contemporary urbanism and informational technologies are so intrinsically linked, that they cannot be simply transcended. Similarly, Castells insists that technology will remain to be a dominant paradigm:

6 Mitchell, 101.

7 The term was coined by Alvin Toffler in 1980 to describe a scenario where homes, equipped with modern communication technologies, would become the center of society. Virtual communication would replace physical environments outside of the homes.

8 Castells, *The Informational City*, 353.

Historical optimism and moralistic pessimism both convey in different tones an equally simplistic message of technological determinism, be it in the liberation of the individual from the constraints of the locale, or the alienation of social life disintegrating in the anonymity of suburban sprawl.⁹

Although Castells argues that information technologies control social relationships and urban processes, he emphasizes that these networks are also adaptable. According to Castells, information technologies by themselves do not organize a spatial logic, in fact because of their flexibility, they become appropriated by the existing dominant forces. Therefore, Baran's diagram of the distributed network is descriptive yet misleading. The diagram suggests equal distribution of power throughout the network, yet in many real life networks nodes are organized with hierarchies and asymmetrical powers.

While networks can be totalizing and exert power from above, nodes can have the capacity to erupt from below and modify the disposition of the network. In the context of urbanism, nodes connected to spaces of flow and rooted in place based activities, can become consequential in the global network. Civic legibility can only be reinstated if the contemporary city engages in a hybridize approach.

In this thesis, I propose to reconsider the role of the library in light of the contemporary paradigms of information and urbanization. The library, as a functional typology and a civic symbol, epitomizes the struggle to recombine the virtues of flow and place. To test this proposal, I have chosen Conestoga College as the site of my thesis. The college is situated at the center of Tri-cities area of Kitchener-Cambridge-Waterloo, a site that embodies the qualities of a typical contemporary city. By exploring the specific and universal disconnectedness of the city, the campus, and academic libraries, I have designed a new library and learning commons for Conestoga College .

In the first chapter, I explain how the two contemporary paradigms of telecommunication and urbanization have produced the sense of anonymity and disconnectedness in the urban context of Conestoga College. From its conception, the college was planned to serve a large territory of Western Ontario. Its location and heavy reliance on transportation infrastructure reflects the postwar agenda of city planning. Much of the contemporary city is diffused in closed enclaves connected by impenetrable infrastructure. The global language of infrastructure, concealed in many forms, dominates the contemporary city while weakening local potencies. By tracing the primacy of space over form in the post-war transformation of the city, I explain the interlaced relationship between physical and psychological disconnectedness of the contemporary city. I offer a close reading of theories of Albert Pope, Pier Vittorio Aureli, Keller Easterling and Manuel Castells, to understand the disposition of the contemporary city, and to ground specific design approaches for redeeming it from total social deterioration.

In chapter two, I investigate the disconnectedness of the physical configuration

⁹ Ibid, 6.

of Conestoga College Campus. In addition to being separated by the highway, the campus is indecipherable from outside and it is disengaging in its interior organization. The initial master plan for the college was highly influenced by the utopian visions of postwar education reform. A study into the lineage of postwar campuses shows how the intermingling of cybernetics and social theories inspired the architectural discourse of the time. Conceived as a single megastructure, the campus has more characteristics of an infrastructural system than an architectural object. I study the campus's history and its organization to identify opportunities for future interventions.

Chapter 3, focuses on the disconnectedness that ensues from the shifting paradigm of information in the context of the academic library. Given the rapid technological advances and the subsequent space-time compression, we face new conditions of information overload. The attempt to collect all information in one place, and make information available instantaneously and simultaneously, results in information overload, where meaning and learning are negated through a surplus of information. I argue that the academic library can become more integrated with the learning process, fostering discovery, exploration, collaboration and reflection, all essential actions of learning. The learning commons, as a new library typology, expands the exchange of information beyond the dualistic program of archive and reading room, and complements it with programs for social interaction and learning resources. While analyzing the typological transformations of the library, I explore the spatial qualities and programmatic elements that would encourage social interaction and prosper learning.

In the final chapter, I present a new design for the Conestoga College campus and the library. The proposal directly addresses the notions of disconnectedness presented in the thesis. Instead of engaging in futile efforts to condemn or reverse the already matured paradigms of information and urbanization, I have attempted to investigate more productive strategies of engagement and counterbalance. Drawing upon emerging architectural theories pertaining to the contemporary city, my thesis serves as a testing ground to make Conestoga College a vital public node in the regions' infrastructure, while satisfying the college's programmatic needs. By revealing the peculiarities of the site and the significance of the institution, I argue for investing in the existing density of activities of the college and activating its dormant monumentality through the hermeneutical role of architecture. A marriage of infrastructure and inhabitation, the proposal interconnects a range of scales and movements and envisions new reciprocities between preexisting infrastructures and new programmatic elements.

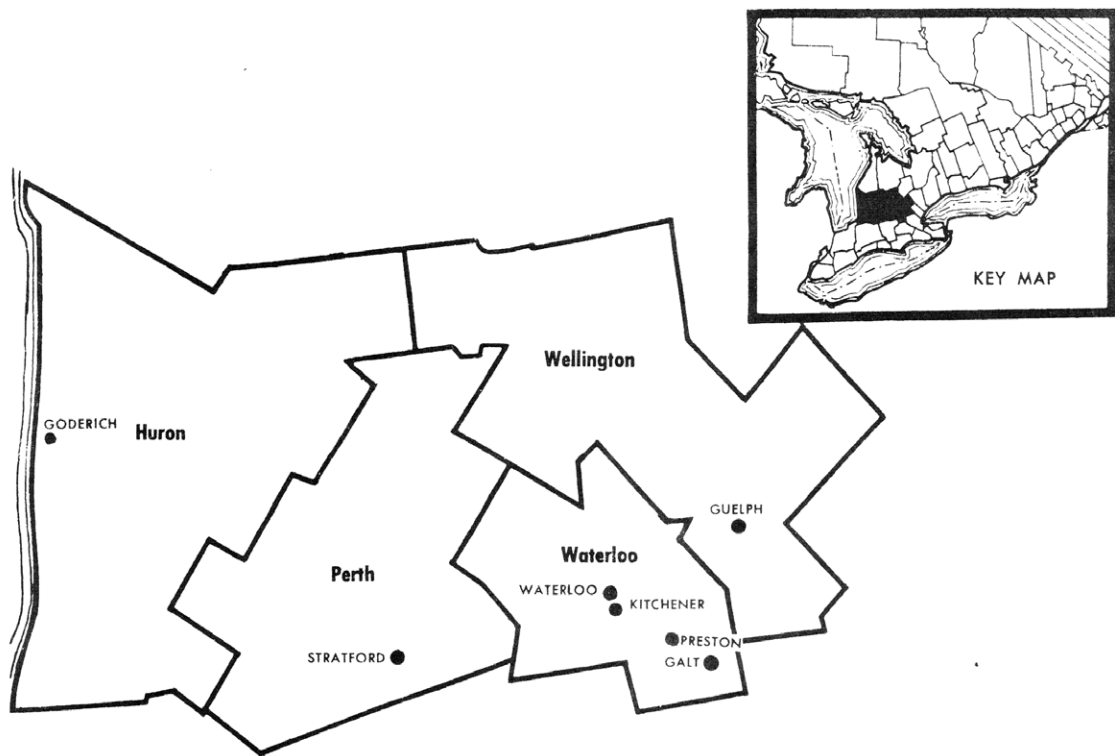


Fig.3-Map of Area 14 in 1967

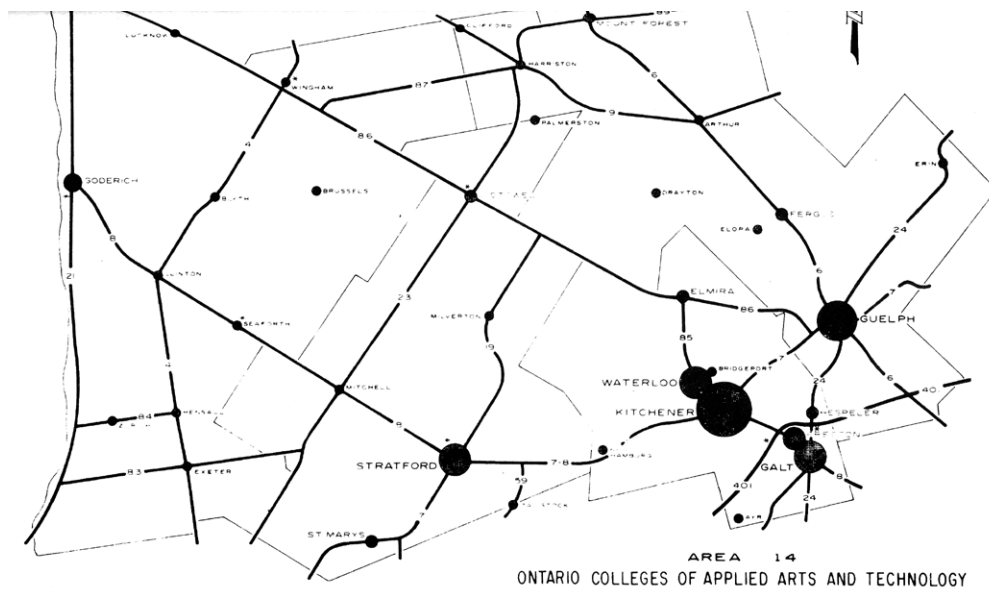


Fig.4-Networks of regional roadways in Area 14 in 1967

1| THE CONTEMPORARY CITY

The disconnectedness in Conestoga College's urban context is emblematic of a general condition of alienation and anonymity experienced in the contemporary city. The post-war expansion of sub-urbs and exurbs, accelerated by telecommunication, results in the disappearance of public space and decline of anthropomorphic exchanges, and ultimately the dissolution of communities.

The contemporary city, in large, refers to the sprawling development of cities that has become globally prevalent in our time. While the phenomena of suburban expansion originated in the late 19th century and the early 20th century (with projects such as Ebenezer Howard's Garden City Movement that aimed to liberate the house and the human from the woes of the industrial city), the polynuclear expansion of cities only gained momentum post World War II. Primarily in the United States, the emergence of the polynuclear sprawl was propelled forward by the promise of individual prosperity; population growth; mass ownership of the automobile; government investments in infrastructure, home loans, and veterans' education; and the threat of nuclear war. In a short time, the rest of the world followed suit.

The pre-war models of suburbanization had advocated for the peripheral expansion of the urban core for residential use. Therefore, the peripheral expansion was still subordinate to the historical city. In contrast, the post-war contemporary city is no longer a subsidiary of the historical urban core; it is an entirely unique urban development that has overwhelmed its predecessor.¹ The contemporary city is a process rather than a place. The sprawling development endlessly reproduces and expands the boundaries of the city, turning it to a megalopolis.

A Community College for the Contemporary City

In 1964, Conestoga College Board of Governance was tasked to select a site for Conestoga College of Applied Art and Technology. The college was to provide training and education for the support and growth of the local community that comprised of the four-county area of Huron, Perth, Waterloo, and Wellington, also known as Area 14.² Therefore, Conestoga College was a community college whose community spreads over thousands of kilometers.

1 Albert Pope, *Ladders* (Houston, TX: Rice School of Architecture, 1996), 92.

2 Dryden and Smith Planning Consultants, *Conestoga College of Applied Arts and Technology: College Location Plan* (Report, Conestoga College Archive and College Documents, Kitchener, ON, 1967), np.

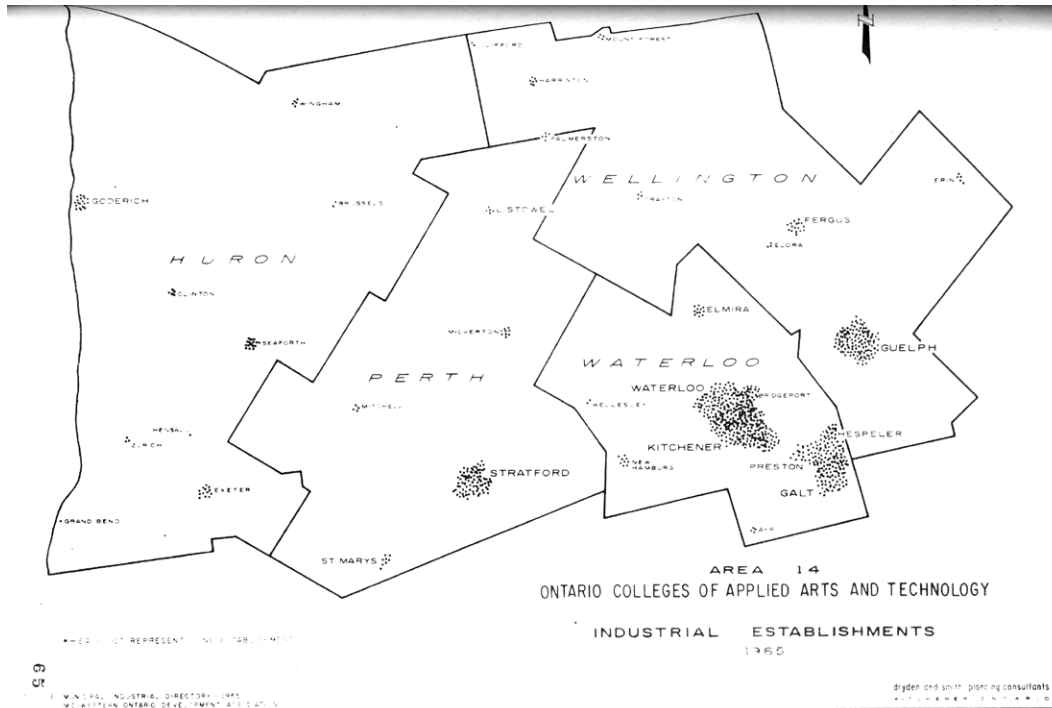


Fig.5-Map of industry distribution in Area 14 in 1967

The choice of the site was conditioned by the major nodes of infrastructure and its proximity to population density. In the College Location Study (1967), it was emphasized that all sites being considered were served by good district highways as a major determining factor for the location of the college.³ The study concluded that the geographic center of the area did not coincide with the concentration of population and industries. The report stated: “It appears impossible to locate a college site which would adequately serve all of the potential students in Area 14 as a commuter college.”⁴ It was also projected that population growth patterns would follow industry concentration. By 1980, the region of Waterloo was projected to have an increased population of over 75 per cent, containing more than 50 percent of the region’s entire population.⁵

In consideration of this conclusion, it was recommended for the main campus of the college to be in the Kitchener-Galt- Waterloo triangle with direct access to Highway 401. Moreover, to equalize the opportunity for post-secondary education throughout the area, satellite campuses would be in the most western part of Area 14; the college would provide specialized courses catering to the local needs.

3 Ibid, np.

4 Ibid, np.

5 Ibid, np.

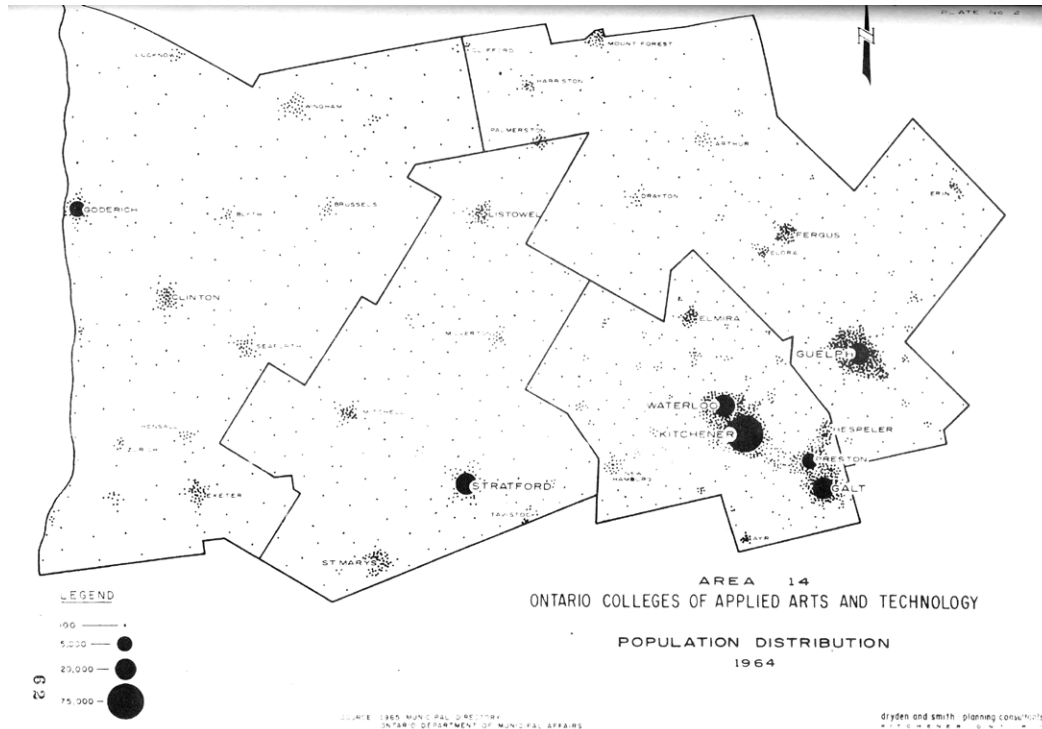


Fig.6- Map of population distribution in Area 14 in 1967

The Site

The triangular site proposed by City of Kitchener was enclosed by roads from all sides, at the intersection of Homer Watson Boulevard and Highway 401. Given that Homer Watson Boulevard was a six-lane regional road, connecting Ottawa Street to Highway 401, access was only possible from Doon Valley Drive on the north of the site.

The 144 acres of land was offered at no cost to the college. Most students were expected to travel from Kitchener, Waterloo, Guelph, Galt, Preston, Hespeler, Fergus, and Stratford. In the beginning, the college was considered entirely non-residential; therefore, traveling time and availability of parking were critical factors for locating the college on this site.

The initial master plan for the college anticipated that enrollment at Kitchener campus would be capped at 6000 full time students. “Factors supplied by OISE and based upon U.S Colleges suggest that a site acreage of 144 is sufficient to support a commuting population of about 6000 persons.”⁶ Although the same source recommended ratio of 1 car to 1 student for parking capacity, given the size of the land, the master plan considered the ratio of 2 cars to 3 persons as a more appropriate ratio. In the phasing plan, all core facilities were sized for the

6 *Conestoga College One.*(Report, Conestoga College Archive and College Documents, Kitchener, ON, 1967), 89-90.



Fig.7-Aerial photograph of the site in 1967



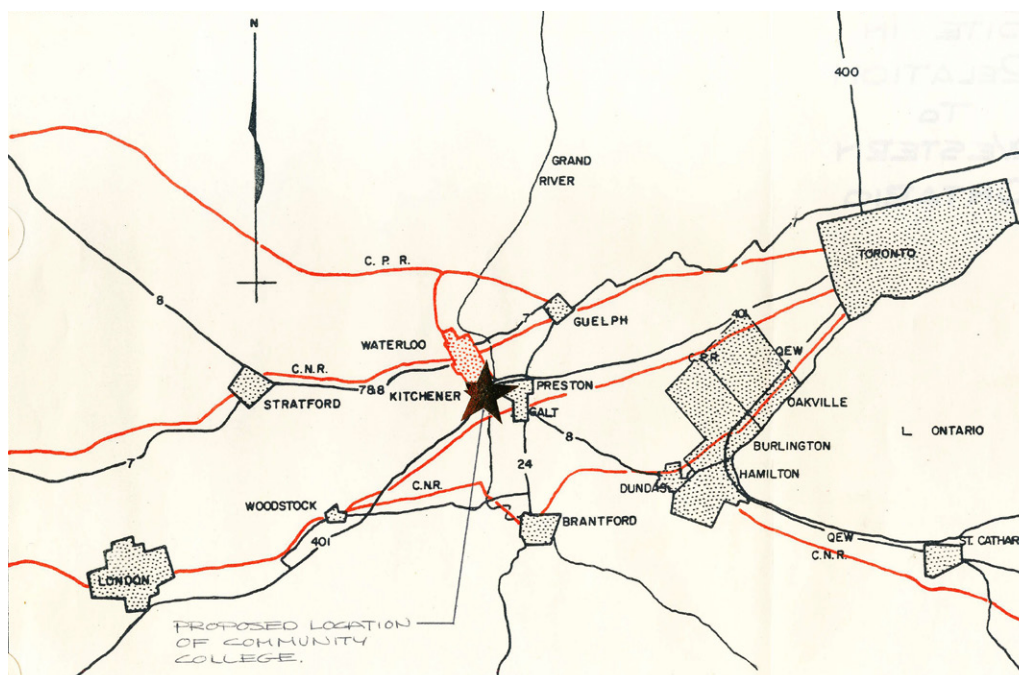


Fig.8- Map showing the proposed location of the college in relation to network of roads in 1967

maximum of 6000 students. It was recommended that if the population of the school exceeded 6000 full time students, auxiliary campuses be built. The site had two distinct landscape features, a dense stand of trees near the center of the site, and a depressed pond near the highway's edge. These two features were preserved and became the defining figures for the placement of the buildings.

College Demographics

Today, Conestoga College is one of the fastest growing campuses in Canada. As of September 2016, the college serves approximately 12,000 full time students, 30,000 part-time students, and 3,000 apprentices. In the past five years alone the full-time enrollment has increased by more than 22 percent, and it is forecasted to grow to an additional 16 percent by year 2018. This growth is attributed to an increase in the region's population and international applicants. The college has changed significantly since its conception. The programs that are offered are no longer limited to apprenticeships and diplomas; the college also offers bachelor degrees and graduate certificate programs. Conestoga has established partnership agreements with local and international institutions, and industry leaders in order to provide the students with opportunities for field and clinical experiences, international exchange programs, and applied research.

Overall, the objective of the college remains to be career focused education and training to meet the current and emerging needs of the community. More than 50 per cent of adults in the tri-city of Cambridge-Kitchener-Waterloo have used the services of Conestoga College for education and career advancement.



Fig.9- Diagram showing college demographics based on 2015-2016 enrollment

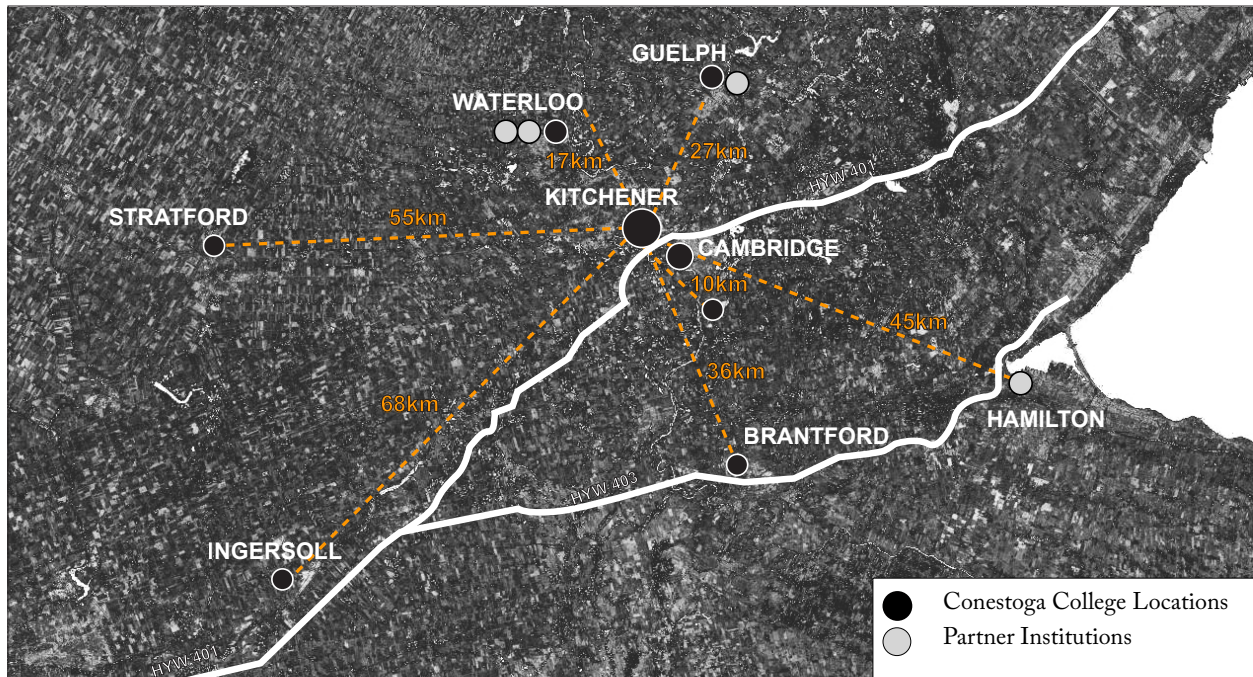


Fig.10- Network of Conestoga campuses and partner institutions

Also, it is estimated that the college contributes to more than \$1 billion to the local economy each year. The Kitchener campus, referred to as Doon Campus, has been the headquarters of the college for 48 years. Other campuses, in form of smaller buildings, have been established across Area 14 to provide educational opportunities to the larger community. In 2011, Conestoga College established the Cambridge campus on the east side of Highway 401, across from the Kitchener campus. The campus now straddles the highway just nearby an interchange. While one half of the campus resides in the legal boundary of Kitchener and the other half in Cambridge, the urban domain of the college is much greater and less discernible.

City of Enclaves

Historically, urbanization has been the process of territorial management and reproduction of labor force. In *The Possibility of Absolute Architecture*, Pier Vittorio Aureli explains that the Roman Urb was motivated by an economical and militaria logic, where through the expansion of the grid infrastructure, alien lands could be territorialized for trade and conquest. In a similar manner, the shape of the contemporary city is a direct result of economical processes.

The post-war transformation of the labor market by telecommunication technologies and the economic stimuli through housing construction and automobile



Fig.11- Map of catchment area for Kitchener and Cambridge campus

ownership, gave rise to a particular shape of urbanization. The sprawling megalopolis is characterized by infrastructural networks, which facilitate the flow of goods, capital, people and information, and dispersed autonomous enclaves. Conestoga College is one of the many closed enclaves that define the megalopolis of Western Ontario. Cul-de-sac subdivisions, corporate plazas, golf courses, parking lots, and shopping malls are the typical enclaves of the territory.

The spatial form of the contemporary city collapses some of the social characteristics of the pre-war gridded city. In his seminal book, *Ladders*, Albert Pope argues that the grid is a simple tool for urban management, yet it has the precondition to cultivate complex relationships due to its permeability. A set of points on a grid are connected by multiple circulation routes and itineraries. However, in the contemporary city, the dispersed organization of enclaves have eroded the permeable grid. These enclaves are typically connected by impermeable linear routes, which Pope calls ladders as an antithesis to the grid. A set of points on a ladder are only connected by a single route, offering a closed itinerary. While the grid was open, centrifugal, explosive and inclusive, the ladder is closed, centripetal, implosive and exclusive.

The enclaves of the contemporary city have dissolved the gradual thresholds between public and private space. They operate on the principle of total separate-

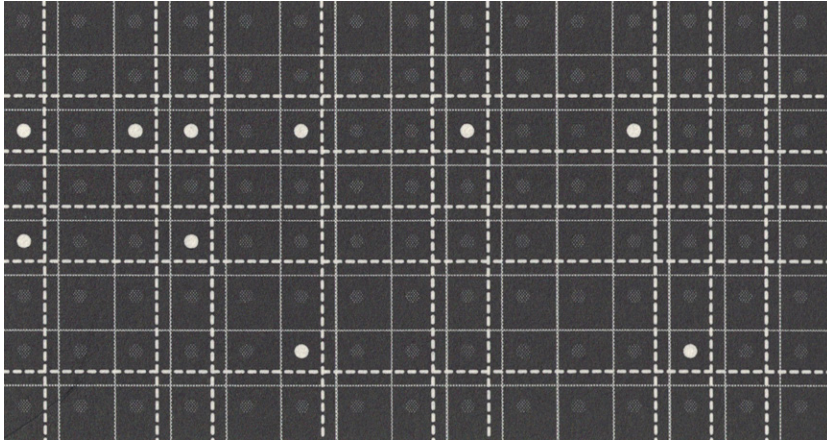


Fig.12-Ten points on a grid

A group of ten points on a grid can be interconnected via several different routes. Grids are open to diverse and complex associations due to their open patterns of movement

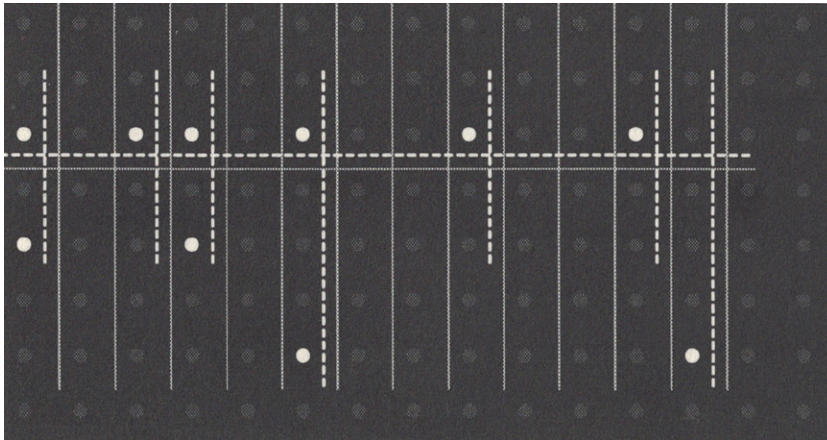


Fig.13-Ten points on a ladder

A group of ten points on a ladder can only be interconnected via a single route. It therefore constitutes a closed system and a prescribed itinerary

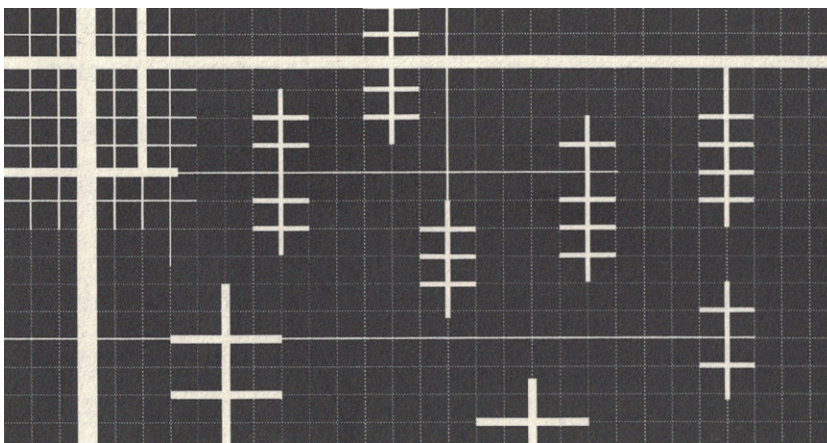


Fig.14-Centripetal ladders

Centripetal ladders, mark the post war urban growth and the decline of single center city, these ladders are encircled by the interurban freeway separating and connecting them at simultaneously.

ness. These enclaves are separated by substantial buffer zones and high speed infrastructure. While the enclaves of the pre-war city, such as monasteries, were separated from an outside urban form, the enclaves of the contemporary city, such as Conestoga College, are one and the same with the surrounding space. Thus, the contemporary city is characterized mostly by the primacy of space rather than form.⁷ The overwhelming amount of formless space dwarfs most architectural gestures and prevents architecture from becoming a device for separation and orientation. Pope further explains:

With the post-war decline of open urban systems, the possibility of forming a heterotopia or countersite has diminished. ... To state the obvious, when everything is countersite, there are no countersites- no alternatives to the predominant social arrangements represented by the principal mode of urbanization.⁸

This comparison provides a useful background for discussing the gradual loss of political constituency in the contemporary city. Aureli argues that there is a phenomenological correlation between the architectural form and political engagement. He notes: "The very condition of architectural form is to separate and to be separated."⁹ This means that form, by act of separation, allows for legibility of conflicting parts and provides the precondition for social and political discourse.

The rupture in the dialectic of form and space is even further deepened by the widespread implementation of information and communication technologies. The city is no longer tied together by functions that are instituted in fixed places; instead, it is mostly connected by lines of communication and transportation. These lines unite, but they also sever and disconnect. They induce a new type of space that becomes the host for multiplicity of movements and exchanges. Manuel Castells employs the term *space of flows* to describe this space. By blurring geographic connections and time sequences, the space of flows allows multiple functions to occur simultaneously. Conversely, the functions and social activities of *space of places* are constructed and contained within physical locations. By delivering functions faster and easier, the efficiency of space of flows has quickly overshadowed the efficacy of space of places.

The contemporary city is the resultant of the complex relationship between space of flows and space of places. The most dominant functions of urban governance are essentially organized around space of flows. However, so long as the human body will retain its physical form and perception, the space of places will not be entirely dissolved. Also, space of flows has a physical dimension; flows operate to and from specific places and require material infrastructure. Therefore, the resulting spatial patterning of the contemporary city is characterized by the simultane-

7 Pope, 3-9.

8 Pope, 181.

9 Pier Vittorio Aureli, *The Possibility of an Absolute Architecture* (Cambridge, Mass.: MIT Press, 2011), iv.



Fig.15-Axonometric map showing the context as agglomeration of fragmented development



ous dispersion of fragmented enclaves and concentration around nodal centers of command and control in a few locations. The nodes play an important role in the flow and transfer of information, capital and power.

In the contemporary city, while there are strong global connections to functional networks, many local ties weaken and disappear. Castells argues that due to rapid urbanization and global migration, the contemporary city no longer subscribes to a dominant urban culture; instead, it is composed of limited yet distinct cultural identities. Castells explain this phenomenon in terms of urban patterns:

It is this distinctive feature of being globally connected and locally disconnected, physically and socially, that makes mega-cities a new urban form. A form that is characterized by the functional linkages it establishes across vast expanses of territory, yet with a great deal of discontinuity in land-use patterns. Mega-cities' functional and social hierarchies are spatially blurred and mixed, organized in retrenched encampments, and unevenly patched by unexpected pockets of undesirable uses. Mega-cities are discontinuous constellations of spatial fragments, functional pieces, and social segments.¹⁰

That is to say, the perpetual cycle of fragmentation and disconnection exacerbate cultural segregation and exclusivity. From the breakdown of communication between individuals and communities emerges defensive spaces. Driven by fear, these spaces, such as gated communities and private clubs, are designed to segregate and exclude. Accessible public space also becomes a scarcity. In the absence of sidewalks, parks and plazas, corporate enclosures (i.e., malls, theme parks, and atria) are often cloaked as urban centers and public spaces. However, these spaces also operate as closed and impermeable enclaves. Unable to share common cultural codes, communities are typically organized around housing units and celebration of private life.

The spatial qualities associated with the contemporary city has substantial political consequences. Citizenry demands space for diversity and engagement. Without friction and congestion citizenry is hard to achieve. In his critique of the 2006 American housing market crash, Ole Bouman writes:

The concept of truth needs togetherness. ...when cities begin to dissolve, when people move to the suburbs to pursue their personal happiness, when communities are dispersed in endless sprawl, truth is no longer guaranteed. On the contrary, one can witness the revival of untruth, of myth, of false assumptions, of brainwashing and scapegoating ... Truth needs density, strangers and a competition of ideas.¹¹

10 Manuel Castells, *The Rise of the Network Society*, 2nd ed., with a new pref. ed. (Chichester, West Sussex ; Malden, MA: Wiley-Blackwell, 2010), 436.

11 Ole Bouman, "Truth or Suburbia," *Volume#9: Crisis! what Crisis? Suburbia After the*

According to Bouman, lack of relationship to context and others results in the loss of truth. The sprawling expansion of the contemporary city, disperses and separates the masses over a large area. Without friction, or points of reference, people, often unknowingly, fall prey to false assumptions, self-righteousness and self-deception.

Alexander D'Hooghe, the director of MIT Center for Advanced Urbanism, also examines the problem of mass estrangement in his study of the American suburbs and exurbs, which he refers to as the *Grey Goo*. He accurately articulates the relationship between the physical space and the mental disorientation experienced in suburbia:

The disconnection from the material world results, amongst others, in a sense of disorientation. This is again not only a psychological term, but also a spatial, even territorial concept, and therefore its treatment falls within the bounds of urban design and architecture. In the *Grey Goo*, there is no common mental map- each citizen has its own few 'known' and familiar trajectories ... Orientation is based on the possibility to decipher figures onto which one can project meaning. In the absence of such finite forms, there is only an endlessly continuous empty space.¹²

This permanent state of emptiness and blankness is an index for the disappearance of citizenry and political constituency. In the absence of formal gestures, which would articulate the differences and provide communal orientation, anxieties heighten and opinions are formed solely through one's own myopic vision.

The absence of strong formal gestures in the contemporary city emerges from a post-war ideology. Monumentality is negatively associated with authoritarianism and fascism. Based on the binary oppositions of capitalism/communism, there has been a misunderstanding that non-hierarchical planning promises democracy. Meanwhile, the contemporary city is far from that ideal. Local enclaves are increasingly controlled by global networks, at the detriment of their own local agency.

The global dominance, which is instituted by space of flows, is not easily discernible on a local level. Despite its physical durability and the global prevalence, infrastructure has the tendency to hide in plain sight; therefore, it is an ideal apparatus for political and economic dominance. Keller Easterling, an architect and a leading urban theorist, has intensely examined the role of infrastructure in the global polity. Easterling writes: "Some of the most radical changes to the globalizing world are being written, not in the language of law and diplomacy, but in

Crash 9 (December, 2006), 12.

12 Alexander D'Hooghe, "Monument Or Armageddon," *Volume#9: Crisis! what Crisis? Suburbia After the Crash 9* (December, 2006), 46-47.

the language of infrastructure.”¹³ The definition of infrastructure is not limited to the physical networks of transportation, communication and utilities, it also includes the structures of financial systems, management protocols, international standardizations, and proliferation of generic architectural objects. Contrary to what the name suggests, infrastructure is no longer the substructure of the city. In fact, it has become a superstructure shaping contemporary urbanism.

Rules of Engagement

Statistics demonstrate that due to automated agriculture processes and shifting of economies, the urban population is rapidly increasing. It is now clear that much of this growth will occur in the constellation of low density exurban areas. In 2013, over 66% of all Canadians were living in suburban and exurban areas.¹⁴ While criticism of this meaningless proliferation is certainly not in short supply, it appears that the contemporary city is irredeemably subject to the global flows of power and capital. The space of infrastructures as a system of communication and management, is indispensable to human processes and vital to economies. It is a leviathan that cannot be tamed with strategies of rejection and revival of pre-war urban models. However, it is important to note that while dominant processes are organized and managed in the space of flows, a complete obliteration and dematerialization of space of place will never transpire.

Functions maybe efficiently transcoded in space of flows, but everyday activities and social meaning have phenomenological roots in space of places. During the past few decades, since the dawn of the contemporary city and telecommunication, it has been proven that spatial transformation is more complicated than the simple logic of efficiency and flow. According to Castells, technological networks are flexible and adaptable structures that can become appropriated by different influences and conditions. Networks are often asymmetrical and variable. Historical specificity, local activities and concentration of actors can privilege certain nodes. These nodes can become switches on a network, capable of redirecting or suppressing flows. The characteristics of privileged nodes are determined by their function and flexibility. Examples include financial centers, research hubs, highway interchanges, hydrological dams, and transit terminals.

A network consists of many interconnected nodes, of which most are redundant. Redundant nodes are connected and in-communication, however, they are inconsequential and can be bypassed by the network. By this definition, much of the contemporary city is inconsequential to the overall function of the whole. Castells argues that large sections of world’s population are not repressed by force but rather by being ignored and reduced to redundant producers or

13 Keller Easterling, "Fresh Field," in *Coupling: Strategies for Infrastructural Opportunism*, ed. Neeraj Bhatia and others (New York: Princeton Architectural Press, 2011), 10.

14 David Gordon and Mark Janzen, "Suburban Nation? Estimating the Size of Canada's Suburban Population," *Journal of Architectural and Planning Research* 30, no. 13 (September, 2013), 197.



Fig.16- Google map showing the campus as a closed enclave

devalued laborers.¹⁵ In this sense, the survivability of cities is dependent on their ability to connect to global networks, while providing multidimensional experiences rooted in regional specificity.

Historically, place based identity has been instrumental in preventing the decline of great cities in the face of technological revolutions and economical upheavals. Cities are enriched socially and politically by the integration and convergence of the two competing logics of flow and place. As Castells points out, the approach of integration may be the only measure to interrupt the patterns of spatial segregation and social exclusion in the contemporary city:

The dominant tendency is toward a horizon of networked, ahistorical space of flows, aiming at imposing its logic over

15 Castells, *The Rise of the Network Society*, 147

scattered, segmented places, increasingly unrelated to each other, less and less able to share cultural codes. Unless cultural, political, and physical bridges are deliberately built between these two forms of space, we may be heading toward life in parallel universes whose times cannot meet because they are warped into different dimensions of a social hyperspace.¹⁶

Castells addresses this challenge by saying that architecture and urban planning have the capacity to strategically reinstate social meaning in the networked society. Without resorting to kitschy representations of preindustrial cities, architecture could be used to mark privileged nodes of communication and transportation. As a critical expression of identity and social life, these nodes can reveal the technocratic nature of infrastructure, and provide grounds for spontaneous interaction and communication between local actors.

The writings of Pope, Castells, Aureli and Easterling provide a useful theory for the understanding of the contemporary city. The authors convey in different tones the same strategy of counterbalance and recombination instead of denial and condemnation. Pope and Aureli argue that the problem of sameness in the sprawling city should be addressed with the reemergence of the dialectic between space and form. Pope points that the dialectic between form and space still remains operative, albeit the weight has shifted towards the primacy of space. Nevertheless, built form, as a subordinate, is capable of engaging the space of the contemporary city. However, unless designers accept the privileged position of space, it is impossible to use form effectively as a response. Easterling looks through a long-focus lens to analyze how infrastructure is implemented on a large scale. Easterling equates the mechanism of infrastructure to that of a software that operates as a formula. Easterling encourages architects to hack into the operating software and act as switches or multipliers to establish new parameters and relationships.¹⁷ While it is impossible to take total control of the system, active forms can be inserted or manipulated to counterbalance the disposition of the system.

Energizing Transportation Infrastructure

With the growing expansion of the suburban periphery, road infrastructure is no longer a space in between. It has inadvertently become a protagonist figure in the collective experience of the contemporary city. From this point of view, transportation infrastructure can become a public object with cultural significance. High speed transportation infrastructure presents an interesting paradox. Unlike telecommunication, the experience is not a virtual one. The road has a static presence as an urban object. It can also provide a fluid experience of time and space as it accelerates movement at varying speeds and approaches moving and static objects simultaneously. Thus, the experience of driving on a road is cinematic and

¹⁶ Castells, *The Rise of the Network Society*, 459.

¹⁷ Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London ; Brooklyn, NY: Verso, 2014), 80.

