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## MATURED INFRASTRUCTURES

## STRATEGIZING ARCHITECTURAL GROWTH THROUGH INFRASTRUCTURE

by

Karl Sarkis B.Arch.Sc., Ryerson University, 2009.

A design thesis project

presented to Ryerson University

in partial fulfillment of the requirements for the degree of

Master of Architecture

In the Program of

Architecture

Toronto, Ontario, Canada, 2013

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Karl Sarkis

Matured Infrastructures: Strategizing Architectural Growth Through Infrastructure Karl Sarkis, B.Arch.Sc., Ryerson University, 2009 Master of Architecture in the Program of Architecture, Ryerson University

## Abstract

Serving the movement of people and goods, infrastructures of mobility guide city growth, by framing and connecting sites to accommodate new development. For decades, infrastructures of mobility have inspired architects to explore how forms of growth could be achieved in architecture.

Based on the research of relevant precedents, this thesis strategizes how architecture can (i) emulate, (ii) hybridize with, and (iii) liberate from types of infrastructure, as a means of serving a more prioritized role in guiding city growth. These strategies inform a design proposal that encourages a method of architectural growth in Toronto's Don Lands.

## Acknowledgements

I thank my supervisor, Leila Farah, for her guidance and for encouraging me to continuously challenge myself throughout the shaping of this thesis project. I also thank Marco Polo, for surpassing my expectations as a Second Reader; his critical reading of the thesis inspired a fulfilling direction for the project. Finally, I thank Colin Ripley for providing insight into the fundamental objectives of a Master of Architecture thesis project.

## Dedication

This thesis project is dedicated to the contribution of ideas in architectural discourse.

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# Introduction: Infrastructures of Mobility

#### Infrastructures of Mobility as Frameworks for Growth 1.1

Within the built environment, "infrastructure" is a loose term that encompasses a variety of meanings. Thus it must be made clear what form of infrastructure is of concern in the context of this thesis. The types of infrastructure that are of interest are those of mobility - roadways, expressways, railways. Ultimately, these infrastructures all share the service of moving people and goods (D'Hooghe, 2011).

Beyond serving to move people and goods, infrastructures of mobility play a significant role in guiding the growth of cities. This is well illustrated in Rem Koolhaas' description of the Manhattan grid from his 1978 publication, Delirious New York. He describes how the grid came to be the fundamental model for guiding the growth of New York City. In the 1811 proposal to regulate occupancy in Manhattan, a plan of the Island was produced with an overlaid grid of street networks framing empty plots of land in its voids (Figure 1.1.1).

The plan is a testimony to an infrastructure of mobility in this case, the roadway – operating as a foundational framework for the future growth of New York City. The street takes formal priority over building or landscape to ensure the flow of people and goods throughout the Island, while the precise nature of future

developments remains open and uncertain; "the land it divides, unoccupied; the population it describes, conjectural; the buildings it locates, phantoms; the activities it frames, nonexistent" (Koolhaas, 1978, p. 19).

Although in the Manhattan model the grid is laid out over the stretch of almost the entire island, infrastructures of mobility would later grow to begin occupying land around the Island, forming the city's surrounding boroughs. This demonstrates the two faceted capabilities for growth inherent in infrastructures of mobility; first, they serve as a framework for growth for other mediums – i.e. by guiding the development of the buildings and landscapes on the sites that they frame – and second, they are able to grow, in-themselves, as a continuous framework (*Figure 1.1.2*).

Consequently, using the grid as a strategy for city growth was applied to the development of most major North American metropolitans and continued to persist for 200 years. The advent of improved methods for mobility throughout the twentieth century – such as the vehicle and subway train - would only reinforce the need for necessary infrastructures of mobility pioneering city growth.



This figure illustrates the infrastructural grid laid out over the Island as a foundational framework for the future growth of the city. Retrieved from Koolhaas, R. (1978). Delirious New York. New York: Monacelli Press, p. 18-19.

Figure 1.1.1 Proposal for the Manhattan Grid, 1811

Figure 1.1.2 Suburban Sprawl in Miami

This figure illustrates infrastructure's ability to continuously expand to serve future developments. Retrieved from Allen, S. (2001). Mat Urbanism: The Thick 2-D. In Sarkis, H. Case: Le Corbusier's Venice Hospital and the Mat Building Revival. New York: Prestel Publishing, p. 126.



#### Infrastructure? Strategizing 1.2 Why Growth Through Architecture

Since only "infrastructures of mobility" are of concern within the scope of this thesis, let them simply be referred to as "infrastructure" for the remainder of this report.

Some of the first interests in applying infrastructure's operation as a framework for growth to architectural design were pioneered in the mid-twentieth century. Architects were driven by a critical reaction to the rigid formal and functional approaches to modernist architecture that dominated discourse in the previous several decades. They were interested in seeking out design solutions that returned importance back to the individual, allowing building users to " '[gain] new freedoms of action through a new and shuffled order, based on...possibilities for growth, diminution, and change' " (Mumford, 2001, p. 49). It was believed that infrastructure could inspire architectural design solutions that fostered these new freedoms for the building user, since infrastructure was understood to be inherently more adaptable to growth and change than conventional architecture at the time.

Team 10's development of the mat building prototype in the 1950s represents one of the first explorations of how architecture could be designed to strategize growth over time. The mat building, amongst other precedents, falls within the first of three themes to be investigated in this precedent research: Architecture Emulating Infrastructure (Section 2.2). This particular prototype was developed with the intention to grow over time – by literally expanding in size – to support new spatial and functional requirements.

Other approaches to strategizing growth through architecture promoted a more direct relationship with infrastructure. Proposals such as Paul Rudolph's for the Lower Manhattan Expressway envisioned architecture and infrastructure as part of a shared terrain, combined and de-prioritized into one "megastructure" (Banham, 1976). Precedents like these are investigated in the second theme of research: Architecture Hybridizing with Infrastructure (Section 2.3).

The final research theme surveyed in this thesis, *Architecture* Liberating from Infrastructure (Section 2.4), identifies architectural precedents that promote a different attitude towards infrastructure in comparison to the two previous themes. In this theme, infrastructure

is understood as a barrier – rather than a facilitator – for growth. This attitude would inspire many of Archigram's utopian proposals that presented the design of new infrastructures to allow inhabitants an ultimate level of individual freedom.

Architectural precedents exploring ideas of growth and individualism would persist throughout the 1960s and '70s, yielding a small stock of built projects. However, by the late 1970s and throughout the '80s, postmodernism would establish its acclaim and significantly shift architectural thinking into the realm of language and semiotics. As a result, prior interests in relating architecture and infrastructure as a strategy for growth quickly lost momentum.

It was not until the mid 1990s that these interests would again resurface as a concern for the architect. In 1994, Rem Koolhaas released another major publication, 'S,M,L,XL', in which he expressed that the future of urbanism "[would] not be based on the twin fantasies of order and omnipotence...it [would] no longer be obsessed with the city but with the manipulation of infrastructure for endless intensifications and diversifications, shortcuts and redistributions" (p. 969).

It is interesting to note Koolhaas' acknowledgement of infrastructure as a medium of interest for contemporary urbanism. Arguing for endless intensifications and diversifications, he is sharing a similar attitude to those 40 years earlier that used infrastructure as inspiration to pioneer strategies of growth through architecture. Over a decade later, Italian architect, Andrea Branzi, would support Koolhaas' argument for urbanism that is open to change and growth,

by stating that architecture should "[focus] not on creating definitive projects typical of classic modernity, but [focus] rather on creating imperfect and incomplete subsystems" (Branzi, 2006, p. 5).

As a result, infrastructure is finding its way back into the lens of contemporary architecture as a medium of interest. Architects are re-exploring the possibilities of how infrastructure and architecture can relate as a method for strategizing growth. However, within these contemporary explorations is the emergence of renewed sensibilities to the concept of growth and how it is strategized through architecture.

Growth, as was strategized in architectural explorations from the 1950s to '70s, dealt with how a building could be designed to physically expand in size over time. Some architects strategized this form of physical growth to operate at the scale of one building, while others proposed methods for how a whole city could evolve, including its infrastructure. Nevertheless, it was found that these proposals strategizing physical growth through architecture although compelling in theory – would not fulfill their promises as realized projects, often due to the complexities inherent in their constructability.

Learning from the obstacles that came with past proposals, contemporary architects are seeking ways in which strategizing growth can offer more promising results in realization. The return of infrastructure's interest in architecture has also inspired the celebration of landscape (versus building) as a forefront medium for contemporary urbanism. Reinterpreted as a form of surface infrastructure, landscape is being heralded by many architects as a

medium that can foster opportunities for growth beyond the capacity of a building.

With landscape prioritized as a new medium for strategizing growth also comes a challenge to the traditional understanding of how growth is achieved. There are indeed contemporary theories, including Landscape Urbanism, that suggest landscape is a suitable medium for allowing physical expansion in size over time, subsequently providing for the support of new uses. Similar theories also argue that landscape can foster the growth of new uses without the need to physically expand in size; that through the initial design of specific physical ground treatments, a landscape can maintain openness to, and even encourage, new uses over time.

Projects that explore the various potentials of landscape as a medium for contemporary urbanism are investigated in the precedent research of this thesis. These and other contemporary proposals also find identification within the three research themes based on their relationship to infrastructure as a way of strategizing architectural growth.

7

# 2.0 Precedent Research

#### 2.1 Three Themes in Precedent Research

The following research precedents are themed based on how architecture relates with infrastructure as a way of strategizing growth. These themes will also serve as the framework for this thesis' design strategies.

The precedents researched throughout the three themes were selected to comprise a diverse body of work. Precedents from the early to mid-twentieth century are researched in comparison to contemporary precedents, to observe how theories and projects from the past have shaped new ideas in architecture. The precedents range from theoretical proposals to built projects and inform how the translation from theory to realization is handled and sometimes challenging. Important lessons are learned from the success and failures of these precedents, and ultimately help to guide the shaping of this thesis project.

#### 2.2 Theme I: Architecture Emulating Infrastructure

This theme identifies precedents in which architecture emulates the operations of infrastructure as a method for strategizing growth. Methodologies for strategizing growth include ways of designing architecture so that it can physically expand over time to accommodate new spaces and/or uses; or designing architecture that is static, but set up with specific physical treatments that allow for or encourage new uses over time.

#### 2.2.1 Team 10 and the Mat Building

Team 10 was the first group of architects to rigorously explore how infrastructure could inspire ways to strategize growth through architecture. As early as the late 1940s, members of Team 10 desired a relief from the highly specific functionalism of modernism in favour of the possibility that new and multiple functions could occur in a building throughout its life span. In this respect, "framework replaces form" (Sarkis, 2001, p. 14). Operating as a framework, the architecture – like infrastructure – could remain open to future growth and the possibility of supporting new spaces and/or uses.

The formation of Team 10 was founded on a shared critique of the CIAM's (French acronym for International Congresses of Modern Architecture) vision for the contemporary city. In the 1950s, the CIAM organization comprised many architects who were highly influential in the modernist movement, including major figures such as Le Corbusier and Walter Gropius. Most of those forming part of Team 10 were previously members of the CIAM and would be instrumental in the eventual demise of the organization in 1959.

The members of Team 10 would express their oppositions to the views of the organization when the group was asked to prepare

guidelines for the tenth CIAM congress in 1955. The young architects put forth a set a guidelines that "introduced consideration of more intangible social and cultural factors into CIAM" (Mumford, 2001, p. 53), presenting a rejection of the highly rational views of the organization at the time.

Team 10 would continue to carry a strong agenda for new forms of architecture and urbanism that placed emphasis on the human's place in the city. Their ideals would eventually find manifestation in the form of the mat building, an architectural prototype that would serve as the basis for much of the architects' thinking and built work throughout the 1960s and '70s.

