Towards Digital Place(s)
Cultivating a Language of Digital Design in Architecture

By

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Abstract

The term “place” has been used to identify meaningful locations or buildings in reference to limitless connections, be they sensorial or emotional that develop an embodied memory of space as experienced by the senses. In the contemporary age of digital society the level of technological depth that an individual may be submerged throughout their daily activities has created a barrier between space and its occupant that must be bridged before a sense of place can be established. The following thesis will explore the social impacts of technological advancements in contemporary society which has created a populace of high-tech nomads and the implications of those advancements for physical environment and architecture.

Finding ways of bridging that intangible barrier or a gap through architecture will drive space and its formal expression to new levels of interactivity and connectivity that are capable of resurfacing the digitally submerged, strengthening the existing and forging new relationships between people and places.

This thesis will explore the bridging of the gap between digital technology and physical space through the advancement of interactive, adaptive spaces, materials, and forms that combine and embody a language and experience of digital design. Each section of the document works towards the establishment of the idea that it is firstly, possible to bridge that gap and to create harmony between the digital and the physical, and secondly to show that this harmony can be meaningful, impactful, and complimentary to the present richness that is the urban fabric.

This thesis will investigate the impact and implications of presence of digital technologies on the forms of societal and spatial interaction. As one’s daily life starts to operate within a digital platform independently of the realm of physical space, architecture can become reoriented to establish its new parameters.

An attempt to formulate a new language of digital design will allow the development of a new form of architecture, capable of engaging contemporary high-tech society in a new place making. As one begins to communicate and engage with his surroundings via his personal devices and vice versa a new system of interaction between occupants and occupied will emerge, as will new relationship between people and spaces.

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To my parents.

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1.0 Introduction

In the digital age of contemporary society, Architecture is compelled to engage with and adapt to the needs of its intended occupants. Society is quickly becoming more and more technologically saturated and digitally oriented to a point that has created experiential interference between space and occupant rendering contemporary architecture incapable of developing place relationships with its users. This loss of place has prompted an exploration in design. The integration of digital technologies in architectural space promotes a re-engagement of interactions between occupant and space. This integration is not only oriented towards the physical installation of technological devices and screens in architecture but also the formal representation of a digital design language informed by digital processes of design and formalization.

The language of digital design shall be formulated in response to new social requirements of program and spatial representation, emerging with the development of digital platforms of social interaction that do not exist in physical space. This is a response to what has been referred to as the *high-tech nomad*. Individuals who are considered to be nomadic as the majority of their daily activities and interactions occur in a reality that is inherently detached from spatial and contextual relationships. This design language is to be supportive of the digital processes and technologies that Architecture and architectural design may incorporate and be informed by to begin to forge a new meaning in a contemporary understanding of architecture capable of providing (digital) place(s) for the technologically oriented user.

Technology has proven to be the most influential driver of change for human civilization. Capable of vast societal shifts for global cultures, deconstructing and restructuring entire civilizations, beliefs, traditions, and daily practices. Defining eras of human existence into “ages” correlating to the technologies of their respective epoch. Throughout these ages architecture has managed to reformulate its capacities and worked to facilitate the implications of changes brought forth by technological progression. This is but another moment in history where the needs of the people will enlighten previously unanticipated requirements to be facilitated by built form.

Interaction between people and built form is an essential proponent for the development of an architectural experience of space and its eventual perception as place. A series of small-scale installations such as Phillip Beesley’s “Hylozoic Ground” to mega-infrastructural-projects like Foreign Office Architects’ (FOA) “Yokohama Cruise Terminal” will perform as antecedent for both design work and theoretical engagement with the important issues brought forth by the digital age and its subsequent technologies. These are the stepping stones for developing an understanding of what we are currently capable of achieving with built form and lend insight as to what architecture may be capable of developing into in the near future.

Recombinant theory shall act as a beginning tool for the expansion of this discussion building on the discourse of integration and place making. Recombinant theory itself has been borrowed by architectural and urban thinkers such as Kevin Lynch and William Mitchell from biologists Francis Crick, James Watson, & Maurice Wilkins to embody a set of

principles and ideas that progress an understanding of assimilation and growth within an existing entity. Identifying a specimen within that entity to be analyzed within its context and engage with opportunities for the implementation of an agent of change. Design that will stimulate growth through the cultivation of a digital language of design in architecture capable of providing place for the technically nomadic.

How will this new understanding of interaction and systems integration merge with the existing fabric of urban centers? A major focus of this thesis, propelled by the methodology of recombinant theory, will be placed on the venerability of existing infrastructure and built form that may at this juncture in its life-cycle be neglected or abandoned. Urban fabric and built form that has developed and grown with the city through time, often considered to be obsolete, can provide some of the most opportunistic possibilities for the engagement of a place making exercise as they are frequently overlooked or underutilized but have already established a meaningful place within their own context. A series of case studies that attempt to re-integrate abandoned infrastructure illustrate the impact that these entities can have on the perception of a project.

The design project that will emerge from this discussion shall be situated in the city of Toronto. Investigating how the language of digital design could influence a new architectural experience of space and become an integral driver of change within an already rich context of urban fabric. Moreover, engaging with the technological desires of the city through architecture will promote Toronto as a networked infrastructure. The design of the project will focus on the thresholds and linkages that connect the fragments of that city as a network through movement and how citizens work within the built environment.