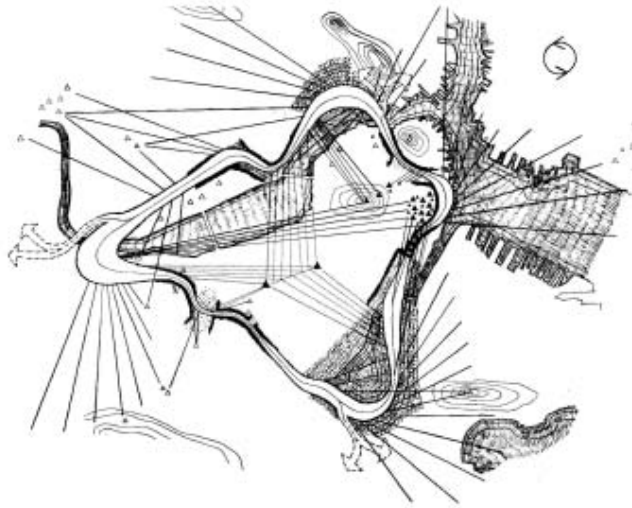


Fig.17-Diagram of visual experience on the Northeast Expressway in Boston

it is relative to the subject.

Kevin Lynch, Donald Appleyard and John Myer's seminal work, *The View from the Road*, investigated how the road can provide a cinematic narrative of the city. By strategically positioning the trajectories of the road and focusing the perspective of the driver on a sequence of monuments, they punctuated the experience of the road and engaged the faculties of perception and memory. The authors sought to make driving into a collective cultural experience. However, this study was limited to the experience of the driver and was not concerned with the view of the road, and its spatial implications.

One of the early attempts at the articulation of the relationship between urban form and urban infrastructure, is Louis Kahn's Philadelphia traffic studies. These diagrams show the integration of public space with transportation infrastructure. Kahn compared the highway to a medieval fortified wall, protecting the historical urban core from the invasion of automobiles. He proposed series of transfer stations and parking towers at ramps and interchanges. He imagined that the infrastructure would simultaneously distribute urban flows and create a vibrant node of public activity.

Examples of architecture and urbanism integrating the space of flows with space of place can also be seen in the works of Rem Koolhaas. He looks for techniques that converge the sedentary nature of the city and the fluid nature of infrastructure. Koolhaas writes:

If there is to be a “new urbanism” it will not be based on the twin fantasies of order and omnipotence; ... but about discovering unnameable hybrids; it will no longer be obsessed with the city but with the manipulation of infrastructure for endless intensifications and diversifications, shortcuts and redistributions – the reinvention of psychological space.¹⁸

Koolhaas recognizes that urbanism is irreversibly subject to the space of flows and it can only be resuscitated by finding new expressions of social meaning in that very space. One model of such conflation is the master plan for Euralille. In 1989, OMA attempted to make the declining city of Lille into a bustling transportation hub. Euralille consisted of several program elements (e.g., park, offices, residences, hotels, shops and congress hall) at the junction of high-speed train lines to Paris, London, and Brussels. The development spanned over 120 hectares of land, transforming the residual space of the periphery into a privileged node. The master plan took advantage of the geographical location of Lille and by simulating congestion and friction, Euralille was to become the center of a megalopolis. The early sketches of the master plan capture the complexity of a hybrid infrastructure by making connections and congestion emphatically visible to the point of exaggeration.

Conestoga as a Privileged Node

The campus of Conestoga College emerged from a logistical process of urbanization. The placement of the campus at the center of population density and convergence of transportation infrastructure is a testament to the managerial impetus of the post-war city planning. The campus is the product of an infrastructural formula that has shaped contemporary cities around the world. Nevertheless, the campus of Conestoga College has an untapped potential to become a privileged node of civic importance for the Tri-cities area.

Functionally, Conestoga College already plays a leading role in the economy and education of the area. With the expansion of the college across the highway, in Cambridge, the campus will become more densified and influential in the megaregion of Western Ontario. Highway 401, is arguably one of the busiest highways in North America and it is instrumental in providing access to the college. However, the college is completely hidden from the road and is reduced to a signage placed along the highway. In addition, the Walter Bean Trail, which follows the Grand River through Waterloo, Kitchener, Cambridge, Woolwich and North Dumfries, abuts the campus and should be considered as an integral part of the region's pedestrian and bicycle network. Furthermore, the city of

18 Rem Koolhaas et al., "Whatever Happened to Urbanism," in *Small, Medium, Large, Extra-Large*, 2nd ed. ed. (New York, N.Y.: Monacelli Press, 1998), 696.

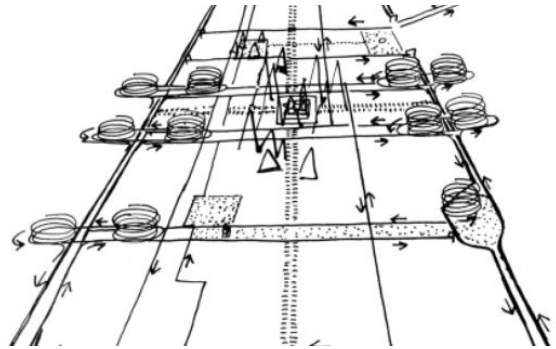
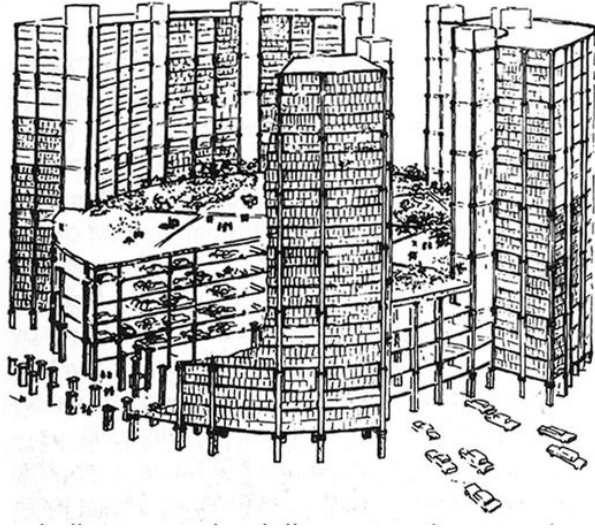


Fig.18-Louis Kahn's Philadelphia City Planning Traffic Studies, showing the integration of infrastructure and pedestrian urban space

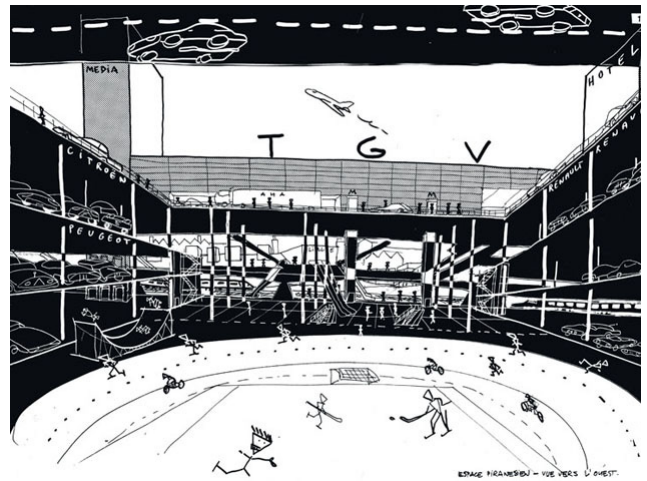
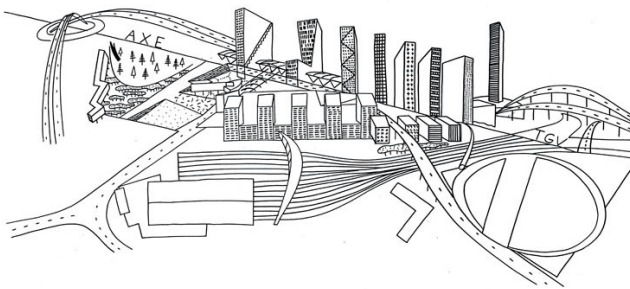


Fig.19-Rem Koolhaas, Euralille master plan, 1989, showing the nodal space of transit and communication as an architectural expression of space of flows

Cambridge has proposed a partnership with Conestoga College to build a new sports multiplex on the campus. The proposal has been met with controversy, however, the integration of the two institutions presents opportunities for social and economic synergies. Aside from the economical savings on site acquirement and servicing, the partnership would justify the expansion of public transportation and future developments in the area. The partnership between the two institutions could provide a platform for efficient use of site infrastructure (parking, roadways), integration of curriculum and services (culinary, childcare), partnership with private enterprise (retail, health services), and provision for civic legibility that is absent in the territory.

The campus is a point of convergence of many paths and flows. It is a field subject to many lines. These lines can be physical, mental or legal. Some are disjunctive, as they delineate or obstruct, such as the highway's edge or the cities' legal borders. Others are connective, as they provide links to institutional and transportation networks, establishing trajectories between departure and destination nodes. The intersections of these lines provide opportunities to articulate complexities and create a legible identity.

In this thesis, I argue that Conestoga College has an immense potential to monumentalize a node of communication and public interaction as a counterbalance to the uncharged space that surrounds it. Conestoga College and its library can be reconfigured to address the disconnections of the contemporary city and unlock the productive potentials of the site. Since the failure of modernist utopias for the contemporary city, the typical response of architects has been refusal and abandonment of suburbs and exurbs. The primacy of space over form has been deemed paralyzing, therefore causing architecture praxis to disengage from the territory and to surrender it to politicians, developers, planners and financiers. The suburban population, dispersed and segregated, face estrangement, disorientation and, political indifference. In this climate, architecture must manipulate infrastructure to create a local identity and build bridges between two spatial logics flow and place.

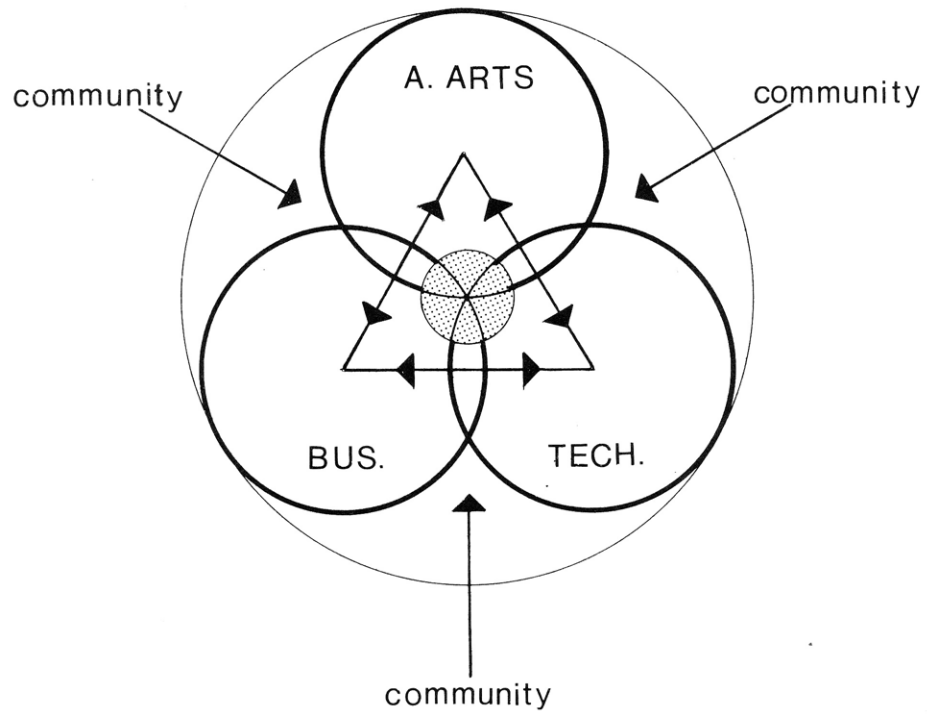


Fig.21-Concept diagram

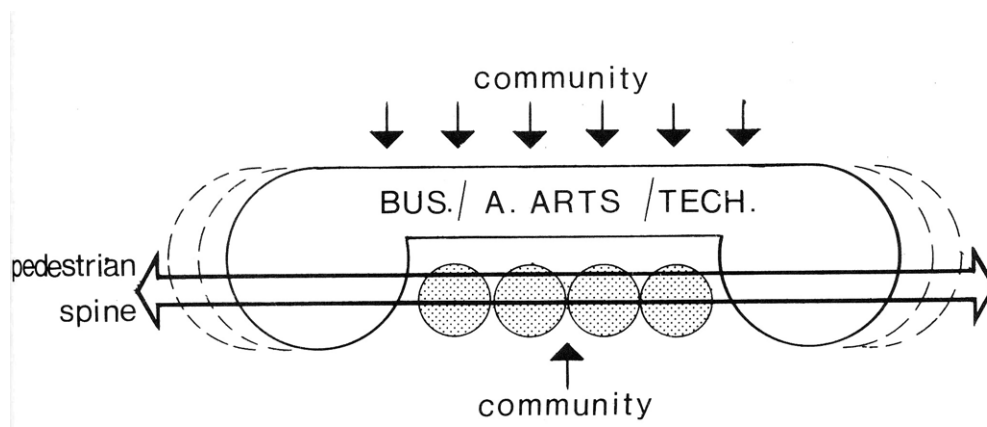


Fig.22-Concept diagram applied to the site

2| CONESTOGA COLLEGE CAMPUS

Conestoga College was initially conceived and built between 1964-1968. During this time, major education and social reforms were taking place in North America and most of Europe. Following the economical prosperities of World War II, public education became synonymous with the aspirations of upward mobility and national prosperity. While the urban development was particularly characterized by the aspiration of the individual, the post-war education reform emphasized the notion of community. In his discussion of post-war education reform, Stefan Muthesius explains: "Educational institutions were prime candidates to inculcate the new intensified postwar sense of community in the citizens. In order to achieve this, it appeared plausible that the educational institution itself should be an ideal community."¹ Therefore, 1960s marked an extraordinary period for campus planning where architects attempted to realize the utopian vision of a learning community.

In 1964, a new category of post-secondary education was established under the administration of Ontario's Ministry of Education. The Colleges of Applied Arts and Technology (CAATS) were mandated to "offer programs of instruction in one or more fields of vocational, technological, general and recreational education and training in day or evening courses and for full-time or part-time students."² The ultimate goal of these colleges was to offer career training and continuing education which would purposefully support the economical and social development of local communities.

1968 Master Plan

The 1968 Conestoga College master plan implemented the philosophies that emerged from the post-war educational reform doctrine. The following three quotations are from the 1968 master plan. They convey the impetus behind the design of the campus. Like many postwar campuses, Conestoga's Board of Governors and the design team expressed the need for self-actualization, interdisciplinary planning, and flexibility in order to meet the growing and changing needs of higher education.

1 Stefan Muthesius, *The Postwar University: Utopianist Campus and College* (London: Yale University Press, 2000), 4.

2 Future Goals for Ontario Colleges and Universities: Discussion Paper, publication, Ontario Ministry of Education and Training (Toronto, ON: Queen's Printer, 1996),3, accessed September 20, 2016. <http://www.tcu.gov.on.ca/eng/document/discussi/postdeng.pdf>

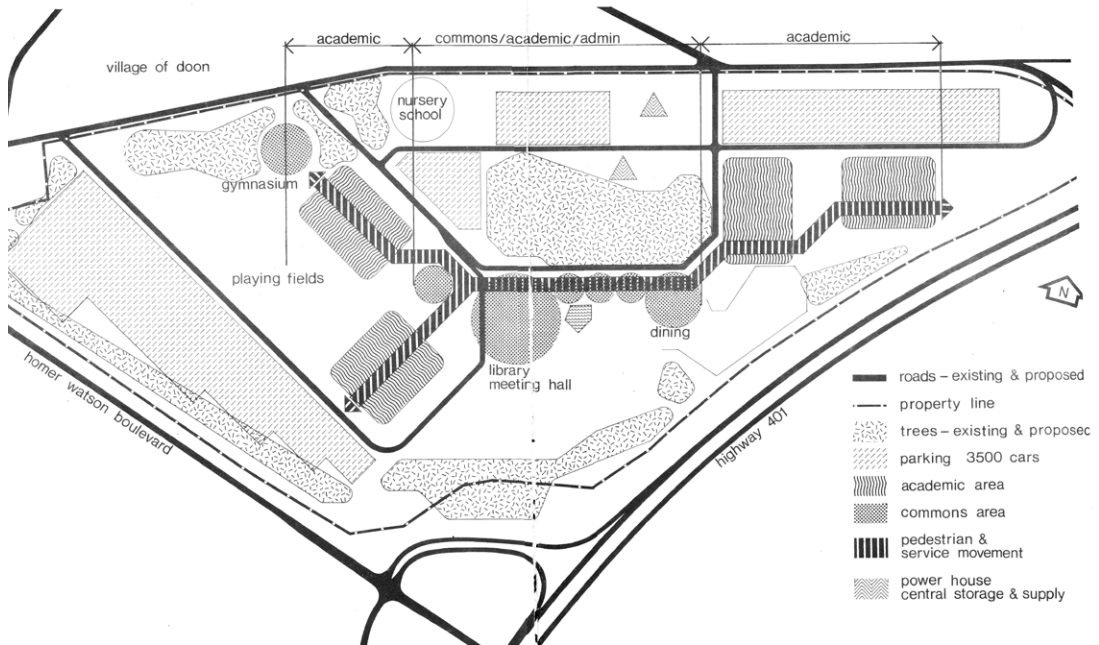


Fig.23-1968 master plan showing program organization

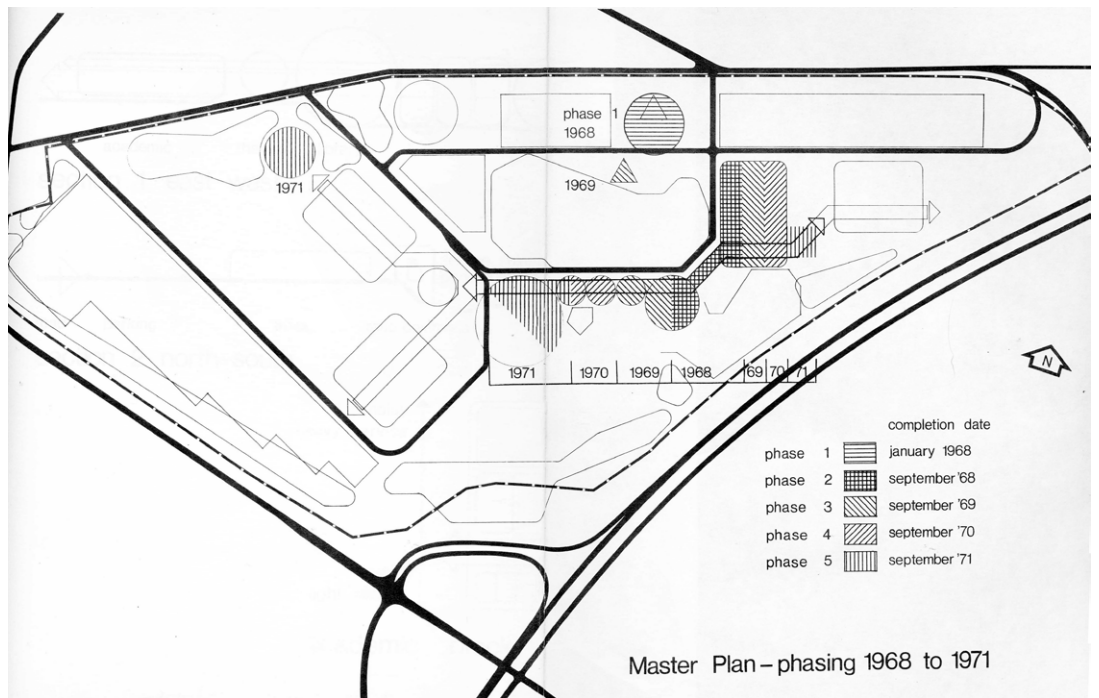


Fig.24-1968 master plan showing phasing

The smallest important unit within the college is the single individual, whether student or staff. The individual student should feel he [sic] has a “place” in the student body even when enrollment reaches several thousand...The college must be able to permit him [sic] to follow his own personal destiny.³

Interaction between groups of different disciplines within the college should be fostered wherever possible. Communication should be optimized not only between students in different areas of endeavor, but between students and faculty, faculty and faculty, and students, faculty and the community.⁴

The only certain aspect of the future is change. This a basic result of technological advance and if our present-day society and social demand. Technologies are dynamic, demanding and self-proliferating-- what is new today is soon obsolescent-- what is unknown to-day is known tomorrow. The key, therefore, in the implementation of our philosophy is maintaining flexibility in every possible way.⁵

Consequently, to nurture the development of the individual and to foster the communication between units and departments through an interdisciplinary model, the design team planned a megastructure campus. To plan for the unpredictable growth and change, all functions were placed along a single interior pedestrian street, also referred to as *the spine*. The implementation of the spine as an organizing tool would ensure intermingling of students, allow easy access to the common areas, and enable gradual expansion over time. Figures 23 to 26 illustrate how the initial concept was applied to the site and the building plan.

The campus was designed as a single-story building, except in the middle where common facilities such as the central mechanical plant, library, dining, and the student commons would be accommodated in four stories. The location of the common spaces was also considered through the section, where the natural fall in the landscape would open up the building to the most attractive feature of the site, the pond. The north south section shows the relationship of the building to the highway, the pond and the forest. (Figure 26)

While the initial master plan was still in development, the first group of students attended classes in portable classrooms located north of the forested area. This area is marked as Phase 1 on the phasing plan (Figure 24). The construction of the permanent campus began in Phase 2. The master plan was to be implemented in series of phases, providing the flexibility to reevaluate new needs and to adjust accordingly. It was anticipated that the college would not grow more

3 *Conestoga College One*. (Report, Conestoga College Archive and College Documents, Kitchener, ON, 1967), 74.

4 *Ibid*, 1.

5 *Ibid*, 3.

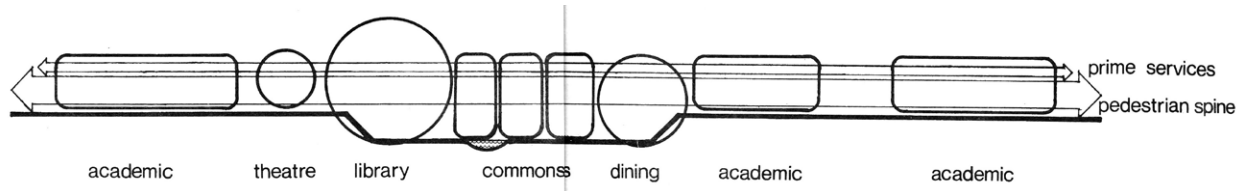


Fig.25-1968 master plan section 1-East West

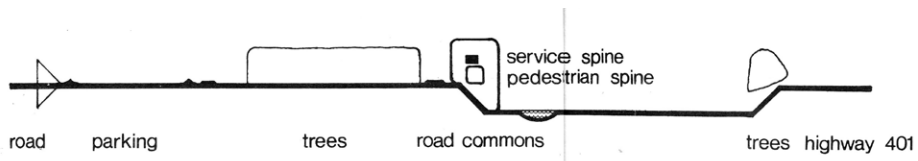


Fig.26-1968 master plan Section 2-North South

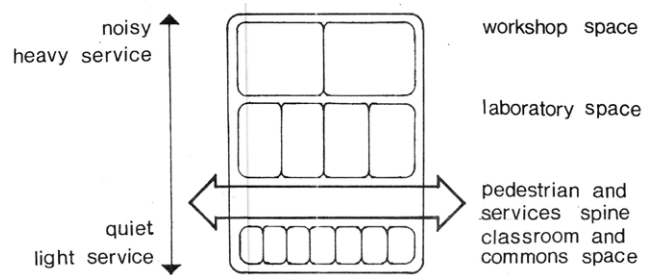


Fig.27-1968 master plan academic block plan

than six to seven thousand students; and ultimately all parts of the college would be within a ten-minute walking distance⁶. The central pedestrian spine would connect all the department with a single route. It was expected that a sense of community would be reinforced by the spontaneous encounters in the *street*. The master plan drawings and writings articulate that the design was essentially governed by the logic of circulation.

Cybernetics in Campus Planning

The 1968 Conestoga College master plan is emblematic of the postwar ideology that shaped institutional ideas and the architecture and planning theories of the time. During WWII, the concept of cybernetics was used in radar tracking systems. It was intended to immediately calculate input and to predict responses of opponent's pilots.⁷ Cybernetics is generally described as the field of study concerned with communication and control systems in living organisms and machines.⁸ Cybernetics brought forth an intellectual revolution which involved understanding of living and technological systems through the understanding of communication process between individual units and the prediction of feedback loops. Following the war, these cybernetic concepts not only surfaced in the military applications of cold war, but they also found widespread applications in other fields of study such as social sciences and information technology. The post-war optimism was in part facilitated by cybernetics and the new-found confidence in technology.

Architects also attempted to introduce the concepts of cybernetics into the architecture discourse. With regards to campus planning, architects took a systematic approach to spatialize the ambitions of education reform that was based on the realization of community through the interaction of individuals. Community was therefore interpreted as communication. Instead of grand campus lawns and monumental piazzas, the corridor became the symbol of community. Each student was perceived as a node in a network of communication. Through the serendipitous communication of nodes in the circulation space, social life was expected to be strengthened. Many architects sought to systematically plan social interactions and incorporate flexibility by applying the logic of an indeterminate network. Diagrams stressing linkages and connections propagated among architects. These sociograms were also reminiscent of Paul Baran's diagram of Distributed Communications. One of the ways these sociograms were implemented was through the design of the spine campus.

6 Ibid, 90.

7 Mary Lou Lobsinger, "Cybernetic Theory and the Architecture of Performance," in *Anxious Modernisms: Experimentation in Postwar Architectural Culture*, eds. Sarah Williams Goldhagen and Réjean Legault (Cambridge, MA: The MIT Press, 2000), 119-139.

8 "cybernetics, n.". OED Online. September 2016. Oxford University Press. <http://www.oed.com/view/Entry/46486?redirectedFrom=cybernetics> (accessed September 13, 2016).



Fig.28-Socio-diagram by C. Perrow, from *Complex Organizations*, 1979

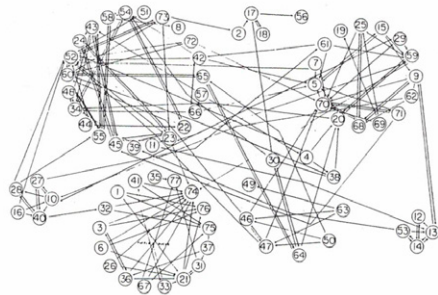


Fig.29-Socio-diagram by J.L. Moreno. Relationships between the inhabitants of Atiro and Pueblo Nuevo, 1949

Fig.30-Socio-diagram by Alison Smithson and Peter Smithson, *Appreciated Unit*, 1968

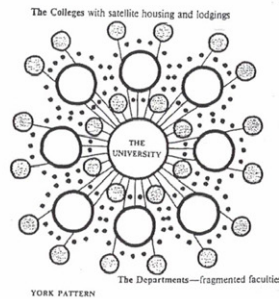
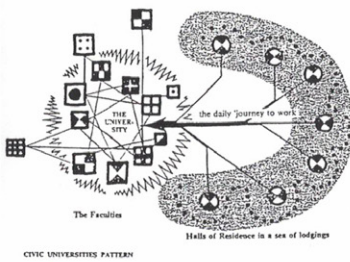
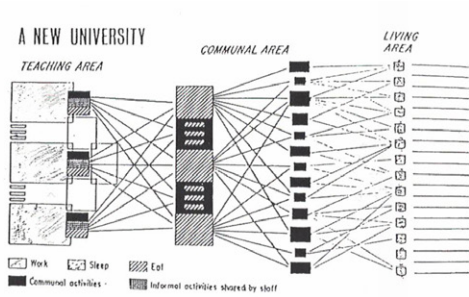
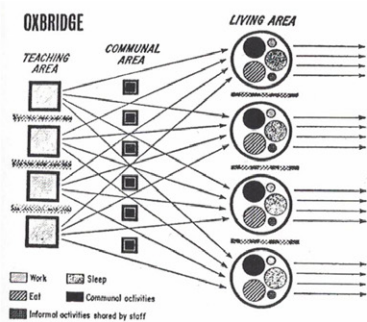


Fig.31-Diagrammatic representation of the functioning of various types of universities by Peter Marris, *Halls or Digs for Students?*, 1962

In the 1960s, architects and planners put a great emphasis on the sociodynamics of institutions and communities. The socio-diagrams abstract the location of network nodes and linkages.

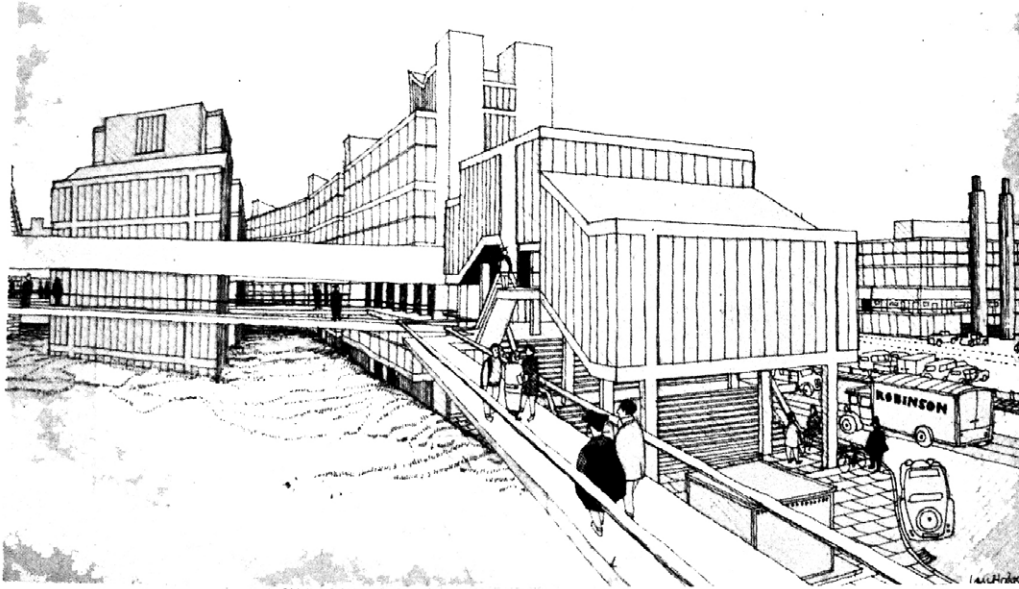


Fig.32-Smithson' proposal for Sheffield University, 1953, The sketch highlights patterns of pedestrian movement as a unifying element for growth and change

The Spine/ Megastructure Campus

One of the early versions of the spine campus was Alison and Peter Smithson's 1953 competition entry for Sheffield University. The Smithsons had designed a campus with an exterior circulation path which campus buildings could straddle. The scheme offered the possibility to reconcile the desire for growth and change while maintaining unity across the campus. The Smithsons wrote, "any building must establish a flow relationship with its sources of supply ... Their shape must not only be able to take change but should imply change."⁹ Given the association of the street as a place for continuous flow and contact, the Smithsons foregrounded circulation routes to imply the aesthetic of indeterminacy. The street would allow individual functions to enrich it without compromising their own freedom to change. The street became the symbol for an anonymous collective.

Conestoga master plan had also planned a central circulation route to control the overall function and growth of the campus. This was made explicit in the 1968 master plan:

The basis for acceptance of unpredictable growth and change, that is flexibility, is an enclosed pedestrian spine or street ... The pedestrian spine may be likened to the bones and struc-

⁹ Alison Smithson and Peter Smithson, "The Aesthetics of Change," *Architects' Yearbook* 8 (September, 1957), 14-22.

ture of a human body; the academic and social/common spaces may be likened to the flesh of the body supported by the bones. Unless supported by the bones, the flesh is useless.¹⁰

This biological analogy likens the campus to a living organism; such poetry implies that the campus is a living and growing system continuously adapting to new conditions. The collection of programs along the circulation spine, also echoes the prevalent attitude that rejected authority and hierarchies. The master plan not only suggests the breakdown of departmental hierarchies, but also the breakdown of hierarchies of individuals. The master plan states: "The role of the teacher is tending to change from instructor to advisor."¹¹ The designers had picked up on the rise of informal pedagogies and the breakdown of academic hierarchies; therefore, the campus design was to reflect and adapt to such thinking.

As with the Smithsons, the logic of space of flow and communication became the driver for the design of many other educational campuses in 1960s. Denys Lasdun's University of East Anglia (1963) and John Andrews' Scarborough College (1963) are two notable examples. In University of East Anglia, Lasdun separated the pedestrian circulation from the vehicular road with an exterior elevated walkway. In Scarborough College, Andrews integrated the spine as an interior street. Upper floors are also linked vertically by cantilevering and cascading balconies over the main spine. The design of both campuses argued that the spine would foster spontaneous encounters and opportunities for informal learning between students and teachers. Thus, circulation, communication and community would be achieved by an infrastructural logic applied to architecture.

Another application of the cybernetic logic to campus design is the Mat-Building. Similar to the spine, the mat is also motivated by the infrastructural logic of free flow of communication and exchange. While the spine is a single direction circulation, the mat is a modular two-dimensional grid with multiple corridors and intersections. The Free University of Berlin campus, designed by Candilis, Josic, Woods and Schiedhelm in 1963, is one of the best examples of the Mat-Buildings. This campus consists of two layers of modular grids, connecting different academic programs and exterior courtyards. The module is also regulated by the dimension of time. The grid is punctuated by intervals of 65.63 meters, which measures approximately a one-minute walking distance.¹²

The mat is above all the diagram of a generative process; it is intentionally not concerned with formal or compositional definitions. The system unifies different programs within a single, proliferating structure. In her analysis of Mat-Buildings Alison Smithson confirms:

Mat-Building can be said to epitomize the anonymous collec-

10 *Conestoga College One*, 73.

11 *Ibid*, 74.

12 Debora Domingo Calabuig, Raúl Castellanos Gomez and Ana Abalos Ramo, "The Strategies of Mat-Building," *The Architectural Review* (August, 2013), 86.

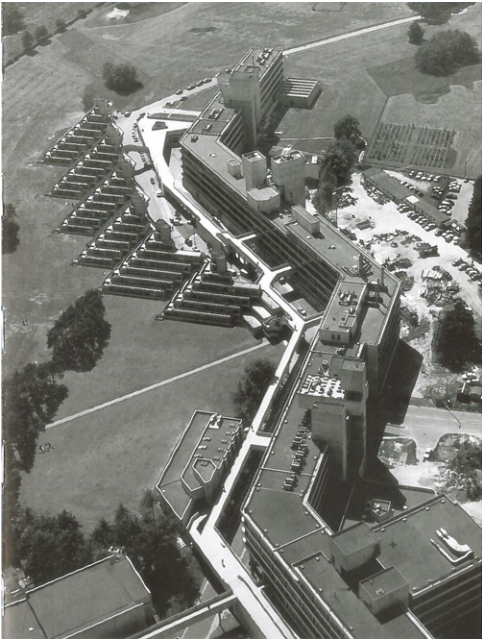


Fig.33-University Of West Anglia,1963. By Denys Lasdun



Fig.34-University Of West Anglia,1963. By Denys Lasdun

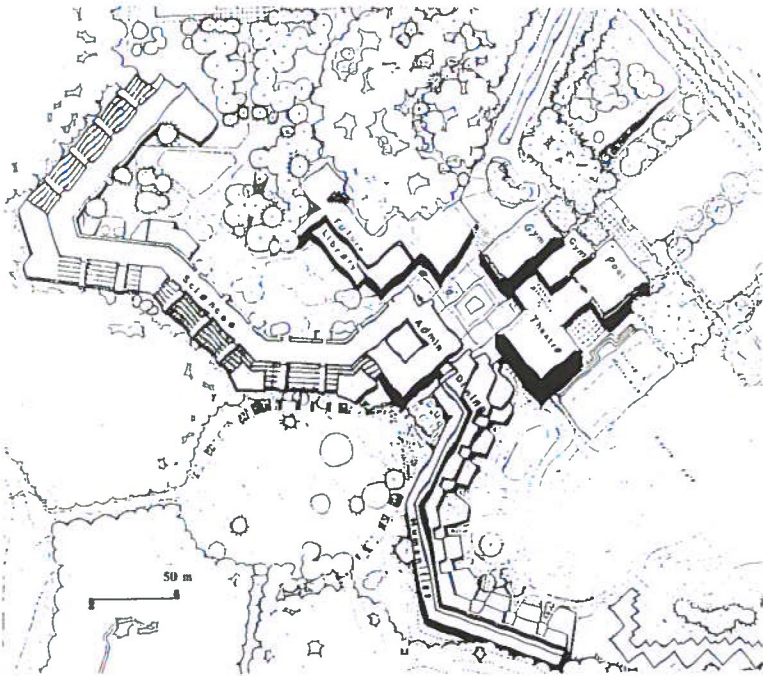


Fig.35-Plan of Scarborough College,1963.By John Andrews



Fig.36-Interior Corridor at Scarborough College

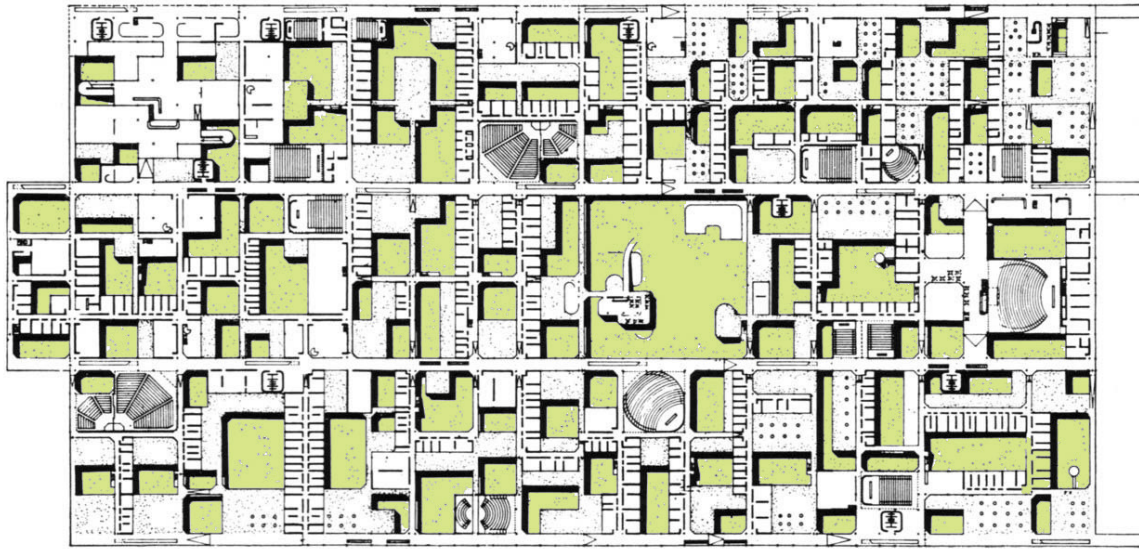


Fig.37-Original competition drawing for Free University of Berlin, 1963. Showing the literal translation of horizontal communication applied to the modular structure of the campus



Fig.38-2012 Aerial showing Free University of Berlin Campus and the new library by Foster + Partners

tive; where the functions come to enrich the fabric, and the individual gains new freedoms of action through a new shuffled order, based on interconnection, close knit patterns of association and possibilities for growth, diminution and change.¹³

Smithson's rhetoric regarding the freedom of the individual echoes the ideas that shaped the fragmented development of the post-war city. Similar to the disposition of the city, the mat building is characterized by a strong global unity and a weak local character. The Free University of Berlin was designed to be anti-hierarchical and anti-monumental. Similar concepts of the distributed network organizing the post-war city was applied to the design of educational campuses, under the false assumption that this approach would increase communication and reduce inequality.

Dissolution of Utopian Rhetoric

The design of the Free Berlin University was intended to facilitate continuous expansion using a modular system. The framework was thought to offer enough flexibility to accommodate a range of functions over time. However, after two more phases of development, the modular grid was finally abandoned and subsequent expansions were added as single buildings.¹⁴ The series of anonymous streets proved to be disorienting and lifeless. Unlike a city grid, each block lacked autonomy and form. The literal translation of horizontal communication across the campus did not result in intensified socialization.¹⁵ In the 2007 renovations, Foster & Partners addressed the monotony of sprawling internal streets by extracting parts of the grids, and inserting a hemisphere shaped library. Without overwhelming the original fabric, the library finally creates a much-needed focal point and orientation for the campus. Its architecture and form expresses the notions of community and collective identity, both to the inside and outside of the campus.

The spine, the mat and other mutations were based on the criteria of growth and circulation, but they made little connection to their surroundings. The perception of community was at best internal to the megastructure alone. The insular logic of these structures did not entertain other interception from the outside. These campuses were seen as isolated containers without any formal consciousness. In the case of the spine campus, such as Conestoga College, once the length of the circulation reached a critical distance, functions became too far from the center to constitute a well-functioning whole. Stefan Muthesius, explains the irony of the relationship between the links and the nodes of the campus:

A crucial new shift however, was increased stress on the links

13 Alison Smithson, "How to Recognize and Read Mat-Building. Mainstream Architecture as it Developed Towards Mat-Building," *Architectural Design* 9 (1974), 573.

14 Not including the campus library designed by Norman Foster and additional renovations in 2015 which were finally incorporated in the original module.

15 Muthesius, 276.



Fig.39- Aerial photograph showing University of Utrecht, Uithof campus in 1976

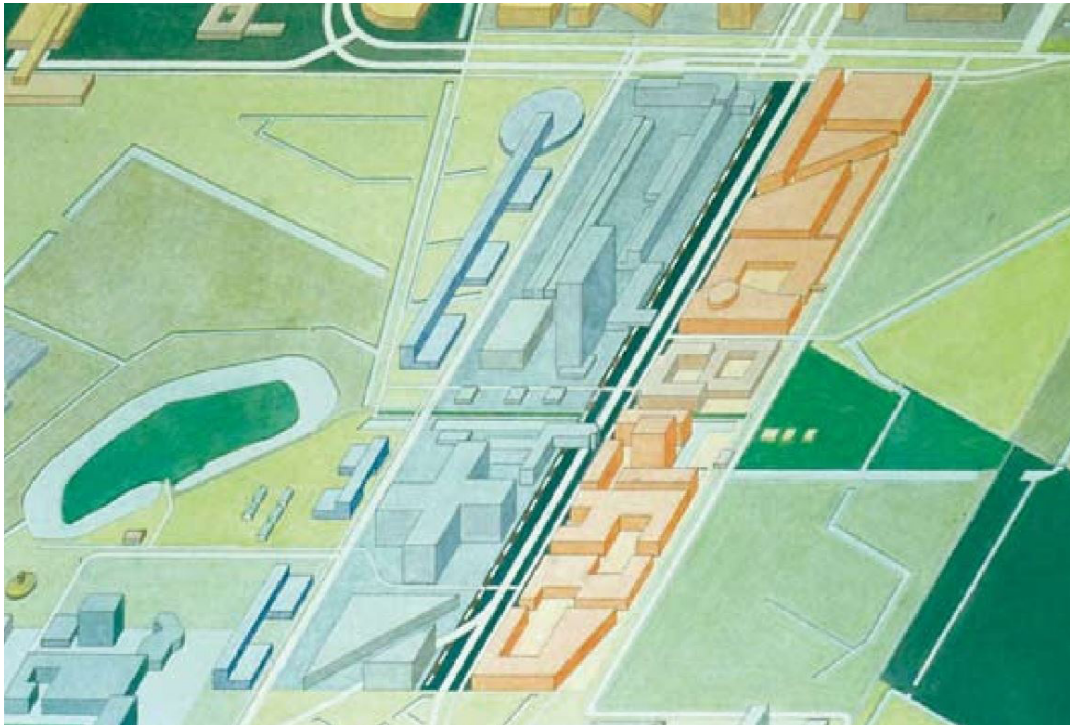


Fig.40-OMA 1988 master plan for Uithof plans for intensification along the main boulevard

between functions, a new interest in circulation and in its differentiation, in connectivity. This meant a reduction in the attention given to all that was merely stationary, to the individual functions themselves.¹⁶

The logic of flow and circulation became so reductive that all forms, functions, and individuals were dissolved into the network. On one hand, the cybernetic design approach intended to celebrate the autonomy of the individual parts. On the other hand, the primacy of linkages and spaces of flow made individual nodes inconsequential to the whole.