The mat building characterizes a form of architecture that is "low-rise and high-density, that is homogenous in its layout, and that consists of systematic repetition of a simple element such as a column, skylight or modular room" (Sarkis, 2001, p. 14). The architects designed with the intention that the modular unit could lead to easy repetition and expansion of a building as was required over time. If there were ever demands for more space to occupy new functions, a modular component of the building be added.

One of the first clear built examples of the mat building prototype was Aldo van Eyck's Amsterdam Municipal Orphanage, completed in 1960 (Figures 2.2.1.1 & 2.2.1.2). "The completed building has an open-ended quality, suggesting the possibility for future growth and change using the same basic architectural order" (Mumford, 2001, p. 56). The building was sited in an empty field within the outskirts of Amsterdam and was composed of a series of modular bays. Each bay comprised a post & beam concrete structure supporting a concrete dome, sometimes implementing a glass skylight at its centre. The building consisted of modular bays connected in varying manners, creating a variety of interior spaces that occasionally framed exterior courtyards. With this completed





#### Figure 2.2.1.1 Aldo van Eyck's Amsterdam Orphanage, built 1960

This figure illustrates the mat building's openended quality, intended to physically expand in size over time. Retrieved from What is Structuralism?, Architecture Linked, 2012. http://architecturelinked. com/forum/topics/whatis-structuralism?commen tld=4741207%3AComm ent%3A24925. Accessed Sep. 2013.



#### Figure 2.2.1.2 Aldo van Eyck's Amsterdam Orphanage, built 1960

This figure illustrates the modular structural bay intended to serve as the repeated component for the building's physical growth over time. Retrieved from Love You So Mat, 2012. http://www. tumblr.com/liked/by/ loveyousomat/page/200. Accessed Sep. 2013.

base model, the building was intended to support added modular bays as required, ultimately catering to new spatial and functional opportunities.

The mat building persisted as a prototype of interest throughout the 1960s and early 70s, however many of the explorations never found implementation as built projects. When they did – like in the case of the Orphanage – they did not succeed in achieving what they had promised. None of the realized mat buildings actually grew over time as was anticipated by its architects.

The limitations of the mat building as a prototype for strategizing growth through architecture extends into further concerns as well. In the particular case of the Orphanage, the building was sited in a fairly remote area, permitting the building to expand as needed. It can be imagined that if a similar prototype were placed within the context of the city's dense urban fabric, the opportunities for growth would have been greatly challenged by property boundaries and adjacent buildings or infrastructures.

That is likely one of the reasons why the mat building has not subsisted as an architectural prototype for contemporary cities. "The problem is that automobile-scaled development is now typical in most cities, and few [mat building] projects have yet convincingly related these proliferating webs of automobile circulation to pedestrian labyrinths and fields" (Mumford, 2001, p. 64). This is the inherent irony of the mat building prototype: it serves to operate and grow like a form of infrastructure, yet it remains bound and restricted within the greater framework of roadway infrastructure.

This inherent limitation, however, did not go unnoticed by the members of Team 10. Further proposals by the group would demonstrate a desire to have architecture operate on the same terrain as roadway infrastructure, serving as a model for city growth: these explorations are reviewed in the second theme, Architecture Hybridizing with Infrastructure.

#### 2.2.2 Japanese Metabolism

As Team 10 was gaining momentum and acclaim in Europe, so were a group of Japanese architects: the Metabolists. They were interested in "changeability and flexibility... *Metabolism*, as we know it, is the biological process by which life is maintained through the continuous cycle of producing and destroying protoplasm" (Ross, 1978, p. 7). The aspiration to parallel concepts of growth in architecture naturally led the group to emulating aspects of infrastructure in their proposals.

The Metabolists carried similar aspirations as Team 10, however their design proposals offered more responsiveness to dense urban cores. As a result, the projects considered how strategizing growth through architecture could operate in the vertical dimension, versus the low-rise horizontal framework typical of the mat building.

Some of the earliest examples of strategizing vertical growth appeared in Arata Isozaki's sketches, titled 'City in the Sky' (Figure 2.2.2.1). The concept sketches presented an architectural prototype that differed from that of the mat building by introducing a distinction between serving and serviced components. Rather than

Figure 2.2.2.1 Arato Isozaki's City in the Sky, 1961

This figure illustrates lsozaki's use infrastructural operation into the realm of architecture; fixed vertical service shafts support modular plug-in units. Retrieved from Metabolism: A Proposal for a New Urbanism, 2011. http://www. cronologiadourbanismo. ufba.br/apresentacao. php?idVerbete=1389. Accessed Sep. 2013.



strategizing the repetition of a singular module as the basic building block for the entire architecture (as was exercised with the mat building), the design situated serving components - this included vertical transportation and mechanical service components - in fixed vertical cores to allow separate units to be plugged into the cores as required. The proposal suggested a sort of "dynamic system... [regulating] growth and transformation in the city" (Lin, 2010, p. 175).

Isozaki and his concepts would eventually inspire the realization of a built project while working under his mentor, Kenzo Tange. The Yamanashi Press and Broadcasting Centre, completed in 1966, embraces strategies and attributes very similar to those found in Isozaki's sketches (Figure 2.2.2.2). "Tange created a network composed of 16 concrete shafts with prefabricated 'teeth' to receive

the bridges linking the towers together...The voids left between the shafts imply the potential for future growth and flexibility" (Ross, 1978, p. 32-33). The project was a clear representation of infrastructure inspiring a way of growth through architecture.

These infrastructural aspects would continue to inspire architectural projects for the following decade, including probably one of the most prevalent emblems of Japanese Metabolism, the Nakagin Capsule Building. The Capsule Building, designed by Kisho Kurokawa, was completed in 1972 and again adopted similar concepts from 'City in the Sky'. Two vertical shafts served as structural and circulation cores for the building, housing staircases and elevators while physically supporting the attachable capsule housing units





#### Figure 2.2.2.2 Kenzo Tange's Yamanashi Press and Broacasting Centre, built 1966

This figure illustrates Tange's adoption of Isozaki's concepts of vertical service shafts supporting plug-in units; notice the "teeth" that line the service shafts providing support for additional units to be added over time. Retrieved from Appearing Adaptable, Daniel Markiewicz, 2012. http://projectjournal. org/category/readings. Accesed Sep. 2013.

(*Figure 2.2.2.3*). Ultimately, the architectural model is set up as a framework for growth by allowing for the potential future expansion of the vertical service shafts, which can subsequently accommodate the addition of further capsules.

However, like Team 10's visions for the mat building, the Japanese Metabolists' discovered that their proposals were more convincing in conception. Most of the projects realized by the Metabolists did not in fact undergo any form of metabolism; they did not grow or change as was anticipated.

The current state within which the Capsule Building finds itself illustrates the limitations of Metabolist architecture. As it

Figure 2.2.2.3 Kisho Kurokawa's Nakagin Capsule Tower. built 1972

This figure illustrates two vertical shafts - housing vertical circulation and mechanical services serving as a framework for attached prefabricated housing capsules. Retrieved from Nakagin Capsule Tower, Ecole SARL d'Architecture, 2012. http://www.ecole. co/classics/kurokawa/ nakagin-capsule-towerginza-tokyo-japon-137 Accessed Sep. 2013.



stands, the Capsule Building is planned for potential demolition in the near future. Many of the existing capsules have since gone into a state of disrepair, and rather than trying to simply replace the existing capsules with new ones – which would follow the philosophy of Metabolism – the owners are considering the opportunities of a new building as a more feasible investment (Scholz, 2006).

Although the prototypes developed by the Metabolists and Team 10 did not succeed in their realizations, they still serve as important precedents from which contemporary architecture can move forward. As is made clear in the following two sections of this theme's precedent research, contemporary approaches to strategizing growth through architecture carry very different sensibilities in comparison to those of the '60s and '70s.

#### 2.2.3 Landscape Urbanism

Landscape Urbanism has emerged as a contemporary design practice that recognizes landscape as a new forefront medium in urban design. Founded on a critique of architecture's limitations as a convincing model for contemporary urbanism, the practice explores how landscape can lead the guidance of growth in the city.

In his 2006 essay 'Terra Fluxus', James Corner, a landscape architect highly influential in the movement of Landscape Urbanism, provides a useful breakdown of the new movement into schematic themes, two of which are of interest here: 'processes over time' and the 'staging of surfaces'.

In the first theme, 'processes over time', Corner argues that

the intangible processes of the metropolis – i.e. societal and cultural - are more crucial to the evolution of the metropolis than the tangible forms, such as buildings and structures. The age of modernism demonstrated a failure in the attempt to create and control urban processes through built form. The rigidly ordered frameworks of modern buildings and structures could never serve to organize the complex intangible processes that filtered through them, thus eventually bringing demise to the era's utopian promises (Corner, 2006).

As a result, the approach inevitably reverses itself and becomes the underlying support for Landscape Urbanism. The practice of Landscape Urbanism places emphasis on the intangible in an attempt to understand and design for the complex processes of the urban environment that will manifest over time.

In Corner's theme, 'the staging of surfaces', landscape is understood to occupy all the surfaces that form the voids between buildings and structures and ultimately connects everything together; i.e. landscape as infrastructure. In this respect, Corner's interpretation of infrastructure (or landscape) comprises more than just infrastructures of mobility.

The place and role of landscape in the contemporary city undergoes a fundamental reinterpretation. Landscape is no longer limited to the traditional milieus of parks and open green spaces, or ground surface treatments surrounding buildings. Rather, landscape is understood to occupy essentially any surface in the city that is not building. Landscape assumes the role of infrastructure, becoming

"much more strategic, emphasizing means over ends and operational logic over compositional design" (Corner, 2006, p. 31).

The infrastructural landscape of the metropolis is an ideal medium for organizing the urban environment because of its intrinsic ability to grow. Corner extends his argument for the flexible potential of landscape as infrastructure by criticizing the rigidity of architecture: "unlike architecture, which consumes the potential of a site in order to project, urban infrastructure sows the seeds of future possibility, staging the ground for both uncertainty and promise" (Corner, 2006, p. 31).

Since its theoretical inception in the late 1990s, Landscape Urbanism has been the subject of much literature and discussion, with lesser impact in the built environment. Nevertheless, few projects have since emerged in contemporary urban environments that demonstrate suggestions of Landscape Urbanism's principles.

The Seattle Olympic Sculpture Park, completed in 2008, is likely the clearest manifestation of Landscape Urbanism theory todate (*Figure 2.2.3.1*). Here, Weiss/Menfredi Architects have built an artificial landscape that provides pedestrian connection between the previously divided urban fabric and waterfront. The designed landscape surface is a large zig-zag platform that stretches over a vehicular expressway and rail corridor, while operating as a "staging" ground for sculptured art.

By serving and directing the movement of people between two previously disconnected parts of the city, the landscape is indeed performing an infrastructural role. Nevertheless, what is also

Figure 2.2.3.1 Weiss/Manfredi's Seattle's Olympic Sculpture Park, built 2008

This figure illustrates the pedestrian landscape designed with various surface treatments to serve multiple uses. Retrieved from Seattle Art Museum Olympic Sculpture Park, e-architect, 2012. http://www.earchitect.co.uk/images/ jpgs/seattle/seattle\_ olympic\_sculpture\_park\_ ub180211\_1.jpg. Acessed Sep. 2013.



of interest in the context of this thesis is how the landscape emulates infrastructure's strategies of growth. It is in this respect that a clear distinction emerges when comparing strategies of growth between contemporary practices – such as Landscape Urbanism – and those of the '60s and '70s.

Landscape Urbanism's favour of landscape over architecture (or building) "as the basic building block of contemporary urbanism" (Waldheim, 2006) presents a significant shift in the attitude towards architecture and its contribution to city growth. While schemes by Team 10 and the Metabolists proposed very clear and systemized methods through which their architecture could grow over time, the methodologies for growth fostered through landscape - including those at the Sculpture Park – are far less prescriptive.

Some Landscape Urbanism theories suggests that landscape offers more promise for physical growth – that is, in literal expansion of size – than buildings do; however, a more common approach to strategizing growth has been based on how a landscape can support changing uses over time without needing to physically expand. This method of strategizing growth formed part of the architects' design intentions for the Sculpture Park: "we try to identify a diagram or a resilient form that's so simple that it can withstand the inevitable changes in program" (Weiss, 2010, p. 16). Weiss' comment suggests a way of strategizing growth that is not concerned with setting up a strict set of parameters that govern a way to grow, but is rather submissive and accommodating to change over time.

This approach seems promising in theory; however, in real project design, the architect is faced with the challenge of designing something that is "simple" enough to accommodate programmatic growth, yet specific enough to encourage it. "You need a degree of fixity in order to trigger diversity of uses. You actually don't get flexibility with an empty field; you need very specific design conditions in order to trigger the potential of that flexibility" (Allen & McQuade, 2011, p. 257). Stan Allen's argument for a necessary degree of fixity reacts to certain Landscape Urbanism proposals that suggest an open space or field – a sort of tabula rasa – as a way of strategizing growth.

At the Sculpture Park, there is a degree of specificity in the design of the artificial landscape. Various surface treatments are

applied to designate specific uses and direct circulation through the site. A crushed stone pathway serves to move people between the urban core and new waterfront area. Certain grassed areas are designated to support art sculptures, while others are intentionally unprogrammed. A portion of the park is designed as a stepped landscape with amphitheatre style seating, suggesting possibilities for informal gatherings or performances.

There are many specific design conditions occurring at the Sculpture Park; however, whether these encourage the potential for growing uses is questionable. Beyond the park's service as a connecter between the city and the water, it does not seem to operate much differently than the traditional urban park. It is possible that the park may accommodate a variety of uses throughout its life span, but perhaps only to the extent that any urban park would.

In an interview with the architects of the park, Stan Allen asked whether people were using the park in unexpected ways since its inception. Michael Manfredi replied: "the strongest constituents are not the people who love either nature or art but the fitness and recreational community. People who use it as a place to jog or even walk their dog have embraced the project in a way that none of us... had envisioned" (Allen & McQuade, 2011, p. 52).

This demonstrates that the park has successfully catered to unexpected uses beyond the architects' expectations; however, these forms of activities could be anticipated to arise in any form of urban park, so long as the proper surface treatments are provided. For many contemporary architects, results such as these are not convincing

enough to support the promise of landscape as the new forefront medium for urbanism. As a result, new practices are emerging that challenge the submissive nature of Landscape Urbanism and reintroduce architecture into the lens of contemporary urbanism.

#### 2.2.4 Landform Building

Landform Building is a new building type that is currently being explored in direct response to the perceived limits of Landscape Urbanism. In their 2011 publication, 'Landform Building: Architecture's New Terrain', Stan Allen and Marc McQuade argue that "the tools of landscape on their own don't have the power to resist, or offset, the forces at work in the contemporary city...Landscape by itself is not sufficient, even though there are important lessons to be learned from landscape" (p. 253).

Landform building does not promote the abolishment of Landscape Urbanism, but seeks to learn from its landscape strategies for application in architecture. The result is an amalgamation of landscape and architecture into one complimentary form of practice:

> Landscape and ecology, understood as dynamic, adaptive systems, offer productive models to understand the complexity of the city today. But the city is also a manmade artifact. Rather than loose organic metaphors, a new synthesis of architecture and landscape is needed to confront these constraints and potentials in emerging urban sites (Allen & McQuade, 2011, p. 34-35).

Allen & McQuade's referral to landscape and ecology as loose organic metaphors is suggestive of the submissiveness apparent in Landscape Urbanism design. As a result, re-instituting architecture back into the design strategy immediately implies a certain level of specificity necessary in Landform Building, precisely the specificity that Corner argued was what made architecture too consuming for the potential of a site. This is however why Landform Building attempts to be both building and landscape in order to encourage new forms of potential growth on a site.

Landform Building seeks to support a productive exchange between landscape and building to enhance transformations on site. Artificial terrains are implemented to favour possibilities for new program rather than formal resolution; these terrains are complex and interwoven to provide opportunity for varying interconnectivity in and around the building and the site. Landform Building does

#### Figure 2.2.4.1 FOA's Yokohama Port Terminal. built 2002

This figure illustrates building and landscape synthesized as a model of landform building. Retrieved from iDesign-Arch, 2012. http://www. idesignarch.com/wp-content/uploads/2010/08/ YokohamaInternational-PortTerminal-3.jpgamaInternationalPortTerminal-3. jpg. Accessed Sep. 2013.



not treat landscape as a material of strict exteriority, but allows it to flow into interior spaces, blurring the boundaries between inside and outside and allowing for new territories to emerge indoors (Allan & McQuade, 2011).

Perhaps one of the most representative manifestations of Landform Building is the Yokohama Port Terminal by Foreign Office Architects, completed in 2002 (*Figure 2.2.4.1*). Although Landform Building emerged as a typology much after the project's completion, the design clearly represents some of the practice's design ideologies. Emphasizing a seamless synthesis between building and landscape, the project "[turns] the building into a ground" (Kwinter, 2004, p. 232). The ground becomes a publically accessible landscape and extension of the urban fabric, at moments spilling into the container below to handle ferry departures and arrivals.

As a way of strategizing programmatic growth within the building, the architects adopted the concept of "intensive space" (Kubo, 2003, p. 17). Rather than adopting the consistent and homogenous space as a strategy for accommodating various uses, the intensive space concept "offer multiple conditions in a continuum, in a similar way in which temperature, luminance, pressure or humidity tend to vary across a large room...The potential of intensive space is to set us a degree of specificity without delimiting extensions" (Kubo, 2003, p. 17). The architects' intention for a degree of specificity as a strategy for programmatic growth parallels Allen's argument for designing beyond the open field.

Ultimately, the strategies for growth within the practice of

Landform Building carry similar sensibilities to those of Landscape Urbanism, despite critiques about the limitations of either building or landscape as more appropriate design mediums. Both practices share the intention to set up a way of growth based on the design of specific conditions up front. Eventually, it is up to the designer to decide how specific these conditions are.

#### 2.2.5 Theme I Precedent Conclusions

Amongst the varying approaches to strategizing growth through architecture, the precedents all share an intention to emulate infrastructure's adaptability to change. It is infrastructure's ability to "work with time and [remain] open to change" (Allen, 1994, p. 55) that allows the medium to guide city growth.

Team 10 and the Metabolists proposed that architecture could adapt to changing demands for new space and/or use by physically growing in size. While the contemporaries propose that architecture can be designed with specific treatments that adapt to changing uses over time, and that through this adaptability the architecture grows (more figuratively than literally). The attitudes about what constitutes growth may vary quite radically between then and now; nevertheless, there are intentions from both eras that are of interest for adoption in this thesis' design strategies.

It is clear that the strategies for physical growth promoted by Team 10 and the Metabolists proved to be unsuccessful in their realizations, but their theories and concepts should not be entirely discounted. The failures of the mat building and the capsule tower models being able to physically grow over time are likely the result of the scale and complexity of the projects. The designs were ambitious and demanded a high level of intervention if growth were to ever occur.

Perhaps these models would have been more successful if the component that allowed for growth – i.e. the structural bay or the prefabricated capsule – demanded less complexity in its addition to the existing building. When considering the physical properties of infrastructures such as the roadway, physical expansion is a fairly straightforward procedure. This is likely why landscapes are being heralded as new medium for growth over time, since they share similar characteristics to the roadway; they are both essentially ground surfaces.

Nevertheless, the complexities behind the mat and capsule models cannot solely be attributed to construction complexities. There are also concerns with project ownership and the undertakings required to finance the physical expansions. By limiting the potential for growth to one building, dependence on growth is being limited to the demands of one owner. If the architecture was strategized to allow for growth across a multitude of sites involving many owners, opportunities for growth may have increased. Of course, this then introduces a layer of political complexity that needs to be accommodated as well.

An appealing aspect of the physical growth model is the concept of continuous connectivity. As the model grows, it expands as a sort of matrix that maintains physical connectivity throughout

its entirety. Beyond the operation of one building, this concept introduces interesting opportunities at the urban scale. The Seattle Sculpture Park captures aspects of this by providing pedestrian connectivity between the urban fabric and the waterfront; however, it does not operate to expand as a continuous network throughout the city. More rigorous examples of creating continuous urban webs of physical connectivity are present in the next two themes of research, and will be of interest in the development of this thesis' design strategies.

The contemporaries' approach to growth is also of interest as a strategy for this thesis proposal. The idea that architecture can be designed to accommodate changing uses over time is appealing, and there seems to be potential in the theorizing behind Foreign Office Architects' concept of the intensive space. Their strategy of creating multiple conditions like the way temperature, luminance, pressure or humidity do within a room begins to suggest interesting ways in which architecture can support changing uses over time. The conditions that the architects describe are all in states of flux; temperature, sunlight, pressure, and humidity are constantly changing. If architecture is designed to work with these fluctuating conditions, different uses could be yielded over time.

Of particular interest is the condition of temperature change, and at the broader time scale, the realities of seasonal change. Especially in the context of Toronto, seasonal change has a tremendous impact on the way city is used by its inhabitants. Architecture's ability to harness the effects of seasonal change and

provide treatments that encourage changing uses throughout the year will form part of the thesis' design strategies.

#### 2.3 Theme II: Architecture Hybridizing with Infrastructure

This theme identifies precedents in which architecture hybridizes with infrastructure as a method for strategizing growth.

Methodologies for strategizing growth include designing architecture and vehicular infrastructure into a combined structure that can physically expand over time; or designing pedestrian landscaped infrastructures that guide the growth of architecture over time.

#### 2.3.1 Noah's Ark

Many of the explorations with the mat building prototype considered how ideas of architectural growth could operate at the scale of a singular building. However, interest in having the prototype operate at a larger urban scale also found place in some of the work of Team 10.

At a 1962 meeting amongst the members of Team 10, Aldo van Eyck presented a scheme for the urbanization of Amsterdam proposed by one of his students, Piet Blom. The proposal was titled 'Noah's Ark' and fit appropriately within the meeting's overall theme, "Urban infrastructure and building group concept" (*Figure 2.3.1.1*).

The proposal, which was fairly abstract in its representation, suggested that the mat building prototype could operate as a framework that strategized growth for the whole city, versus just one building. In this respect, the mat building had to undergo a fundamental shift in its relationship to infrastructure. Unlike the



prototypes explored in the previous theme, such as Van Eyck's Orphanage, 'Noah's Ark' took the mat concept from emulating infrastructure to hybridizing with infrastructure.

The result was a "60-hectare village...organized into interlocking built clusters that provided for a wide range of urban functions...all tied together by a four-level road network" (Mumford, 2001, p. 59). The architecture is no longer bounded and restricted in its growth by the existing infrastructure that defines its site. Instead, the architecture becomes the infrastructure of the city; it guides and grows the city.

The critique for *Noah's Ark* will be considered in the next section of the precedent research, "The Megastructure", for both precedents carry similar ideologies in their strategies for growth.



#### Figure 2.3.1.1 Piet Blom's Noah's Ark, 1962

This figure abstractly illustrates the mat concept of growth operating at the urban scale through building and infrastructure. Retrieved from Love You So Mat, 2012. http:// loveyousomat.tumblr. com/post/15288950412. Acessed Sep. 2013.

#### 2.3.2 The Megastructure

The Megastructure is a building type – although not limited to a singular definition – that emerged in the 1960s and began to re-conceive architectural interventions at a larger urban scale. The Megastructure was inspired by the thinking and projects of the Japanese Metabolists and very much became a North American phenomenon. More than ever, architects were considering how their projects could serve as a framework for future city growth.