By the early 1970s, architects and planner began to realize the limitations of self-contained, infrastructural campuses. The shortcomings of giant structures that turned their back to their surroundings and grew unpleasant excrescences, resulted in cynicism towards total planning. Planners and architects began to value town-integrated campuses, such as Oxbridge or Harvard, which incorporated indeterminacy and layers of complexity through gradual development. Still, the preoccupation with cybernetics applications to architecture never fully dissipated. These applications were later investigated in projects such as the Fun Palace and Centre Pompidou, and continue to evolve into what we identify today as parametricism. Nevertheless, the challenge of campus design remains to be simultaneously planning for growth and creating an identity of a comprehensive whole.

The Campus as Heterotopia

The 1988 master plan revision of University of Utrecht in Uithof provides a hopeful potential for the post-war campus. This master plan takes on the approach of layering complexity and incremental growth by integrating a network of individual buildings anchored along a central street. By 1958, Utrecht University could no longer accommodate the demands of a rapidly growing student population. As with many other post-war campuses, the university chose a suburban site for the development of a commuter campus, in Uithof. Still at the early stages of the post-war era, Uithof did not build a cybernetics inspired megastructure. The campus was rather laid out in a strict orthogonal fashion. Modernist volumes were set apart, claiming the corners of the site. The new campus was isolated and lifeless; it was cut off from the city center by a six lane highway on two sides and had no immediate neighbors. The buildings were set far apart from each other, and due to the low density, there were no justification for other commercial or cultural functions.

In 1988, OMA, under the leadership of Art Zaaijer, was commissioned to revise the master plan and to transform the desolate commuter campus into a thriving community. Zaaijer's approach was deceptively simple. Instead of proposing a utopian master plan at a large scale, he introduced two simple rules. First, space for future development would be strictly limited to existing clusters of buildings. Second, a central boulevard would be intensified with buildings to form a center

¹⁶ Ibid, 275.

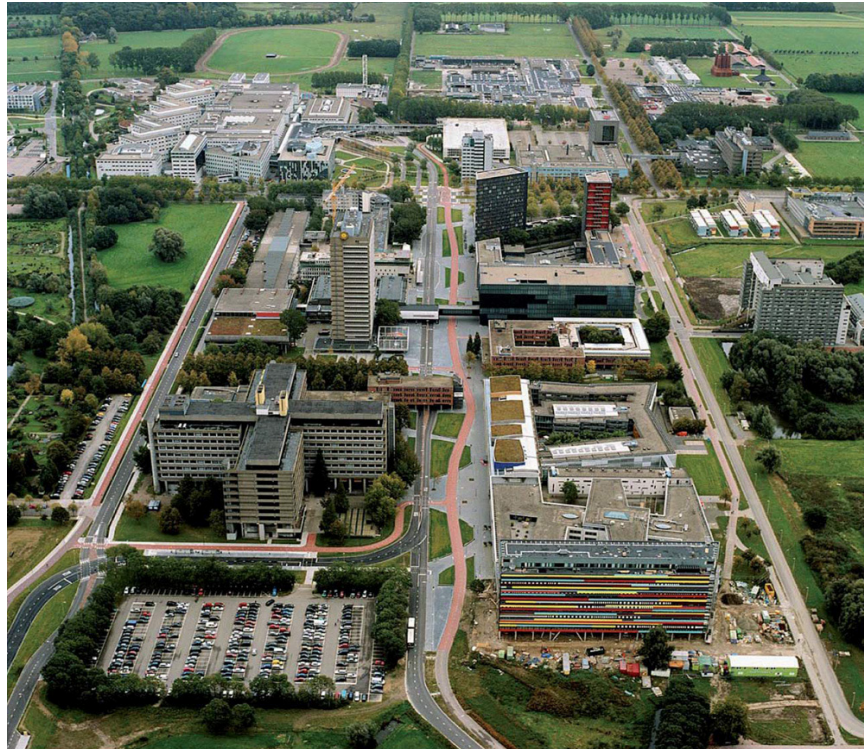


Fig.41-Utrecht University, Uithof, aerial photograph showing concentration of buildings along the central boulevard



Fig.42-Utrecht University, Uithof, activity on the central boulevard

for the campus. The objective of the plan was to end the inundation of meaningless space between buildings and to create density for flourishing of activities and interactions.¹⁷

Over the years, the campus has been revitalized into one of the most vibrant academic hubs. The main street has been intensified with new buildings built right up against old ones. Despite the strict cluster boundaries, no specific programmatic or architectural restrictions was imposed. Therefore, the urban structure has provided a breeding ground for autonomous architecture. The treatment of the ground floor as street activator with storefront activity has provided a sense of unity between the buildings. The introduction of student residences and commercial partners, alongside new academic departments strengthened the argument for a dense mixed use campus. Like a healthy urban street, the Utrecht Boulevard thrives on symbiosis of old and new buildings, automobiles, cyclists and pedestrians, and infrastructure and landscape elements. It has an urban framework that is open to diversity and potential. On the other hand, the megastructure campuses will always remain to be a closed system.

Learning from these strategies, Conestoga campus can overhaul its existing cybernetics design, and recombine to make a campus that is physically connected and animated. As of January 2017, the campus has a full-time student population of 12,000, twice the size the college was intended for. The expansion of the college in Cambridge would allow it to grow to at least twice its current size. That population would be comparable to the size of larger institutions such as Carleton University (23,796 full-time enrollment)¹⁸ or University of Guelph (20,771 full-time enrollment)¹⁹. Instead of treating the two campuses as separate entities, I propose to articulate the connection between the two sites, and to use formal architecture to animate the campus and to address its immediate context.

17 Kerstin Hoeger and Kees Christiaanse, *Campus and the City: Urban Design for the Knowledge Society* (Zürich: GTA Verlag, 2007), 63.

18 "Facts - About Carleton," *About Carleton Facts*, accessed January 17, 2017, <https://carleton.ca/about/facts>.

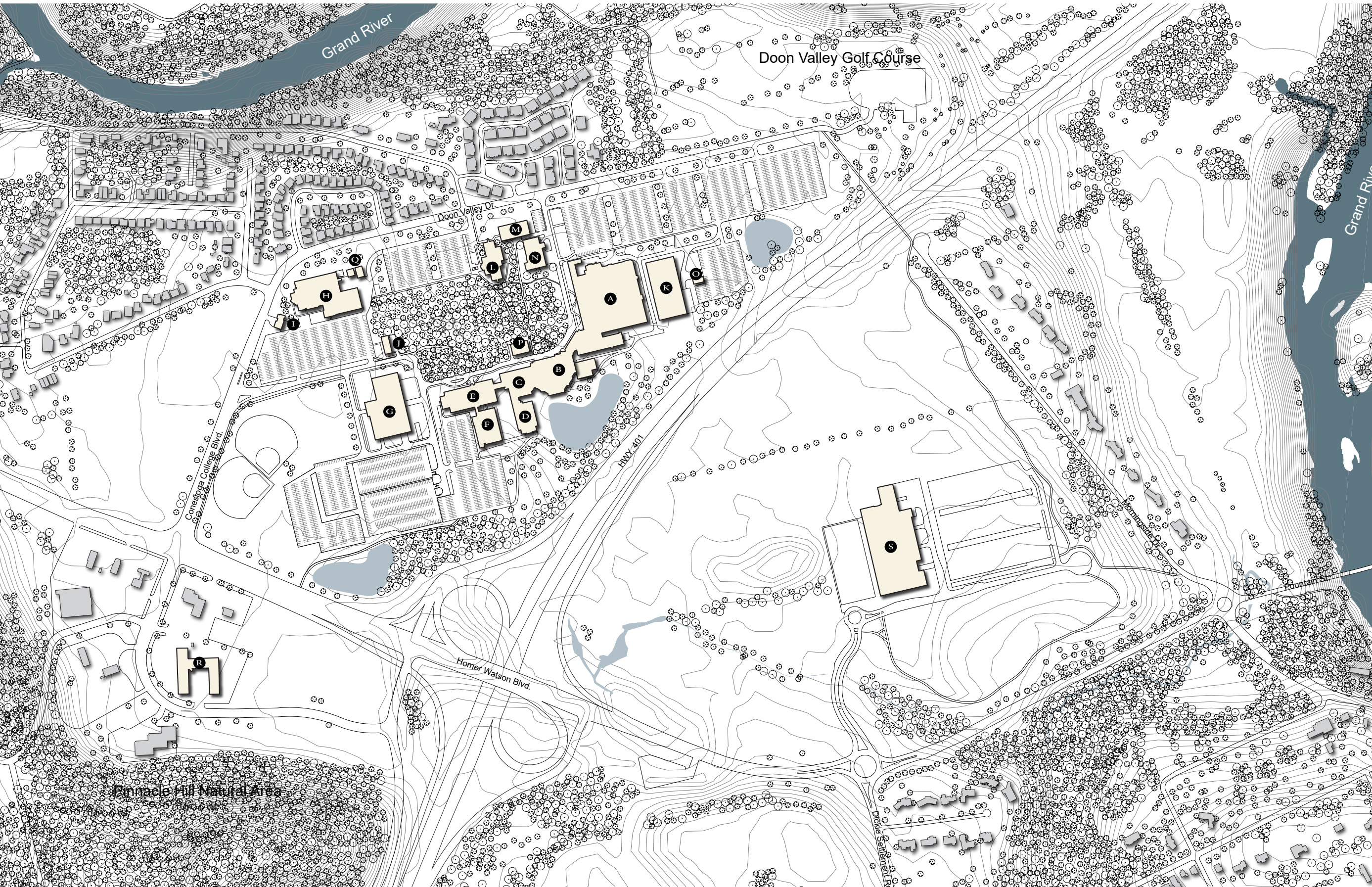
19 "Facts and Figures | University of Guelph," *Facts and Figures | University of Guelph*, 2015, 1, accessed January 17, 2017, <http://www.uoguelph.ca/info/factsfigures>.

Existing Conestoga College Campus

Since its founding, Conestoga College has been evolving to accommodate a growing student population and the demands of the local economy. Through the evolution of its academic programs, its needs for space continues to grow. Most of the development of the campus has been based on the 1968 master plan. Due to constraints of the site, few buildings have been constructed separately on the opposite side of the forest.

In 2011, Conestoga college established the Cambridge campus on the east side of Highway 401, across from the Kitchener campus. With limited public transportation options and a growing student population, the college had been struggling to meet its needs and accommodate for growth. City of Cambridge, eager to have a campus within its political boundary, sold the vacant land to the college. As of 2016, only one building, with total area of 260,000 sf, has been built on the 130 acres of land. The building is home to the School of Engineering and Information Technology building, and the Institute for Food Processing Technology. The college plans to expand similar programs on the new campus.

Majority of students reside outside of the immediate area of the college. Therefore, more than 60% of the students commute to the campus. Campus parking has been a vexing and controversial issue. Commute time has a negative impact on students' academics and extra curriculum participation. Also, the extensive surface parking destroys community and limits future development. There has been some consideration for student residences in the recent years. Former hotels, across from the campus on Homer Watson Boulevard have been converted to student residences. Students at these residences are required to cross a 6-lane road and walk for 15 minutes to reach the campus. The residences are themselves isolated enclaves separated from any urban activity.



- A-A Wing
- B-B Wing
- C-C Wing
- D-D Wing
- E-E Wing
- F-F Wing
- G-Recreation Center
- H-Engineering Complex
- I-Emergency Medical Services
- J-Toyota Power Engineering Center
- K-Woodworking Center Of Ontario
- L-Welcome Center
- M-Employee Services
- N-Early Childhood Education
- O-Motor Cycle Program Storage
- P-Power House
- Q-Quonset Huts
- R-Residence & Conference Center
- S-School Of Engineering & Information Technology

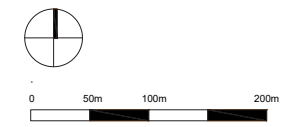
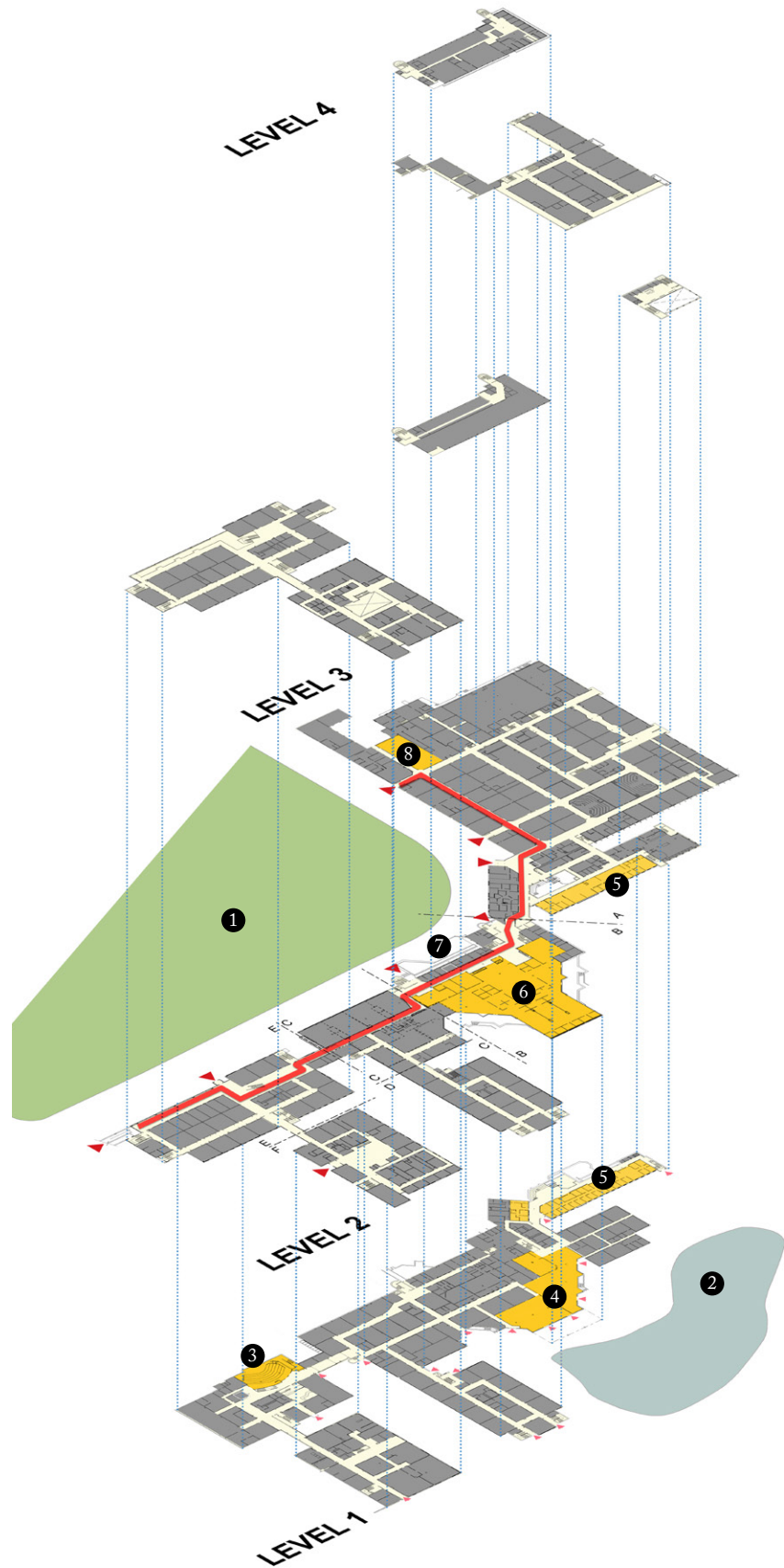


Fig.43- Existing Site Plan

The megastructure building defining the Kitchener campus is now comprised of six buildings with total area of 681,183 sf. The central spine remains to be the main circulation route and it has been continued into the newer additions. In Buildings A-D, the main street is bounded by programmed spaces (offices, lockers, computer labs, study rooms), cutting off natural light and views to the outside. The spine is almost indistinguishable from other corridors. Also, there is no main entrance to the megastructure. Entrances are inconspicuously spaced along the perimeter of the building. The sense of disorientation is so strong that a barrage of signage is used to guide people to their destinations. The newer additions, Buildings E-F, have integrated the spine in a more positive way. The spine has been shifted to the perimeter of the building, providing natural light and views from the outside. The width of the spine is widened to accommodate seating and informal activities, and the height is extended for an open and airy space that resembles an atrium. Additionally, front entrances are architecturally emphasized and integrated into the internal organization.

One of the most impressive features of the campus is the wooded area, containing species of Sugar Maple, Basswood, Beech, Elm and Buckthorn. The forest conjures the unspoiled beauty of the country side. Few paths cut through the forest to provide a serene route from the parking lots to the main academic building. The forest is an unexpected retreat from the asphalt covered surrounding. The tall canopies screen visual access across the site; therefore, the forest does not function as an open public space in the same way that a university lawn would.

The pond at the foothill of the main building is another distinctive place on the campus. In addition to serving a social function, the pond supports a variety of aquatic life and migrating species. The natural slope of the land provides access to the pond from the lower level of Building B, through the cafeteria. Access from outside requires circumventing the megastructure from either side of the campus. A band of trees and vegetation somewhat shield the pond from the noise and the view of the Highway 401. The view of the pond is very attractive and iconic; however, it is not a view that students would encounter on their daily paths as it is mostly concealed by the megastructure.



1. Forest
2. Pond
3. Auditorium
4. Cafeteria
5. Learning Commons
6. Library
7. Loading Dock
8. Bookstore

Fig.44- Axonometric plans of the main building at Kitchener campus

Essentially, the Kitchener campus has two sides: one that faces the forest, and one that is oriented towards the pond and the highway. From the Highway 401, parts of the main building and the recreation center are made visible. Two signs on opposite sides of the highway announce the presence of the college. The main road into the campus encircles the forest providing direct access to the main building. A bus stop and passenger drop-offs are located along this road. Although it is the most trafficked path for cars and pedestrians, it resembles a service road rather than an active boulevard.

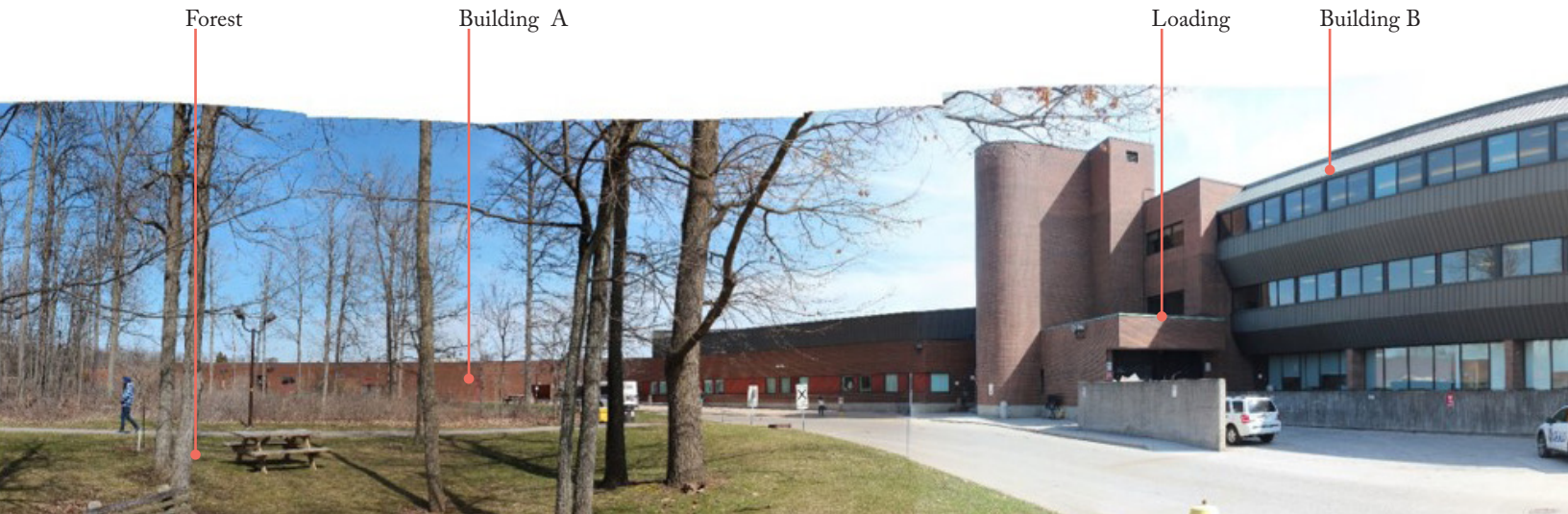


Fig.45-View of loading area in front of Building B at center of Kitchener campus



Fig.46- South View of the library, cafeteria and pond at Kitchener campus

The main building provides only a few windows facing the street, of which most are covered by blinds. The central section of Building B, the tallest part of the campus, is conveniently located to face the forest and the pond on either side. The current library faces the pond, however, the side facing the forest is occupied by a loading dock. The appearance of the loading dock, often occupied by large delivery trucks, is unattractive and highly prominent.

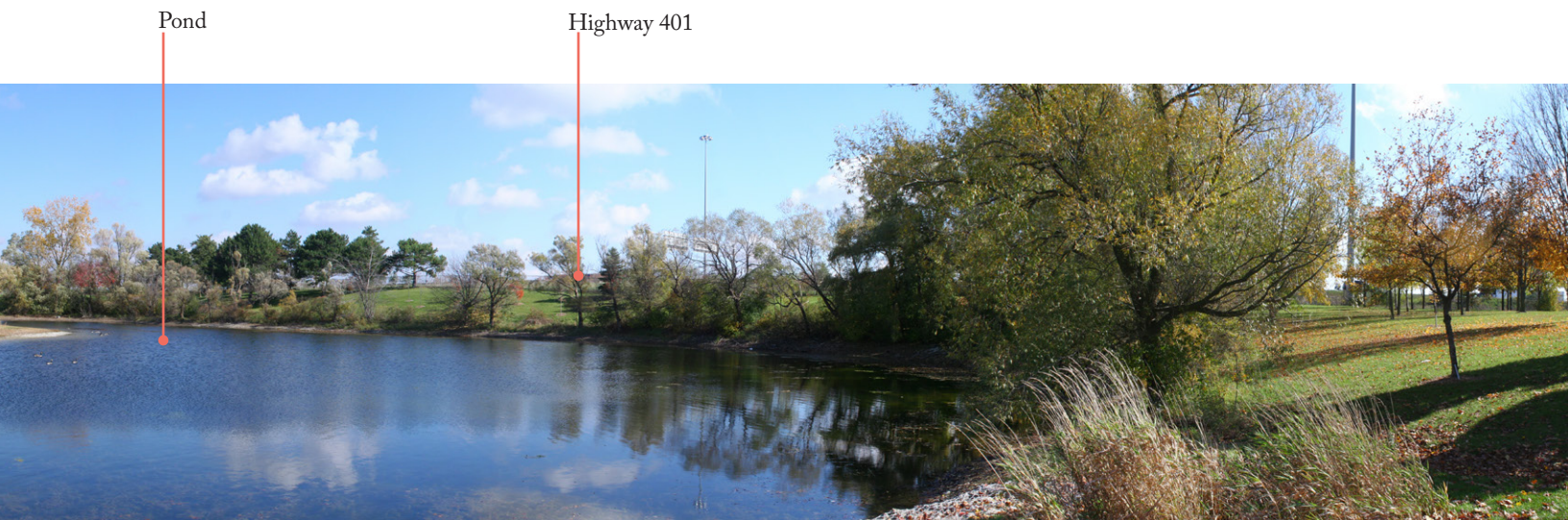




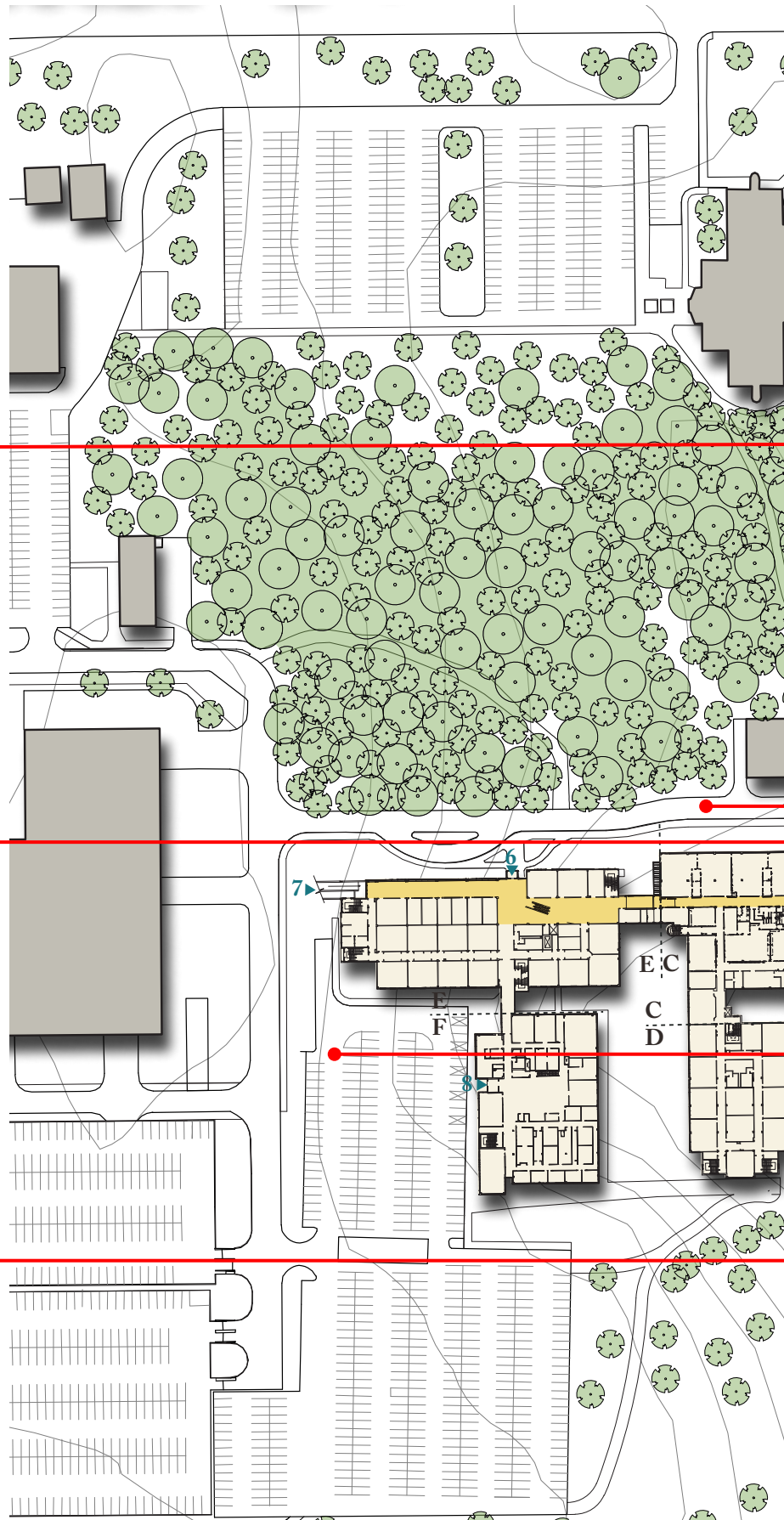
Fig.47-View of the forest in Fall



Fig.48-Landscape outside of cafeteria



Fig.49-View of the pond and highway beyond



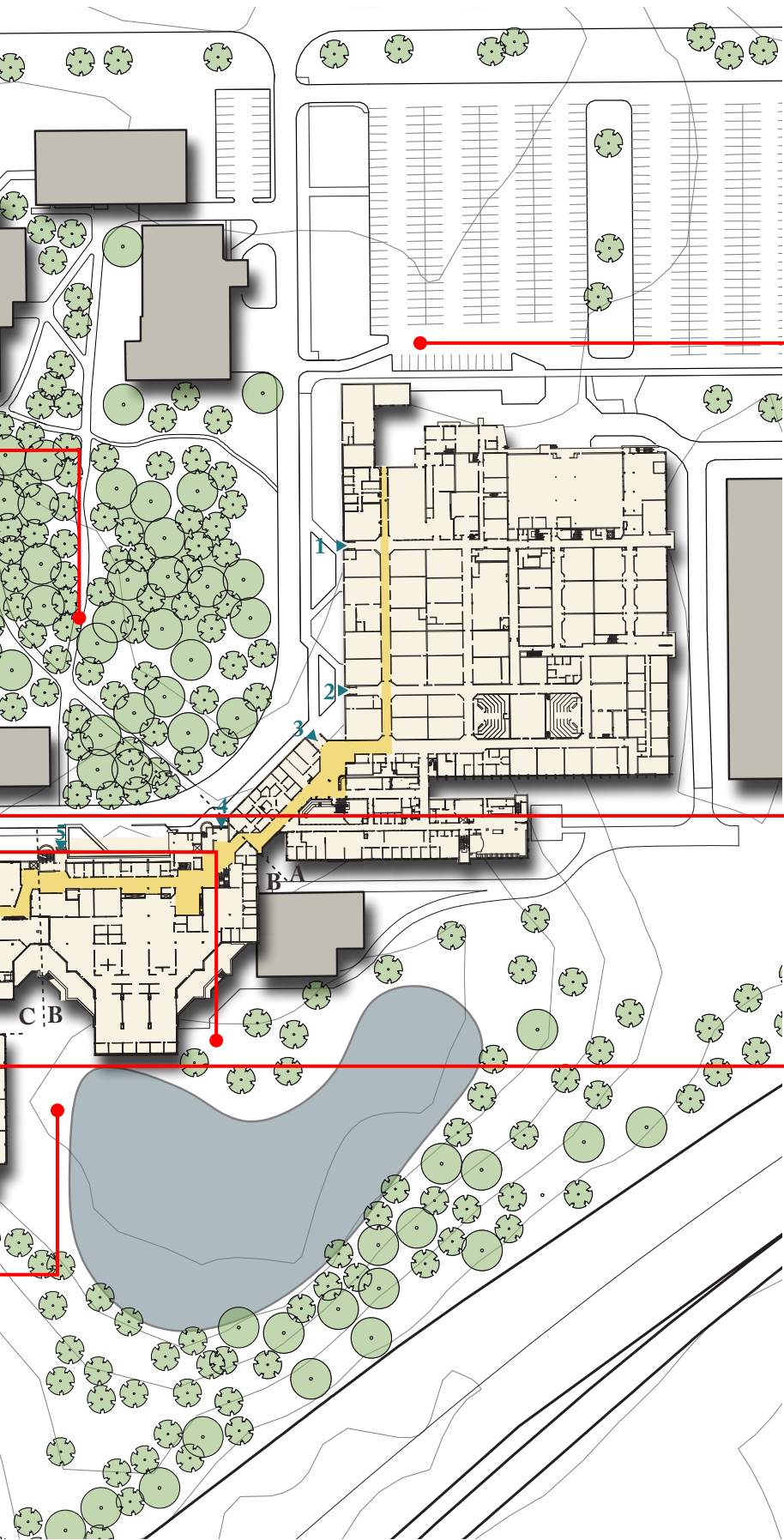


Fig.50-View of the North parking lot



Fig.51-View of the ring road along Building C



Fig.52-Exterior of Building E & F



Fig.53-Entrance 8 to Building F



Fig.54-Entrance 6 to Building E



Fig.55-Entrance 5 to Building B

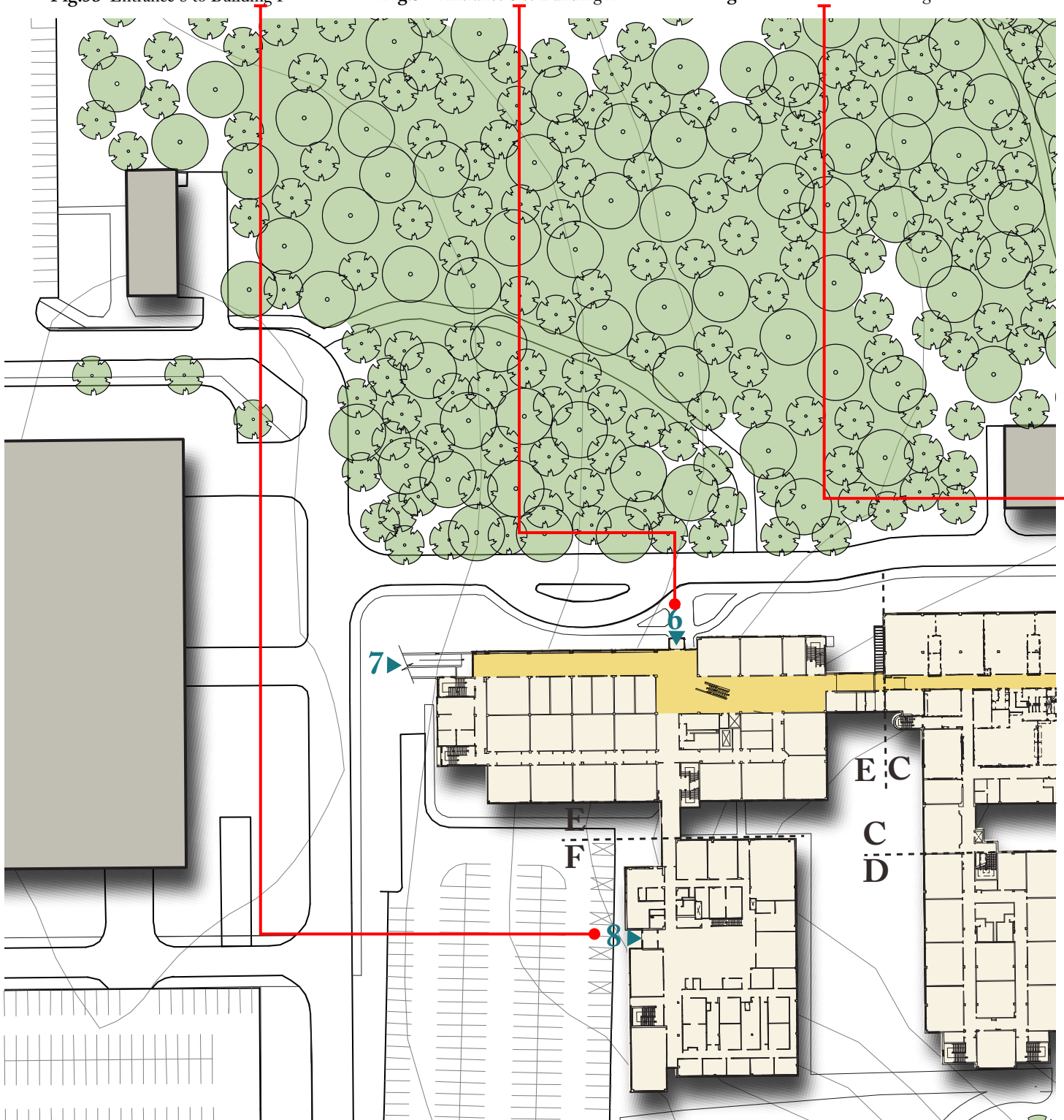




Fig.56-Entrance 4 to Building B



Fig.57-Entrance 2 & 3 to Building A



Fig.58-Entrance 1 to Building A

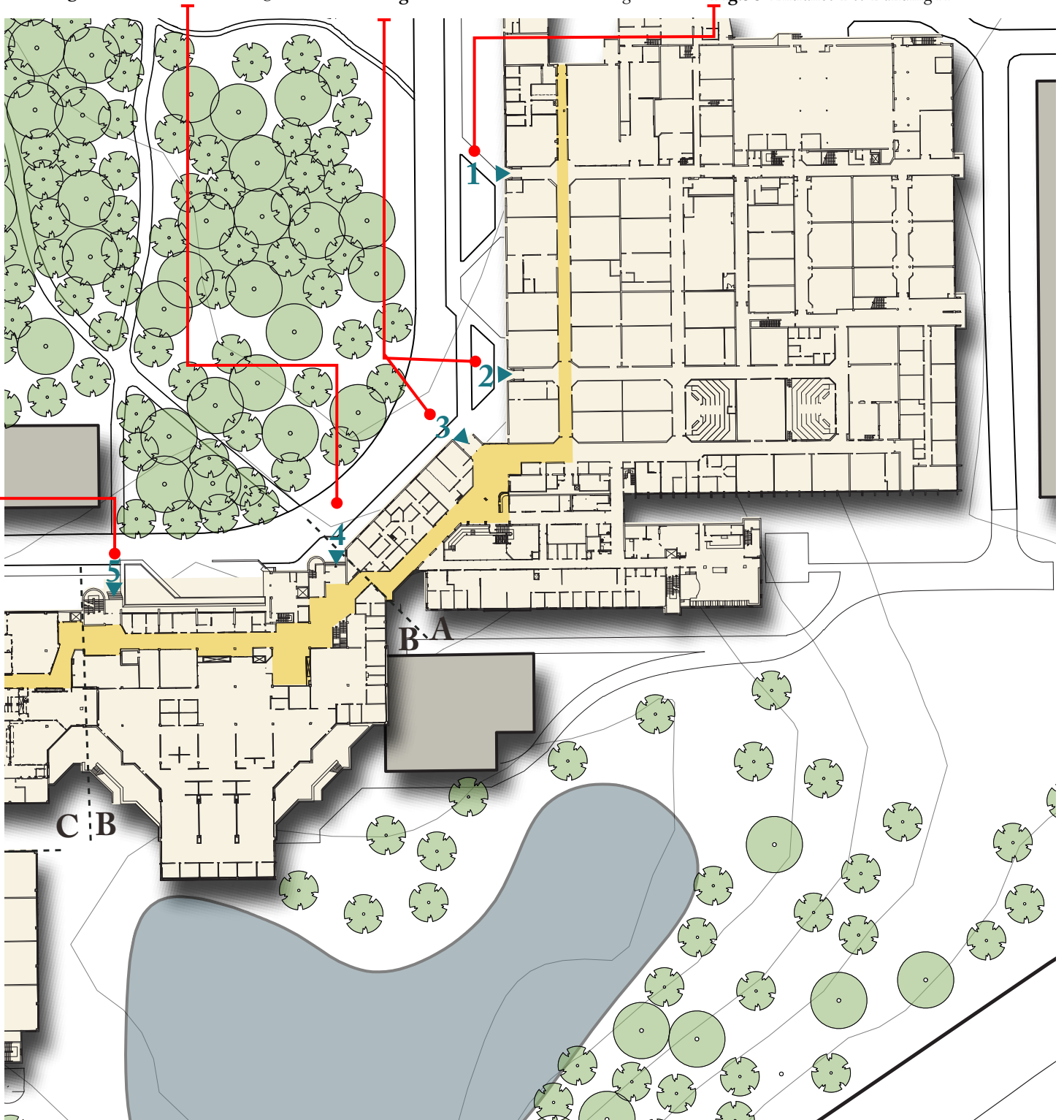




Fig.59-Main Corridor in Building F



Fig.60-Main Corridor in Building E

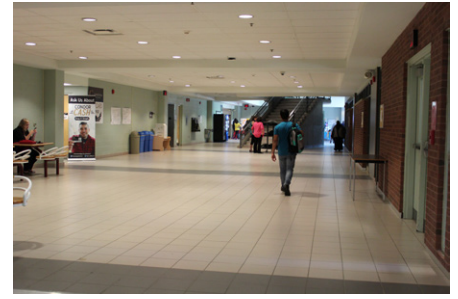


Fig.61-Main Corridor in Building E

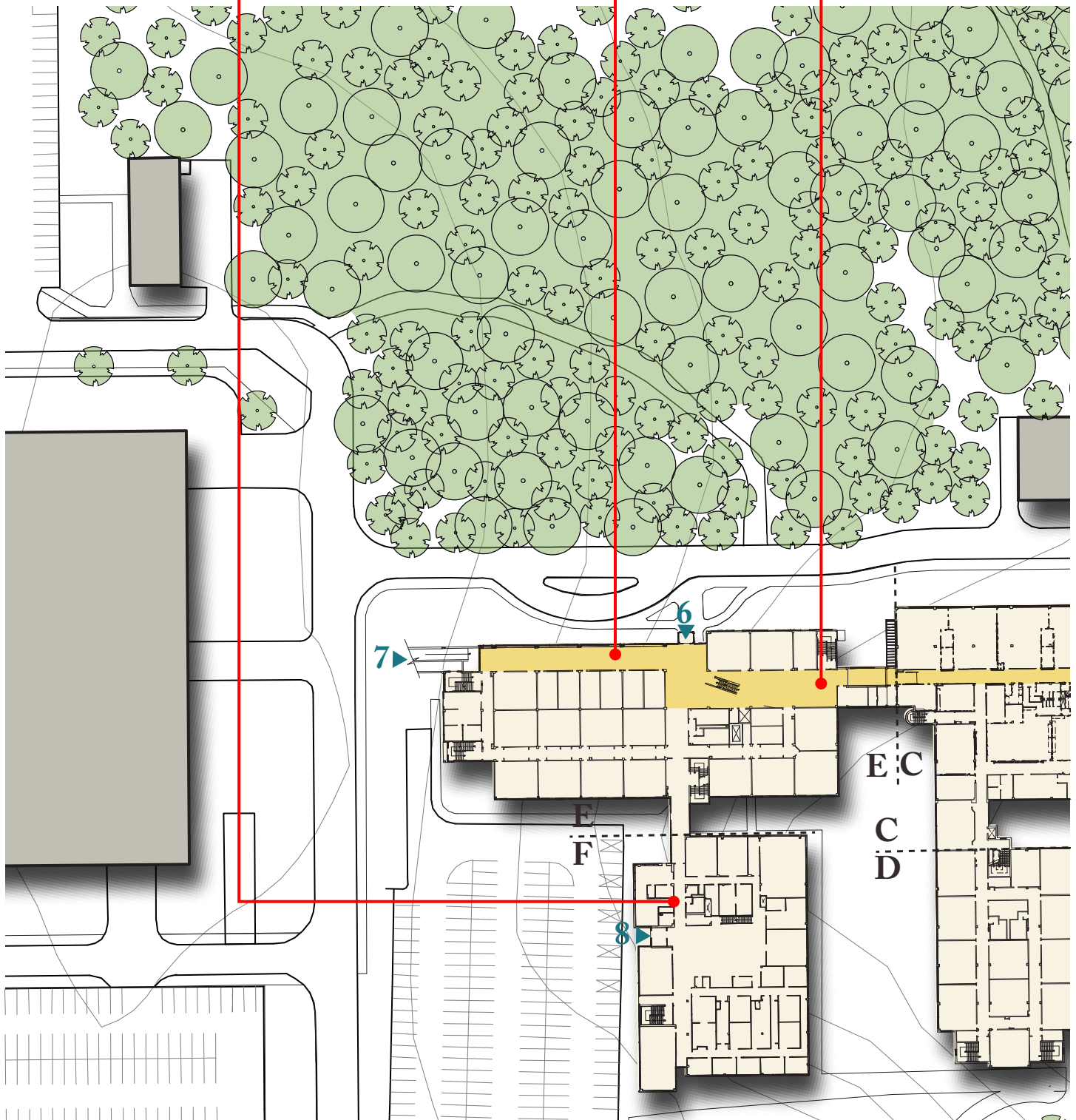
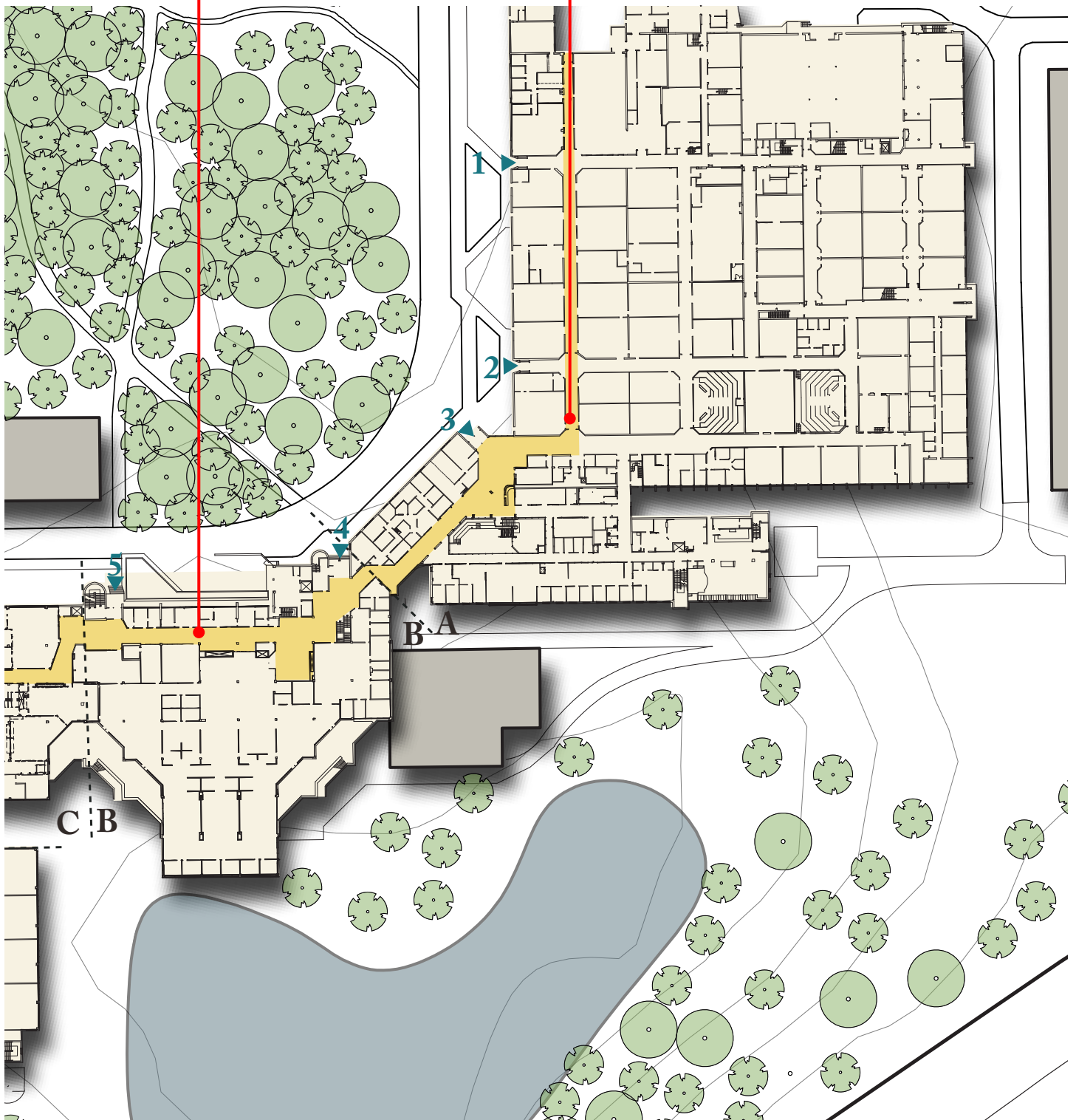