Although the Megastructure became a significant form of architectural exploration in the 1960s, its inspirations could be said to stretch much further back in history than the work of the Metabolists. Paul Rudolph, an American architect involved in the discourse of the Megastructure concept, classifies the famous historic bridge in Florence, Ponte Vecchio, as one of the earliest models of his interpretation of the Megastructure (*Figure 2.3.2.1*). The bridge

Figure 2.3.2.1 Florence's Ponte Vecchio, built 1345

This figure illustrates one of the earliest interpretations of a Megastructure; the amalgamation of architecture and infrastructure. Retrieved from *Downtime\_1882*, Flickr, 2012. http:// www.flickr.com/ photos/7806017@ N04/7395907636. Acessed Sep. 2013.





allows for the flow of people across the river, while supporting a range of shops and housing along its peripheries; the clearest traditional example of hybridizing architecture and infrastructure.

A more recent suggestion of the Megastructure model also appeared in some of Le Corbusier's exploratory work from 1931. His proposal, Project 'A', for urbanization in Algiers again depicts the hybridization of architecture and infrastructure (*Figure 2.3.2.2*). However, there are clear distinctions to be made between Le Corbusier's proposal and Rudolph's identification of Ponte Vecchio as a model of the Megastructure. While both projects indeed bring architecture and infrastructure together into the form of a Megastructure, Project 'A' carries an agenda to strategize urban growth.

There is a clear separation of levels between housing and vehicular flow, a typical division of functions found in much of Le Corbusier's work. This strategy understands that the environments of housing and transportation infrastructure – although carrying necessary adjacency – require very different architectural sensibilities.



#### Figure 2.3.2.2 Le Corbusier's Project 'A', 1932

This figure illustrates Le Corbusier's hybridizing of architecture with infrastructure as a model for urban growth. Retrieved from *NOW* + *WHEN Australian Urbanism*, Productspec, 2012. http://respeak. net/articles/now-whenaustralian-urbanism. Acessed Sep. 2013.

Overall, the Megastructure sets up a structural framework within which the road network can expand and accommodate new housing units as required. The potential for the structure's future growth is clear in the proposal's manner of representation. Rather than the depiction of a complete and finite project, the structure stretches far into the landscape, losing definition and becoming more abstract. Le Corbusier has rendered a sense of endlessness to the project.

Many of the qualities captured in Le Corbusier's project would form the basis for several Megastructure proposals proliferating throughout the 1960s and '70s. Paul Rudolph's proposal for the Lower Manhattan Expressway demonstrates clear influence from the Algiers project, by introducing architecture to the terrain of infrastructure as a way of strategizing urban growth. Commenting on the scheme, Rudolph expresses that "one characteristic of the twentieth century is that nothing is ever completed, nothing is ever fixed. We don't think of things being complete within themselves... So the whole idea of the uncompleted building which is going to be expanded in unknown ways is an obsession" (Cook, 1975, p. 107).

The Lower Manhattan Expressway project proposed various scales and typologies of architecture operating with infrastructure in different ways. Several residential and commercial towers closely flank an elevated expressway at the edges of the Island, while in other areas the expressway sinks into the ground to allow low-rise A-framed housing structures to hover above (*Figure 2.3.2.3*).

Rudolph understood infrastructure as an urban system that could continuously expand, and so he designed architecture



to grow in tandem with it. This strategy for growth carries similar sensibilities to Blom's 'Noah's Ark' proposal, although Rudolph's scheme is clearly much more resolved and compelling. Ironically, it is in the impressive level of resolution that the scheme's flaws begin to emerge.

It is not surprising that a proposal of such magnitude did not end up realizing itself. Beyond the common critiques of unhealthy relationships between automobile exhaust and house dwellers or the neglect of design considerations at the pedestrian scale, there are factors outside architectural criticism that compete with the scheme's ambition. To "have access to so many lots and rights of way, and the required stylistic continuity could never occur with multiple developers" (Kilian, Rawlings & Walrod, 2010, p. 55). Placing architecture and infrastructure in the same field

#### Figure 2.3.2.3 Paul Rudolph's Proposal for the Lower Manhattan Expressway, 1972

This figure illustrates Rudloph's hybridizing of architecture with infrastructure as a model for urban growth Retrieved from Paper + Architects, 2012. http:// paperplusarchitects. tumblr.com/page/4. Accessed Sep. 2013.

of development necessitates a fundamental re-organization in the division of work between public and private sectors, especially at such a scale. Ensuring that the proposal maintains a consistent language throughout its entirety with the investment of different private owners would seem futile. Of course the entire project could be a public work, but given the funding required to accomplish such a feat makes the proposition highly unlikely.

There are many political realities that stand in the way of realizing proposals such as Rudolph's. At a much smaller scale, the scheme may have been realizable; however, a downgrade would likely go against ideologies of architecture expanding at the scale of urban infrastructure. The same issues extend towards Blom's proposal. Despite its lack of resolution in comparison to the Expressway project, its similar ideologies for urban growth would eventually be challenged.

Nevertheless, there is much to learn from challenging the traditional divide between architecture and infrastructure and the issues and opportunities that come with it. Contemporary approaches to hybridizing architecture and infrastructure – some of which are presented in the following section – are perhaps less ambitious than those of the '60s and '70s, yet still carry ideologies of how architecture can serve a more significant role in guiding city growth.

#### 2.3.3 Landscape Infrastructures

In 2010, Stan Allen released an essay titled 'Landscape Infrastructures' that promotes yet another position in contemporary urban design based on a critique of Landscape Urbanism. Allen argues that the realized projects of Landscape Urbanism to date "have stayed within the conventional boundaries of landscape architecture...reinforcing the conventional expertise of the landscape architect" (Allen, 2010, p. 38).

He promotes a new strategy for urban design that, again, embraces aspects of Landscape Urbanism, but is more explicit in landscape's operation as a form of infrastructure. "An expanded institutional definition is still required, one that would open up to the design of systems and infrastructures: a shift from landscape urbanism to landscape infrastructures" (Allen, 2010, p. 38).

In his competition entry for Gwanagyyo Pier Lakeside Park, Allen synthesizes landscape, infrastructure, and architecture into a "mega-form", re-interpreting the traditional Megastructure as a model for strategizing urban growth. The competition brief called for the design of an urban park that could accommodate 16,000 inhabitants in a newly planned city. The proposed park presents itself in the form of an infrastructural pier supporting a variety of recreational programs, with buildings situated at points along the structure (Figure 2.3.3.1).

In comparison to Rudolph's Megastructure proposal, Allen's mega-form suggests a different approach to strategizing urban growth. Present in Allen's scheme is a higher sensitivity to the realities

Figure 2.3.3.1 Stan Allen's Gwangyyo Pier Lakeside Park. 2008

This figure illustrates Allen's reinterpretation of infrastructure as a landscaped pier for recreational use. Retrieved from Gwangyyo Pier Lakeside Park, SAA/ Stan Allen Architect, 2008. http://www. stanallenarchitect. com/#GWANGGY0%20 LAKESIDE%20PARK. Accessed Sep. 2013.



of urban development. Rather than presenting a fully densified and complete plan – as was proposed by Rudolph – Allen prioritizes only certain components to be built, suggesting opportunities for incremental growth. In this case, the landscaped infrastructural pier is given priority as the guiding component of the project's growth, "capable of holding its own against the development planned on site" (Allen, 2010, p. 41-42). This strategy allows future developments, especially high-density buildings, to flank or "plug into" the pier over time to take advantage of and contribute to the infrastructure's resources.

Interestingly, there are many aspects of Allen's design principles captured in the New York City High Line project that support the promise of his theories. Although the High Line carries a richer history in its development, in today's state it is indeed a form of landscape infrastructure.

Designed by Diller Scofidio + Renfro, along with James Corner, the High Line project has been gradually converting a decommissioned elevated railway infrastructure into a new continuous pedestrian park since 2009. The new landscape reactivates the infrastructure running north-south along the western edge of Manhattan, offering pedestrians new ways to experience and engage with the surrounding fabric of the city.

Because the High Line has so quickly become a unique and celebrated place within the city, a lot of new developments are appearing immediately surrounding it, and in some cases, hovering directly over it; the Standard Hotel has become a popular icon that stretches directly over part of the High Line (*Figure 2.3.3.2*). As developments around the High Line continue, a new attitude concerning the relationship between architecture and infrastructure



#### Figure 2.3.3.2 Diller Scofidio + Renfro's High Line, ongoing since 2009

This figure illustrates how the High Line has encouraged a new relationship between architecture and infrastructure. Retrieved from The Standard, Architect, 2012. http:// www.architectmagazine. com/hospitality-projects/ the-standard.aspx. Accessed Sep. 2013.

is growing. The new pedestrian infrastructure is encouraging an engagement with architecture that is intimate and begins to challenge the traditional divide between public and private uses.

In regards to Allen's argument for the landscape infrastructure as a tool for strategizing urban growth, the High Line has proven the potential of his theory. However, the High Line goes beyond merely holding its own against development planned around the project and promotes an attitude about how that development should be carried out.

#### 2.3.4 Theme II Precedent Conclusions

The most consistent strategy present amongst the precedents researched within this theme is the challenge of the traditional divided relationship between architecture and infrastructure. For centuries, infrastructure and architecture – whether it comprised buildings or landscapes – have been treated as divided mediums. This reality extends beyond the physical and into the realm of disciplines as well. Engineers have been at the forefront of infrastructural design, reducing the public ground to the service of efficient transportation networks.

Introducing an architectural presence to the terrain of infrastructure begins to challenge the role of infrastructure and offers insight into how this ground can be optimized beyond the service of moving people and goods. Earlier explorations such as Blom's and Rudolph's suggest that architecture could be relocated directly onto the terrain of vehicular infrastructures. This layered

approach maintains the operations of vehicular infrastructure and designs the architecture in response to its new context; housing units are situated at an appropriate distance above automobiles to reduce noise pollution, while vertical shafts integrated into the building help with relief from exhaust. Ultimately, the architecture becomes subservient to the operations of the vehicular infrastructure.

In the contemporary precedents, this subservience is avoided by redefining the fundamental role of infrastructure in itself. The landscape infrastructure accepts that vehicular infrastructure is its own system and that it does not lend itself to healthy integration with architecture. Rather than have vehicular infrastructure bring compromise to the design of architecture, the contemporaries redefine infrastructure in itself to accommodate uses beyond merely moving people and goods. In this case, the infrastructure is designed as a system that gives priority to the pedestrian, opening up opportunities for new public uses. As is seen in Allen's proposal and at the High Line, the infrastructure is activated to become a place of destination, while still serving the movement of people throughout the city.

This fundamental redefining of infrastructure sets in place new ways in which architecture and infrastructure can relate. By activating infrastructure with new forms of public use, the traditional figure-ground divide between architecture and infrastructure can now be consolidated to strategize new opportunities for urban growth.

#### 2.4 Theme III: Architecture Liberating from Infrastructure

This theme identifies precedents in which architecture liberates from infrastructure as a method for strategizing growth.

Methodologies for strategizing growth include designing architecture that offers liberation from the impediment of infrastructure in the form of pedestrian dedicated infrastructures, allowing architecture to strategize growing physical connectivity in the urban realm.

#### 2.4.1 La Citta Nuova

In 1914, Italian Futurist architect, Antonio Sant'Elia, presented a collection of drawings depicting his urban vision for the city of the future, titled 'La Citta Nuova' (Italian for 'The New City'). Working at a time when the pressures of industrialization were transforming static cities into growing, dynamic metropolitans, Sant'Elia and his peers were addressing concerns for vehicular transportation and high-density housing in the design of their architecture (Caramel & Longatti, 1987).

The rise of the automobile's presence in the city would be celebrated by the Futurists, contributing to a faster pace of life and dynamicism that strived to be captured in the aesthetic of new architecture. Bold and stripped-down curvilinear forms would replace the traditional orthogonal, highly ornate designs of the Art Nouveau movement. The scale and height of buildings would increase, celebrating new construction and building technologies such as the elevator (Caramel & Longatti, 1987).

With the inspiration that industrialization brought to Futurist architecture, also came the need to respond to new complexities that transportation networks would introduce in the urban realm. The roadway, although serving the celebrated automobile, was also perceived as an unhealthy and dangerous place for the pedestrian. Sant'Elia's response to this reality would become an integral part of the design of his architecture, by proposing urban conditions that offered the pedestrian liberation from the negative affects of automobile traffic (Caramel & Longatti, 1987).



Figure 2.4.1.1 Sant'Elia's La Citta Nuova, 1914

This figure illustrates Sant'Elia's depiction of the elevated pedestrian bridge serving physical connection to buildings and street level below. Retrieved from Sant'Elia Antonio New City, 1914, Atlante dell'arte italiana, 2013. http://www. atlantedellarteitaliana.it/ artwork-7669&htmlphp?art work=7669&lang=english. Accessed Sep. 2013.

In his drawings for 'La Citta Nuova', Sant'Elia would propose a series of pedestrian bridges interconnected between buildings at a level raised above street. This strategy went beyond protecting the pedestrian from the effects of the automobile; "the bridges satisfy Sant'Elia's constant need to create connections between various parts of the urban system" (Caramel & Longatti, 1987, p. 24). "The buildings are not conceived as isolated single elements in their own right, but as tenements...referring to a global urban web" (Caramel & Longatti, 1987, p. 33). This strategy is suggested in his drawing for the terraced apartment building, depicting an elevated pedestrian bridge connecting to the building and a stairway providing access to street level below (*Figure 2.4.1.1*).

Sant'Elia's drawing suggests liberation from automobile infrastructure as a method for architectural continuity throughout the city. However, it is interesting to observe that the liberation from the automobile infrastructure is provided for through the form of another infrastructure; the pedestrian bridges that rise above the street and connect between buildings are indeed forms of infrastructure. operating through connectivity and suggesting opportunities future growth.

The use of multi-layered infrastructures operating a variety of uses is also evident in a drawing done by American architect H. Wiley Corbett from a year earlier, depicting a future vision for New York City (Figure 2.4.1.2). It is very clear that Corbett's drawing inspired some of Sant'Elia's strategies, since the Italian architect was interested in the urban development occurring in the United



States at time. Although the visions of the architects would never actualize into the form of new cities, attitudes about architecture's support of pedestrian dedicated infrastructures would prove to subsist throughout the twentieth century.

#### 2.4.2 Archigram

By the 1950s, modernist architecture had reached a point where its promise of achieving social transformation through the aid of technology was no longer convincing. With the emergence of brutalism at the peak of the modern period, architecture had simply been reduced to a mere practice of space making through the use of modern construction techniques (Sadler, 2005).



#### Figure 2.4.1.2 H. Wiley Corbett's Future New York, 1913

This figure illustrates Corbett's future vision for New York City and its influence on Sant'Elia's use of multilayered infrastructures for La Citta Nuova. Retrieved from Metropolis of Tomorrow, Tumblr, 2010. http:// metropolisoftomorrow. post/609777496/city-ofthe-future-by-harvey-wileycorbett-1913. Accessed Sep. 2013.

Figure 2.4.2.1 Archigram's Plug-in City, 1964

This figure illustrates the city as a large system open to the evolving transformations initiated by its users. Retrieved from Relational Thought, 2012. http:// relationalthought.files. wordpress.com/2012/05/ peter-cook-archizoommaimum.pressure. area-plug-in-city-1962-64-section.jpg?w=500. Accessed Sep. 2013.



In reaction to modernism's legging in technological and social advancement, Archigram began to re-explore the potentials in which architecture could radically promote social transformation through the use of technology. Archigram argued that "architecture should not create fixed volumes of space to be mutely inhabited, but must provide the equipment for 'living', for 'being' " (Sadler, 2005, p. 5).

The fixity of modernism was fundamental to Archigram's critique, for although modernism utilized modern technologies in the construction of buildings, the techniques were not appropriately utilized for social advancement. Archigram's position for the design of architecture was more sensitive to the needs of the users rather than the ideals of the architectural object itself. Architecture was promoted as an event that came into being through the active involvement of its users (Sadler, 2005).

With the intent of designing for the needs of the individual,

Archigram launched into a multitude of utopian proposals that envisioned new cities operating at the service of the individual's desires. One of the first proposals of this kind was from 1964, titled 'Plug-in City' (Figure 2.4.2.1). In this model, the individual is introduced to a new and liberated way of city living, for whom "connections [can] be made and disconnected at will" (Sadler, 2005, p. 19). A system of cranes, interchangeable living units, rapid transportation links; the new city is designed as a model for rapid urban growth, allowing itself to unfold based on the requirements of its people over time.

Despite the utopian nature of the proposal, there are attitudes in the scheme that offer opportunity as realistic urban strategies. In one of the scheme's drawings, 'Simplified Guide-Section 2' (Figure



SUSTENANCE COMPONENTS PLUG-IN CITY SIMPLIFIED GUIDE-SECTION 2

Figure 2.4.2.2 Archigram's Plugin City Simplified Guide-Section 2. 1964

This figure illustrates Archigram's intention to provide division between infrastructures serving people and those serving goods. Retrieved from The Plug-in city/Peter Cook, Archigram, ArchDaily, 2013.http://www. archdaily.com/399329/ ad-classics-the-plug-incity-peter-cook-archigram. Accessed Sep. 2013.

2.4.2.2), distinction is made between infrastructures serving the movement of humans versus goods. The "basic network" of the city, composed of a matrix of tubes, is divided into two; half are lifts to move people, while the others serve to move goods. This infrastructural division between people and goods - although simplified and unresolved in its representation – suggests significant implications for how the individual can move more freely throughout the city.

Infrastructure – especially vehicular – can often be an impeding barrier for the pedestrian. Archigram's dedication of a specific form of infrastructure to the active human affirms that Sant'Elia and Corbett's intentions have maintained relevance fifty years later.

#### 2.4.3 Contemporary Pedestrian Infrastructures

More than ever, contemporary cities are attempting to renew their industrial footprint with more environmentally conscious approaches to urban design. A significant component of this ongoing renewal involves returning underutilized land back to the pedestrian. Realized projects such as the Seattle Sculpture Park and the High Line are emblematic of this, converting underutilized post-industrial infrastructure or land into landscapes that prioritize pedestrian use.

This attitude is credible but for the most part has stayed fairly fragmented throughout the city. This thesis is interested in the potential of such attitudes being strategized to operate more

continuously throughout the city, consistent with Sant'Elia;s vision for the city's architecture as a global urban web. Two contemporary precedents have been identified that begin to speak to how architecture can contribute to a continuous pedestrian web as a promising strategy for urban growth.

The first is a project sited in Shanghai that was realized in 2011. The Lujiazui Pedestrian Bridge is a circular walkway that has been superimposed just over five metres above the ground of a large vehicular intersection in Shanghai (Figure 2.4.3.1). The bridge liberates pedestrians from the impediment of automobile infrastructure and provides physical connection to surrounding buildings and sidewalks via stairways, ramps, and escalators.

The scale of the project and its interconnectivity with surrounding sites suggests a compelling way in which the elevated



#### Figure 2.4.3.1 Lujiazui Pedestrian Bridge, built 2011

This figure illustrates the elevated pedestrian bridge connecting to multiple surrounding sites to provide relief from the impediment of vehicular infrastructure below. Retrieved from Luiiazui Circular Pedestrian Bridge, China, Knstrct, 2012. http://knstrct. com/2012/10/21/lujiazuicircular-pedestrian-bridgechina. Accessed Sep. 2013.

#### Figure 2.4.3.2 Archigram's Fulham Study, 1963

This figure illustrates Archigram's explorations with the elevated pedesrian bridge serving physical connection between buildings. Retrieved from Sadler, S (2005). Archigram: Architecture without Architecture. Cambridge: MIT Press, p. 85.



bridge can work with architecture to strategize a continuous pedestrian network throughout the city, uninterrupted by automobile infrastructure. Interestingly, Archigram proposed a very similar strategy for pedestrian prioritization sixty years earlier (Figure 2.4.3.2). It is assuring to note that many of the attitudes from the 1960s that were deemed utopian are now being applied to remediate the urban issues that many contemporary cities are facing today.

The second contemporary precedent, SOM's proposal the Grand Central Terminal in New York City, also reveals a new sensibility towards once-utopian gestures. Here, the architects have proposed to re-zone the sites surrounding the terminal in order to allow for three high-rise point towers connected by circular observation deck (*Figure 2.4.3.3*). The elevated observation deck is intended to provide users with panoramic views of New York City. Although the elevated pedestrian ring does not carry the same intentions to become part of a continuous web throughout the city – as suggested in 'La Citta Nuova' and 'Plug-in City' – the proposal still reflects a contemporary attitude that supports the concept of pedestrian infrastructures operating at an urban scale.

Another important aspect to consider from this precedent is the introduction of public use at an elevated level within otherwise privately used buildings. Typically, public uses are situated at street level to accommodate pedestrians and contribute to street life. Elevating the public realm provides pedestrians relief from the impediment of roadway infrastructure, while introducing new



#### Figure 2.4.3.3 SOM's Proposal for Grand Central Terminal, 2012

This figure illustrates the architects' proposal for an elevated pedestrian observtion deck connection three high-rise towers surrounding the terminal. Retrieved from Flying saucers, glass roadways, subterranean caverns: three visions of the Grand Central Station of 2112, Gizmag, 2012. http://www.gizmag. com/grand-centralstation-2112/24714/ pictures#24. Accessed Sep. 2013.

ways of experiencing the city. Such benefits are clear at the High Line; however, including stronger architectural engagement with these forms of elevated pedestrian infrastructures can enhance the individual's experience by introducing the types of public amenities typically found at street level.

#### 2.4.4 Theme III Precedent Conclusions

Providing consideration for the pedestrian within the urban realm is the clear underlying design strategy within this theme. Giving the pedestrian priority is based on a reaction to infrastructures and the limits they can impose for the pedestrian within the city, despite the conveniences they offer.

Automobiles and pedestrians have been sharing the same urban surface of infrastructure for over a century: the street. Over the years, streets have evolved to include the sidewalk and the crosswalk; systems that allow the pedestrian and vehicle to safely share infrastructure. This co-existence on the street, although efficient, can often yield unfavourable conditions for the pedestrian. This is especially evident in dense urban cores where large vehicular intersections can impede the free flow of pedestrians through the city, or where congestion ensues on sidewalks. Projects like the pedestrian bridge in Shanghai attempt to provide relief from such conditions.

At the city scale, large infrastructural developments over the past few centuries have left behind significant footprints in many developed metropolitans, in many cases scarring the urban fabric with unpleasant conditions and physical barriers for the pedestrian. Railway and expressway infrastructures have typically found their place along the city's waterfront edge, leading to significant disconnections between the urban fabric and the waterfront. This condition is emblematic in Toronto, where the rail corridor and Gardener Expressway are often attributed as barriers, rather than facilitators, of movement throughout the city. Today, many cities are recognizing the negative effects of such infrastructures on the urban fabric and are attempting to return priority to the pedestrian.

In attempts to provide relief from these barrier infrastructures, many urban designers are superimposing new pedestrian dedicated infrastructures in order to reconnect divided parts of the city. A successful example of this superimposition technique is evident at the Seattle Sculpture Park.

This thesis will thus strategize ways in which architecture can return priority back to pedestrians, by encouraging their movement throughout the urban fabric and providing opportunities for new ways to experience the city. Ultimately, these pedestrian infrastructures will enable architecture to maintain growing physical connectivity throughout the urban realm.
# **3.0** Thesis Design Strategies

Based on conclusions from the three themes in precedent research, the following thesis design strategies summarize how architecture can serve a more prioritized role in guiding city growth. These strategies ultimately inform the design proposal presented in Section 5.0.