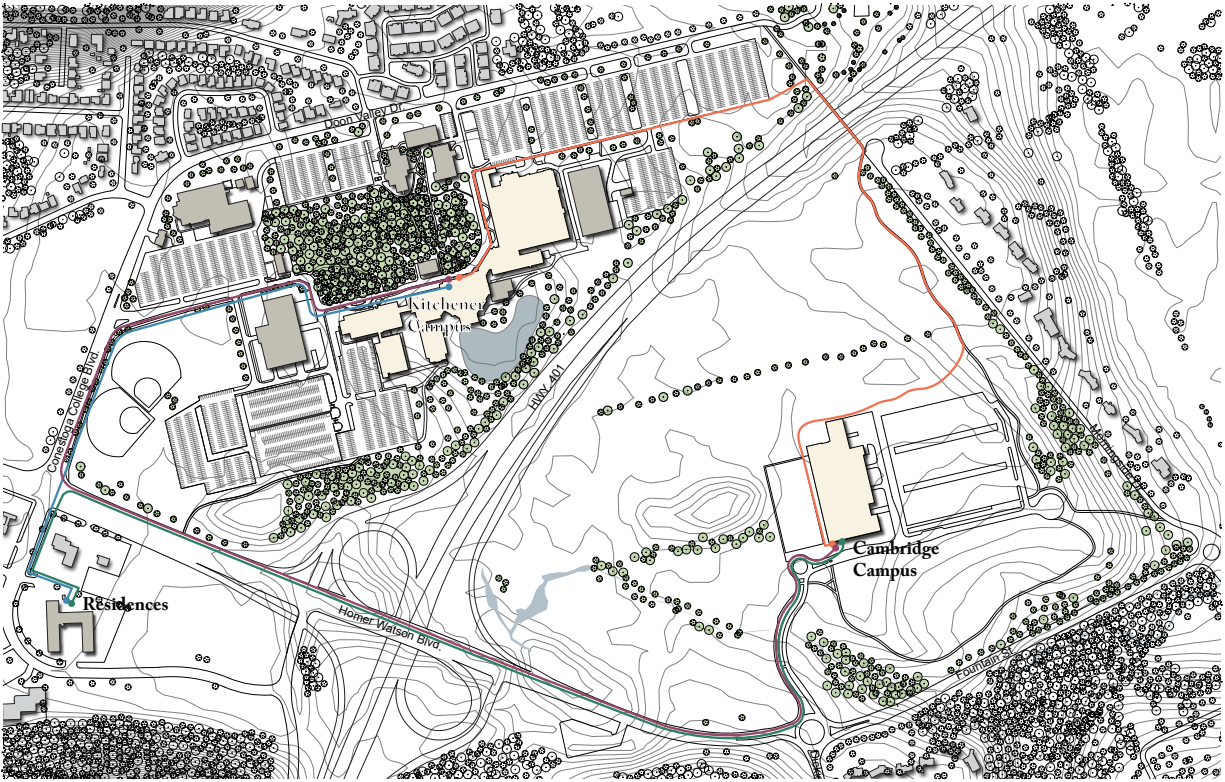


Fig.62-Main Corridor in Building B



Fig.63-Main Corridor in Building A





Cambridge to Kitchener via footbridge	Cambridge to Kitchener via Homer Watson Blvd.	Cambridge to Residences	Kitchener to Residences
— 1.9 km	— 2.4 km	— 1.6 km	— 1.1 km
⌄ 23 min	⌄ 30 min	⌄ 20 min	⌄ 13 min
🚲 6 min	🚲 9 min	🚲 7 min	🚲 4 min
	🚗 6 min	🚗 3 min	🚗 3 min

Fig.64-Diagram showing critical distances on campus

Scale

Scale and distance play an important role in the experience of disconnectedness on Conestoga Campus. Walkability on campus contributes to the vitality of campus life, active cross-disciplinary communication, and sustainability. Walking allows one to travel through the landscape at a speed that a connection between perception and thought can be established. Through walking, a finer grain of detail can be registered, and students are able to relate socially and environmentally with other people and places. According to Jan Gehl, a notable architect and urban designer, the acceptable walking distance for daily errands is about 400 to 500 meters (1,300 ft to 1,600ft).²⁰ Given the average walking pace of 5 km/h,

²⁰ Jan Gehl, *Life between Buildings: Using Public Space* (Washington, DC: Island Press, 2011), 137.



Fig.65-Cambridge Campus-Adverse walking conditions due to lack of visual links and human scale design



Fig.66-Homer Watson Blvd-Pedestrians encounter limited crossings and fast moving vehicles

this distance can be accomplished in 5 to 6 minutes. On Conestoga College, the distances between events, points of arrival, parking, and the two campuses far exceeds this comfortable distance.

Walking is also a visual and experiential activity. The landscape that appears before one's eyes, can be perceived as dull or animated, cumbersome or stimulating. The same distance when punctuated with points of interest and perceived in manageable stages, can become desirable and less taxing. At Conestoga, the walk between the Kitchener campus and Cambridge campus takes place across a vast vacant field, overpassing the highway. During the cold season, which constitutes most of the academic year, the lack of shelter from extreme elements make walking a difficult experience. Ultimately, the combination of the fast-moving cars on the highway, the long distance between destinations, and the unfavorable walking experience make for a hostile and disconnected campus, where most students dread walking and opt for using their vehicles if given the choice.



Fig.67-Circulation network on campus

Roads (Orange)

Conestoga site can be described as an irregular pentagon, surrounded by roads on all sides, and the highway running at the center.

Homer Watson Boulevard - a six-lane regional road, with vehicles traveling at 70 km/h. It is the main thoroughfare from Downtown Kitchener to Highway 401. This road continues as Fountain Street in Cambridge.

Fountain Street - country road, with four lanes of traffic and two consecutive roundabouts, one of which provides an entrance to the Cambridge Campus.

Doon Valley Drive - named Conestoga College Boulevard for a short segment- provides the only entrance to the Kitchener Campus, and it is the buffer between the college and the neighboring suburban homes. The road terminates at the golf course's parking lot.

Morningside Drive- a tree lined rural drive, with rural country homes. The road is separated from the bike path, with a wide carpet of natural grassland. It terminates in a court before nearing the highway.

Highway 401 is a provincial Highway which separates the two campuses by approximately 50 meters. The highway sits almost at level with the campus, separated by gently sloped berms. At the location of the footbridge and the overpass, the highway is more depressed in relationship to the campus.



Pedestrian/Bike Path (Green/Blue)

The Walter Bean Trail (Green) - runs at the edge of the Cambridge Campus, crosses the highway via a pedestrian bridge, and continues along the Grand River in Kitchener. This trail runs through the areas of Waterloo, Kitchener, Cambridge, Woolwich and North Dumfries. It is well used for hiking, biking, skiing and snow shoeing. The 78 km path provides access to parts of the Grand River and its magnificent ecosystem. At the moment, this path provides the best way for students to travel between the two campuses. Students residing in the proximity of the trail, can use biking as an alternative mode of transportation to the college.

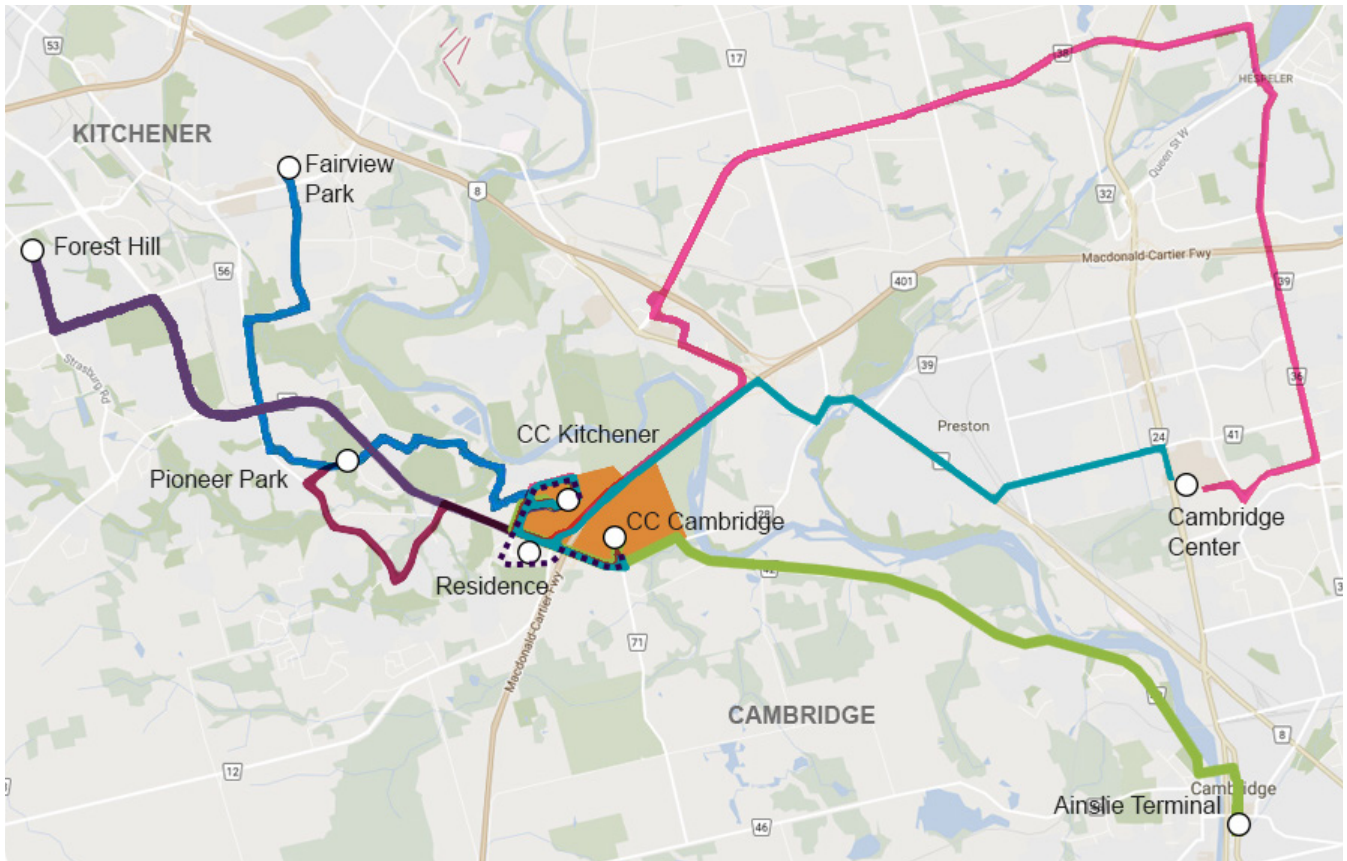


Fig.68-Bus routes to Conestoga College










 61 35min	 116 18min	 110 19min
 203 53min	 16 26min	 76 15min
 111 22min	 10 25min	 Shuttle 20min



Fig.69-Bus stop at Conestoga College in Kitchener



Fig.70-Bus stop at Conestoga College in Cambridge

Public Transportation

Access and cost of transportation is significant to the enrollment and academic performance of students. The profound environmental implications of using personal automobiles and the cost of providing parking spaces have been a longstanding concern for the college. According to a 2015 student survey²¹, only 27.7% of Conestoga students use public transit as a primary mode of transportation. Despite costly parking fees, more than half of the students use personal vehicles to access the college.

Grand River Transit provides six direct bus routes to the Kitchener campus, two of which stop at the Cambridge campus. Access to other routes throughout Kitchener, Waterloo and Cambridge is possible via transfers. In addition, Conestoga student's association provides a complimentary shuttle service between the campuses and the residences. However, direct public transit from neighboring towns are not available. Long commute adversely affects student participation and academic success. Students with financial limitations and those from rural and suburban areas without access to public transportation, are at a direct disadvantage.

The constellation of enclaves and single purpose itineraries in the contemporary city propose a serious challenge to cost effective and efficient mass transit. Intensification of activities on the site can subsidize and justify the expansion of mass transit.

2015 Student Transportation Survey	
Mode of Transportation	Percentage of Students
(Personal vehicle (by myself	50.0
(Personal vehicle (with others	11.1
Public Transit	27.7
Walk	8.4
Other	2.8

21 This information was obtained from the Conestoga Office of Institutional Research and Planning from an unpublished survey.



Conestoga Campus as a Civic Node

The inclusion of Cambridge Sports Multiplex on the Conestoga campus can intensify public activity and mark a civic monument for the territory. Whereas, neither institution could spur such monumentality on their own. The adjacency of the two institutions could result in positive synergies in the interest of the larger community. As the college grows on the Cambridge campus, the addition of the multiplex will justify the expansion and improvement of public transit. Parking and road infrastructure would be shared between the college and the multiplex. The college's operation peaks during the day, whereas the multiplex would be used mostly in the evenings. Partnership between the two institutions could provide opportunities to integrate the college curriculum and the multiplex services. Students enrolled in culinary arts, early childhood education, health services and recreation services could gain practical experience while working in the multiplex. In addition, the capacity of the site ecology and infrastructure can be expanded to host other public and commercial programs that could further activate the site.

Any revisions to the campus master plan should consider the civic potentials of the site. The new Conestoga library should be a building that unites the divide between institutional and community functions, between infrastructural obligations and public colloquy, a building that is both projective and pragmatic.

Fig.71-Looking from
Cambridge
campus
towards
Kitchener

3| THE ACADEMIC LIBRARY

Following WWII, the application of cybernetics shifted dramatically from its origins in military combat and found its way in academic research and communication. Paul Baran's design for a distributed communication network was given its first large-scale trial in 1969 by the Advanced Research Projects Agency. The system, that became known as ARPANET, established a network between computers in University of California Los Angeles, Stanford University, University of California Santa Barbara, and University of Utah. This first successful computer network grounded the foundation for the internet as we know it today. As long as information could be transcoded into digital signals, it could be communicated across the network. Using the packet switching method, data was broken into smaller parts, called packets, and transmitted as electronic signals (bits) via multiple routers. In the following decades, the protocol for packet switching was redrafted and redeveloped continually by different innovators. By the 1980s, the internet was widely used for email and file transfer in academia. Finally, in 1991, the World Wide Web became the first publicly available *virtual network*. Since then, the internet has become a medium for the transfer of information and a space for social interaction.

The possibility to store and transfer information on a virtual network, erases fixed boundaries of physical space and time. Unlimited virtual storage and unrestricted access to international databases has made the delivery of information continuous, simultaneous, and instantaneous. This shift in the paradigm of information marks an important cultural moment, and a fundamental change in the library typology. In their 1995 introduction to the book *Future Libraries*, Howard Bloch and Carla Hesse, compared this defining moment to other historical precedents:

We live at a threshold moment in the history of libraries and the forms of knowledge they imply—a moment comparable to that of early antiquity when the clay tablets of the pre-Christian era were replaced by papyrus rolls; or when these rolls gave way, in the fourth century A.D., to parchment leaves bound in codex; comparable, finally, to the transformation of the great monastic libraries of the middle ages, where manuscripts were chained to desks, into the renaissance humanist libraries in which the numerous books made available by printing came to be stacked along the walls, configuring the library as we know it.¹

1 R. Howard Bloch and Carla Hesse, *Future Libraries* (Berkeley: University of California Press, 1995), 1.

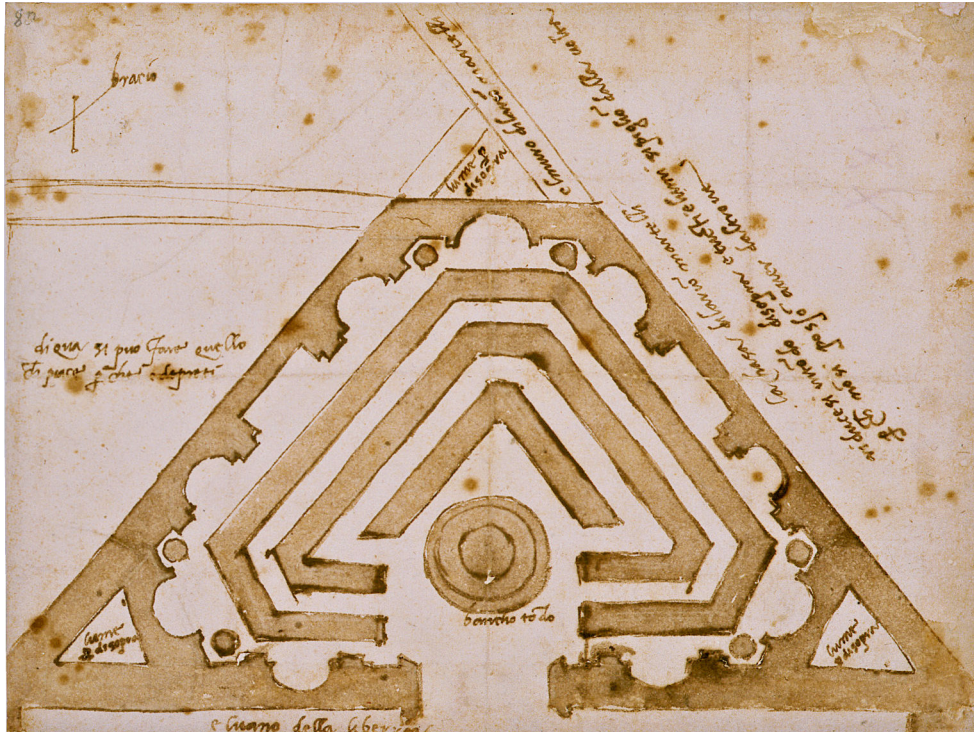


Fig.72-Michelangelo's maze like plan for the Laurentian Library, 1525-1526, showcases a protective attitude towards information

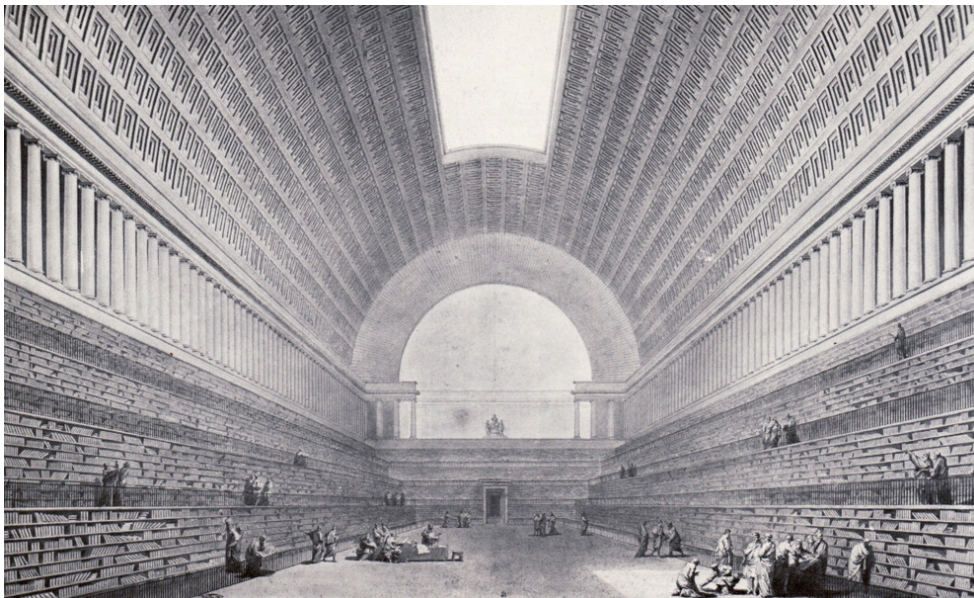


Fig.73-Étienne-Louis Boullée, Bibliothèque du Roi, 1785, celebrates the democratization of information by displaying books along the perimeter of the library

That is to say, as the medium of information has evolved throughout history, the typology and organization of the library has evolved with it. The library typology was refined over the centuries to correspond to the changing information technology, the politics of information access, and the surveillance of resources. The design of the library is a profound reflection of a society's relationship to knowledge. For example, the medieval library protected and restricted access to knowledge to a privileged few, whereas the library of the enlightened age, democratized access to information for all. Boullée's design for Bibliothèque du Roi, in 1785, is notable for facilitating access and surveillance of books in an amphitheater where books were displayed at the perimeter of the reading room. Later, the development of alternative surveillance methods, such as the magnetic strip, allowed the circulation desk to separate from the reading room and to become another layer of the threshold between the outside world and the interior of the library.

Although the transformations of the library typology has been historically linked to the emerging technologies, the digital revolution of the 1990s to the present has had the most drastic outcomes. First, these transformations occurred and proliferated in a comparably short span of time, and second, the medium of information transformed from a physical format to a virtual space. Before this time, despite the many transformation, some characteristics of the typology were reinforced by the continual relationship of the reader to the "book" as a physical entity. The direct corporal relationship of the reader to the book gave an appearance of permanency and legibility to information. The volume enclosed within the covers of the book and the mass of the books in the stacks conveyed a perceptible correlation of the content to the container.² This time, however, the storage and dissemination of information could be transcoded into bits of data, eliminating the physical presence of the the book, the stack and even the library.

While the functional aspects of many traditional institutions can be reduced to an infrastructural formula, the increase in the number of grand library projects built around the world since 1990s, proves that the need for libraries exceeds beyond the utilitarian aspects of information storage and access. The library stands for something more than a repository for books. It symbolizes the persistence of civilization through passed-on knowledge. There is the expectation to satisfy a collective identity by looking towards the future and paying homage to the past. The library presents an image of cohesion to a seemingly infinite and fragmented world. Therefore, the fundamental mission of the library is to overcome physical, social, and economic disconnectedness.³ Andrew Carnegie famously funded public libraries to help immigrants like himself gain access to knowledge and self-educate. Through the design of the library we shall continuously redefine the problem of disconnectedness, and outwardly express the symbolic ambitions of the society. In the age of digital revolution, where information is all pervasive, and an avalanche of data, moving images and fleeting sounds command our at-

2 Amir Ameri, *The Architecture of the Illusive Distance* (Burlington, VT: Ashgate Publishing, 2015), 80.

3 Edwards and Fisher, *Libraries*, 214.

tention and overload our senses, how can the library stay relevant to its mission?

The Infinite Archive of Information

With the rapid technological advances and the subsequent space-time compression, we face new conditions of information. Digital information is organized in a lateral network of fragments, with no precise location or boundary, moving through the space like series of vectors, overlapping multiple disciplines. A simple search in google may yield to millions of results. In the cobweb of data, information could only be superficially scanned. With the surplus of information, literacy and understanding are harder to achieve. Andrew Whitworth, author of the book *Information Obesity*, likens information overload to a physical obesity, where the excess consumption of low quality food results in the deterioration of physical and mental health, and the wellbeing of the society. He writes, "Mass production has given us easy access to very large stocks of information. Finding information is no longer the problem, but being discriminating, filtering out, and managing it is difficult."⁴ Therefore, information literacy has become the challenge of our time.

The notion of infinite and eternal knowledge has been a source of consternation and fascination throughout history. Denis Diderot, a French philosopher attempted to curate all branches of human knowledge in his book "Encyclopaedia, or a Systematic Dictionary of the Sciences, Arts, and Crafts". However, he too noted that the expansion of the encyclopedia would end in its own demise:

As long as the centuries continue to unfold, the number of books will grow continually, and one can predict that a time will come when it will be almost as difficult to learn anything from books as from the direct study of the whole universe. It will be almost as convenient to search for some bit of truth concealed in nature as it will be to find it hidden away in an immense multitude of bound volumes.⁵

Jorge Luis Borges, the renowned Argentinian writer, was also preoccupied with the infinite nature of knowledge in his literary work. In the *Library of Babel*, Borges illustrates a metaphor of the universe by describing a library that is constructed of innumerable adjacent rooms containing every book that is ever written and those to be written. In the *Book of Sand*, Borges tells the story of a man who becomes in possession of a book, whose pages are infinite, with no first or last page. The man keeps the treasure to himself, only to discover that it will consume him entirely, as a monster would. To relieve himself of the burden, he

4 Andrew Whitworth, *Information Obesity* (Cambridge, UK: Chandos Publishing, 2009), xi.

5 Denis Diderot, *Encyclopédie; Ou Dictionnaire Raisonné Des Sciences, Des Arts Et Des Métiers*. (Paris: De l' Imprimerie des éditeurs, 1751), quoted in Daniel Rosenberg, "Early Modern Information Overload," *Journal of the History of Ideas* 64 (2003): , accessed January 2016, <http://www.jstor.org.proxy.lib.uwaterloo.ca/stable/3654292>.

then loses it in the basement of the National Library, among other abandoned texts.

These examples demonstrate that anxiety from information overload has existed since early modern period. However, there is a distinction between the structure of information prior to the internet, and the contemporary paradigm. The former was a hierarchical and vertical accumulation, and the latter is a lateral flow of fragments. Bloch and Hesse suggest changing our rhetoric when talking about information, as it no longer occupies the same space:

Knowledge is no longer that which is contained in space, but something that passes through it, like a series of vectors, each having direction and duration yet without precise location or limit. In the future, there will be . . . no fixed canons of texts and no fixed epistemological boundaries between disciplines, only paths of inquiry and modes of integration.⁶

Bloch and Hesse paint a picture that is metaphorical and literal of information flow. Using packet switching transmission, texts, images and sounds are broken down to smaller packets of digital signals and sent in random order. Once information is received, and then re-sent, it becomes divorced from its original source. Since its form is malleable and fluid, information can be manipulated, extracted and overlapped.

The EPFL Rolex Student Learning Center, by SANAA, is a library and learning commons that is evocative of the digital information paradigm. This project is reminiscent of a concrete landscape, rather than a building. The architects use the tectonics of a landscape, such as valleys and ridges, to divide a uniform space while maintaining its fluidity. The building consists of diverse programs such as: a library, a café, a lecture hall, offices, and study spaces. Operating like the information network, there is no prescriptive hierarchy of space. The learning center provides a network of stimulating places to meet, confront, discuss, experiment, read and collaborate, all the essential actions of the learning process. Unlike most buildings, where one can enter from the perimeter, the Rolex center is entered from one of the internal courtyards. The surface lifts up from the ground, inviting the patrons to enter from multiple points into a single fluid space. “The architects instead of building a temple of knowledge took inspiration from the process of knowledge itself- a culmination of multiple paths and a result of the miracles of serendipity.”⁷ Unlike an architecture that is prescriptive with use, the Rolex Center is a field of space, encouraging users to create their own space, connections and journey, which can be different with every visit. Students are encouraged to move the furniture around, and define space for their specific use. This permeable network of programs and movements creates a Library and Learning center that favors synergy between disciplines, because many import-

6 Bloch and Hesse, *Future Libraries*, 11.

7 Francesco Della Casa, *Rolex Learning Center* (Lausanne, Switzerland: EPFL Press, 2010), 29.



Fig.74-Rolex Center- Courtyards defined by light and shadow provide multiple entrances to the interior landscape

ant discoveries emerge in the overlap.

Library and Learning Commons

The word library has ambiguous meanings. It can refer to a building, a room, furniture containing books, or a collection of media. The origin of the word can be traced to the Latin word *liber*, which means book, paper, parchment; originally the inner bark of trees, and probably a derivative of *leub*, referring to a leaf⁸. On the other hand, if we follow the etymology of learning, it means to get knowledge, to be cultivated, to study, to read and to think about. The dictionary takes us all the way to the old English word *laestan*, meaning to endure, to follow or find the track.⁹ Therefore, the word library is quintessentially the delivery of information on a medium. To most people, it conjures the overriding presence of books. Yet the goal of the library is no longer the expansion of book stacks and catalogue. Instead, the product of the library has become the act of *learning*. And, effective learning needs inspiration, access to information, time to digest and the space to process.

In the context of academic institutions, rapid advances in ICTs not only influence the academic library, they also change the primary task of education and research.¹⁰ First, teaching methods are becoming more diversified. New technologies allow teaching to be customized towards individuals. Some institutions

8 Douglas Harper, *Online Etymology Dictionary*, s.v. "Library," accessed October 21, 2016, <http://www.etymonline.com>.

9 Douglas Harper, *Online Etymology Dictionary*, s.v. "Learn," accessed October 21, 2016, <http://www.etymonline.com>.

10 Bas Savenije, "More Than a Gateway: The Role of Future University Libraries," in *Living Library: Wiel Arets: Utrecht University Library*, ed. Marijke Beek and Eva DeCarlo (New York: Prestel Pub, 2005), 381.



- 1 Information
- 2 Cafe
- 3 Science Corridor
- 4 Bookstore
- 5 Library Admin
- 6 Forum
- 7 Library
- 8 Group Study Room
- 9 Patio
- 10.Cafe

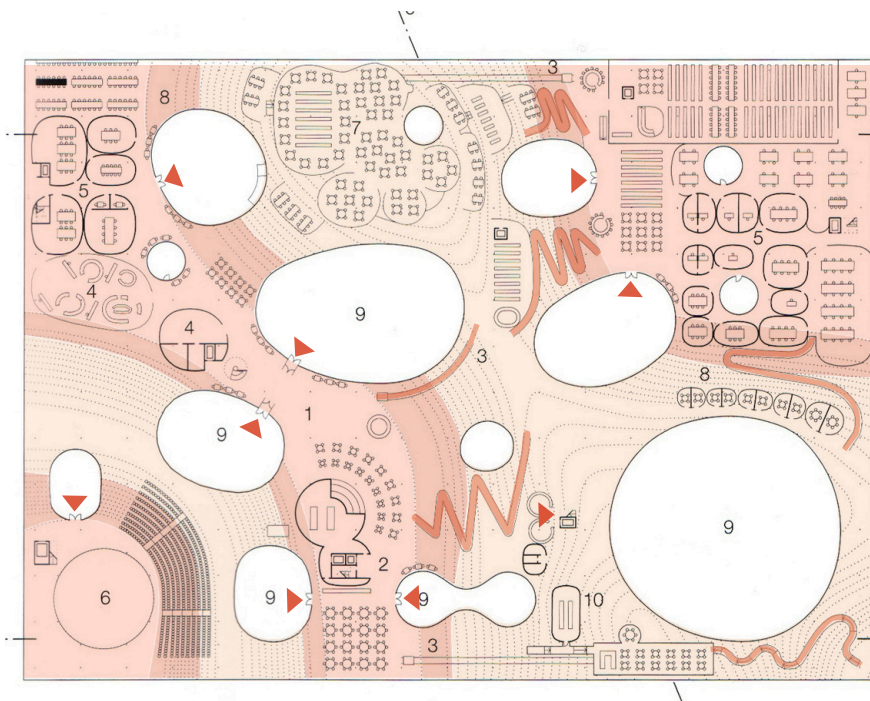


Fig.75-Rolex Center floor plan- Multiple entries into the sloped study spaces

are experimenting between various forms of blended teaching to discover the optimal balance of face-to-face and distance learning. Second, academic education is shifting its emphasis from instruction to academic competencies, such as communication, research and information literacy. And third, research is becoming more collaborative, and interdisciplinary. Researchers increasingly demand diversity of non-text primary sources and they also produce their work in nontraditional media.

Upon reflecting on the growing demands of education and research, the academic library must become more integrated with the learning process, and expand its services to accommodate all types of learners. "The Learning Commons" is a natural evolution in the library typology. Seizing the opportunities of information digitization, the staff of the learning commons will no longer be preoccupied with searching for books in the stock rooms. This freedom will allow the staff to provide much needed services, such as offering one-on-one research assistance and running skills workshops.

The learning commons should not completely abandon the print media. The digitization of scientific and legal journals, textbooks and handbooks have been a welcomed development, but there is still a general longing for the sensual experience of holding a book. Gyorgy Konrad, a Hungarian writer, explains:

The tangible and the intangible are not enemies, nor are the sensual and the intellectual. [...] Let digitization (thank God for its successes!) take ever greater bites out of the store of knowledge; this very progress increases desire for the private, the banal, the personal, the intimate—for person to person experiences and dialogues.¹¹

Konrad's assertion that the rise of the intangibles has brought more value to the tangible, closely ties to the arguments of Manuel Castles regarding the reinforcement of space of places to counterbalance the space of flows. In fact, the more information is diffused in the dataspace, and the more distant the community sprawls, the library becomes far more significant to compensate for the loss of the spatial and temporal dimensions. The Rolex Student Learning Center symbolically emulates the space of flows and the ephemeral actions of learning. At the same time, it amplifies the feelings of disorientation and incoherence that results from the electronic paradigm of information.

Rem Koohaas's competition scheme for Bibliothèque Nationale de France was one of the first libraries to balance the competing logic of flow and place. The library project was commissioned by the government of President Françoise Mitterrand to mark the dawn of the digital revolution and represent a global library. In addition to providing for public programs, such as restaurants and conference center, 75% of the program was to consolidate the five libraries that contained all

11 Gyorgy Konrad, "In The Library," in *Living Library*: Wiel Arets: Utrecht University Library, ed. Marijke Beek and Eva DeCarlo (New York: Prestel Pub, 2005), 75.

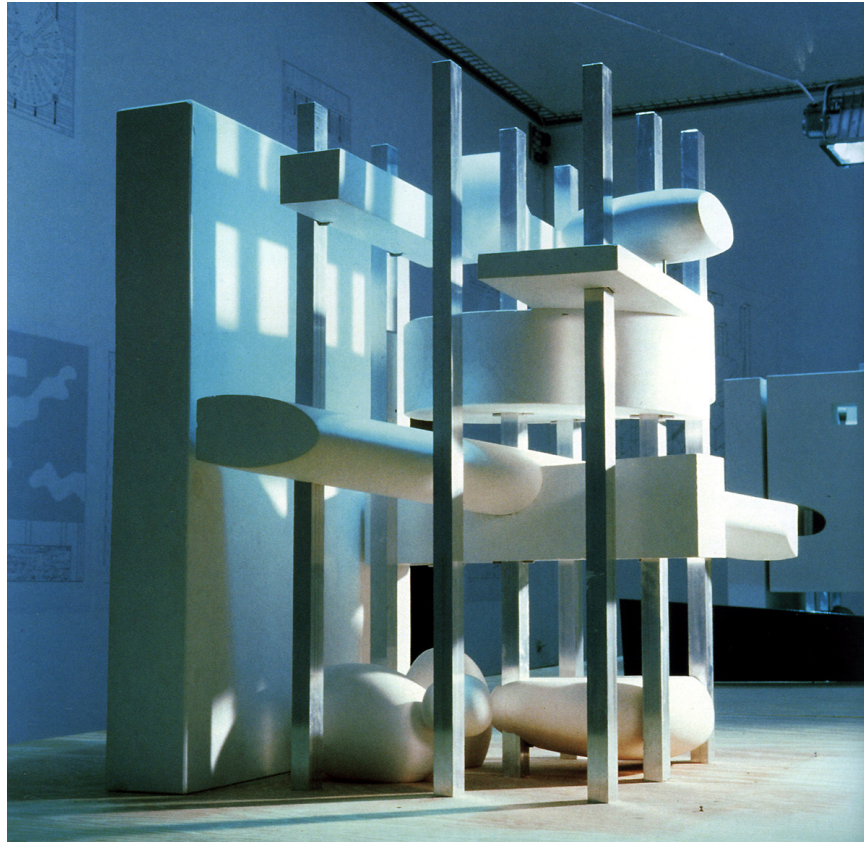


Fig.76-Koolhaas's entry for Bibliothèque Nationale de France, model shows solid forms of storage programs and voids of social space

post-war production of text, images and videos.¹²

Koolhaas clearly identifies the interplay between the functions of flow and meanings of place as the basis of his competition brief:

The ambition of this project is to rid architecture of responsibilities it can no longer sustain and to explore this new freedom aggressively. It suggests that, liberated from its former obligations, architecture's last function will be the creation of the symbolic spaces that accommodate the persistent desire for collectivity.¹³

12 Rem Koolhaas et al., ed., *Small, Medium, Large, Extra-Large: Office for Metropolitan Architecture, Rem Koolhaas, and Bruce Mau* (New York: Monacelli Press, 1998)602-662.

13 Ibid.

OMA's disclaimer about his project recognizes that the 21st century library will be oriented towards people and should address social issues. The literal approach to this problem would be to eliminate or conceal any type of material storage. However, Koolhaas inverts this logic. All storage programs of the library are deliberately separated from the public spaces, and contained within five solid forms resembling different forms of memory archived in a very big cube. The forms are legible and monumental. Each library is shaped by its own logic and independent of the exterior. The solid forms create variety of negative spaces used for different public activities. The translucent exterior provides a faint shadow of what is contained inside. There is a perceptible correlation between the container and the contained, which embodies the logic of a traditional book.

At a time when information is pervasive, and place and time are losing meaning, Koolhaas' scheme presents a strong thesis to reinstate the power of objects in order to give a sense of orientation and coherence to an increasingly fragmented world. Instead of amplifying the anxieties and the sense of disconnectedness that comes with digital information, this project alleviates those feelings by projecting a sense of control and order in a careful mutation of a classical building type.

The juxtaposition of contrasting pairs—tangible and intangible, progressive and historical, collaborative and silent, light and dark, slow and fast—should be a celebrated aspect of the learning commons. Learning needs diversity of space, and it should offer the opportunity to be perceptible of ambiguities and paradoxes. The Exeter Library by Louis Kahn also embodies a great balance of opposing relationships. Upon entrance, Kahn masterfully orients the patrons to a great atrium animated by light, geometry and books. Patrons then move to the intimate setting of a reading carrel next to a window where they are greeted by natural light and a pleasant view of the landscape. The view that one encounters when they lift their head up from a book, or when they shift their gaze from their computer screen, is an important experience of the library.

An ethnographic study of McKeldin Library, in University of Maryland, revealed that when students are working in the library, they alternate between periods of extreme productivity and rest. In their interviews, students indicated that they preferred bright environments, attractive furnishing, and a view at a distance to relax their eyes.¹⁴ The study summarizes its findings as such:

People who use the library need to work with a variety of physical materials, electronic resources and devices; spread their material out and see what they are doing; shift rapidly between serious work and breaks to rest, socialize, or do something relaxing; eat and drink; retreat from distraction, sometimes into privacy and silence, sometime into quiet noise and companionship; and get help finding or learning something.¹⁵

14 Patricia Steele et al., *The Living Library: An Intellectual Ecosystem* (Chicago: Association of College and Research Libraries, 2015), 35-36.