#### Emulate Infrastructure 3.1

# 3.1.1 Connect Physically

Architecture establishes physical connections between sites to serve the movement of people at an urban scale. This ensures a level of physical continuity beyond the restrictions of typical property boundaries, strategizing architecture to physically grow throughout the urban fabric.

# 3.1.2 Encourage Changing Uses

Architecture encourages the change of seasonal activities throughout the year. This is achieved through design treatments that work with changes in weather to allow architecture to foster programmatic growth.

#### Hybridize with Infrastructure 3.2

# 3.2.1 Diffuse the Figure-Ground

Architecture mediates the traditional divided relationship between itself and infrastructure. This encourages architecture and infrastructure to share their physical footprints a way of strategizing urban growth.

# 3.2.2 Activate the Void

Architecture introduces new public activities to terrain of infrastructure. This evolves infrastructure's role beyond the service of moving people and goods and renders it a place of destination.

#### Liberate from Infrastructure 3.3

# 3.3.1 Encourage Active Mobility

Architecture encourages active mobility (i.e. walking, jogging, running, cycling, etc.). This optimizes the movement and experience of the pedestrian throughout the urban fabric.

## 3.3.2 Bridge Divides

Architecture offers pedestrian dedicated physical connections where infrastructures create divide. This ensures that the pedestrian is not impeded by the physical barriers of infrastructure and allows architecture to form a continuous network of physical connectivity.

# **4.0** Site Background

#### Site Selection & Overview 4.1

The Site of concern for the design project is situated amongst a collection of precincts currently under development at the south-eastern edge of the downtown Toronto area, much of which fronts Lake Ontario (Figure 4.1.1). The site comprises several post-industrial areas and park lands being proposed for revitalization as new mixed-use communities for living, working, and leisure. All precincts of concern fall within the scope of Waterfront Toronto's vision for North America's largest urban revitalization project (Waterfront Toronto, 2013). The thesis project will present a specific design proposal within a focused area of the site that serves to strategize how the site can grow over time, ultimately aiming to satisfy general intentions at the master planning scale.

Waterfront Toronto's main objectives are to revitalize a vast amount of land that was constructed strictly for industrial purposes over several decades in the late nineteenth century and throughout most of the twentieth century. These constructed lands continuously reshaped Toronto's shoreline along Lake Ontario, leaving behind extensive man-made waterfront property that currently sits highly underutilized. These waterfront properties now hold tremendous potential for new development as models for

a twenty-first century way of life in the city (Waterfront Toronto, 2013).

At the master planning scale, the precincts of concern for this project include the West Don Lands, the East Bayfront, the Lower Don Lands, and Lake Ontario Park which includes Tommy Thompson Park. The Central Waterfront is also of concern given its strong connectivity to the precincts. Most of the Portlands precinct, although central to the area, is not slated for revitalization and is planned to maintain its industrial operations on site. Otherwise, each precinct currently has an associated comprehensive plan, outlining principle development objectives for the respective area.

Given the location and significant scale of these precincts within the city, development over the course of the next few decades will undoubtedly serve as an important model for urban building in 21<sup>st</sup> century Toronto. These precincts offer tremendous potential to explore new ways of growing the city.

The site also contains a considerable amount of existing infrastructures that create a series of physical barriers when accessing the site from the downtown area. These infrastructures will serve as important focal points of consideration in the design proposal.







# Proposed mixed-use development



Map background retrieved from *Google Earth* 

Figure 4.1.1 Site Precincts

# 4.2 Site History

The various precincts that comprise the site of concern for this thesis have been subject to significant transformation over the course of Toronto's history (Desfor & Laidley, 2011). As areas located along the city's waterfront, most of these precincts do not form part of the city's original shoreline. Industrial development beginning over a century-and-a-half ago has lead to the landfill development of these precincts along Toronto's shoreline edge, expanding the city's footprint southwardly (*Figure 4.2.1*)

The West Don Lands precinct is the only area to have had part of its land exist within Toronto's original shoreline, given that it is the most northerly situated amongst the precincts. The precinct used to comprise one of the city's largest parks until the property was sold in 1830 to site a new hospital. The 19<sup>th</sup> century saw industrialization, housing, and community buildings including schools begin to proliferate the area. The Gooderham & Worts Distillery was one of the first industries established within the area in 1832. The Don River running through the area was straightened off its natural course and marshes were filled as land was leveled (Urban Design Associates & DTAH, 2005).

The 20<sup>th</sup> century brought more industrial occupation to the area's land. Railway expansion became a critical piece of development in the area, forming what is today's GO Train rail yard directly south of the precinct. As a result, residential use began to occupy less land. Eventually, as industries continued to grow







1860

Map information retrieved from http://maps.library. utoronto.ca/dvhmp/maps. html

Map background retrieved from *Google Earth* 

Figure 4.2.1 Toronto Shoreline Development

1890



1910







1930

1970

Current

Map information retrieved from http://maps.library. utoronto.ca/dvhmp/maps. html

Map background retrieved from *Google Earth* 

Figure 4.2.1 <sub>(cont'd)</sub> Toronto Shoreline Development they began to relocate to larger sites situated in suburban areas, leaving behind vacant building stock and vast open space within the precinct (Urban Design Associates & DTAH, 2005).

The East Bayfront and Central Waterfront areas followed as land area landfills in the early 1900's. Land was built to accommodate new industry and included a new railway that continued extension from Bathurst Street to the Don River. By the 1920's, the Keating Channel had been constructed, channelizing the natural delta of the mouth of the Don River into its current condition (Koetter Kim & Associates, 2005).

The Keating Channel would serve as an important lane of access for shipping boats serving industry in what would become the Lower Don Lands. As industrial development in the Lower Don Lands quickly grew in the early to mid 1900's, a larger shipping channel was constructed south of the Keating Channel which would also serve to support the new industrial landfilled areas of the Portlands. By the 1950's the Gardener Expressway had been constructed, flowing vehicular traffic east-west above the Lower Don Lands. Spanning over the Don River, the expressway overshadowed the river mouth's previously significant presence in the city (Waterfront Toronto, 2013).

By the 1970s, much of the industry that previously occupied the Lower Don Lands and Portlands had terminated or relocated operations within the city. Most of the remaining building and land stock does not carry significant heritage value, and as result will be eliminated to make way for the area's proposed mixeduse developments. As shown in Figure 5.1.2, however, there are still industrial occupancies in operation within the Portlands precinct (Waterfront Toronto, 2013).

Around the same time, construction of the Leslie Street Spit (now Tommy Thompson Park) began to serve as disposal grounds for surplus fill and unusable construction materials from development sites throughout Toronto. Over the course of a few decades however, the spit grew into one of the largest natural habitats on Toronto's waterfront, supporting various meadows, forests, marshes, beaches, sand dunes and wildlife. As a result, the spit was proposed for conservation as parkland in the early 1990's, establishing the creation of Tommy Thompson park. This one-ofa kind parkland will form the basis for creating the newly proposed Lake Ontario Park (Waterfront Toronto, 2013).

#### **Existing Precinct Plans** 4.3

The following sections outline the design objectives from each precinct within the site of concern that pertain to the scope of this thesis design exploration. These are extracted from comprehensive plans that have been developed by Waterfront Toronto in conjunction with hired professional design consultants.

# 4.3.1 Central Waterfront

One of the Central Waterfront's objectives most pertaining to this thesis is the desire to create a continuous pedestrian and

cyclist friendly promenade that lines the water's edge and allows connection directly into the Lower Don Lands and Portlands. Proposed and currently under development is an 18 metre wide water's edge promenade that widens the existing waterfront's boardwalk and utilizes new footbridges to span the several water slips that interrupt the straight land edge. Consideration for relating and connecting to this new promenade will be essential in the thesis design exploration (DTAH & West8, 2006).

# 4.3.2 West Don Lands & Corktown Common

The West Don Lands precinct is one of the first two precincts currently under development. Development within the precinct is mixed-use with diverse character, incorporating smaller scale interventions such as townhouses that borrow from surrounding neighbourhoods including Corktown, as well as larger scale condominiums that speak to surrounding developments in the Distillery District, Regent Park, and St. Lawrence areas. Park space is also an important aspect of the West Don Lands plan, and as such a proposal for Corktown Common (previously named Don River Park) has been set in place to occupy the south-eastern corner of the site (Urban Design Associates & DTAH, 2005).

Perhaps the most important aspect of the West Don Lands precinct is its location. The West Don Lands are situated at the south-eastern edge of downtown, framed at the intersection of the Gardiner Expressway and Don Valley Parkway, with the Lower Don River running flanking the precinct to the east. Given its situation,

the precinct becomes Toronto's downtown gateway neighbourhood for connection to the Lower Don Lands and Lake Ontario Park.

As part of a gateway neighbourhood, Corktown Common carries a significant role as a new public amenity in the downtown area and serves to attract people from nearby neighbourhoods and throughout the city. Over seven acres in size, the park will offer playgrounds, an athletic field, and a variety of open spaces to accommodate flexible uses for visitors of different age groups throughout the year.

The park will be planted with an abundance of trees, shrubs, and groundcover, and include a significantly sized marsh to support diverse plant and animal life on site. A network of intersecting trails will support active mobility throughout the site – walking, cycling, rollerblading, etc. – and connect to a centralized pavilion that will provide for shaded areas and washroom use (Waterfront Toronto, 2013).

# 4.3.3 East Bayfront

The East Bayfront precinct is the second of the two precincts currently under development. The precinct is situated directly on the waterfront, spanning 1.5km along the water's edge and occupying land from Lakeshore Boulevard southwards to the water. The East Bayfront will become Toronto's first waterfront neighbourhood community of the 21<sup>st</sup> century, making it a model to inspire a new way of building along the city's water's edge. Given that the Central Waterfront's new promenade will

run through the East Bayfront precinct, accommodating public and recreational life along the water becomes fundamental to the community's character. The East Bayfront will also principally employ mixed-used development for living and working (Koetter Kim & Associates, 2005).

### 4.3.4 Lower Don Lands (Keating Channel Precinct)

The Keating Channel precinct is the first area within the Lower Don Lands that has undergone a comprehensive planning strategy. This precinct stretches from the eastern edge of the East Bayfront precinct to the west edge of the Don River, flanking the Keating Channel to the north and south. The plan proposes the development of residential, institutional, and recreational use.

The Keating Channel itself plays an important role in promoting public and recreational use within the precinct through various proposed activities occurring within and around the channel throughout the year.

Perhaps one of the most significant proposals for the precinct's plan is the re-naturalizing of the Don River mouth. Since the development of the Keating Channel over 100 years ago, as well as industrial development in the Lower Don Lands, the Don River has lost many of its surrounding wetland areas. Channelization of over two kilometres of the river north of its mouth has resulted in areas of stagnancy and accumulation of debris leading to high levels of pollution (Lister, 2008).

Renaturalizing the river's mouth will re-establish proper

water flow into Lake Ontario and remediate current issues of stagnancy and pollution. Land habitat for natural species will be renewed and increased flood protection will be provided for the Lower Don Lands and Portlands areas (Michael Van Valkenburgh Associates, Inc., 2009).

### 4.3.5 Lake Ontario Park

Lake Ontario Park is currently undergoing proposal to be developed as North America's largest urban park. Encompassing parts of the Portlands area, the new Park will revitalize underutilized post-industrial sites and join with the existing Cherry beach and Tommy Thompson Park areas to form 925 acres of public park, including 37km of shoreline.

The Park will incorporate a vast network of pedestrian and multi-use trails to unify the various areas. The many existing natural wildlife habitats and species in the Tommy Thompson Park area will be maintained, while new possibilities for public recreational activities and attractions will be offered throughout the Park, including water-oriented programs (Field Operations and Schollen & Company, 2006).

#### **Existing Land Use and Infrastructural Analysis** 4.4

The site of concern currently occupies a variety of existing and proposed land uses that are characterized by a number of significant infrastructures framing the various precincts. Many

of the infrastructures that currently exist on site are the product of heavy industrial use in the area throughout much of the 20<sup>th</sup> century (*Figures 4.4.1 & 4.4.2*).

Although there are currently roadway infrastructures that connect the various areas of the site together, there still exists a strong divide between the various precincts as a result of major infrastructures intersecting the site. The majority of these dividing infrastructures run east-west, resulting in impeded north-south access between the various precincts.

As it exists, the major dividing infrastructures on site include the rail line and GO Train rail yard, Lakeshore Boulevard with the Gardener Expressway above, the Keating Water Channel, and the Shipping Channel. All of these infrastructures, except for the Keating Water Channel, are currently in operation.

Cherry Street currently serves as the only north-south running roadway infrastructure that breaches these divides, allowing access from the downtown area southwardly to what will be Lake Ontario Park. Cherry Street also accommodates the Waterfront Trail's continuation from downtown to the Lake Ontario Park area. At the intersections of the Keating Water Channel and Shipping Channel, steel structured bridges allow Cherry Street to span the water. The bridge spanning the Shipping Channel is an operable lift bridge that allows boats access between Lake Ontario and the channel when necessary.

These two bridges are the only to each span the two channels. As a result, the Lower Don Recreation Trail is directed

eastwardly when it reaches the intersection of the Don River mouth and Keating Channel. The trail runs east along Lakeshore Boulevard until it reaches far enough to merge around the eastern edge of the Shipping Channel by running southwardly on Leslie Street. This eventually leads the trail to Lake Ontario Park.

The Lower Don Recreation Trail stems direct connection from Riverdale Park, which is the next major park situated north of the site of concern. Corktown Common, which is currently under development in the West Don Lands precinct, will allow some of Riverdale Park's presence to spill southwards via the Don Trail. This new Park will provide an anchor for pedestrian activity at the southeastern edge of the downtown area and serve as a starting point of interest for the project.

#### 4.5 Site Strategies and Project Area

At the Master Planning scale, the design intention for the project is to suggest ways in which architecture can grow throughout the site over time to establish opportunities for continuous physical linking between the various divided precincts. This proposed physical link will serve as an extension of the existing green corridor that stretches southward from Riverdale Park and provide relief from the many existing infrastructures that create physical barriers on site.

The project will apply the thesis design strategies developed from the precedent research to propose a model that can inform

a method of architectural growth throughout the site. With consideration of the overall design intention, the area of focus for the thesis project will be situated at the starting point of the desired physical link, Corktown Common (*Figure 4.5.1*). As a centre piece within the gateway neighbourhood of the West Don Lands, Corktown Common's presence as a new significant public amenity will drive the siting and programming of the design proposal.

The project will embody a physical link that extends southwards from Corktown Common, hurdling over the GO Train rail yard to connect into the mixed-use development proposed for the Keating Channel Precinct. The link will be dedicated to pedestrian and active forms of mobility, providing relief from the impediment of other infrastructures. Architecture and infrastructure will hybridize to activate the physical link into a place of destination by supplementing the park's recreational programming to provide opportunities for fixed and seasonally changing activities.

When reaching the Keating Channel Precinct, the link will land people at the roofscape surfaces of the mixed-use podiums. This strategy challenges the traditionally private nature of the podium's roofscape and introduces opportunity for an elevated public realm. It is intended that several of these roofscapes become physically interconnected to provide a continuous pedestrian network supported by public programs.

73







Proposed mixed-use development



Pedestrian trail

Roadway

Expressway

Railway

Water channel

Map background retrieved from *Google Earth* 

Figure 4.4.1 Existing Infrastructures and Land Use



# Park

Proposed mixed-use development



Pedestrian trail

Roadway

Expressway

Railway

Water channel

Map background retrieved from http://www.bing. com/maps

Figure 4.4.2 Existing Infrastructures and Land Use



Map background retrieved from http://bing.com/ maps

Figure 4.5.1 Site and Project Area

# 5.0 Design Project

# 5.1 Project Proposal

The following visuals represent the embodiment of the thesis design strategies in the form of an architectural project. The project – identified as the "link" – strategizes a method of architectural growth for Toronto's Don Lands.





This early sketch captures some of the strategies that drove the design of the project. Clearly represented is an intention to hybridize architecture and infrastructure as a way of providing physical connection for pedestrians across the rail yard. Figure 5.2.1 Early Concept Sketch This aerial view illustrates the final project in context. As an extension of Corktown Common, the new link provides physical connection across the rail yard to serve the movement of people from grade to the roofscape level of the podium buildings in the Keating Channel Precinct. The project strategizes a way in which architecture can extend beyond property boundaries to grow continuously throughout the urban fabric.

Figure 5.2.2 Project in Context





This site plan illustrates the new link sited in context. Extending from the park, the link runs parallel to the rail yard before curving southwards to span over the train tracks to connect with the podium roofscapes. The link provides relief from the rail yard's presence as physical barrier by bridging a significant divide in the urban fabric.

Figure 5.2.3 Site Plan



This project plan illustrates the link's surface treatments. Wood decking designates pathways serving active forms of mobility across the rail yard - walking, jogging, cycling - while other material treatments define specified areas of activity along the link. The tradtional figure-ground divide is blurred by extending grass onto the start of the link, and continuing wood decking onto the podium to treat the roofscape as an extension of the link.



Figure 5.2.4 Project Plan



This diagram illustrates paths of mobility at the surface level of the link. The thick lines represent primary paths serving the movement of people across the rail yard, while dashed lines represent secondary paths connecting people to areas of activity throughout the link.

Figure 5.2.5 Surface Mobility





This diagram illustrates the distribution of contained programs throughout the link. The programs are situated within the footprint of the rail yard to activate the void of the existing infrastructure, capitalizing on unique views to the surrounding context and intake of ample daylighting.

Figure 5.2.6 Contained Program

This diagram illustrates the distribution of outdoor programs throughout the link. The pond and skatepark benefit from the same access to views and light as the contained program, while the rock climb wall and ground recreation serve to activate the void below the link.

Figure 5.2.7 Outdoor Program





This plan illustrates the relationship between the outdoor paths of mobility serving movement between the divided precincts and the link's interior spaces serving to activate the void of the rail yard. The paths of mobility change in width, orientation, and elevation to encourage different paces of mobility and access to various views to the interior spaces.



activation of the rail yard void. By centralizing the interior circulation and situating the larger volumes  $\cdot$  the gym and the pool  $\cdot$  as anchors to the north and south, each space benefits from access to ample daylighting and clear views to the surroundings.

Floor Plan



This section - taken at the centre line of the link throughout its length - illustrates how architecture takes on many forms to make the link a place of destination. At its extension from the park, the link is elevated to serve a path of active mobility at its surface while the void below is activated with opportunities for recreation. Before the path's slope reaches a necessary elevation to bridge over the rail yard divide, a rock climb wall punctures through the link to promote a dialogue between above and below.

Merging into the footprint of the rail yard, the link assumes its most robust forms to activate the void above passing trains. The link transforms into an elevated container for recreational activity by supporting interior programs and seasonally changing uses at its outdoor surface levels, while capitalizing on unimpeded access to daylighiting and views to the surroundings. Dialogues between inside and outside are encouraged by intersecting the outdoor paths of mobility with the link's programmed volumes at various elevations. The sloping outdoor paths of mobility are translated inside to inform the link's interior circluation ramps. Reaching the southern end of the rail yard, the link physically returns to its minimal form to connect into the podiums, ultimately creating a continuous activated ground between Corktown Common and the Keating Channel Precinct.



Figure 5.2.10 Longitudinal Section



This elevation illustrates the link situated in context. Amongst the verticality of high-density development in surrounding precincts, the link's service of physically connecting over the rail yard void inspires an expression of strong horizontality.



Figure 5.2.11 Context Elevation



This elevation illustrates the link's diffusion of the traditional figure-ground divide. By extending a continuous ground surface across the rail yard to connect the park and podium roofscapes, the link hybridizes building (the figure) with landscape and infrastucture (the grounds).



Figure 5.2.12 Project Elevation



This elevation illustrates the material palette used to evoke a desired expression in the overall reading of the project. The use of longitudinal zinc panelling and vertical silicone joints for the curtain wall glazing lend to an expression of horizontality across the rail yard..





Figure 5.2.13 Elevation Detail



These sections illustrate a series of cuts taken along the length of the link and reinforce the architecture's diffusion of the traditional figure-ground divide. Beginning as an extension of the park's ground surface, the link's changing volumetric profiles evolve to support occupiable environments within and around its envelope before continuing the ground surface onto the podium roofscapes.

Figure 5.2.14 Processional Cross Sections





This section illustrates the hybridization of architecture and infrastructure into a shared volume. The outdoor path of mobility and recreational activities occupy the surfaces of the same container to simulatenously serve the movement of people between the divided precincts and activate the void above the existing rail lines.

Figure 5.2.15 Section (a:a) at Gym/Skatepark This sectional perspective illustrates the intimacy that is achieved between the path of mobility and the contained activities when architecture and infrastructure are hybridized. The hybridized volume's shell is clad in zinc to evoke an overall expression of homogeneity, while its various surface material treatments serve to distinguish uses. Figure 5.2.16 Sectional Perspective at Gym/Skatepark





This section illustrates how fragmenting the outdoor path of mobility through changes in width, orientation, and elevation provides for various ways of movement throughout the link. Fragmentating architecture and infrasructure's hybridized volume also creates the opportunity for new dialogues between the passerby and occupant of the link.

Figure 5.2.17 Section (b:b) at Fitness Area This sectional perspective illustrates how the fragmented path of mobility goes beyond serving the movement of people across the rail yard to inform the shaping of interior environment. The fragmented horizontal plane - serving simultaneously as the path of mobility's ground and the interior spaces' roof - represents a sharing between figure and ground, between architecture and infrastructure.

Figure 5.2.18 Sectional Perspective at Fitness Area





This section illustrates the link's support of changing uses throughout the year. While the pool maintains operation during all seasons, the pond at the outdoor surface level of the link is frozen over in the winter time to encourage skating.

Figure 5.2.19 Section (c:c) at Pool/Pond

This sectional perspective illustrates how the link can support varying environmental conditions amongst the same volume, maintaining year-round use for the interior pool while encouraging seasonally changing acitivities above.



Figure 5.2.20 Sectional Perspective at Pool/Pond







This view illustrates how the topographical transition between the park and the link encourages changing uses with seasonal fluctuation, lending to the support of activities like cross country skiing and toboganning in the winter time.

This view illustrates the seamless transition between Corktown Common and the new link. By extending the park's grass landscape onto the link, a continuous ground is created to challenge to the figure-ground divide.

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Figure 5.2.21 View at Transition from Park (Summer)

Figure 5.2.22 View at Transition from Park (Winter)







This view illustrates the encouragement of active mobility at the surface level of the link. Walking, jogging, and cycling become prioritized modes of mobility, providing liberation from the rail yard's impediment as a physical barrier in the urban fabric.

This view illustrates the activation of the void below the link. By providing for ground level recreational activity underneath the link, the typically underutilized space becomes a destination.

Figure 5.2.23 View at Grade Below Link

Figure 5.2.24 View at Surface Level of Link







This view illustrates the shared ground between the paths of mobility and areas of outdoor recreational activity throughout the link. Architecture's hybridization with infrastructure encourages this shared ground, using material treatments to distinguish between uses.

This view illustrates another way of activating the void underneath the link. Puncturing a rock climb wall through the link stimulates activity at ground level and creates a dialogue between the surface and sub-surface levels of the link.

Figure 5.2.25 View at Rock Climb Wall

Figure 5.2.26 View at Skatepark







This view illustrates the link's support for programmatic growth by encouraging changing uses in recreational activity throughout the year. The link's pond is frozen over in the winter time to provide users with a unique location for outdoor skating.