15 Ibid, xiii.

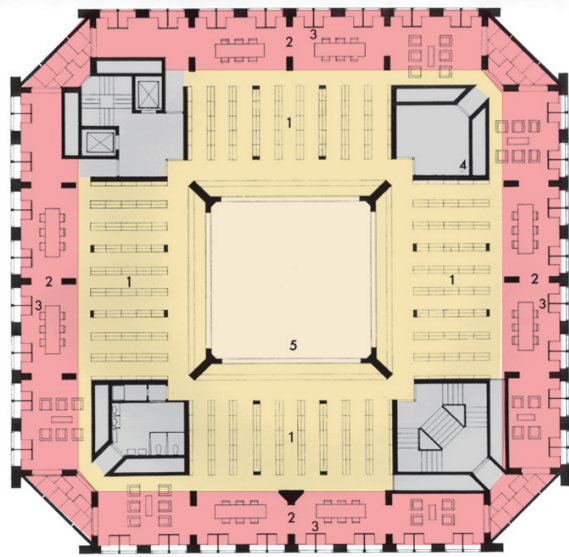


Fig.77-Exeter Library typical plan



Fig.79-Exeter Library entry atrium

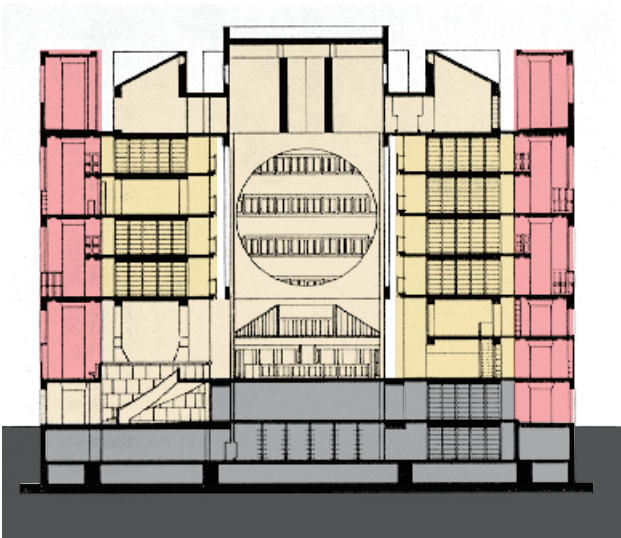


Fig.78-Exeter Library section

- Atrium
- Circulation
- Stacks
- Archive
- Study



Fig.80- Exeter Library intimate study carrel

The McKeldin Library study makes clear that students need variety of spaces for different tasks at different times of the day. Students use the library to access resources and to be amongst like-minded peers. To do something individual collectively, students feel a connection to a grander academic purpose. At the same time, students are constantly fighting off distractions, and need space to think and concentrate. They want to be able to choose from a variety of settings, and to have a measure of control over their environment. While students look to the library to find legacy and digital resources, they want the library space itself to be inspiring and stimulating.

As the physical expression of intellectual activity on a campus, the architecture of the learning commons must establish a dynamic presence, conjure imagination, and entice engagement. By offering learning services and technology support, it expands, not replace, the role of a traditional academic library to further skills of the students outside the classroom. The program may include tutoring, skills workshops, digital fabrication labs, multimedia production studio, and counseling. This model of integrated services and resources will be a step against information obesity and the problems of social isolation.

Conestoga College Library

The library services at Conestoga College is focused on providing resources to students and faculty. The Cambridge campus has a 4,300 sf library room on the ground floor of the Engineering Building. Due to the distance between the two campuses, Cambridge students do not use the main library in Kitchener campus. The main library occupies 25,800 sf of the second floor of Building B. It is directly accessible from the main pedestrian spine. There are no exterior views of the library from the north side, as the main loading dock is in front of the building. Two small entrances next to the loading dock, bring pedestrians onto the main spine and then into the library. From the south, the library faces the pond and the trees screening Highway 401. To keep up with the demands of a growing population, the library has been renovated in small increments over the years. In 2003, 5400 sf was added to the south side of the library. The most recent renovation was completed in 2016. Finishes and furniture were updated to look more contemporary and comfortable. Fully glazed partitions opened the library to the main spine, showcasing the activities happening in the library lounge. Keeping with current trends and metrics, the library collection was expanded to E-resources and one third of the collection was weeded out. With less space required for stacks, the result has been an open plan configuration, providing a mixture of independent and collaborative study spaces.

Despite the renovations, the library is still too small to accommodate the needs of a growing population. According to the Standards for Canadian College Libraries, there should be 1 seat provided for every 10 students.¹⁶ That means, the entire college should have approximately 1200 library seats. However, the main library at Kitchener has total of 500 seats, and the Cambridge library has 130

16 CTCL Standards Committee, *Standards for Canadian College Libraries*. (Canadian Association of College and University, 2004), 8.



Fig.81-Library opens to the main corridor



Fig.82-Library entrance provides a lounge

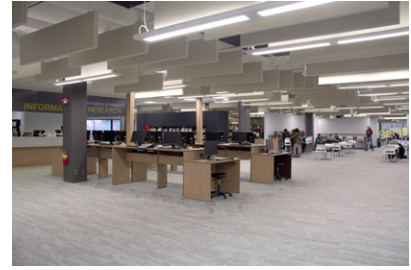


Fig.83-Newly renovated library offers an open plan

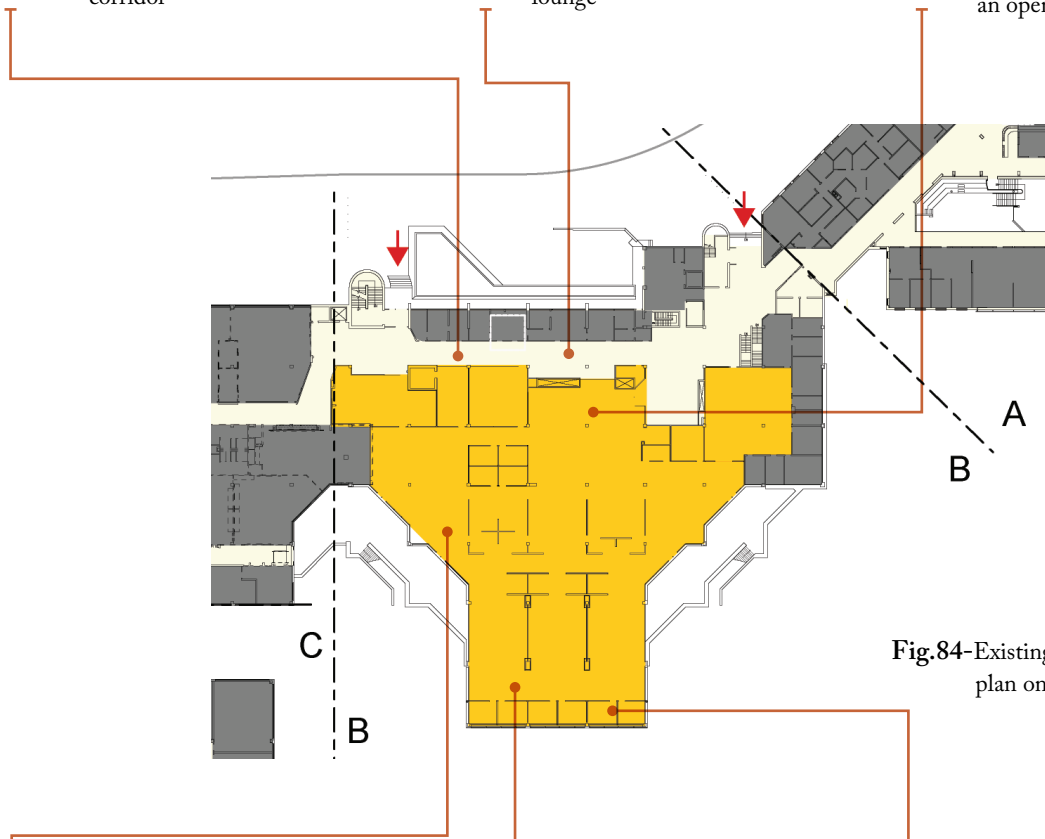


Fig.84-Existing Conestoga library plan on level 2, Building B

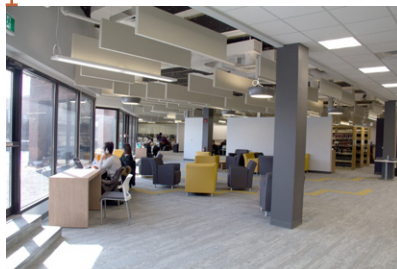


Fig.85-Partitions and stacks create separation for clusters of seats

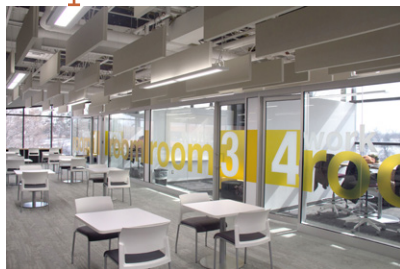


Fig.86-Group and individual spaces along the south edge



Fig.87-Group meeting room facing the lake

seats. Therefore, the library should be at least twice its existing size. In a commuter campus, with a diverse demographic of full-time and part-time students, the availability of space and resources in the library plays an important role in the success and retention of students. Many students rely on the library for peace and quiet, and a place to go between classes to study or interact with peers and the faculty.

Conestoga Learning Services

The existing program called Learning Commons at Conestoga College is known as learning services in many other institutions. The program focuses on assisting students with learning skills and providing remedial help. Services include peer support, skills workshops, and math and writing clinics. These services are appointment based, whereas the library's services are generally drop-ins. As of 2016, the department also oversees programs for accessibility and health and counseling services. The Learning Commons is currently located on the first and second floors of Building A, at 16,650 sf. The open lounge on the oversize stair landing is one of the few gathering spots in the building. According to Patricia Weigel Green, the Library Director at Conestoga College, the program would prefer more open spaces for students to study before and after appointments. It is also preferable for the staff to be in a flexible open offices. Shared meeting rooms could be used when the privacy of students is of concern. In general, Learning Commons would like to promote openness; they want to send the message that there is no shame in seeking support.

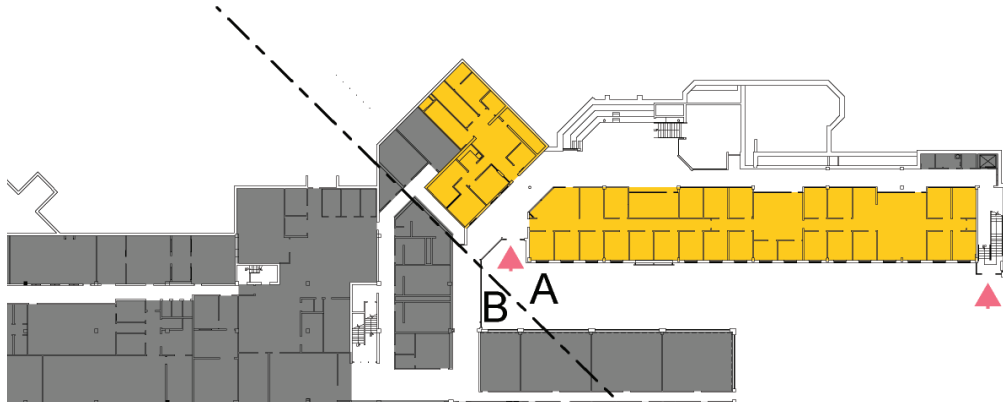


Fig.88-Existing Learning Commons on level 1, Building A

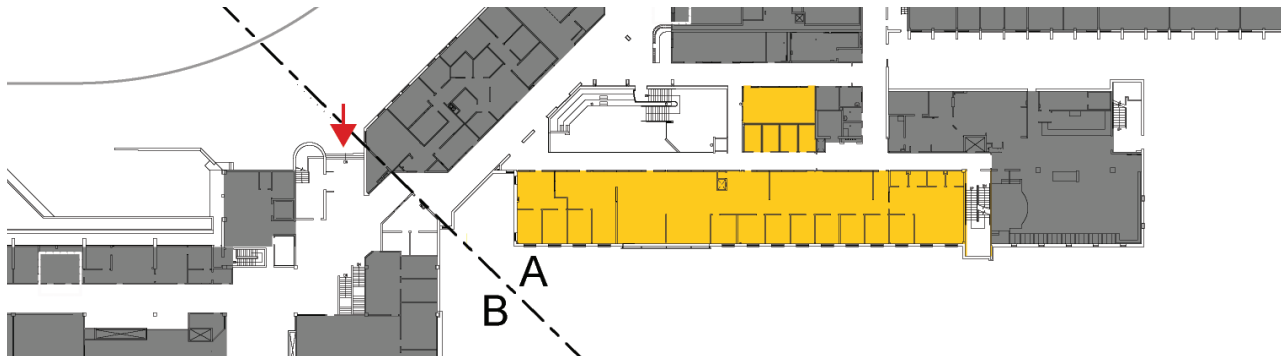


Fig.89-Existing Learning Commons on level 2-Building B



Fig.90-Existing Learning Commons panorama

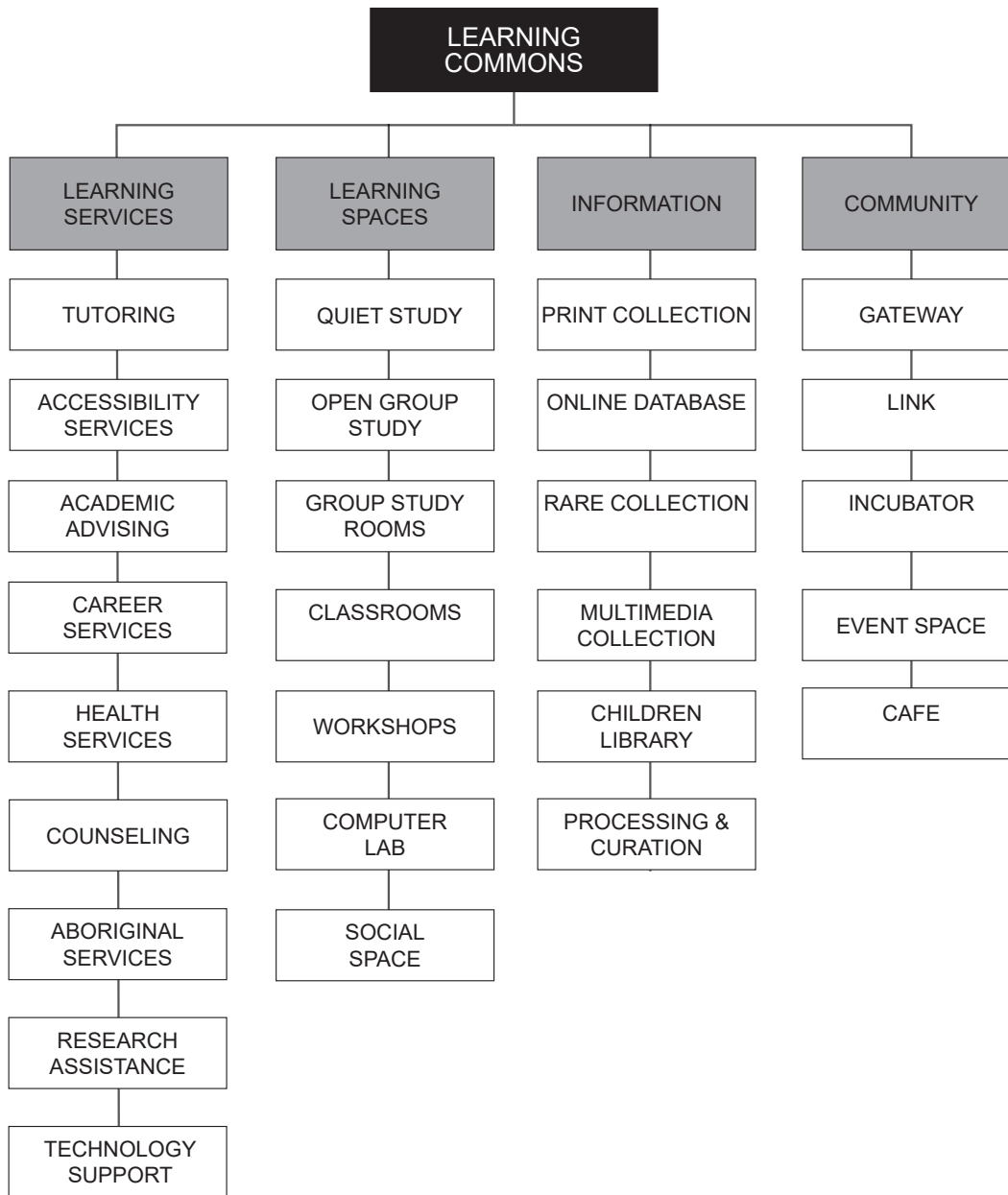


Fig.91-Concept program for integrated Conestoga Library & Learning Commons

A Future Library and Learning Commons

If given the availability of real estate and funding, there is a strong desire to establish a collaborative model between the library and learning services at Conestoga College.¹⁷ Already, the two departments collaborate on writing clinics, workshops and training of Technology Tutors. In an ideal collaboration scenario, all support would be consolidated into a unified information/service desk. The staff would be cross-trained to assist students with common questions and IT problems. The one-stop shopping would provide students easier access to services, and reduce duplicated resources.¹⁸ If we are to look at a truly collaborative model, we need to look critically at the relationship between the two campuses. Instead of piecemeal renovations and expansions, a central learning commons can unite the two campuses and address the needs of a growing college population. The center would provide integrated services for resource distribution and information literacy, and visibly articulate that learning and community are at the heart of the institution.

17 Patricia Weigel Green (Conestoga College Library Director), Interview by Author, Kitchener, July 20,2016.

18 Ibid.

4| DESIGN PROPOSAL



Fig.92-Aerial diagram showing connection to site amenities

DESIGN GOALS AND STRATEGIES

The design of the new Conestoga “Library and Learning Commons” converges the logical obligations of movement and program with site-specific nuances, to inspire a sense of community for the college, and to become a monument for the greater contemporary city. Informed by the three scales of disconnectedness: the suburban city planning, the campus master plan and the digital medium of information, the library proposal is expanding the capacity of infrastructure, and establishes a series of relationships across the different scales, speeds and programs. The library is designed to stitch the fragmented campus, and galvanize existing amenities such as the forest, the pond and the bike path.

To respond to each level of disconnectedness, I have studied the current state of the site, the campus history, and the pedagogical trends regarding libraries. These investigations are presented in detail in the previous chapters. To make the most positive impact with the library, I have concluded that the campus master plan should be revised to strengthen the goals of connectivity and community. The current master plan continues to address the two sites as separate campuses with their backs turned against Highway 401. My proposed master plan looks at the two campuses in unison. The comprehensive master plan exceeds the confines of each campus boundary and offers a scheme that promotes circulation over the highway and engagement with the exiting landscape.



Fig.93-Building B facing the ring road and the forest



Fig.94-Aerial diagram showing the renovation strategy for Building B in Kitchener campus

Kitchener Campus: Connecting the Forest and the Lake

The two major features of the Kitchener campus are the central forest and the pond. They are astonishingly beautiful throughout the seasons, yet they have very little connection to each other and the major spaces of the buildings. While the existing library and cafeteria offer serene views to the pond, one must circumvent the entire megastructure to reach the pond from outside. The wooded land separating it from the highway has a steep slope, making the occupiable space around the pond small and limited. The forest offers a respite from a continuous layer of asphalt that constitutes most of the campus, but it cannot be a substitute for a much-needed open public space. On many visits to the campus, I have observed students gathering around the picnic tables placed in front of the bus stop.

The central section of the megastructure, Building B, faces both the pond and the forest. However, the side facing the forest is abutted by a large loading dock, and the side facing the pond is at best underwhelming. Due to its central location, the bus stop is also located few meters away from the loading dock. In the 1968 campus master plan, Building B was designed to serve as the forum for the college. At four stories tall, the building is the tallest and the most visible part of the campus. The upper floors provide an elevated view of the forest, however the programs on these floors are limited to administration and mechanical services. The cafeteria is centrally located at the lower level of Building B. The natural fall in elevation allows the cafeteria to have full height windows looking towards the pond. While the location of the cafeteria is central and the space is adequate, better connections to the main level could be provided. My master plan proposes a new outdoor plaza on level 2 (slightly above grade), that provides an iconic and a porous connection between the forest and the pond. The space will be a relief from the congested existing pedestrian spine. It will become an arrival plaza, facing both the forest and the pond, where a wide range of outdoor events and gatherings can take place.

Cambridge Campus: Developing of a New Campus

As noted in chapter 2, the Cambridge campus has been in commission since 2011. The phase 1 implementation of the master plan included the first academic building, a central campus lawn, and some required infrastructure including an entrance from Fountain Street and a parking lot. In accordance with the guidelines set by the Grand River Conservation Authority, the existing master plan has made consideration for storm water management, creek protection, and conservation of the natural ecosystem. Therefore, my proposed master plan respects the boundaries of the area marked for development. However, the existing master plan turns its back to the Kitchener campus and does not integrate The Walter Bean Grand River Trail abutting the site.

The existing master plan is inspired by the Beaux Arts principles of campus planning. A great central lawn is featured along a formal axis, and it is flanked by subsidiary academic buildings. The orientation of this axis is set by Kitchener's prime axis and the existing tree line on the Cambridge campus. The tree line running east-west, has been a native feature of the site. Nevertheless, the existing master plan fails to anchor the axes with strong focal points and destinations. Operating on the design objectives posited in this thesis, my proposed master plan looks to connect the two campuses and accentuate the existing features of the site. Therefore, by proposing a sinuous library along the existing tree line, I emphasize the connection to the bike trail, and provide a path towards the Kitchener campus.

Rather than placing the Sports Multiplex outside the campus boundary, I have placed it at the end of the longitudinal axis. The large and iconic structure would define the central lawn and provide a monumental backdrop to the campus. In addition to the Multiplex, a baseball field, tennis courts and a track and field arena are integrated in the landscape to activate the outdoors and encourage spectatorship. The juxtaposition of the multiplex and the library supports programmatic synergies, intensification and density. In contrast to the homogeneity of the Kitchener's megastructure, the Cambridge campus would epitomize plurality through the composition of multiple buildings.

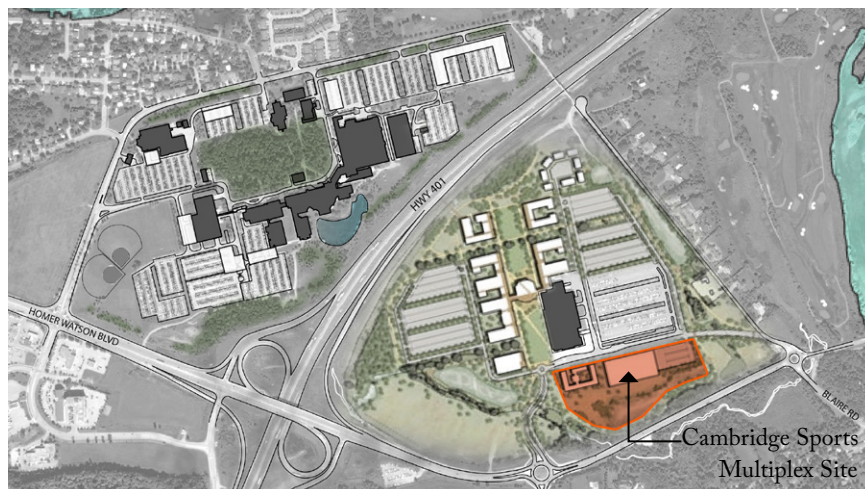
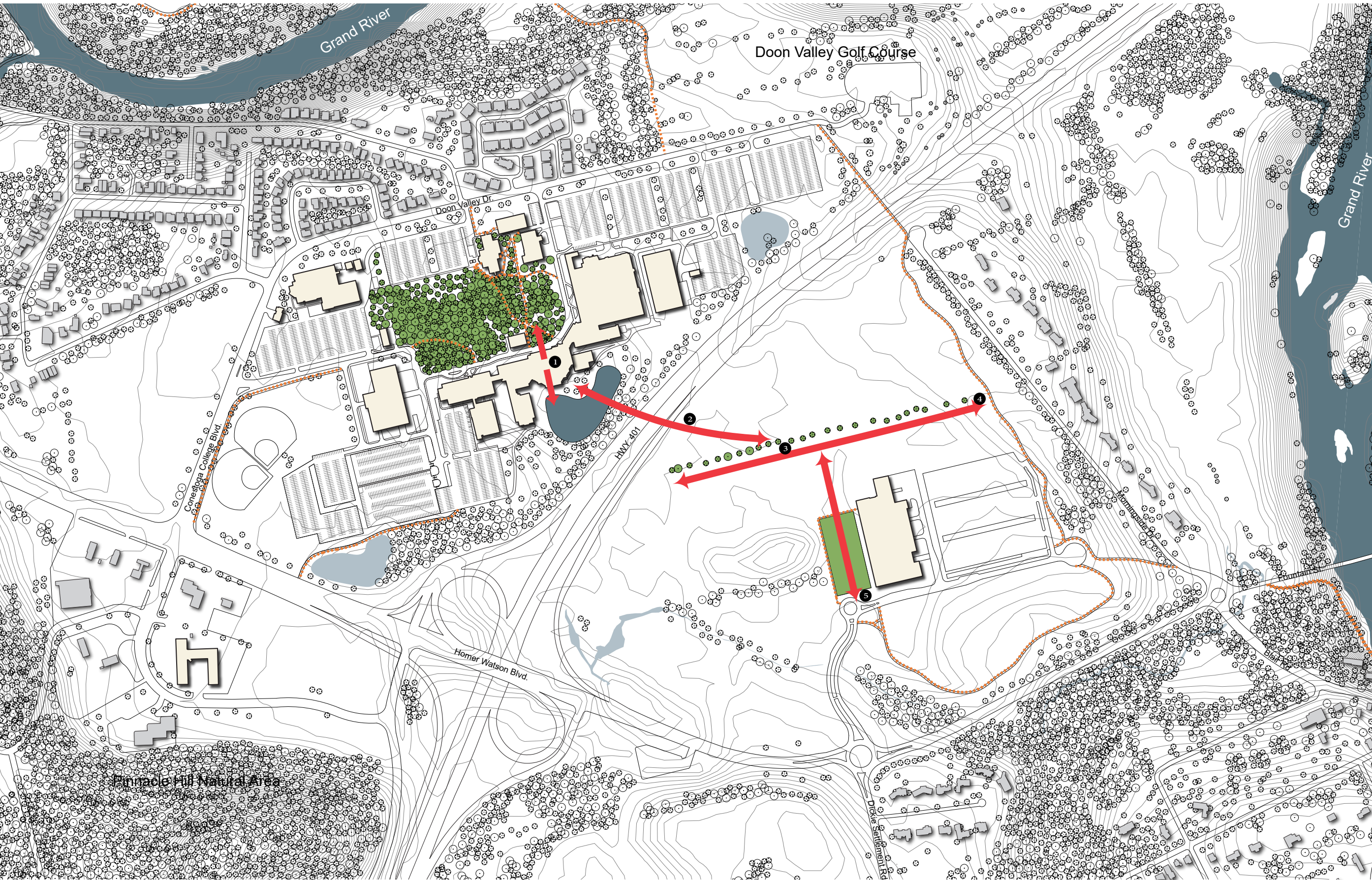


Fig.95- Existing Cambridge Campus master plan by WalterFedy Consultants



- 1 Connect The Central Forest to The Lake
- 2 Provide a Walkable Path Between The Campuses Over the Highway
- 3 Strengthen The Existing Tree Line
- 4 Connect to The Walter Bean Grand River Trail
- 5 Intensify Activity Along Campus Lawn With A Connection to The Bus Stop

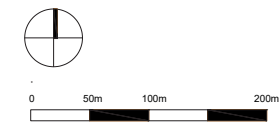


Fig.96-Proposed site plan strategy

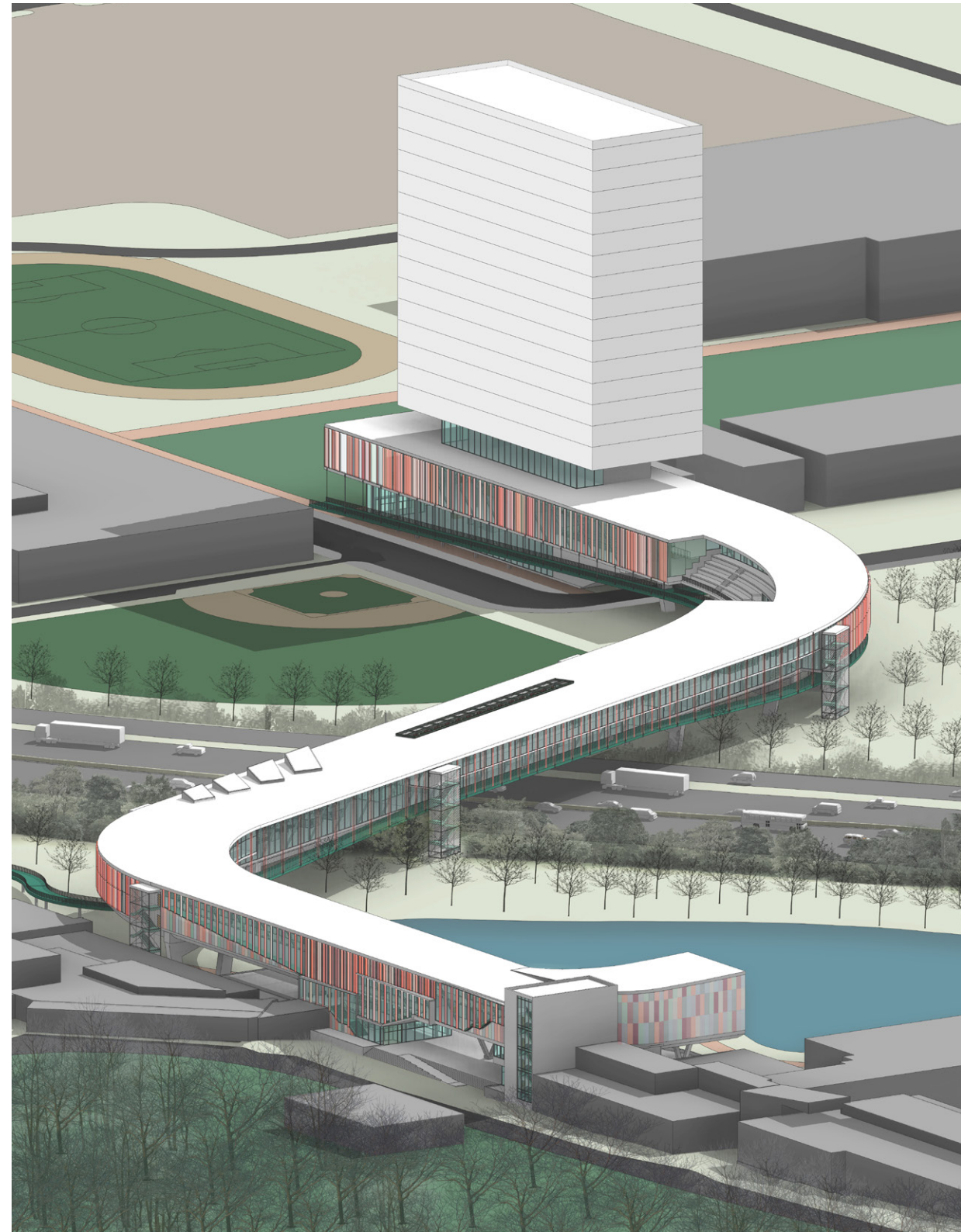


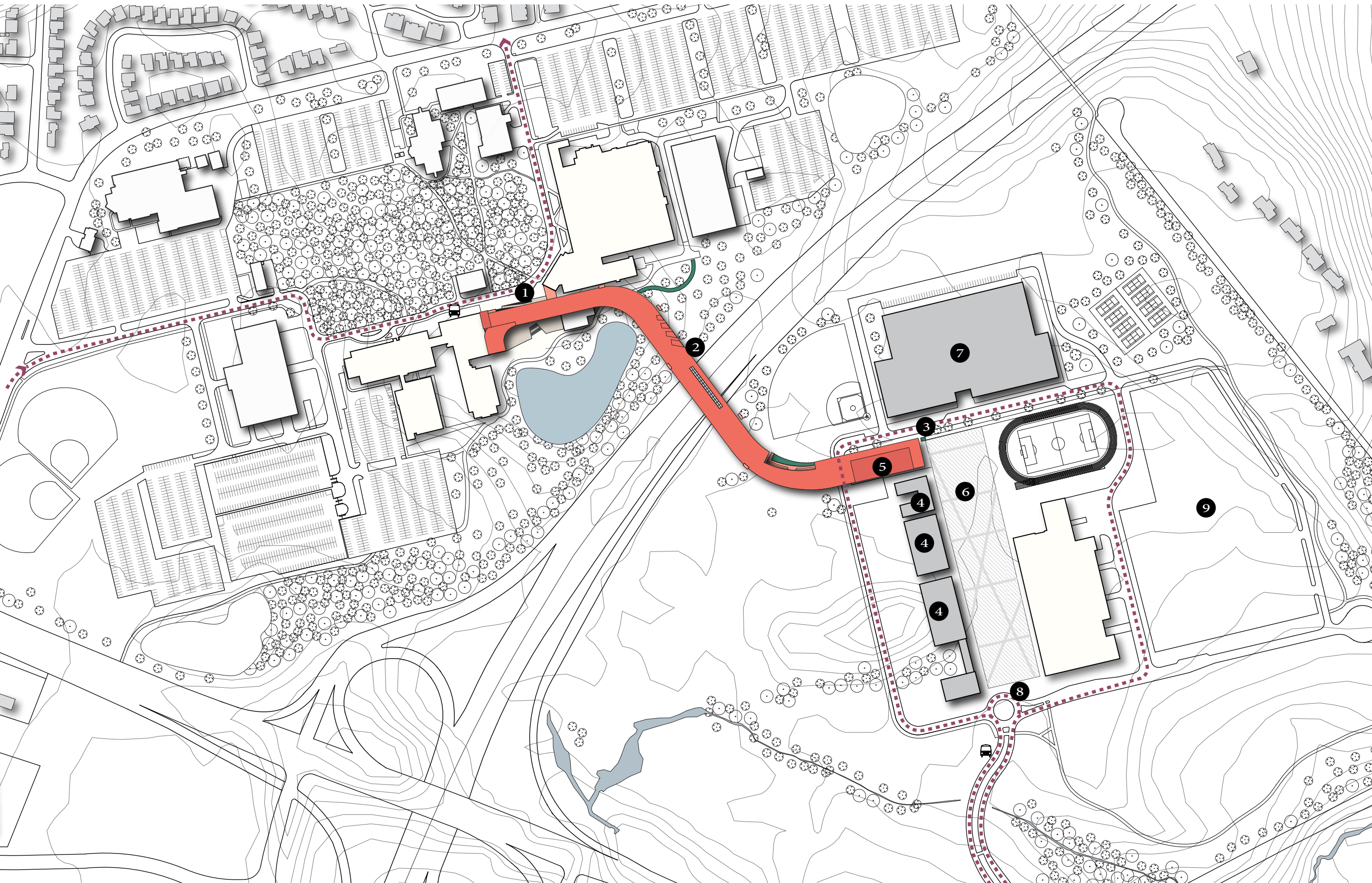
Fig.97-Bird's eye view of the library looking from Kitchener towards Cambridge

THE BRIDGE : *Connection & Orientation*

A bridge can metaphorically and pragmatically unify disparate parts. While it imposts an infrastructural device, it has the formal capacity of architecture to circumscribe events and activities, therefore, simultaneously embodying the paradox of flow and place. Lifting one from the ground, the bridge offers alternative views of the territory. Undulating above the landscape and moving objects, the journey along the bridge can be a cinematic adventure. The project ultimately constitutes a datum of experience instead of dissolving into the generic space of infrastructure.

As discussed extensively in chapter 1, the managerial approach of contemporary urbanization foregrounds infrastructure and subverts the architectural object. Ultimately, the loss of formal consciousness of architecture, which lays ground for political and social engagement, results in the regression of masses into private echo chambers, incapacitated to view conflict and multiplicity. In contrast, this bridge is a voyeuristic device that encourages the narrative of seeing and being seen in the suburban territory.

In my proposal, the library becomes a decipherable figure that is an antidote to the dominant infrastructural logic. It marks a physical center of gravity and becomes a monumental image of Conestoga College. Its formal presence punctuates the monotonous drive along highway 401 and reorients the two campuses towards each other and the highway.



- ① Central Public Plaza Connecting Forest and Lake
- ② Learning Commons & Library Bridging Two Campus
- ③ New Bike Path Along Existing Tree Line Elevated to Connect to Library
- ④ Academic Building
- ⑤ Residence & Conference Center
- ⑥ Campus Central Lawn
- ⑦ Cambridge City Sports Multiplex
- ⑧ Central Drop Off
- ⑨ Surface Parking/ Future Development
- Bus Stop
- Access Route

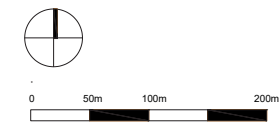


Fig.98-Proposed site plan

The Bridge: Infrastructural Monumentality

The notion of infrastructure plays a symbolic and pragmatic role in the structural design of the library. Employing similar structural language, the library makes visual references to large scale bridges and overpasses of the highway. The structural design provides an open floor plan and transparency to maximize light, views and flexibility needed for the ever-changing program of the library.

The structure of the building is essentially an inhabited truss bridge connecting the Kitchener and Cambridge campuses across the highway. It consists of two main components: steel trusses and precast concrete columns. The bridge spans 550m in total. For the most part, parallel trusses at 8m high are supported on 7 precast concrete columns. The two ends of the building land on top of other campus buildings, where columns and core structures support the truss frame. In the Kitchener campus, part of the bridge cantilevers out over the plaza in Building B. Currently, Building B has good-sized columns supporting the existing library and three levels of structure. However, to support the bridge and the plaza, additional columns and underpinning of the existing foundation in Building B is likely required.

The width of the bridge changes according to the internal programs. It is the narrowest at 15m and the widest at 21m. The clear span between the columns is at minimum 44m, and the longest at 95m, where it hovers over the highway. This section of the bridge houses the library's book collection. Vertical columns are integrated in the book shelf units, carrying the loads to the transfer beams in the floor. Girders are designed at 2m deep to support live loads, the truss structure and the weight of the books. The depth of the girders allows for the integration of an insulated mechanical floor below the library.

Truss elements must be fabricated individually and welded on site to facilitate construction precision and to accommodate the intricacies of the design. A secondary system of horizontal trusses should be incorporated in the diaphragms of the main floor and the roof in order to stabilize the main girders during construction, and to deflect lateral winds and seismic forces. A protected exterior bike path runs at the south edge of the bridge. It allows cyclists and pedestrians to travel between the two campuses without entering the building. The path is partially supported by beams cantilevering from the bottom chord of the truss and steel rods suspended from the roof.

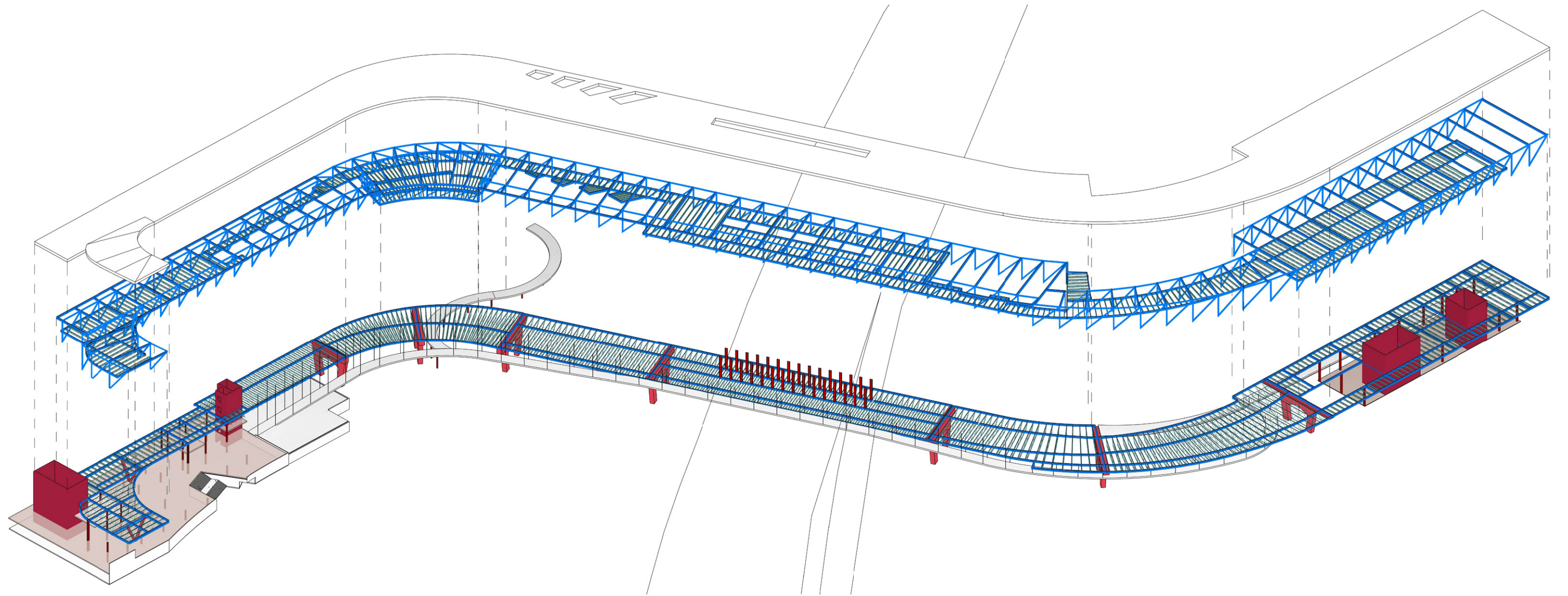


Fig.99-Structural axonometric

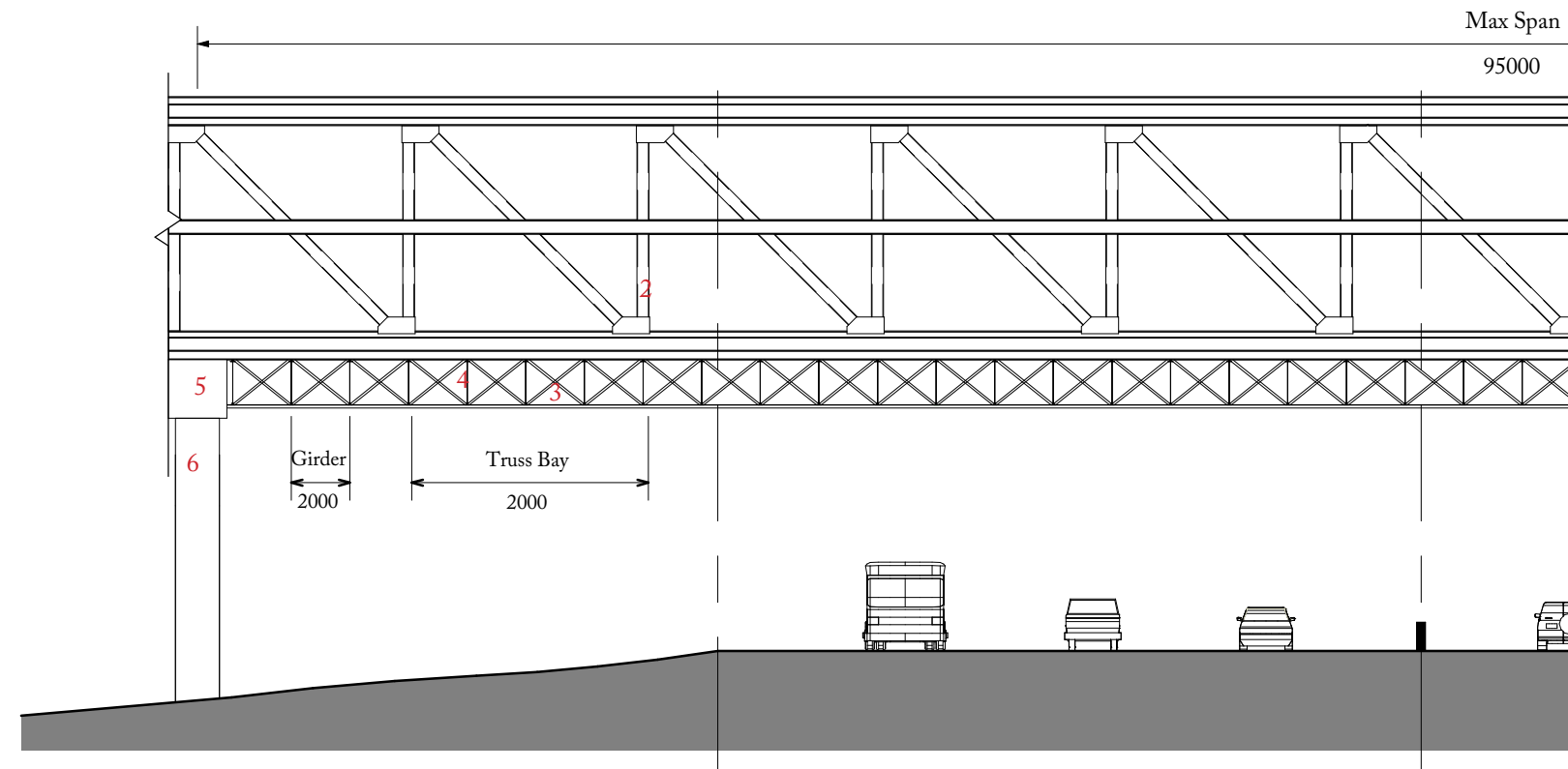


Fig.100-East/West structural section over the highway

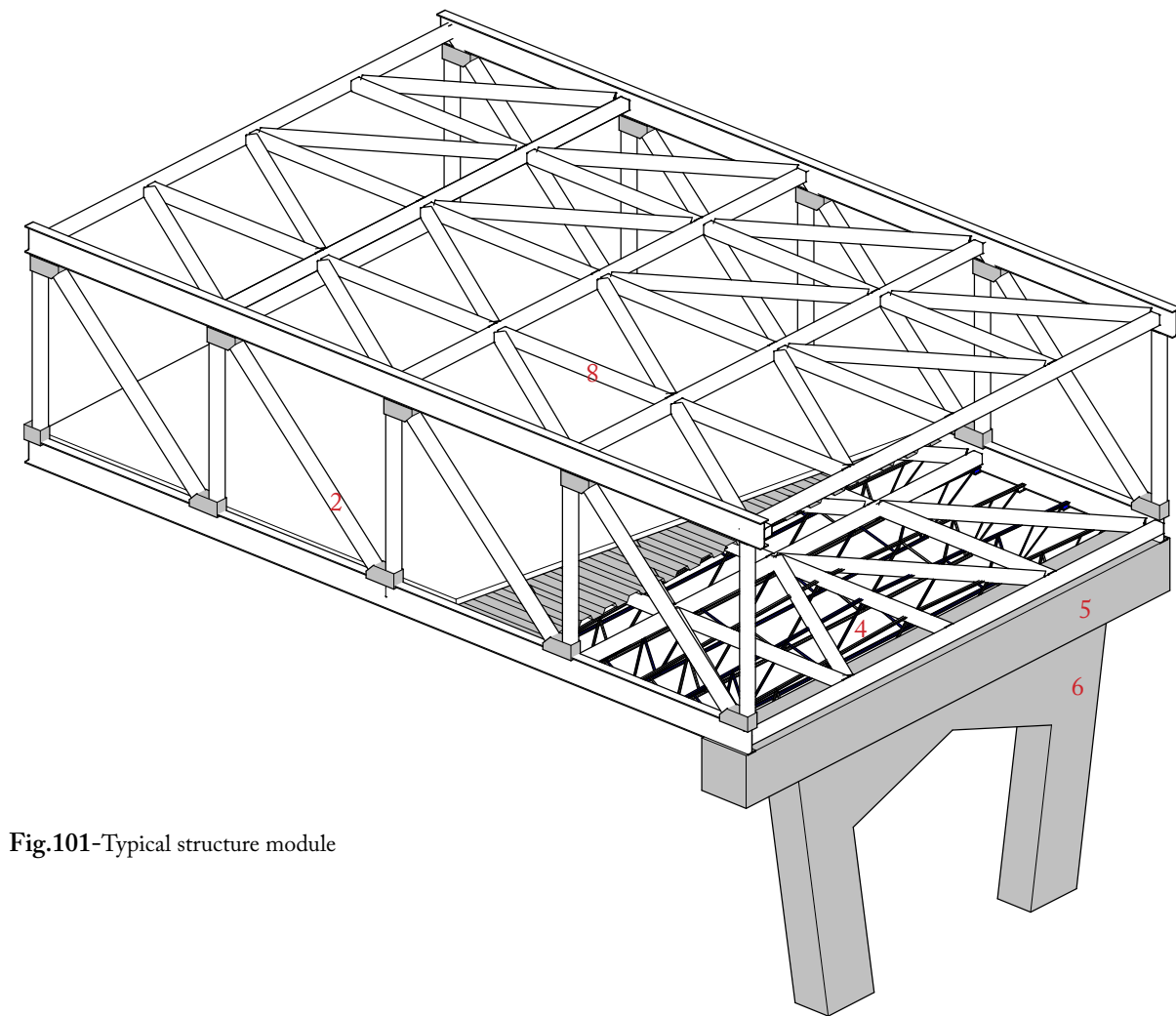
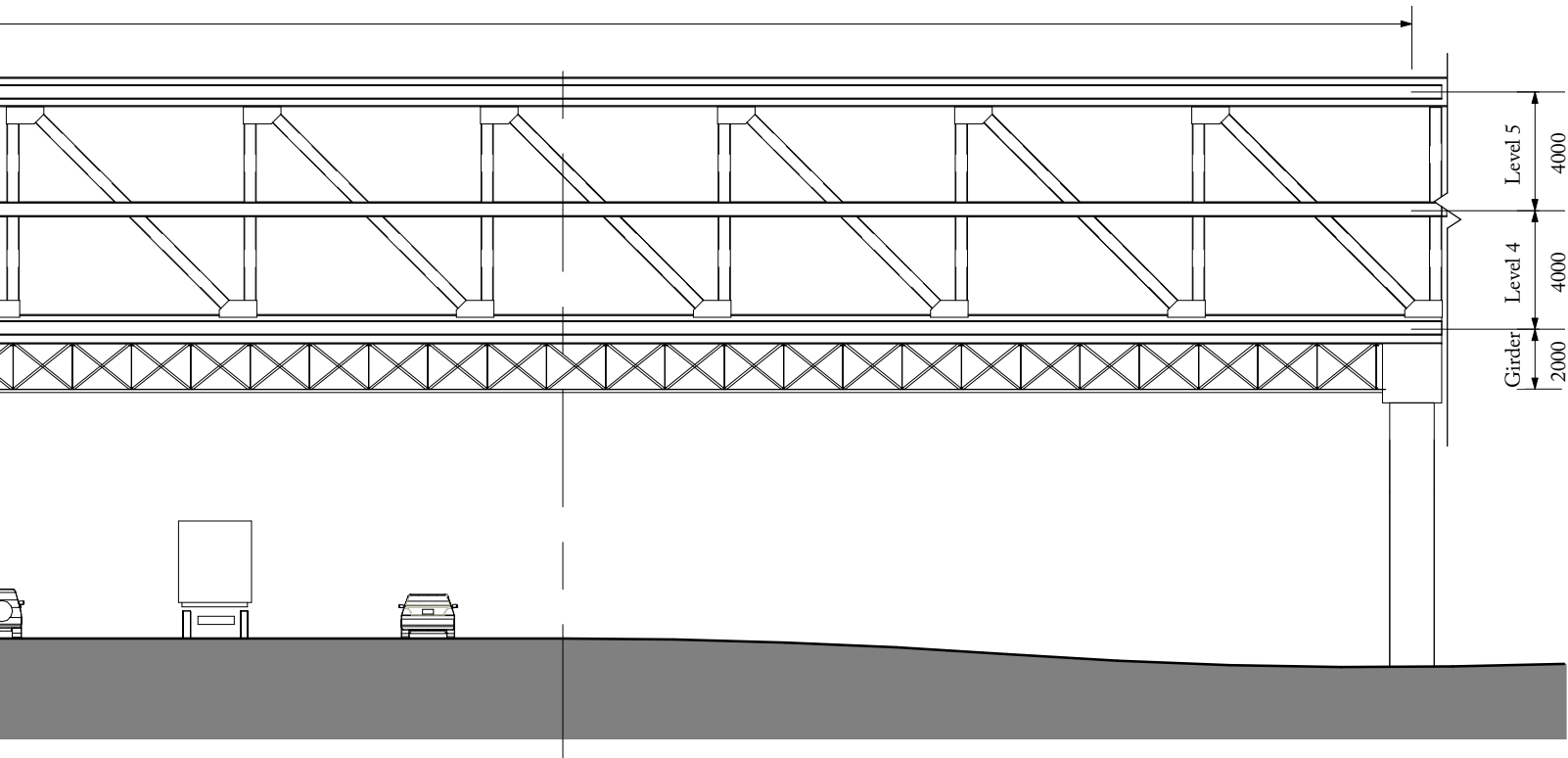


Fig.101-Typical structure module



- | | |
|---|-----------------------------|
| 1. Concrete Floor Slab | 6. Concrete Column |
| 2. Steel Truss | 7. Steel Rod |
| 3. Cross Bridging | 8. Horizontal Truss Bracing |
| 4. Girder Joist / Insulated
Mechanical Space | 9. Bike Path |
| 5. Concrete Beam | |

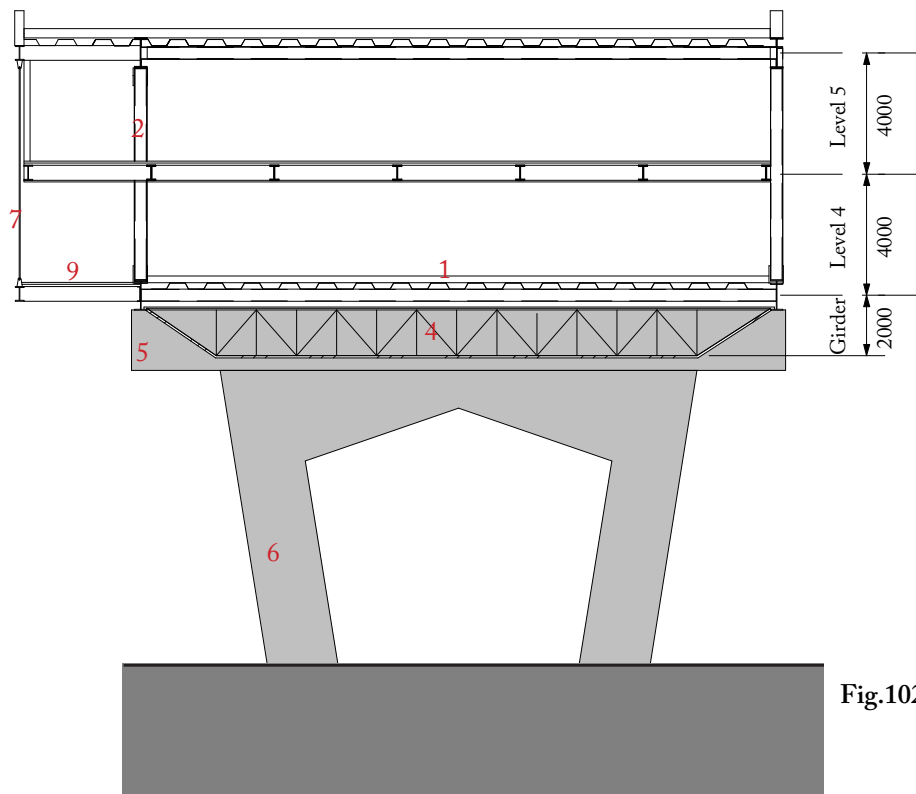


Fig.102-North-South structural section over the highway

- ① Plaza
- ② Bookstore & Café
- ③ Learning Services
- ④ Learning Commons
- ⑤ Library & Resource Center
- ⑥ Entry/Public Functions
- ⑦ Events & Conference Center
- ⑧ Residence
- ⑨ Bike Path
- ⑩ Pond
- ⑪ Forest
- ⑫ Highway

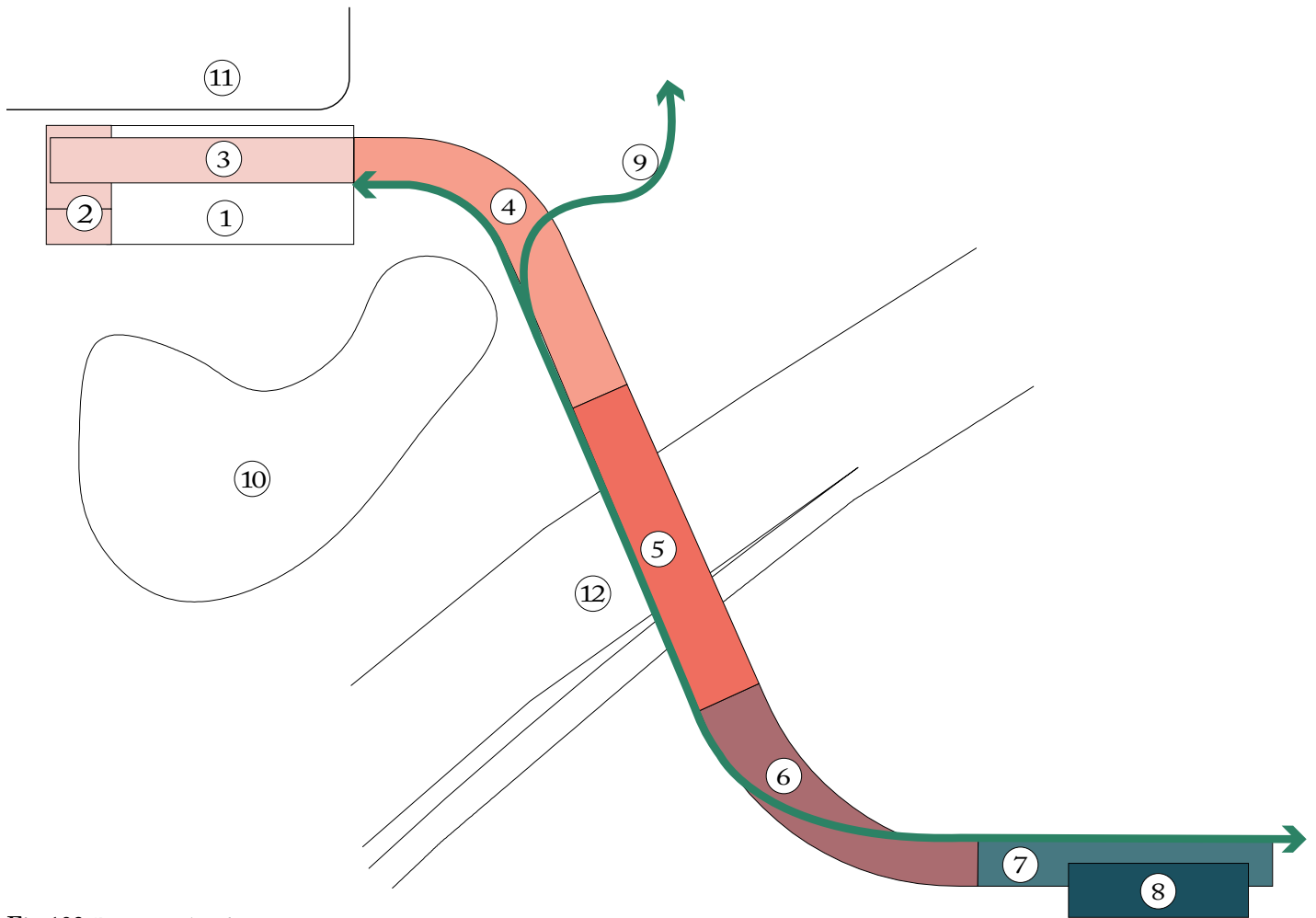


Fig.103-Program plan diagram

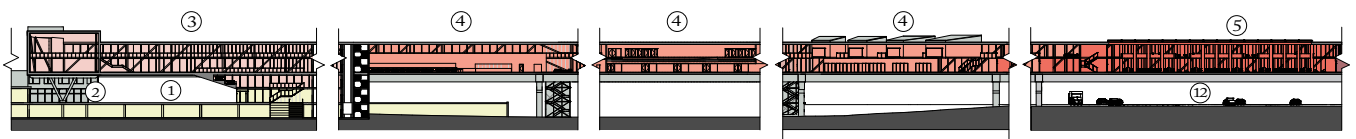
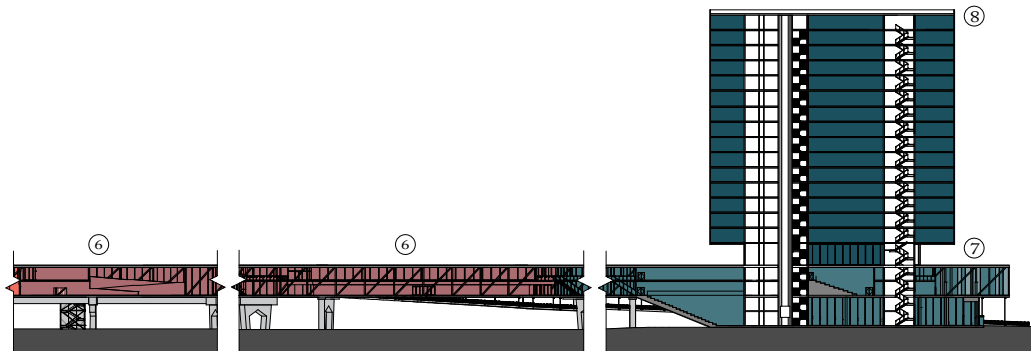


Fig.104-Program section diagram

The Bridge: Program

The program for the bridge is expressed as six different districts. They are organized from the most institutional to the most public as one moves from Kitchener towards Cambridge. The program is a balance between the traditional requirements for a library, spaces for collaborative learning, digital media, and community engagement. The careful choreography of concentration and interaction is expressive of the process of learning. The layering of programs intertwined with circulation paths of different itineraries create a complex social infrastructure that encourages new connections and perceptions.



The Bridge: Views and Orientation

The bridge strategically wavers in and out of the landscape to direct specific views and frames. The sinuous curve of the bridge provides a parallax experience of the bridge itself. One can peak into different programs, glimpse at the path ahead, and see a different perspective of where they have been. This dynamic relationship between the subject and object is continuously shifted through movement. The approach is a departure from the everyday experience of suburbia where everyone sees the environment through their own myopic vision.

In *The View From The Road*, Lynch, Appleyard and Myer examined the aesthetic experience of driving on the road. The authors argued for punctuating the path of movement with visual features without breaking the continuity. They noted:

This sequence is made up of many elements; it is convenient to group them according to a presumed progression in the process of visual perception. ... These perceptions are organized into identifiable objects, which are then interpreted as moving in space. The observer locates these moving objects and spaces in a total structure, orienting himself with regards to the world around him [sic].¹

The authors advocated for using visual nodes to generate mental maps and spatial orientation for the driver. Instead of straight roads, they promoted those with large curves softly blending into each other. Although the study was presented for the highway, the same principles can be applied to the experience of movement along the library bridge.

At the landing, the bridge follows the existing axis of the master plan. The shape follows a wide curve to span over the highway and connect to the other side. The pointing and wavering of the shape directs the attention of patrons to specific events and landscape features. For example, at the end-point in Cambridge, the event room looks towards the central campus lawn and the river in distance. Learning Services and the main circulation stairs have an elevated view of the forest, while the Writing Center on the Kitchener end is oriented towards the pond. In Cambridge, stadium seats are carved into the concave curve, focusing spectators towards the baseball field. Similarly, the tiered reading room steps down and provides a serene panorama of the pond. There is a strong visual connection between the interior and exterior communal spaces.

1 Donald Appleyard, Kevin Lynch, and John Randolph Myer, *The View from the Road* (Cambridge: The Massachusetts Institute Technology, 1971), 5.

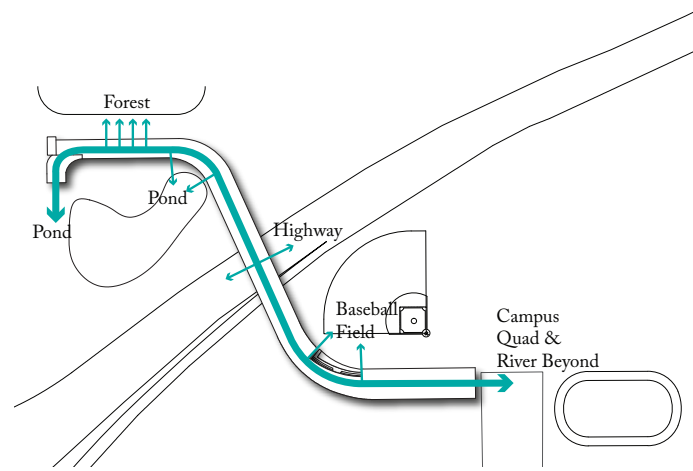


Fig.105-Diagram showing the visual sequences for the observer in motion

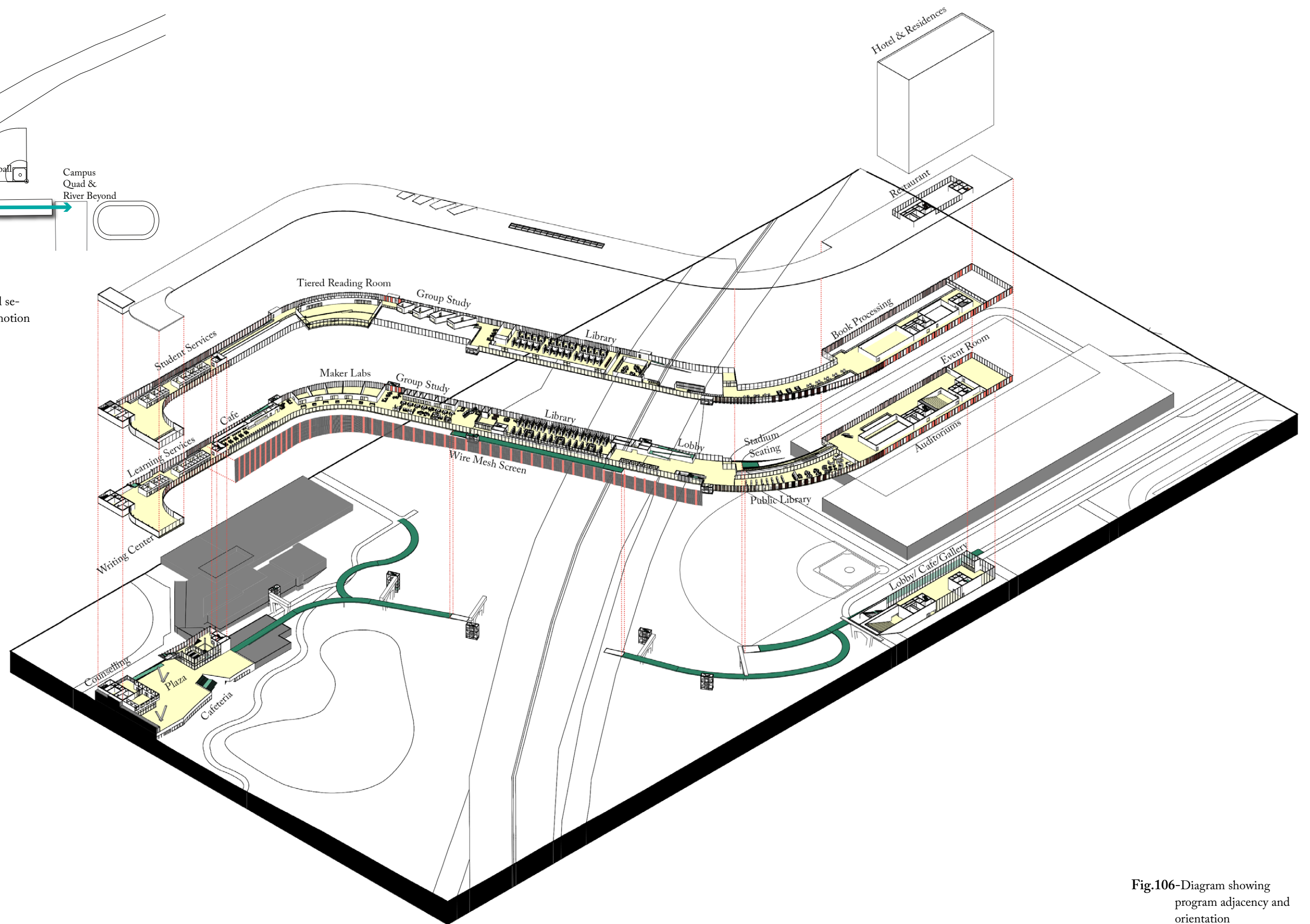


Fig.106-Diagram showing program adjacency and orientation

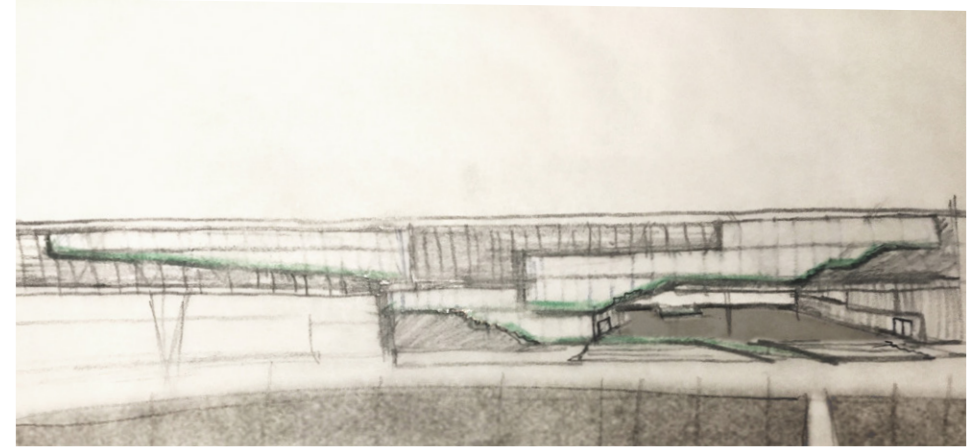
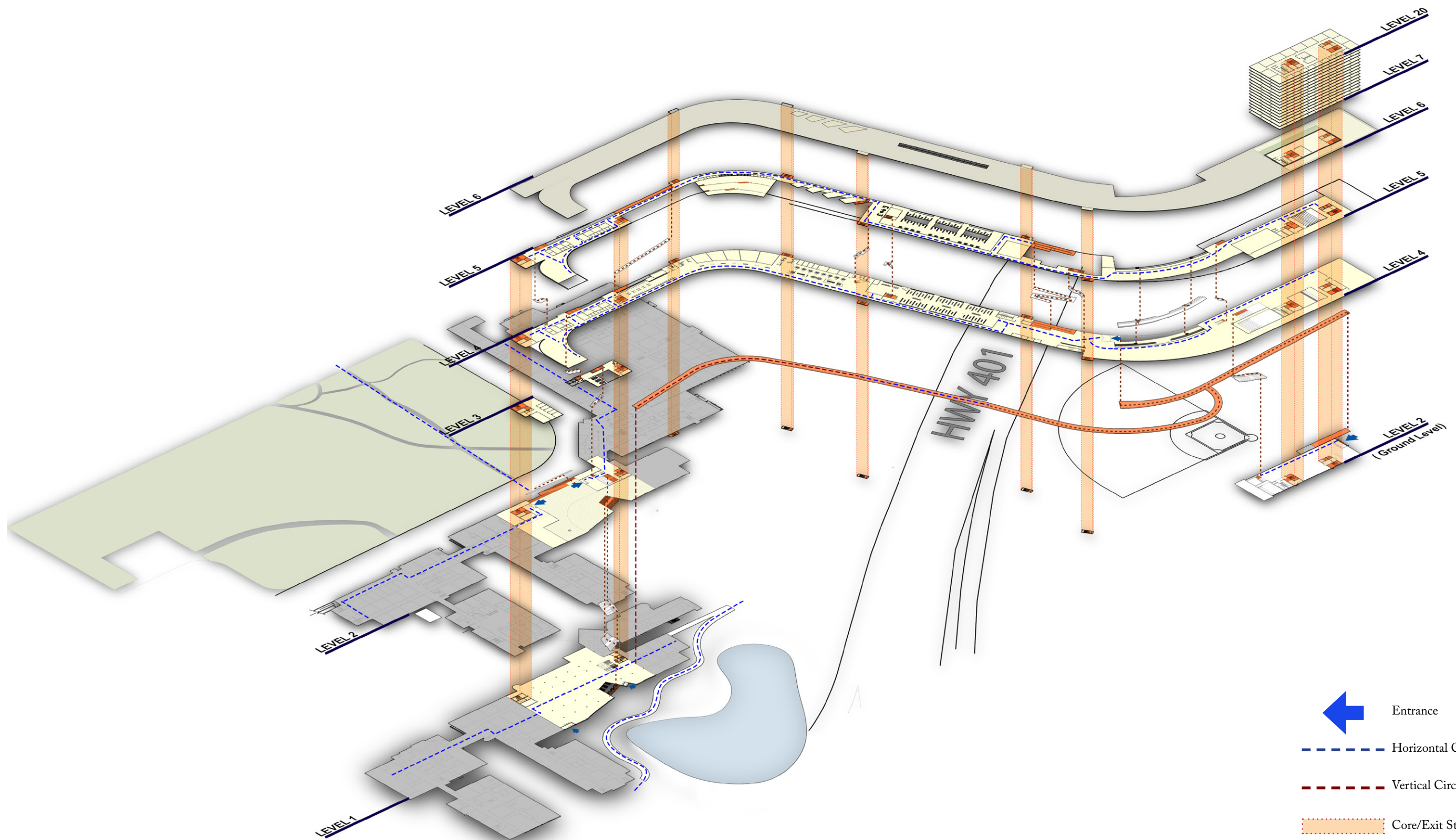


Fig.107-Sketch showing the plaza and the continuous staircase on the west facade

The Bridge: Connectivity

The design of the internal circulation is informed by the strategy to create links between spaces of flow. Exposing the bold colored circulation elements at the perimeter of the building, activates the elevation and allows users to understand the orientation and the circulation logic of the complex. Aside from increased physical activity, occupants are encouraged to use grand stairs and generous landing areas for impromptu meetings and serendipitous encounters. The internal ramps are not just accessibility means for patrons and book trollies, they also provide the instrument for slow and gradual movement to see and be seen. The superimposition of views of the interior programs and the exterior landscape creates a rich cinematic experience.







-  Entrance
-  Horizontal Circulation
-  Vertical Circulation
-  Core/Exit Stairs

Fig.108- De-lamination of the circulation system

The Bridge: Connectivity (Cont'd)

The proposed design establishes a connection to the Walter Bean Grand River Trail. A cyclist lane veers off the trail along the tree-lined axis at the edge of the central lawn. The lane then splinters into an elevated ramp that takes off from the library building. The ramp is 4m wide and has a 1:20 slope, which makes it suitable for wheelchair users, pedestrian and cyclists in both directions. Library patrons are directed towards the main entrance on Level 4; the rest of the ramp detours others underneath the structure and then along the south façade of the library. While on the path, one can peak into different programs and circulation spaces. Seen from the inside of the library, multiple speeds and modes of movement are layered in one view. This approach to the section animates the relationship between different flows and collapses different itineraries in a single frame.

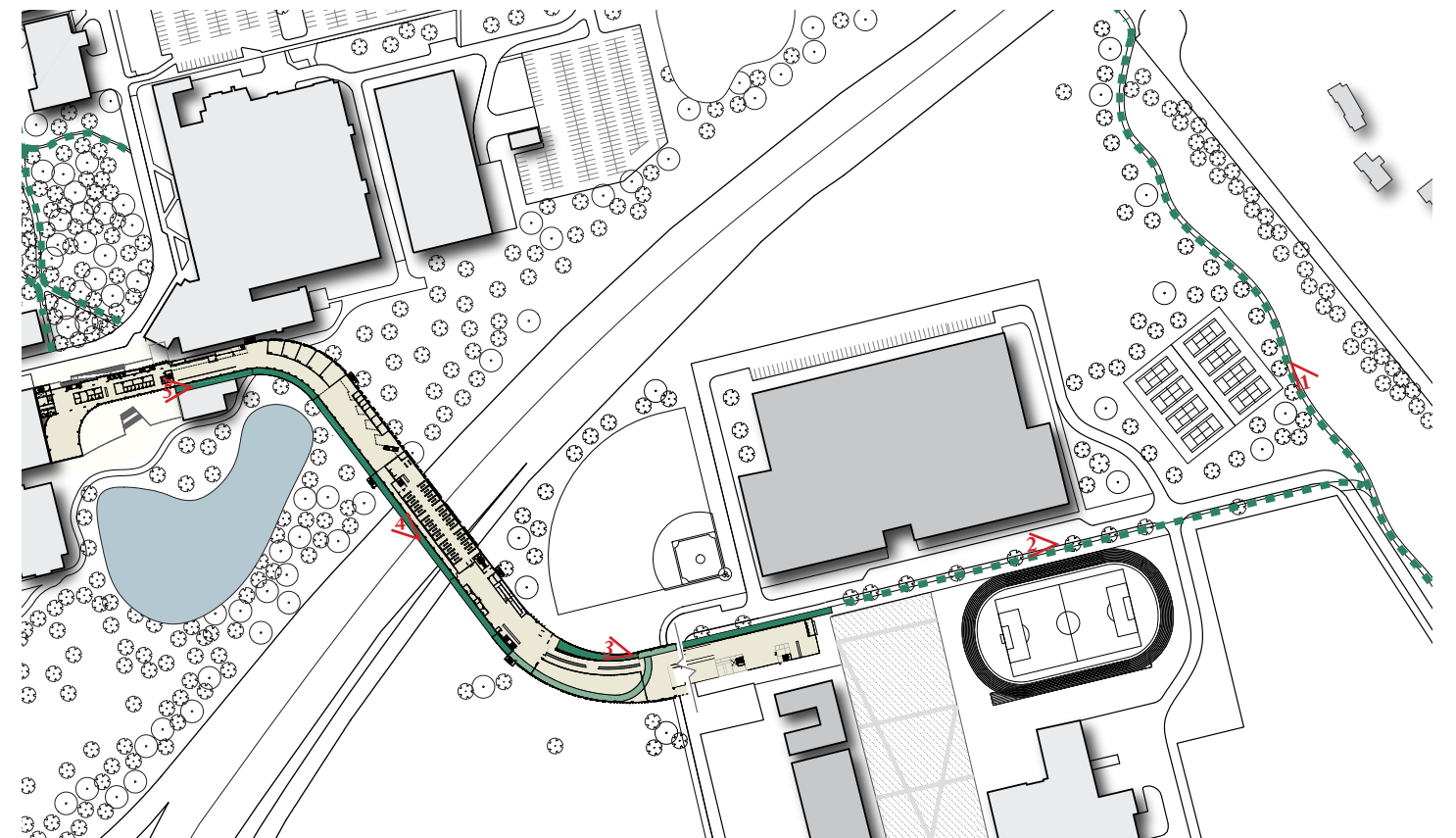


Fig.109-Site plan - bike path shown in green



V1: Cyclist approaching the existing academic building in Cambridge campus



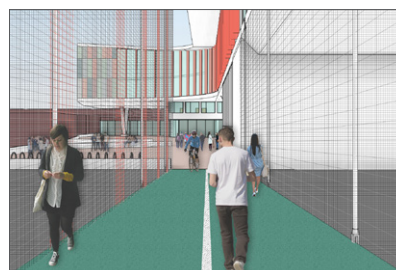
V2: Cyclist approaching the building on Cambridge campus



V3: Ramp towards stadium seating and library entrance on Level 4



V4: Bike path passing the library section over the highway



V5: Bike path approaching the plaza in Kitchener campus

Fig.110-The visual sequence as seen from the bike path

The Bridge: Legibility

The facade of the bridge also carries out the aspirational qualities of legibility and monumentality. These qualities stem from how the object stands within the context and how it is perceived by different observers. The proximity of the site to the highway and the interchange ramp provides a unique opportunity to communicate the college's presence and identity. The color and the depth of the facade give the building legibility against a rather uniform and bland landscape where shades of gray and brown dominate. Memorability is a vital attribute of a civic monument. The colorful screen acts as a vibrant visual anchor that is readable or at least skimable from the highway.

The external envelope is constructed of a unitized curtain wall system with vertical mesh fins placed in front of the mullions to provide sun shading and acoustic mitigation. The colors of the fins are calibrated to complement the materials used on the existing buildings. Warm shades of brick red, along with cool shades of aqua and seafoam green are picked up to provide a contemporary but unifying language across the campus. On the south elevation, a continuous screen of



Fig.111-Color pallet: the colors of the louvers are calibrated to complement the materials used on the existing buildings.



Fig.112-Night view from the highway on eastbound lane , south facade



Fig.113-View from the highway on westbound lane, north facade

wire mesh veils the facade and provides fall protection for the cycling path. The screen permits desirable views while controlling solar gain from the south sun. In addition to the visual qualities, the mesh material, used in the louvers and the screen, offers brilliant sound absorbing effects. The material can effectively reduce the highway sound by absorbing and deflecting it in multiple directions.

The texture and the shadows of the mesh panels, coupled with a vibrant color strategy, create a dynamic façade system that offers observers a unique visual experience according to their position and pace. During the day time, the facade provides abundant natural light deep into the building. At night, the building will be a beacon on the highway. From far away, motorists driving on the highway will register the louvered facade as a uniform color sequence. The interplay of the colors and the moiré effect of the woven fabric will provide a surface that is colorful and animated to the distant driver. At the same time, the pedestrians and cyclists looking closely and slowly at the building will only notice a slight shift in the colors and see right through the wire mesh.



Fig.114-Fall-Spring equinox



Fig.115-Summer solstice



Fig.116-Winter solstice

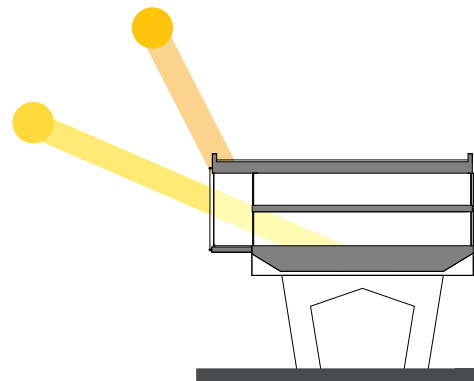


Fig.117-Passive strategy for the south facade, overhang and mesh screen provide shading in summer but allow some heat gain in winter

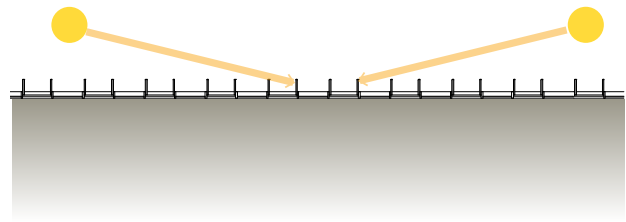


Fig.118-Passive strategy for south-easterly or south-westerly sun angles

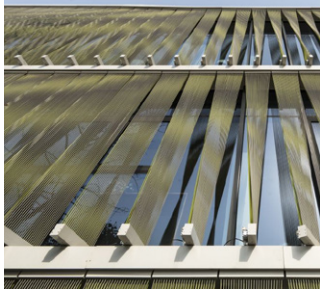


Fig.119-Colored wire mesh vertical fins used for solar shading



Fig.120-Wire mesh illuminated at night



Fig.121-Wire mesh screen

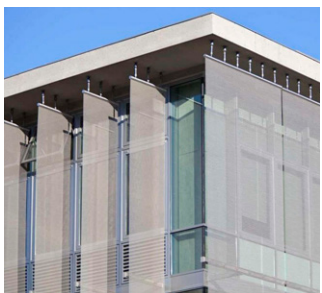
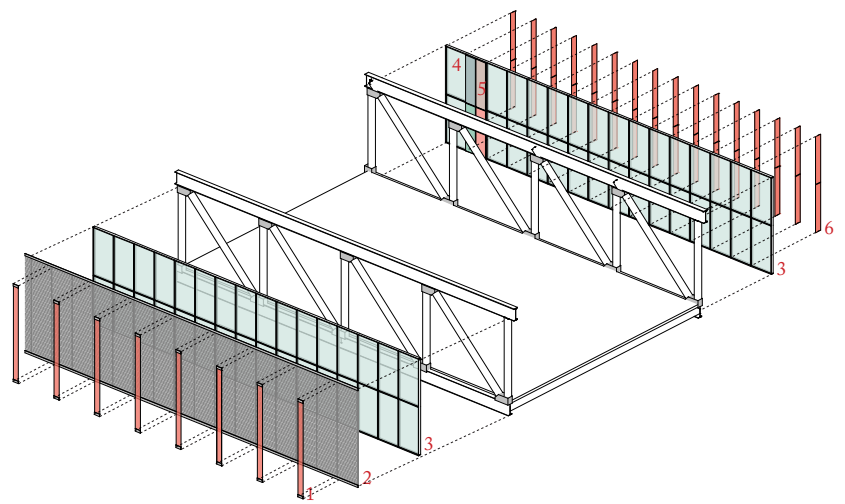


Fig.122-Wire mesh panels used as fins and screen



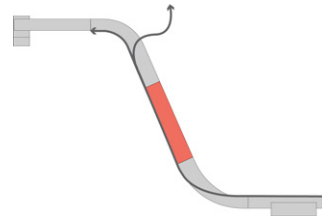
1. Wire Mesh Color Panels
2. Wire Mesh Screen
3. Curtain Wall System
4. Insulated Glass with Low-E Coating
5. Color Ceramic Frit
6. Wire Mesh Colored Fins

Fig.123-Exploded axonometric of typical facade assembly



Fig.124-View showing Library & Resource Center from gallery level

THE LIBRARY: *Repose & Concentration*



The Library and Resource Center houses the college's physical collection of books, maps, periodicals and archived materials. This program is located centrally on the bridge on levels 4 and 5, right above the highway. It represents the intimate and enduring relationship between physical books and readers. The design pays homage to the long room of the library of Trinity College in Dublin. This typology was widely adopted in post-medieval academic libraries. The book stacks are incorporated in the structure of the columns, punctuating the double height gallery space. The stacks create a series of semi-private study alcoves on both levels. The reading room at the center accommodates large communal tables equipped with reading lamps, reminiscent of traditional reading rooms in Bibliotheque Sainte Genevieve or Widener Library at Harvard. An internal stair connects the main level to the gallery, where there is also a special room dedicated to special collection and archive material.