This view illustrates how the link's diffusion of the figure-ground divide encourages architecture to adopt infrastructure's support of public use. Architecture renders the link into a public amenity, providing users open access to recreational acitvities.

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Figure 5.2.27 View at Pond (summer)

Figure 5.2.28 View at Pond (winter)







This view illustrates how architecture's activating of the void above the rail yard infrastructure capitalizes on unimpeded access to daylighting and clear views that would otherwise be hindered within the denser urban fabric.

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This view illustrates how the hybridization of architecture and infrastructure encourages reshapes the relationship between

inside and outside. The shared figure/ground (i.e. roof/outdoor path) plane's fragmentation creates opportunities for interesting

views inwards and outwards and intake of daylighting, giving shape

to the qualities of the link's interior and exterior environments.

Figure 5.2.29 View at

Fitness Area

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Figure 5.2.30 View at Pool





This view illustrates how strategies driving the design of the proposed link can inform ways in which the podium roofscapes within the Keating Channel Precinct may be used. By physically interconnecting podiums and activating portions of the point towers with commercial/retail use, the typically underutilized roofscape level becomes a new elevated public realm.

Figure 5.2.31 View at Podium Roofscape Level

This view illustrates an overall capture of the project from above. The link's extension of activity from Corktown Common to the Keating Channel Precinct suggests how architecture can grow continuously throughout the urban fabric to support a new public ground in the city.

Figure 5.2.32 Project Aerial View





Figure 5.2.33 View of Physical Model from Above (looking west)

Figure 5.2.34 View of Physical Model from Above (looking east)





Figure 5.2.35 View of Physical Model from Podiums

Figure 5.2.36 View of Physical Model from Park

### 5.2 Strategizing for Future Growth: Observations and Conclusions

By investigating the thesis through the lens of the proposed project, responses to strategizing growth through architecture will be evaluated to suggest how the project could move forward in informing future growth throughout the site.

An appropriate starting point for the evaluation of the project begins with the link's role as a physical connector. The link fulfils the outlined strategy to establish physical connections between sites while serving the movement of people at the urban scale. Rather than maintaining a subservient position to the railway infrastructure, the link reclaims ground in the urban fabric by pushing architecture beyond the limits of property boundaries and over the rail yard. This proposes a new freedom for architectural growth, demonstrating how the link can become part of a greater continuous network throughout the city.

This continuity allows architecture to carry more priority and consistency in guiding future development of the city. In many ways, this tactic speaks to the intentions of the Noah's Ark proposal and how it strived to apply the principles of the mat building at an urban scale, unimpeded by the limits of site and other infrastructures.

It is also important to note the manner in which the link proposes connection into the Keating Channel Precinct as a way of suggesting architecture's continuous urban growth. By connecting

people onto the roofscapes of the podiums within the precinct, the link demonstrates architecture's support of a continuous pedestrian ground throughout the city. This promise of architecture's continuity would not be possible if the link simply landed people back at grade on the south side of the rail yard. In this case, architecture's ability to physically grow continuously would once again be impeded by other infrastructures of mobility, specifically the roadway.

Infrastructures of mobility take priority at grade; they frame out and connect city development on the ground. Thus, if architecture is to become physically continuous throughout the city, it must create its own ground; it must work below or above the ground of infrastructure. This strategy already exists in many metropolitan areas in the form of underground pedestrian networks connecting to various buildings throughout the city, including Toronto's PATH system. However, a convincing model of this strategy operating above grade in the same capacity is yet to exist.

The proposed link begins to suggest ways in which a continuous elevated ground for architecture may exist throughout the city. Supporting a new elevated ground responds to the strategy of liberating from infrastructure, where architecture must disassociate from the impediment of infrastructures of mobility as a way of maintaining opportunities for continuous growth.

With that said, it should made clear that it is not the intention of the project to provide complete disassociation between grade and the newly occupied roofscapes in the Keating Channel

Precinct. The purpose of the new elevated public ground plane is to provide an opportunity for architecture's support of a pedestrian dedicated surface that can exist continuously and uninterrupted by the roadway infrastructures at grade.

Thus, it is suggested that there would indeed be opportunities to connect people between the existing pedestrian infrastructures at grade (i.e. the sidewalks) and the roofscape level. This vertical connection could occur by encouraging public access to the elevators in the podium buildings, or may find its form in an outdoor staircase or ramp connecting grade and roofscape. In this respect, the public ground at grade becomes a further extension of the activity above.

Nevertheless, in elevating itself to bridge divides in the urban fabric, architecture essentially becomes a form of infrastructure, confirming that the impediment of existing infrastructures is only trumped through the establishment of new infrastructures.

This circumstance is typical in the infrastructural design of many North American cities, where networks of infrastructure become layered to serve independent modes and speeds of mobility. A clear example is the elevated expressway, which liberates from roadways below to serve faster mobility (Toronto's Gardener Expressway is an emblematic example, serving express movement above Lakeshore Boulevard and other intersecting infrastructures below). The typical highway overpass is another example presenting a reversal in the relationship, where the

roadway elevates itself to allow the continuation of the expressway below.

This same circumstance can be applied to architecture as a means of strategizing its continuous growth. By treating it as a form of infrastructure – by hybridizing it with infrastructure as a means of liberating from other existing infrastructures – architecture can too serve its own means within an independent and expandable network. However, it is crucial to ensure that architecture's implementation as a new infrastructure carries sensitivity to its surroundings, to ensure that further barriers are not created in the urban fabric; this is a consequence that has come with the construction of many elevated infrastructures in the past, including the Gardener Expressway.

Once architecture attempts to grow continuously at the urban scale, it must serve its own independent form of mobility to allow for movement and accessibility throughout its expanding network. In this thesis, active mobility (i.e. walking, running, cycling) is prioritized as the infrastructure of mobility with which architecture hybridizes.

This particular hybridization of architecture and infrastructure is clearly represented in Sant'Elia's sketches for La Citta Nuova. Architecture's growth throughout the city maintains its continuity and achieves its expansion through intermediate pedestrian infrastructures that extend over roadways to connect buildings. This suggestion of how architecture can continuously grow over time is promising because of how future buildings are
implied to connect with existing buildings.

The manner in which the relationship between new and existing architecture is managed – literally where the new physically intersects with the existing (i.e. the point of joinery) – forms a vital role in the architecture's ability to physically grow over time. Inconsideration of this intersection is likely to have played a significant role in the failure of Team 10 and Metabolists projects. Their proposals to add a new modular bay or pre-fabricated capsule to an existing building becomes complex in the realities of construction practice.

That is why the intersection between new and existing implied in Sant'Elia's sketches delivers a more convincing strategy for growth. In La Citta Nuova, buildings are treated as individual components that achieve physical continuity through less intensive mediating pedestrian infrastructures. Rather than having the building itself physically expand (e.g. in the form of a modular bay or capsule), it is instead a continuous pedestrian surface that grows and becomes the tying together of the architecture.

This sensibility finds clear adoption in the link's suggestion of physical growth over time. The link avoids the maintenance of a rigid geometry throughout its entirety by taking on a form that is closer to that of a pedestrian infrastructure when intersecting with the park and podium roofscapes. This transformation in form is clearly illustrated in the link's processional section cuts (*Figure* 5.2.14) and speaks to how architecture can diffuse the traditional figure-ground divide. This treatment at the joinery between the

park, the link, and the podiums demonstrates a manageable way in which the separate, yet joined, components could be part of the same continuous architectural network despite their various physical forms and characters.

Ultimately, it is the continuation of a surface (or a new ground) that allows for architecture's growth. Expanding a surface - versus a building - relates more closely to the form of growth that infrastructures of mobility are able to continuously manage. When considering the growth of a roadway or expressway, for example, it is the asphalt surface that serves the continuity of the network. The ability to easily construct a new surface that ties into an existing one provides this manageability in growth.

Thus, in observing how the link can inform a way of architectural growth for future developments, surface continuity is suggested as a way of maintaining possibilities for joinery and expansion throughout new developments. This form of physical connectivity is what informed the suggestion for future architectural growth in the Keating Channel Precinct (*Figures* 5.2.32 & 5.2.33). The same strategies that were applied to resolve the link serve to suggest how the typical podium and point tower typology can maintain architecture's physical continuity throughout the urban fabric. In this case, physical pedestrian links are proposed to interconnect the roofscapes, maintaining physical connectivity between the podiums despite their possible variations in form or character.

The use of physical pedestrian links as a means of

maintaining surface continuity proposes a strategy that provides manageability of phased development within the precinct. Assuming that all four podium buildings proposed to be interconnected will likely not be constructed at the same time, this strategy allows for manageable connectivity between newly built and existing podiums because of the bridges minimal physical impact with the existing; that is, the minimal area of physical contact between the new and existing makes expansion possible.

Nevertheless, if strategies for physical expansion and interconnectivity between the podiums are outlined in the planning phases of the future podiums, than these connections can begin to take on more robust forms, suggesting the possibility of occupiable floors extending to interconnect buildings and support public use.

The suggestion of how architectural growth can be fulfilled within the Keating Channel Precinct demonstrates that the thesis carries the potential to continue extending further southwards into the Lower Don Lands, ultimately satisfying the intention to create continuous architectural connectivity throughout all the site's precincts. When considering the thesis' operation at the master planning scale, the design strategies and the project proposal can continue to inform ways in which architecture may extend its growth.

The next major hurdles to be considered within the site area would be the Gardener Expressway and the Keating Water Channel. Given the scale of these significant infrastructures, the architecture operating within these footprints would apply the thesis design

strategies in similar ways to the proposed link's crossing over the rail yard, ultimately serving to extend and continue architecture's new ground from the podium roofscapes.

Along with the project's opportunities for a new form of architectural growth in the city, arise some challenges when considering the bigger moves of the proposal. In diffusing the figure-ground divide between architecture and infrastructure, the project also challenges the public and private division of property ownership in the city. The link's footprint occupies ground in Corktown Common, the GO Train Rail Yard, and the Keating Channel Precinct, and as a result, implies a necessary negotiation between public and private owners. This negotiation extends further into the organization of the link itself, where areas of outdoor surface activities may require different ownership than the interior spaces within the link.

At the link's transition into the Keating Channel Precinct, a challenge is introduced when the new extended ground increases public use of the privately owned point tower and podium building typology. Beyond the relationship between public and private owners, attention must be given to how public and private users can share the same footprint harmoniously. Although public occupation of the podium is already being exercised throughout the city, it has for the most part remained at ground level and sometimes within the first few levels of the building. Allowing for public occupation at the roofscape therefore needs to take on new sensibilities in the public/relationship, especially considering the surface level's closer

proximity to the privately occupied floors in the point towers.

Finally, it is important to note that all of the potential of the project's growth in the bigger picture is grounded in the architecture's presence at a detailed scale throughout the link. It is fundamentally architecture that makes the link a place of destination; giving it appeal, attraction, and energy. Otherwise, the project would simply be a bridge providing physical connection across a vast rail yard. They are strategies like activating the void and encouraging changing uses that demonstrate how the link can become a compelling proposal for why architecture should ultimately be desired to grow continuously throughout the city.

It is the architecture's extension and support of recreational activity from Corktown Common onto the link that offers unique ways in which users can engage a healthy lifestyle while experiencing new relationships with the surrounding city and existing railway infrastructure. It is the architecture's encouragement of seasonal use on the link that ensures sustained activity throughout the year. It is the architecture's hybridization with infrastructure that creates opportunities for new dialogues between the traditionally divided mediums, translating into enhanced relationships between the indoor and outdoor and the shaping of each medium's environment. It is the architecture's creation of a new and elevated public realm that reclaims ground in the city. It is the architecture's evocation of a sense of life captured in the project's visual representations.

It is in essence this – the architecture's strategized

relationship with infrastructure – that supports the project's true capacity to grow.

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