Light enters the library from a central skylight and the high windows on the north façade. South light is filtered by an exterior mesh screen and adjacent circulation paths before entering through the clerestory windows. Only at intervals, full windows provide views into the library from the corridor. The dynamism of the communal spaces is countered by the calm and order of this library room. All the aspects of the architecture signals to the patrons they have transitioned from the outside space and entered a space of slowness and contemplation. Sound absorbing materials are used to reduce noise levels from the outside and inside. The furniture and the stacks are heavy, dark and stationary. The location of the library over the highway juxtaposes two paradoxical views: the kinetic wave of cars approaching and speeding away on the road below and the seemingly endless array of book stacks sitting still.



Fig.125-Library view 1: study nook on level 4



Fig.126-Library view 2: reading tables on level 4



- 7. Bike Path
- 16. Office
- 33. Reference Desk
- 34. Collection & Archives
- 36. Print & Copy

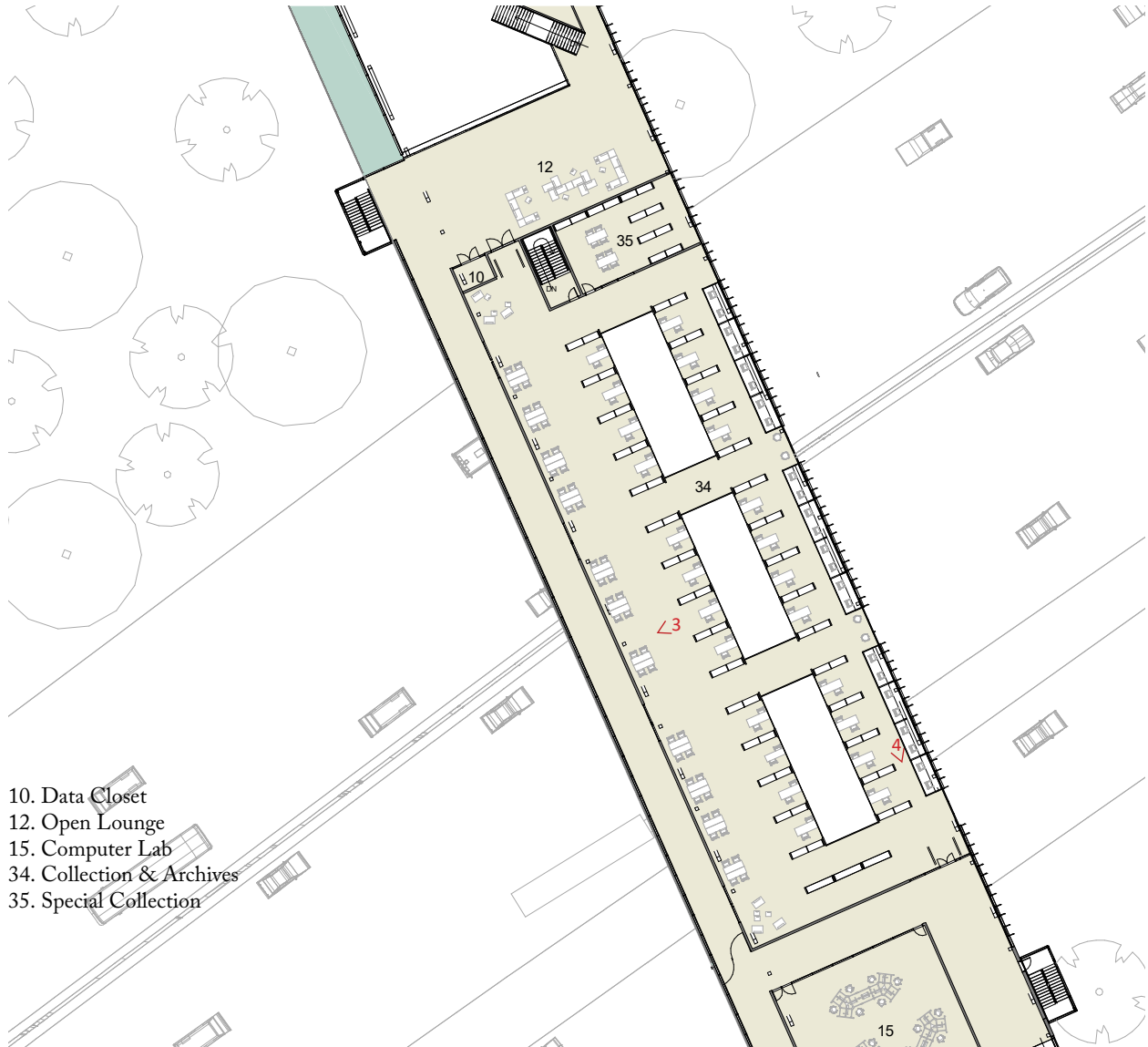
Fig.127-Floor plan level 4- Library & Resource Center



Fig.128- Library view 3: study nook on level 5



Fig.129- Library view 4: study balcony facing the highway



- 10. Data Closet
- 12. Open Lounge
- 15. Computer Lab
- 34. Collection & Archives
- 35. Special Collection

Fig.130-Floor plan level 5- Library & Resource Center

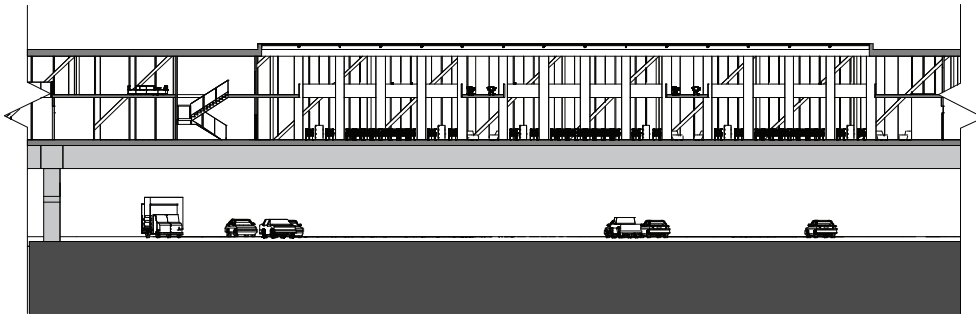
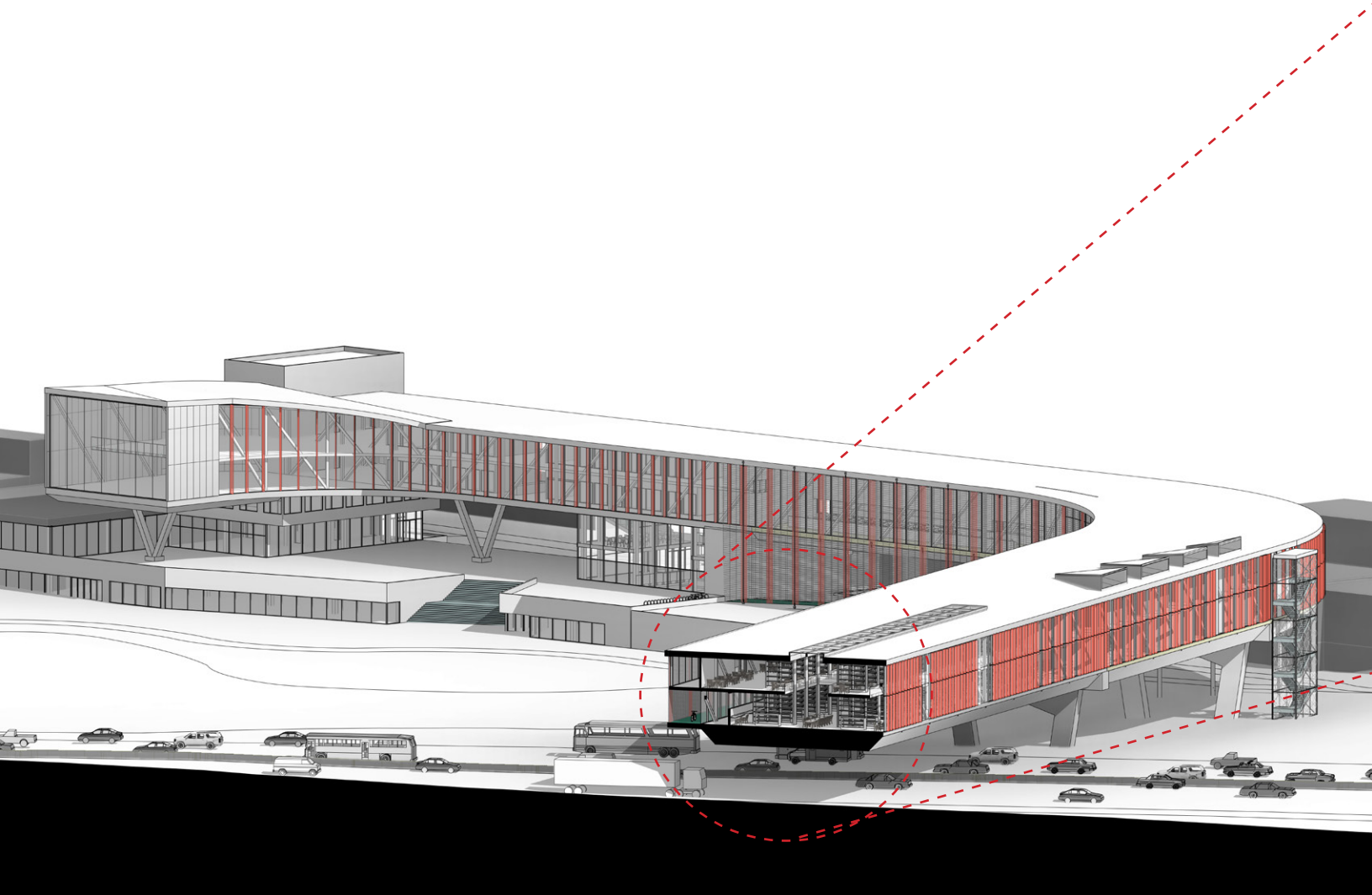


Fig.131-Library long section over Highway 401



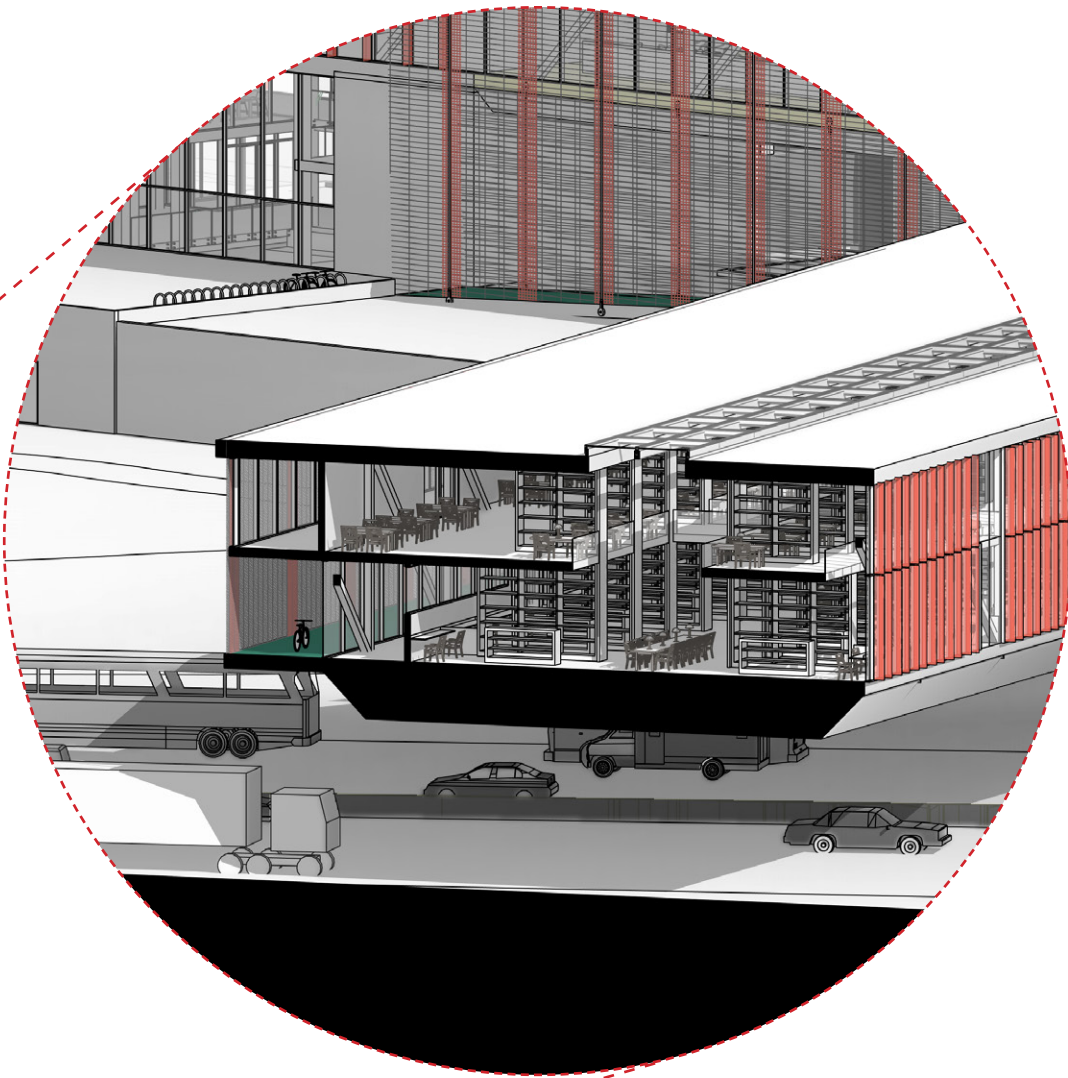


Fig.132-Axonometric section at the intersection of the resource center, highway and the bike path, multiple speeds and modes of movement are layered in one view.

Liminal Spaces: *Interaction & Community*

The advancement of information and communication technologies are significantly changing the operation and typology of academic libraries. Even though digitization has decoupled the book from the confines of the stacks, the library remains as the center of the campus to gather and study. It is a transitional space where opposing spaces of real and virtual, public and commercial, individual and communal are interfaced. The library is a place where the community crosses paths, accesses new technology and seeks support. The academic library today provides a richer range of learning spaces and services to accommodate the different needs of students. The informal and formal transitional programs are instrumental in shaping social identities and advancing academic growth for students. These spaces encourage collaborative learning and innovative explorations.

In Conestoga College, the current location of the library and learning services are disconnected from each other and fail to take advantage of the natural synergies between their activities and operations. The integration of these transitional programs with the library can unite resources and provide opportunities for community building. In addition, the inclusion of the Cambridge Sports Multiplex on the campus affords the library the opportunity to provide hybrid programs for the public and become a new civic interface for the larger community.

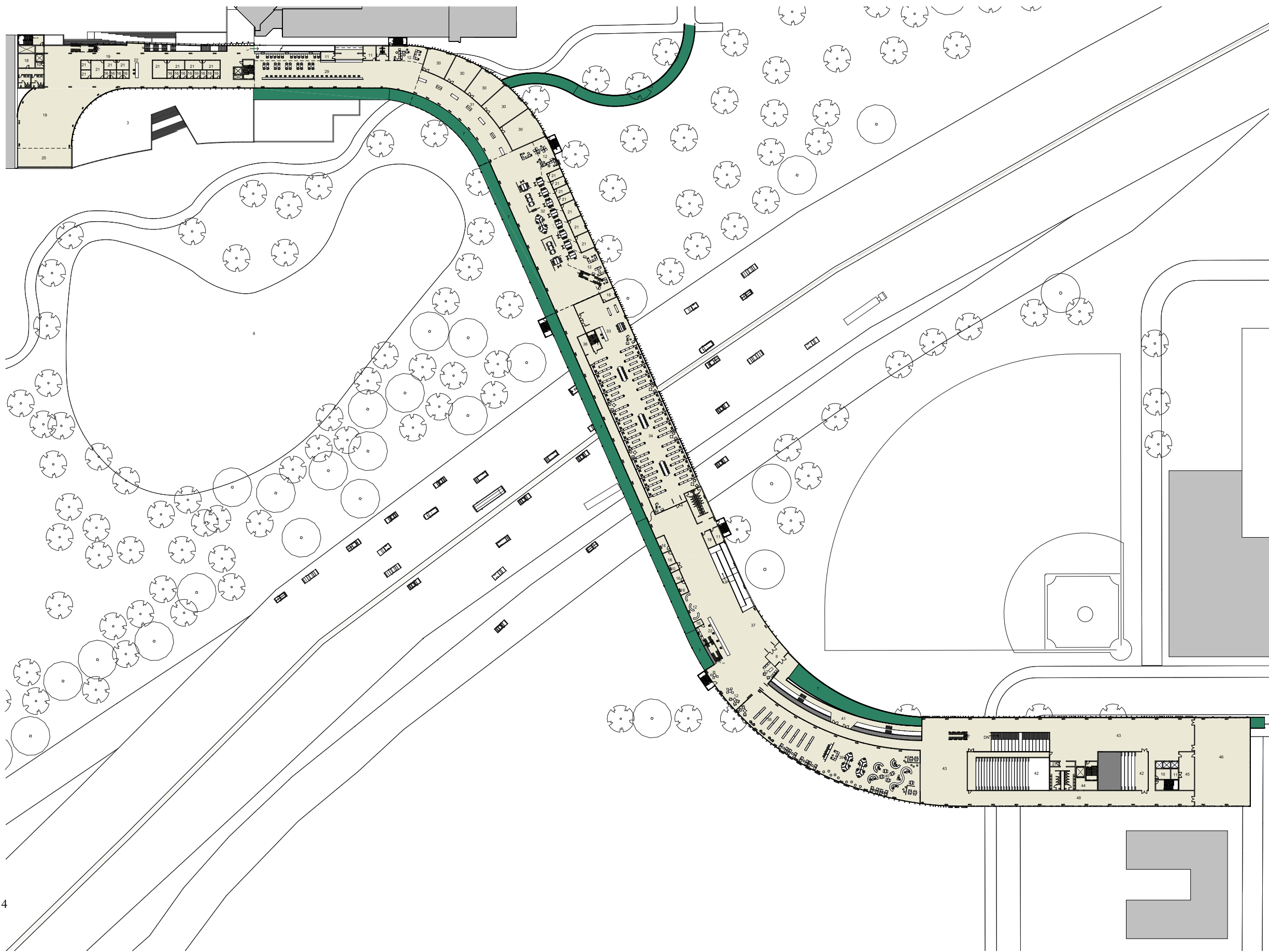


Fig.133-Floor plan level 4

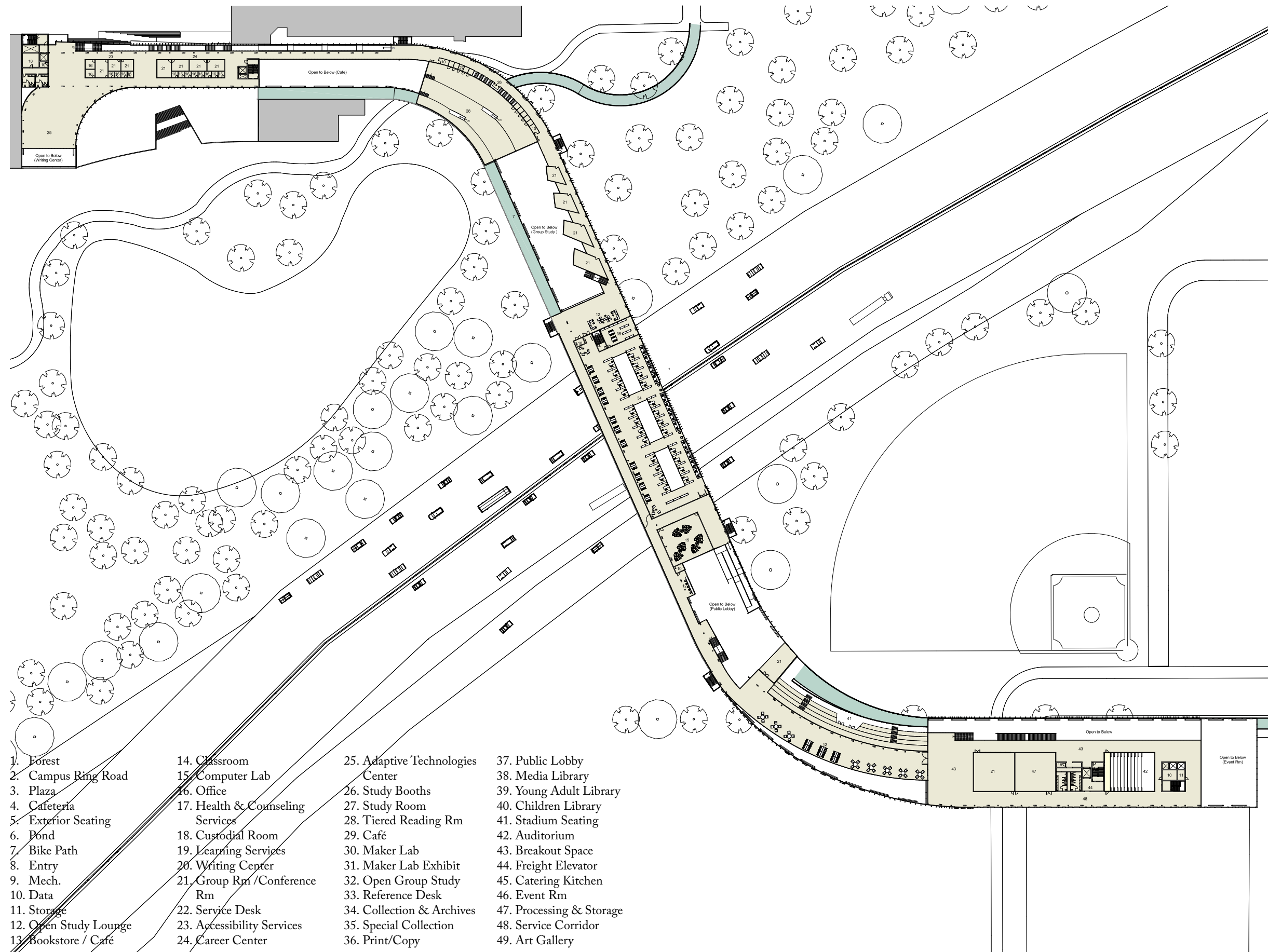
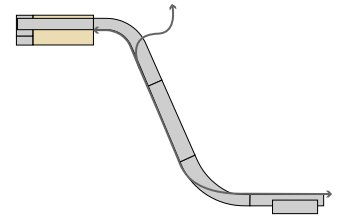


Fig.134-Floor plan level 5



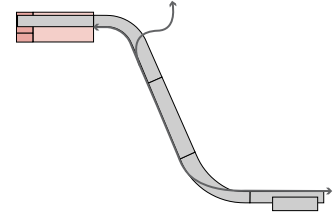
Liminal Spaces: Entrance Plaza (23,250 sf)

Located on level 2 of Kitchener campus

Replacing the existing building B, the plaza is carved out of the megastructure to establish a connection between the forest and the pond. It offers a much-needed outdoor area for the cultural and social activities of the college. Orienting a variety of routes towards the plaza promotes greater exchange among the community and establishes this destination as a new “gateway hub”. The bus stop is strategically placed in front of the plaza and the cycling ramp that runs along the bridge makes a landing at its edge, connecting pedestrians, cyclists and wheelchair users directly to the Cambridge campus. Vibrancy at the plaza level is supported by activities and spaces opening or looking onto it. New entrances to buildings A and C ensure the continuity of the existing pedestrian spine, while providing a relief from its confines. The bridge is held directly above the plaza with large expressive columns. The bridge is accessible via two elevator cores and a series of monumental stairs featured on the west façade. A grand exterior stair links the plaza to the pond and provides the opportunity for informal outdoor performances with a dramatic backdrop. Below the plaza, the existing cafeteria is gut renovated with new structural members that will carry the loads of the new bridge.



Fig.135-View of entrance to the plaza from Building B



Liminal Spaces: Bookstore & Café (4,300)

Located on level 2 of Kitchener campus

The new bookstore opens to the entrance plaza, a highly-trafficked area. A small cafe selling coffee and snacks provide storefront activity to the plaza. This is in stark contrast to the existing location that is hidden in the maze-like corridors of Building A. During the warm seasons, the plaza can be used as outdoor seating for the café.

Liminal Spaces: Cafeteria & Food Services (32,500 sf)

Located on level 1 of Kitchener campus

The 1968 master plan located the cafeteria and food services at the center of the megastructure in the lower floor of Building B. As the building is built on a steep site, the cafeteria is buried on one side and open to the pond on the other side. This arrangement allows the kitchen services to be packed against the wall and dining spaces to be placed in front of full height windows. Without disturbing the traffic flow to adjacent buildings, the entire lower level of building B is renovated to accommodate dining services for a larger student population. The geometry of the floor is simplified to provide with generous space around the pond for circulation and congregation.



Fig.136-View showing the connection of the plaza to the pond

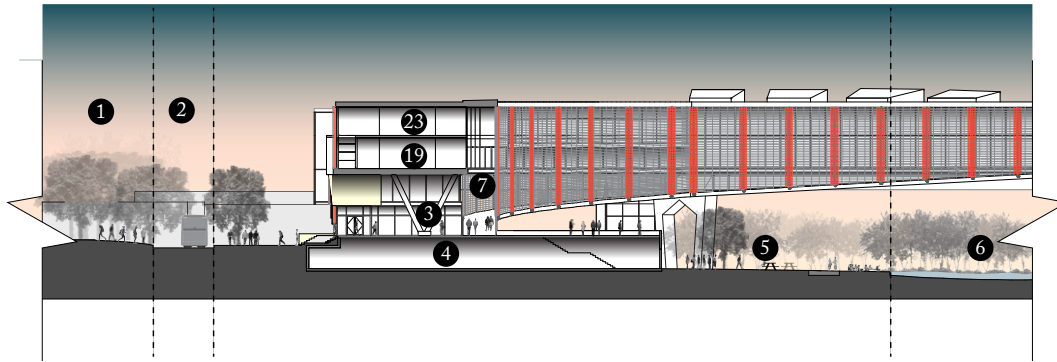


Fig.137-Section 1: Kitchener Campus at the plaza

- | | | | |
|---------------------|--------------|-----------------------|----------------------------------|
| 1. Forest | 6. Pond | 11. Storage | 20. Writing Center |
| 2. Campus Ring Road | 7. Bike Path | 12. Open Study Lounge | 23. Accessibility Services |
| 3. Plaza | 8. Entry | 13. Bookstore / Café | 24. Career Center |
| 4. Cafeteria | 9. Mech. | 14. Classroom | 25. Adaptive Technologies Center |
| 5. Exterior Seating | 10. Data | 19. Learning Services | |

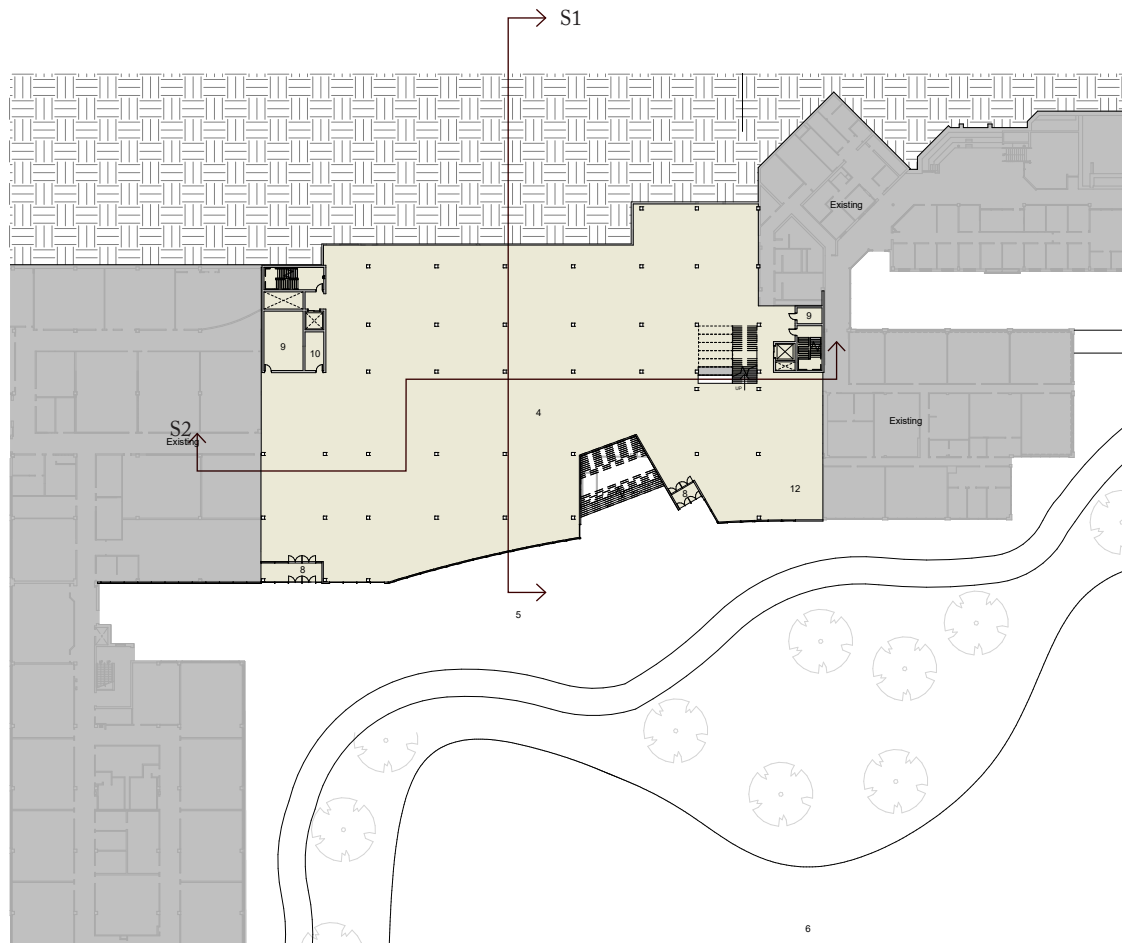


Fig.138-Floor plan level 1

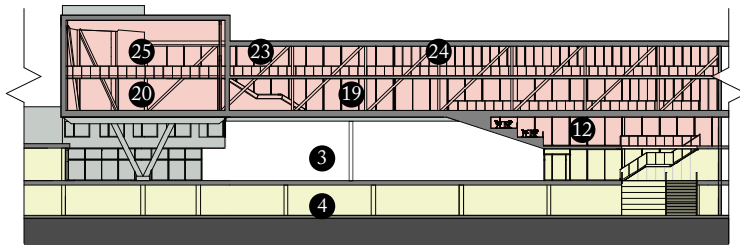


Fig.139-Section 2: Kitchener Campus at the plaza

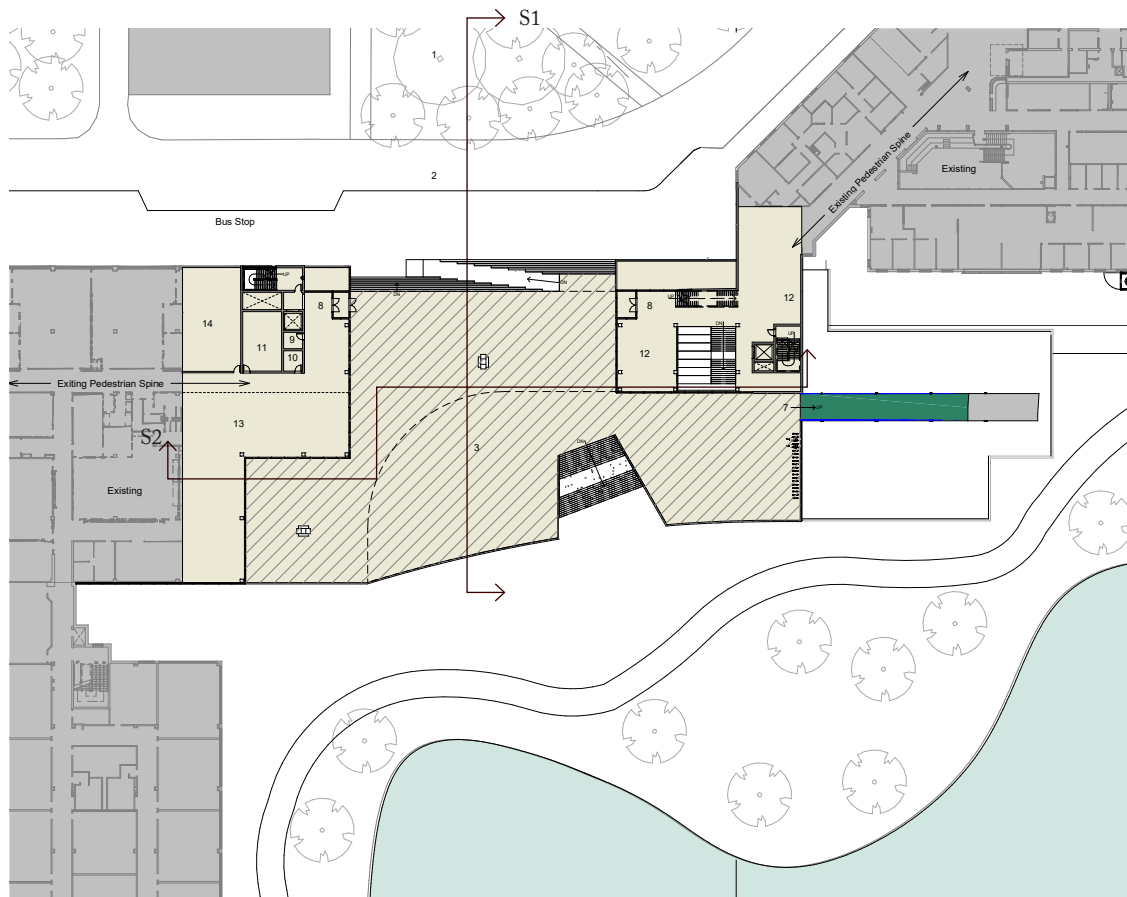
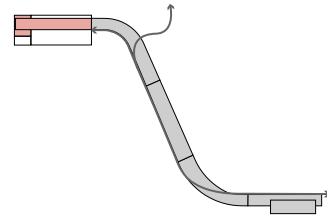


Fig.140-Floor plan level 2



Liminal Spaces: Learning Services (38,700 sf)

Located on the levels 3,4,5 of Kitchener Campus

Learning services provide academic and social services that support students throughout their education. The section of the bridge spanning directly above the plaza, includes spaces for Accessibility Services, Academic Advising, Tutoring, Career Services, Health Services, Counseling, Aboriginal Services, Research Assistance and Tech Support. Space types range from offices, classrooms, meeting rooms, computer labs and open study spaces. The 15-meter span provides elevated views west to the forest and east to the pond.

A series of circulation stairs, protruding in and out of the west façade, facilitate seamless movement from levels 2 to 5. Landings are generously sized to provide meeting and conversation room at the end of each staircase. The stair connecting levels 3 and 4, cantilevers over the main entrance, marking the entrance with a dramatic canopy. Full height glazing at staircases brings in natural light and allow for complete visibility of the campus from the stairs. From the outside, the protruding stairs visually link the floors and provide an understanding of the inner circulation to the Library and Learning Commons. As the bridge nears its termination point, it splinters into a curve and culminates in a cantilevered double height Writing Center that overlooks the pond and the highway in the distance.



Fig.141-View of circulation space on level 3

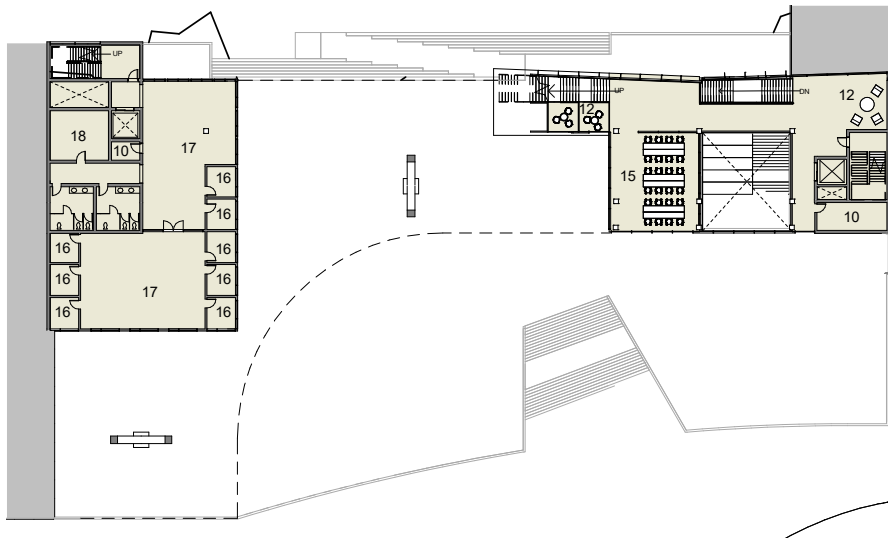


Fig.142-Floor plan level 3- Learning Services

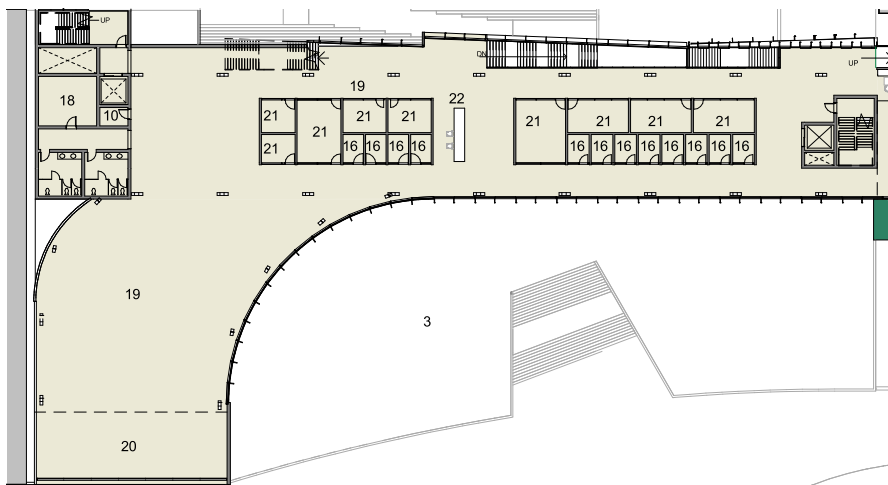


Fig.143-Floor plan level 4- Learning Services

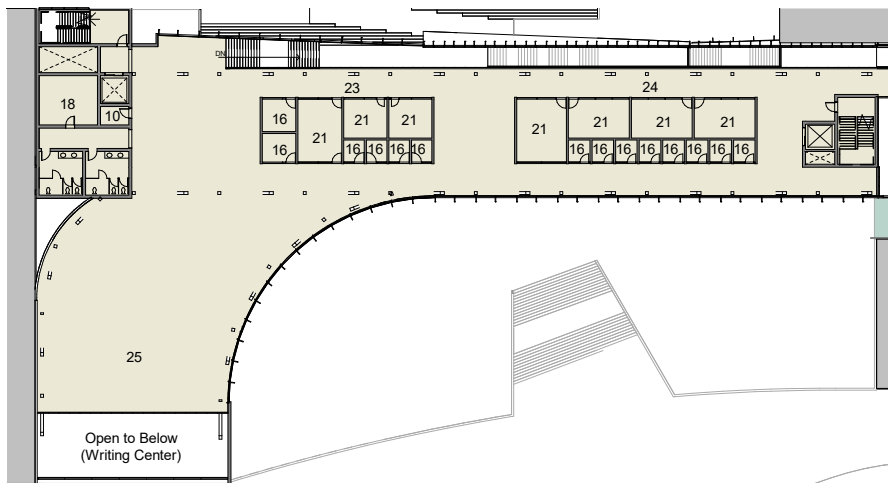
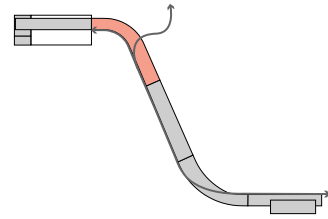


Fig.144-Floor plan level 5- Learning Services

1. Forest
2. Campus Ring Road
3. Plaza
4. Cafeteria
5. Exterior Seating
6. Pond
7. Bike Path
8. Entry
9. Mech.
10. Data
11. Storage
12. Open Study Lounge
13. Bookstore / Café
14. Classroom
15. Computer Lab
16. Office
17. Health & Counseling Services
18. Custodial Room
19. Learning Services
20. Writing Center
21. Group Rm /Conference Rm
22. Service Desk
23. Accessibility Services
24. Career Center
25. Adaptive Technologies Center



Liminal Spaces: Learning Commons (32,000 sf)

Located on the Levels 4,5 of Kitchener Campus

The Leaning Commons provides seating for informal gatherings, café services, huddle rooms, flexible study spaces, workshops, and a tiered reading room. A wide variety of space types and noise levels accommodate different learning styles and group sizes. The library's maker labs provide access to extensive analogue and digital media. Faculty and students can use the technology for screen sharing, rapid prototyping, original media productions, and videoconferencing.



Fig.145-View of cafe seating on level 4



Fig.146-View of study booths on level 5

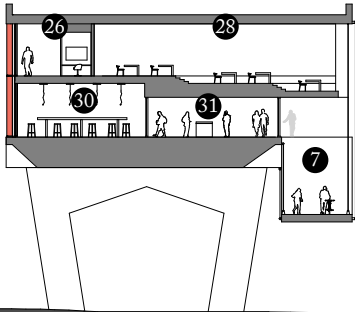


Fig.147-Section at tiered reading room overlooking the pond

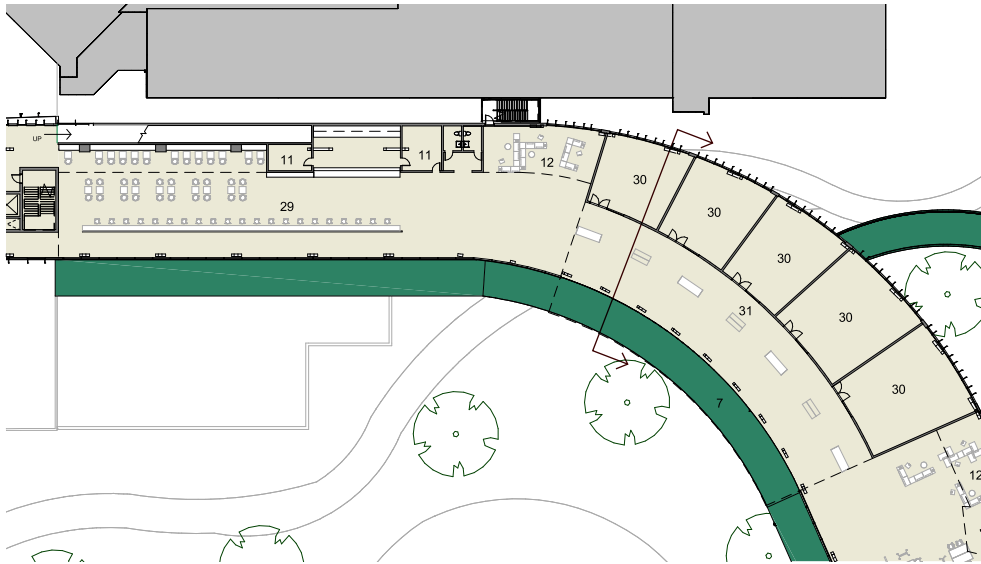


Fig.148-Floor plan level 4- Learning Commons

- 7. Bike Path
- 9. Mech.
- 10. Data
- 11. Storage
- 12. Open Study Lounge
- 26. Study Booths
- 27. Study Room
- 28. Tiered Reading Rm
- 29. Café
- 30. Maker Lab
- 31. Maker Lab Exhibit

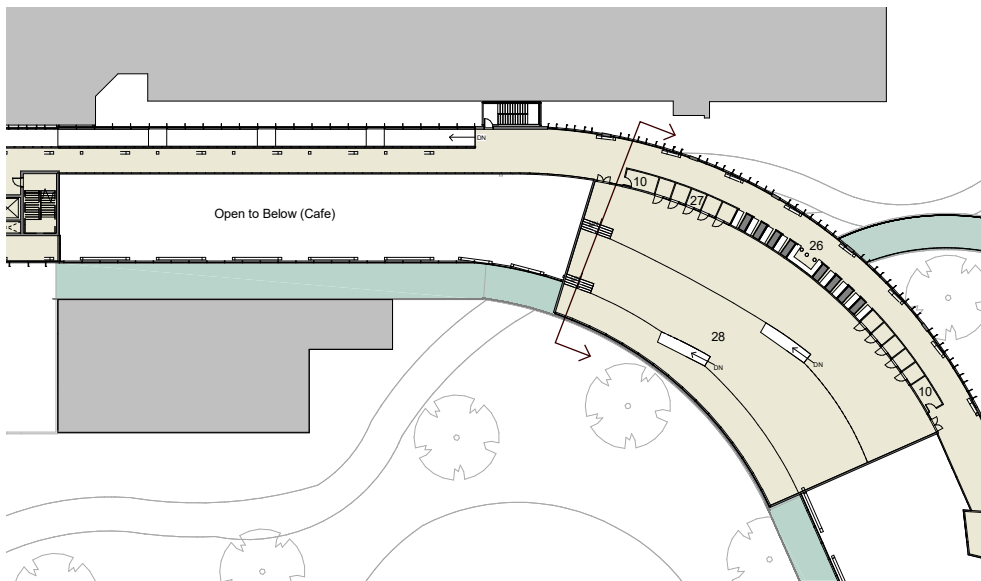
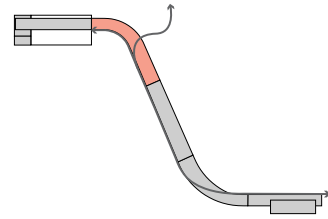


Fig.149-Floor plan level 5- Learning Commons



Liminal Spaces: Leaning Commons Cont'd (16,500 sf)

Group Study

The group study area is designed to accommodate both formal and informal group meetings. On level 4, a flexible space is set up with small and large tables and computer stations. Low partitions serve as both visual and noise barriers between huddle areas. Students can use screen technology to project from their laptops and collaborate on ideas. The full height windows on the south facade provide filtered light and views to the bike path and the pond.

On the same level, seven small meeting rooms, designed for groups of 4-6 people, are located at the perimeter of the floor. These rooms can be booked in advance for group study and seminars. Four larger meeting rooms, designed for groups of 6-10 people, are cantilevered on level 5. These rooms hover over the open area and have skylights facing the highway. In addition to these rooms, open lounges equipped with white boards are scattered along the building. These spaces provide opportunities for students to gather serendipitously before and after classes.



Fig.150-View of the group study rooms from level 4 with bike path on the south facade



Fig.151-Examples of acoustic ceiling treatment for noise control



Fig.152-Floor plan level 4- Learning Commons, Group Study

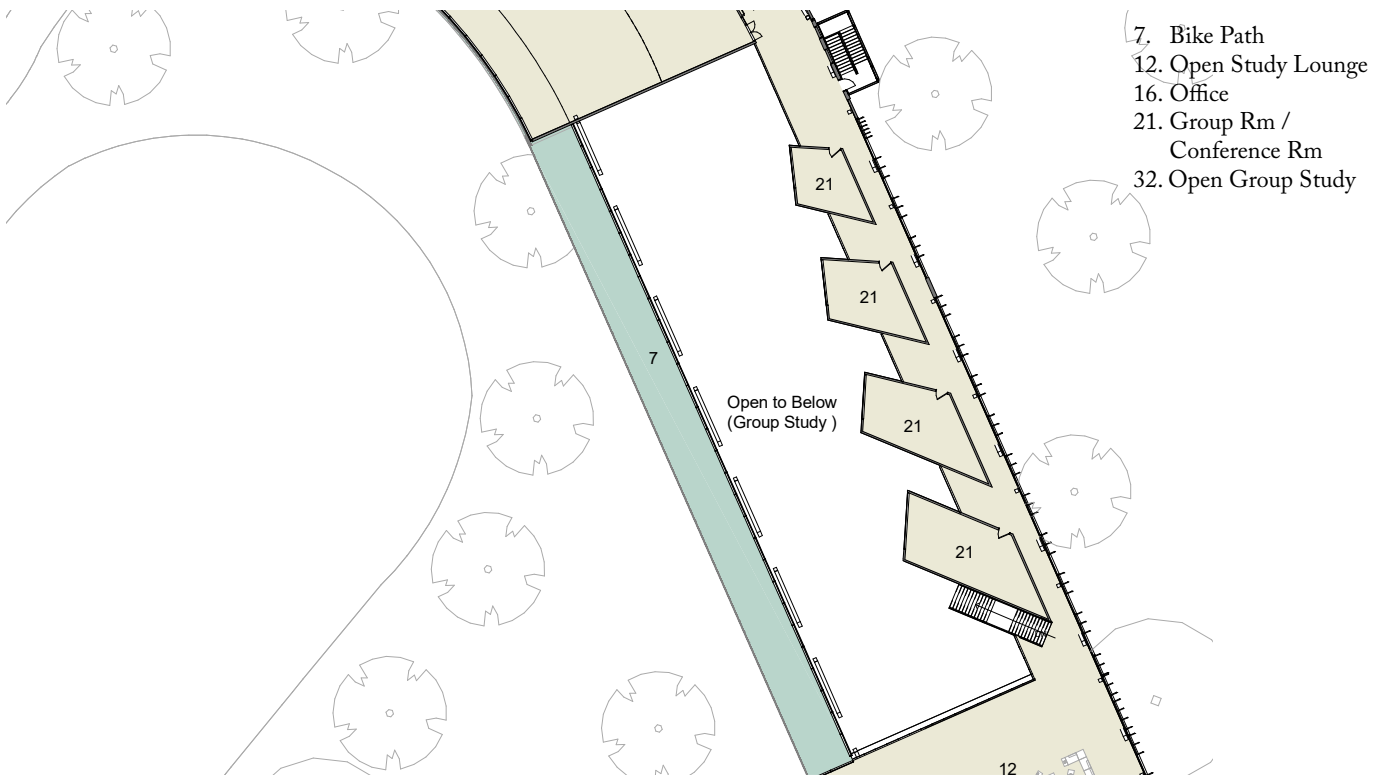
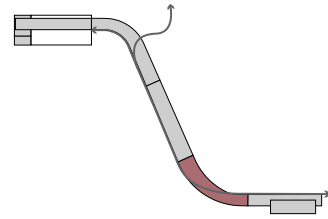


Fig.153-Floor plan level 5- Learning Commons, Group Study



Liminal Spaces: Public Functions & Entrance (48,000 sf)

Located on level 4& 5 of Cambridge Campus

The main cycling ramp directs patrons from the central lawn into the main library entry on level 4. Prominent and visible from the library's entrance, the circulation/service desk welcomes patrons and checks-out resources. Fully glazed conference rooms and balconies can be seen from the entry space, offering vistas into the different activities and inviting patrons to further explore. The perimeter is flanked by a circulation stair and a ramp, providing accessibility to level 5. In the concave side of the bridge, outdoor stadium seatings are positioned to view baseball games at the ground level. The convex part of the curve includes the library's public collection for children, young adults, films, music, audio books, magazines and newspapers.



Fig.154-View of the main entry on level 4 in Cambridge campus



Fig.155-Floor plan level 4- Public Functions & Entrance

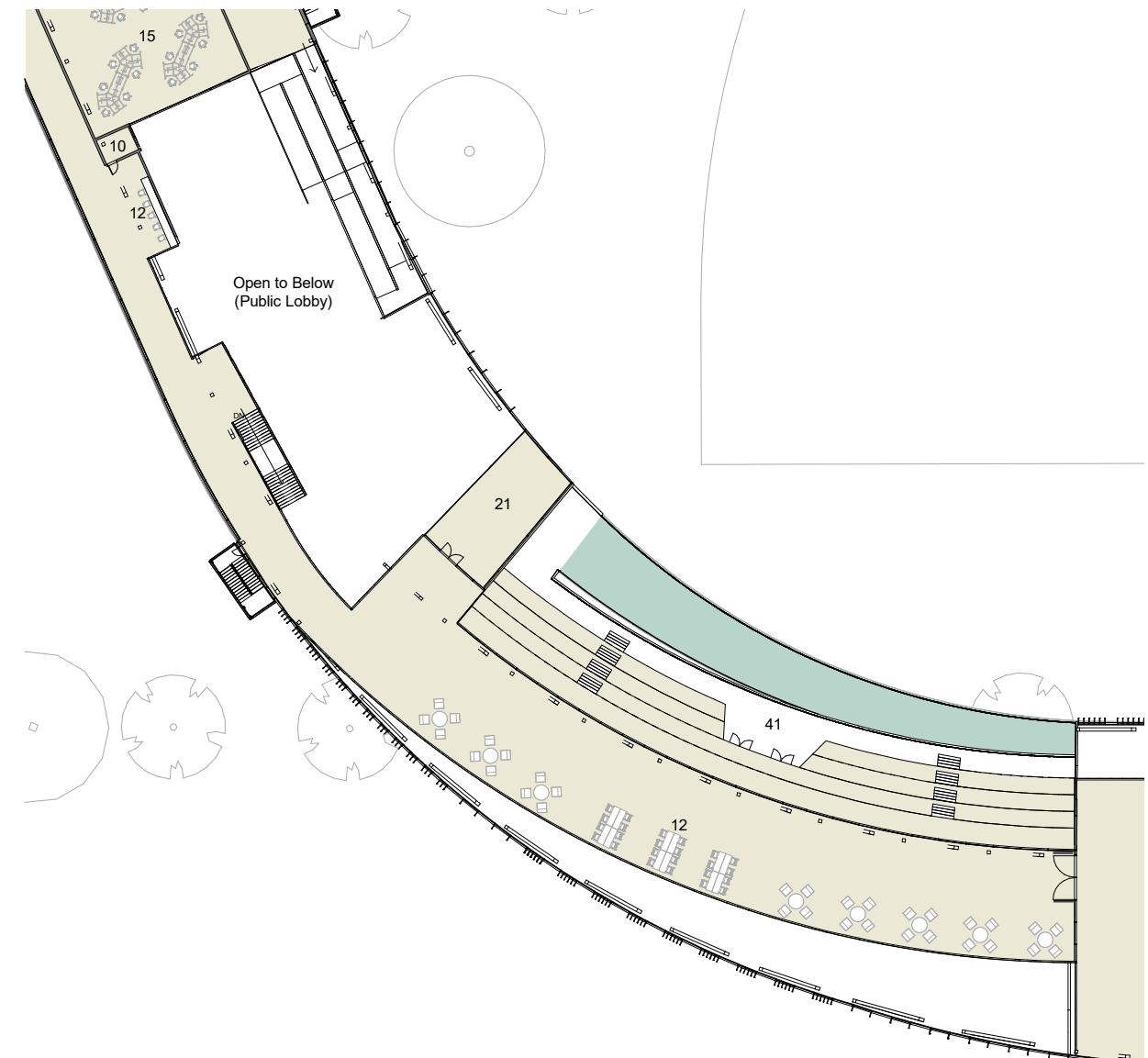
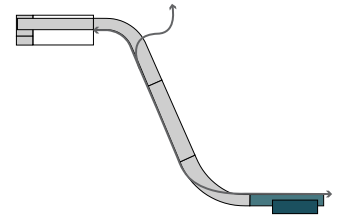


Fig.156-Floor plan level 5- Public Functions & Entrance

- | | | |
|-----------------------|--------------------|-------------------------|
| 7. Bike Path | 16. Office | 38. Media Library |
| 8. Entry | 18. Custodial Room | 39. Young Adult Library |
| 10. Data | 21. Group Rm / | 40. Children Library |
| 11. Storage | Conference Rm | 41. Stadium Seating |
| 12. Open Study Lounge | 22. Service Desk | |
| 15. Computer Lab | 37. Public Lobby | |



Liminal Spaces: Events & Conference Center (73,000 sf)

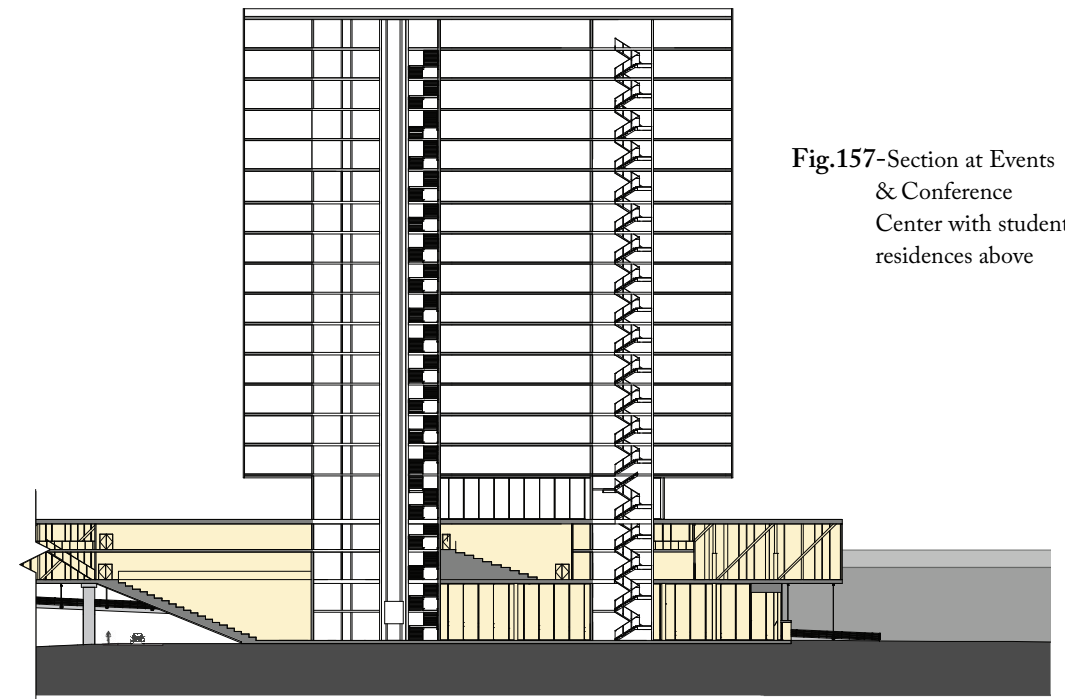
Located on Ground level, 4 & 5 of Cambridge campus.

The Cambridge part of the library is aligned to the main campus axis and the central lawn. The Sports Multiplex and the library are formally arranged to frame the lawn and give it spatial definition. The ground floor takes advantage of this proximity by offering inviting spaces and public activities. For example, parents who drop-off their children at the multiplex can use the library's facilities in between events. Patrons are welcomed into an eight-meter-high lobby. The lobby includes a café, an art gallery, an entrance to the main auditorium, and a break-out space. This lower lobby is connected to the bridge (level 4) via a wide staircase and a stepped seating area that is appropriate for informal gatherings and performances. On level 4, there is a second auditorium and a double height event room for larger functions. This 6400 sf room looks towards the river and provides a panoramic view of the Cambridge campus.

Hotel & Student Residences

Located on Levels 7-21 of Cambridge campus

Student housing contributes significantly to the vibrancy and development of mixed use campuses. The existing housing options are not geographically integrated with the campus and deter from a sense of community. The proposed 15-storey residence tower sits above the bridge. The tower acts as node, a vertical object set against the horizontality of the bridge. The residence features approximately 625 beds. These residences can also be used as lodging for sports events and conferences. Level 6 (bridge roof level) provides dining and amenities for the students. The design of the residential tower is not in the scope of this thesis.



**Fig.157-Section at Events
& Conference
Center with student
residences above**

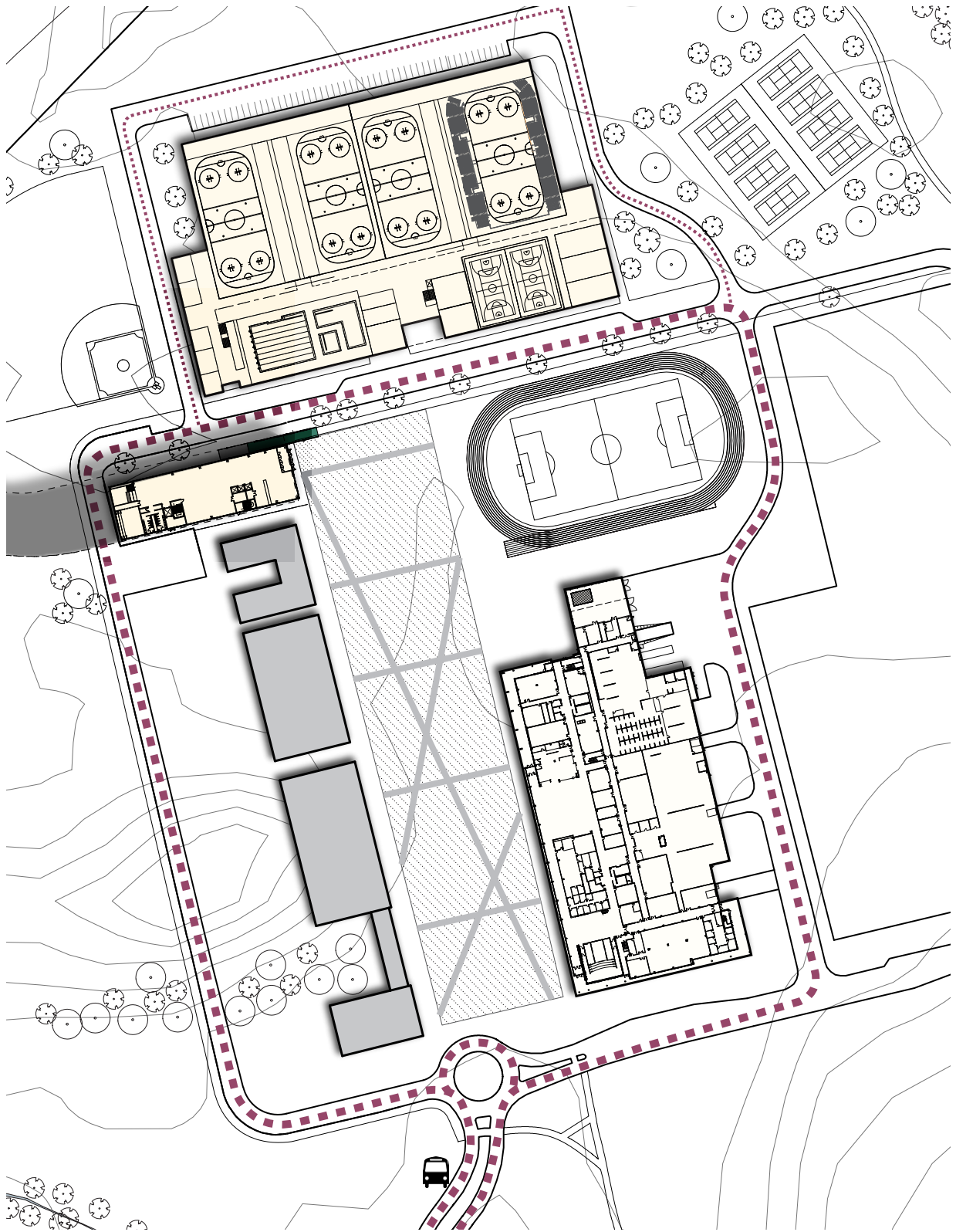


Fig.158- Cambridge campus at grade, showing the relationship between the open spaces and the interiors of the library, sports multiplex and the academic building



Fig.159-Breakout space on level 4 adjacent to the auditorium

- | | |
|---------------------------------|--------------------------|
| 7. Bike Path | 37. Public Lobby |
| 8. Entry | 42. Auditorium |
| 10. Data | 43. Breakout Space |
| 11. Storage | 44. Freight Elevator |
| 12. Open Study Lounge | 45. Catering Kitchen |
| 18. Custodial Room | 46. Event Rm |
| 21. Group Rm /
Conference Rm | 47. Processing & Storage |
| 22. Service Desk | 48. Service Corridor |
| 29. Cafe | 49. Art Gallery |

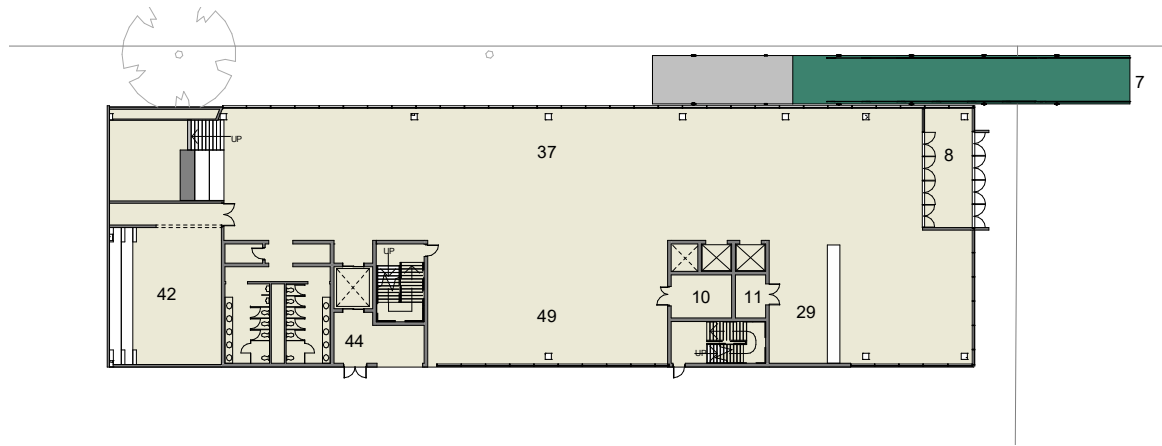


Fig.160-Floor plan ground level-Events & Conference Center

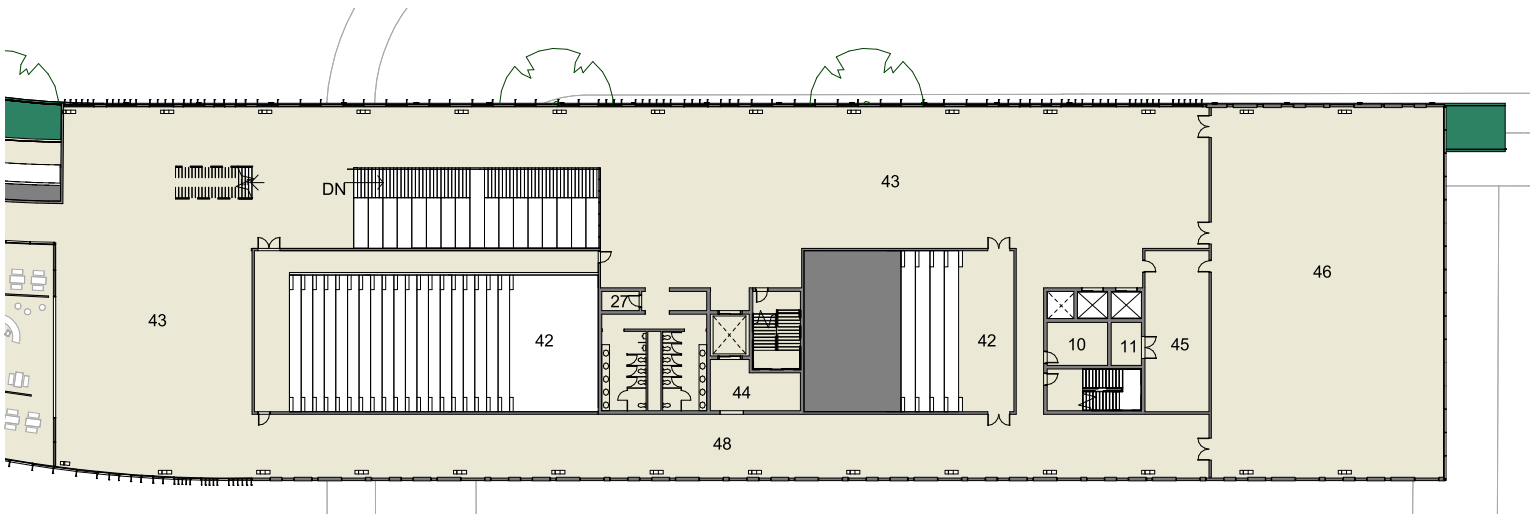


Fig.161-Floor plan level 4-Events & Conference Center

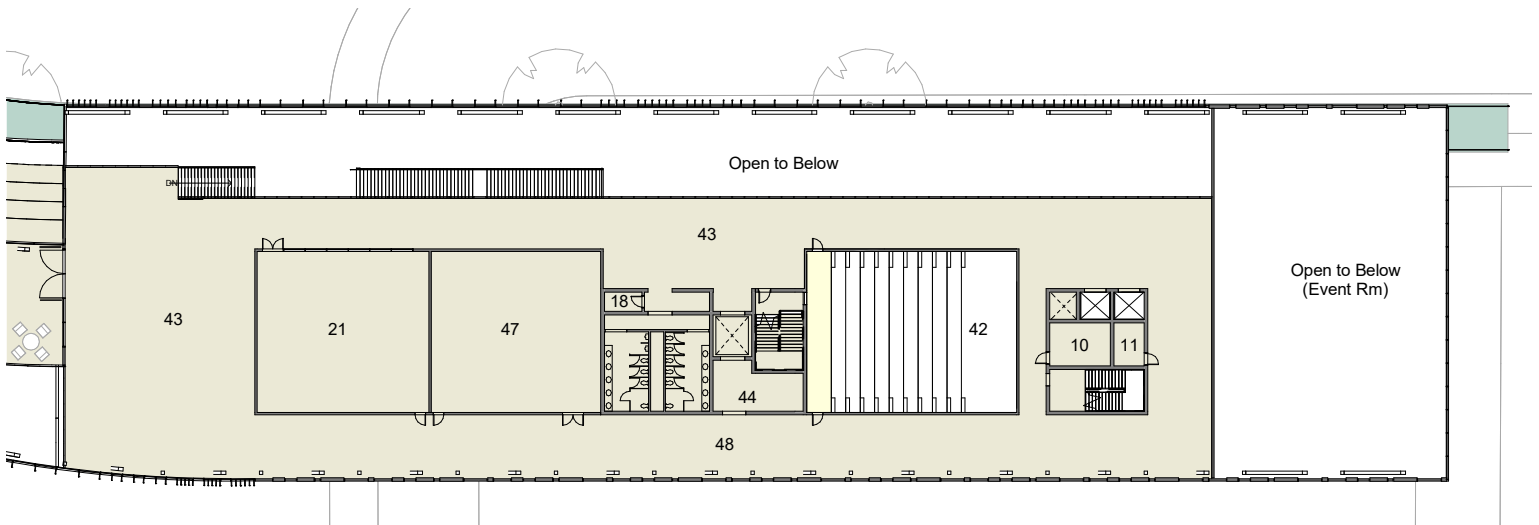


Fig.162-Floor plan level 5-Events & Conference Center

CONCLUSION

What started as my own fascination with the ramification of information technologies in the design of academic libraries, turned into a comprehensive endeavor to explore the problems of disconnectedness within the larger context of the library building. Along with pragmatic functions, libraries are expected to represent a sense of continuity with the past, make connections between the fragments of the world and express the ambitions of the future. Using Conestoga College as the site of my investigation, I have followed the physical and intellectual sources of consternation and disconnection affecting the campus and the inhabitants of the sprawling city. How the library could address these problems at different scales became the research question of my thesis. The postwar applications of cybernetics to telecommunication technologies, sprawling patterns of urbanization and the idealized models of social and spatial organizations, such as the megastructure campus, are studied side by side, to make sense of the experience of disconnectedness in the context of Conestoga College. This thesis is by necessity a hybrid project. It synthesizes the ideas and theories pertaining to the problems of disconnectedness in the contemporary information age, and applies those theories to the design of the Conestoga College library.

The proposed design of the library is a sinuous bridge building. It is both an infrastructure and an architectural artifact. It expedites movement between the two campuses, but at the same time delineates the space for moments of intensified activities and serendipitous encounters. As a monument for the sprawling city, the bridge exposes the friction between the competing spaces of flow and place. The building can be experienced by multiple routes and speeds, simultaneously overlapping moments of movement and stillness. Patrons are encouraged to move inside, outside and along the building, experiencing different sightlines of the interior and the landscape.

The campus of Conestoga College is a byproduct of an infrastructural formula devised for the suburban commuter campus, but the strategy proposed in this thesis is by no means a universal solution. On the contrary, placemaking in the contemporary city should be based on the exploration and strengthening of local relationships. During my investigation, the study of library precedents revealed the many ways architects have reinterpreted the question of the library and addressed the empirical and transcendental functions of the institution. Each library, with different form and characteristic, responds according to its historical and regional contexts.

Like these precedents, the bridge library is contextually derived from the particularities of the site and the needs of the institution. The design is both speculative

and pragmatic. It is speculative in as much as it challenges the purely utilitarian tendency of infrastructure by projecting a sense of civic belonging through a monumental act of architecture. The bridge presents a point of orientation and legibility for students and visitors. The intervention is necessary because it alleviates the sense of banality and alienation experienced by the residences of the sprawling city. The project juxtaposes multiple meanings of public space. The lamination of the different itineraries -the library, the sports multiplex, the plaza, the campus quad, the forest, the bike path, and the highway- offers a new potential for increased friction between people and a venue for understanding one's own identity in reference to others.

The interior of the library also addresses new and traditional dichotomies. It is a transitional place where tensions and synergies between competing spaces -such as real and virtual, attention and distraction, movement and stillness, public and commercial- are interfaced. For this reason, my design carves out many spaces for liminal activities that have little to do with the acquirement of information. The design gives a physical expression to these activities while still valuing the libraries' book stacks at the heart of the campus.

Traditionally, architects have precluded themselves from addressing the sprawling city, and surrendered it to the realm of other professionals. This landscape neither urban nor rural, driven by capitalism, has been seen as an unworthy cause by the discipline at large. Architects need to find ways to engage in this territory and to reinstate the aesthetic and social values of formal architecture. Constructed or contrived forms of public space must be championed for, otherwise the perpetual cycle of fragmentation and disconnectedness will provoke further cultural discontinuity and exclusivity.

The tragedy of mass estrangement and the segregation of the masses into isolated enclaves (physical or digital) cannot be averted by a single architectural building. The problem is complicated and cannot be solved within the realm of urbanism or architecture alone. However, the formal and spatial manifestations of disconnectedness can be addressed in increments with strategies of inversion and counterbalance. These measures could include hacking of an infrastructure form as a place of interaction, or engaging the anomalies of a place (the river, the forest and the path) to monumentalize the activities and the information embedded in the site.

One of the challenges of materializing a project such as the Conestoga Library is the attainment of funding and consensus from stakeholders. First, the inundation of space and horizontality of the territory requires architecture to operate at the scale of infrastructure which can be more costly than standard projects. Second, the development of the contemporary city has been based on a culture of privatization and pursuit of individual desires. Therefore, public ventures are mostly limited to city management and infrastructural needs. Preoccupations with property lines, legal divisions of municipalities and provision of services could raise conflicts of ownership and servicing.

In my view, the influence of such projects would extend beyond the borders of

the college and the cities of Cambridge and Kitchener. Given that the global systems of infrastructure have already blurred these boundaries, perhaps alternate models of lease and financing can be employed for the project. Although most of the work in this thesis has been focused on the intensification of Conestoga Campus as a single node, it would be useful to direct this approach towards an extended network of charged nodes in the region. Further research could identify other potential sites along the regional transportation lines for clustering of civic uses. In a similar way that the landscape along the Grand River provides a sense of unity and continuity between the municipalities, the network of civic nodes could strengthen regional identity and instigate financial reciprocities between the involved stakeholders.

APPENDICES

INTERVIEW NOTES

Interviewer: Parisa Kohbodi

Interviewee: Patricia Weigel Green Director of Library

July 20, 2016

Conestoga college Library

*These notes are based on an in-person interview. Content has been paraphrased and restructured.

References

NMC (New medium consortium) Horizon Report, the library edition, is a great resource for researching new trends in post-secondary education. The new issue explores the role of the digital library, and suggests that academic libraries are moving towards the Learning Commons Model. We base some of our forecasting and annual planning on this resource.

Library

At Conestoga, the library focuses on providing resources to students and faculty. We have been working to expand the E-Resources and weeding about a third of our print collection. We work closely with faculty to provide course material, purchase resources and make them available to students. The library is also a service desk. Students approach the staff with questions regarding resources, and technology. Technology related questions, regarding use of programs and devices, are one of the most common questions library staff attend to. I would like to have a service desk, with trained staff, that could answer those questions.

We have held few events in the library. Recently we hosted a fashion show which a group of students were involved in. Coming up in November, we will be hosting a workshop with Canadian Authors Association on writing graphic novels. As for use from the community, we don't have that many visitors. We do have borrowing privileges for the community, however, I believe that there are other institutions in the area, such as Guelph or Waterloo University, that community members use for research and resources. We do have alumni members that come to the library to use the E-Resources. E-resources are not available to them off campus.

The recent Library renovation has received very positive feedback from students. Returning students, who have a point of comparison, have been impressed the most. The space looks brighter and more contemporary. The renovation increased interest in the library and consequently shed light on other needs of the library. Because of the positive reception and increase in usage, I am able to ask for other resources. I did wish that the new furniture was more durable and cleanable. The fabric is already fading and getting dirty from continuous use, which has an effect on the image of the library.

Right now, the library is used at maximum capacity. The space is still too small to accommodate the college's needs. We can use more of everything, meeting rooms, collaborative space and quiet study. However, if given another 3000sf, I would say increasing quiet study would be priority. The standard for library space planning is one (supported) study seat per ten students. Currently, we have 580 study seats. Given the full-time enrollment of, we should have about 800 seats.

The opening of the Cambridge campus has not changed library operations significantly. The two campuses are viewed as separate campuses. Maybe with regards to staffing and scheduling, there is some coordination. A program liaison operates the library in Cambridge. That library is also at full capacity right now. At the moment, the Cambridge library is being renovated to accommodate more seats and achieve better collaboration between Learning Commons and library services. By taking away some individual offices, we have been able to add 50 more seats, for the total of 130 seats. Moreover, all staff will be cross trained to provide library services and book appointments with Learning Commons. Streamlining front-line services enables library and Learning Commons to work collaboratively and provide easier access to the students without additional resources.

Learning Commons (Services)

Learning Commons, in most institutions referred to as learning services, focuses solely on assisting student. Their services include tutoring, math skills, writing skills, and general study skills. These services are appointment based, whereas the library's services are generally drop-in. The Learning Commons would prefer to have more open space for students to study before and after appointments. It is also preferable for the staff to be in a flexible open office. Shared meeting rooms could be used when the privacy of students is a concern. In general, Learning Commons would like to promote openness; they want to send a message that there is no shame in seeking support.

Collaboration

Currently the library and Learning Commons collaborate on writing clinics and workshops. These are arranged in the library and students can drop in to seek assistance. The Library and Learning Commons Working Group meets regularly to find out what each department is doing. Our goal is to tackle issues proactively. Something we are working on right now, is to have Tech Tutors that could help students in the library. These tutors would be hired by Learning Commons. They maybe the same tutors for other subject who have technology expertise and can spend some of their time in the library.

Bonnie Lipton' role, the Director of Leaning Commons, has expanded to include Accessibility, Health Services and Counseling Services. This shift in direction moves away from the Library and Learning Commons Model.

Technology

The idea of including new technologies and gadget in the library program is still a little illusive to me. The initial investment in equipment and hardwiring could be expensive, and the technology could be outdated quickly. Some technology also requires support and expertise of additional staff. Even with computers, we are moving towards providing access rather than hardwire equipment. We look to provide flexibility for future use.

Benchmarking

Mohawk College and Humber College have recently constructed Library and Learning Commons. At Mohawk the administrative organization is such that it includes IT services, collaborative learning, and resources. I have not yet visited Ryerson new Learning Commons, yet I have heard positive feedback. One criticism that Bonnie Lipton had was that the different floors felt disconnected.

Future of Library and Learning Commons

In an ideal world, we would have had built a new facility to combine the library and the Learning Commons. Given the constraints in budget and space, it was not possible. The college has been renovating spaces in piecemeal overtime, resulting is a mixture of styles and spaces.

Moving towards the collaborative model would mean that support would be central. I strongly believe that front line services would integrate all services, including IT. This model could also include retail such as the bookstore. Additional study spaces and meeting rooms would be provided. I think the library and Learning Commons should be central to the campus. Having services and study space dispersed makes monitoring and maintenance difficult. There is something about having the collective feeling of library. Our current location in the college is ideal; it is central and bright. The view is amazing. Any expansion, up, out, or down would be desirable. I would want to maintain the open flow, the daylight quality and centrality of the library. The library should not be designed in a way that would become outdated quickly.


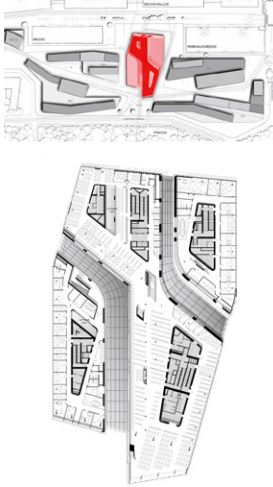
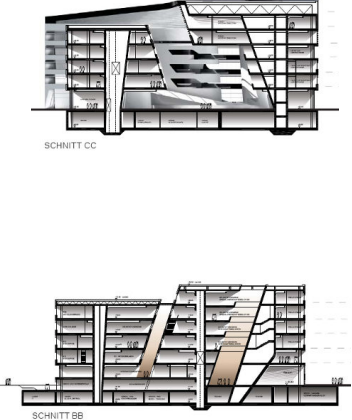
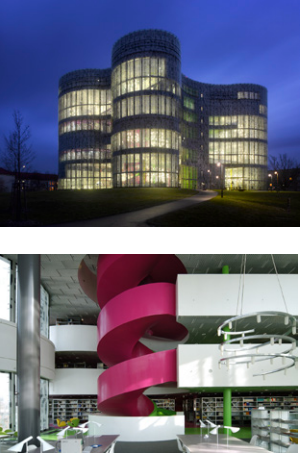
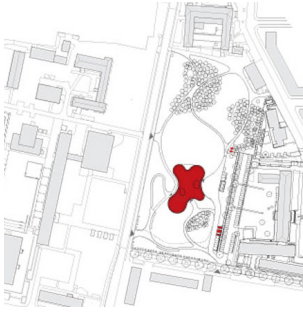
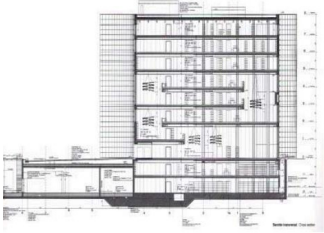


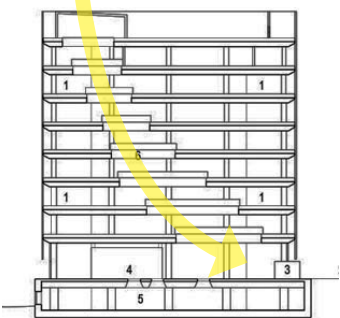
AREA DETAIL FOR THE DESIGN PROPOSAL


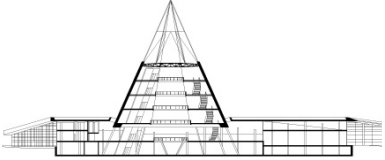


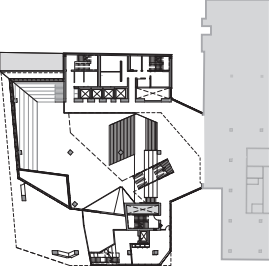
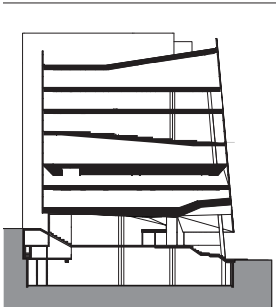



Level	Campus	Construction Type	Program	GSF
Basement Level	Kitchener	Renovation	Cafeteria Student Lounge	32,500 sf
Level 2 (Ground Level)	Kitchener	Renovation	New Entry Bookstore Student Lounge	14,800 sf
Level 2 (Ground Level)	Kitchener	New Construction	Exterior Plaza	23,250 sf
Ground Level	Cambridge	New Construction	Lobby Art Gallery Auditorium Café	16,400 sf
Level 3	Kitchener	New Construction	Health & Counseling Services Computer Lab Study Lounge	9,500 sf
Level 4		New Construction	Learning Services Learning Commons Public Functions	130,350 sf
Level 5			Events & Conference Center	99,000 sf
Total GSF for Library & Learning Commons				255,250 sf

2016 Full-time Student Enrollment:	12,000
Area (SF) /Student Population	21 sf

2016 Total Student Enrollment (Including Part-time & Apprentice)	45300
Area (SF) /Student Population	6 sf

LEARNING COMMONS PRECEDENTS

Exterior/ Interior	Institution/ Architect/ Location/ Year	Area(sf)/ Student Population	Plan	Section
	<p>Library And Learning Centre University Of Economics Vienna</p> <p>Zaha Hadid Architects</p> <p>Vienne, Austria</p> <p>2013</p>	<p>301,000 sf/ 23,584 Students</p> <p>13 sf/ Students</p>		
	<p>Cottbus Technical University Information, Communications And Media Center</p> <p>Herzog & De Meuron</p> <p>Cottbus, Germany</p> <p>2004</p>	<p>135,600 sf/ 9,000 Students</p> <p>15 sf/ Students</p>		
	<p>University Of Aberdeen Library</p> <p>Schmidt Hammer Lassen Architects</p> <p>Aberdeen, Scotland</p> <p>2011</p>	<p>167,000 Sqm/ 12,000 Students</p> <p>14 Sf/ Students</p>		

Exterior/ Interior	Institution/ Architect/ Location/ Year	Area(sf)/ Student Population	Plan	Section
 	<p>Delft University Of Technology Central Library Learning Center</p> <p>Mecanoo Archi- tects</p> <p>Delft, Netherland 1998</p>	<p>161,000 sf/ 19,500 Students</p> <p>8 sf/ Students</p>	 	
 	<p>Ryerson University Learning Center</p> <p>Snøhetta & Zeidler</p> <p>Toronto, Canada 2014</p>	<p>155,000 sf+</p> <p>130,000 sf (Existing Li- brary) / 33,600 Students</p> <p>8 sf/ Students</p>		
 	<p>EPFL Rolex Learning Center</p> <p>Sanaa</p> <p>Lausanne, Swit- zerland 2010</p>	<p>121,500 sf / 10,350 Students</p> <p>12 sf/ Students</p>	 	

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