2.0 Technology

2.1 An Agent of Change

The development of a technology or building process has repeatedly informed a myriad of societal changes that would define eras of human culture. Each era referred to as an "Age" idealizing the most central technological advancement of its time. The Stone Age, Bronze Age, Iron Age, and Industrial Age would each hold immense impact on their corresponding societal progressions. The development of nations and urban centers, tools, and weaponry, writing and recording systems, trade between nations, war, politics, scholarly studies, art, transportation, and culture all provided for through architecture capable of identifying and reciprocating the evolving needs of its populace.

One such example of the adaptation required of Architecture throughout these technological evolutions can be observed through the way that ancient Egyptians recorded and stored information. The earliest known instances of information recording, through hieroglyph carvings and paintings on stonewalls, meant that the teaching and learning of events would be experienced by people walking amongst the buildings and engaging with that information in an open communal experience. The advent of a more accessible, universally written language allowed for that information to be produced and examined in books and scrolls, which needed to be stored and housed due to their fragility. This created the need for an architectural response, the library, which resulted in the removal of that information from the eyes of society, unless one was directly engaged with academia, into a closed-door environment. Revolutionizing the way that events were recorded and stored as well as who would be allowed access to that information. This symbolized the creation of academia, formal education, and the ability to transport entire tombs of knowledge from one location to another requiring architectural responses to match a demand that was never before imagined to be necessary (Weller, P.1-10). Technological advancements such as these have been one of the most influential agents of change for human civilization; reshaping cities, the built environment, societal constructs, and propelling societal evolutions.

Digital computation technologies will most definitely become the defining technology of twenty first century society, which is already being referred to as the "Digital Age". The cultural and communal effects of which have already begun to emerge. A simplified way of understanding the immensity of these effects can be shown through the development of one such technology, the mobile phone. The first hand-held mobile phone call was made in 1973 on a device that weighed almost three pounds. Since that time, roughly forty years, global cultures have adopted entire phrases and pieces of everyday language that were never before needed. A question as simple and common place today as "Where are you?" was never required pre-mobile phone as an individual would need to know where the person they were phoning was located in order to place the initial call (Hanson, P.5). The direct influence that mobile communication technologies has had on social behaviors is not solely limited to linguistics but has developed to impact many more complex levels of societal interaction as the complexity and capability of devices continue to grow. The mobile phone is however only one device amongst a myriad of digital communication and information technologies that have been re-shaping the way in which people occupy and understand the world around them.

Figure 2.0- Conceptual diagram representing digital information technologies. The apparatus of indirect interaction.

2.1.1 Place & Digital Technology

How digital technologies have affected that understanding of the built world has been described as a difficulty for architecture to be able to provide for the now revolutionized needs of its occupants, resulting in a loss of the ability for space to be engaged with and understood as place (McCullough, P.5). Heidegger described place as"…a site where human modes of being are well provided for…" (Heidegger qtd., McCullough, P.176). In light of digital technologies that occupy a majority of the attentions spent by individuals, which as of yet are incapable or underutilized in their ability to communicate with the built environment. These modes of being are continually becoming less and less "well provided for."

Place has also been described as a level of comprehension or familiarity between the space that an individual may occupy and the embodied memory of their senses as related to that space. The ability that a space may have to impart meaning and recollection of itself upon its occupants is partly what enables space to be appreciated as something more than just geometric forms that provide shelter or facilitate a use. Pierre Von Meiss describes the aesthetic qualities of a space as merely the beginning point for which place relationships can be manifested. He describes *place* as space and time formulating the ability to assume a precise, unique value in which they may no longer be understood as purely formal abstraction or an experience of aesthetics. In the moment where a space becomes place it acquires an identity and becomes a reference for our existence. (Meiss, P.135)

The creation of place truly formulates in something much more difficult to explain. These multitudes of factors that work towards the translation of space into something perceived as place, in light of digital technologies, must be re-negotiated to include yet another parameter. The implication of a society that is so intrinsically linked with their technological devices requires the consideration of an architecture that may become capable of integrating technologies of its own. Architecture capable of initiating a discussion between built from and its occupants. A new understanding of the requirements for which architecture is bound to engage in order to become capable of ensuring that human modes of being are once again *well provided for.*

2.1.2 The High-Tech Nomad

That re-negotiation of parameters has been sparked by communication and transportation technologies that have begun to change the way that an individual engages with the world and people around them at a fundamental level. Malcolm McCullough refers to this society of individuals as *high-tech nomads*. The high-tech nomad is not nomadic in the traditional understanding that they have no permanent residence or that they are even innately inclined to travel or even move around frequently. It is instead an understanding that the traditional definitions of space, place, and the interactions of people between one another due to proximity and locality have become blurred (McCullough, P.5). As real time interactions between individuals and their respective geographical locations becomes less and less important with the advancement of technologies such as mobile phones, and laptops the social boundaries of distance and proximity are being dissolved. Digital devices have the ability to establish social engagement in a reality that is not embodied by physical space. Contemporary society has formulated dependencies on this form of communication to perform daily activities that would have previously provided opportunities for the strengthening of relationships between an individual and the space they occupy. By association developing a population rendered *technically nomadic* through a dependency on technologies that have developed a relationship with places that do not require physical space to operate.

To paraphrase Yi-Fu Tuan as he writes of the importance of human interaction in the development of place; “Intimacy between persons does not require knowing the details of each other’s life,” but develops “moments of true awareness and exchange.” Each exchange has “a locale which partakes in the quality of the human encounter.” That may be “etched in the deep recesses of [an individual’s] memory.” (Tuan, P. 141). It is therefore crucial to the development of “place” in architecture to re-cultivate social interaction within physical space if it is to once again become a hub of social communication interaction.

To re-engage the technically nomadic and begin to re-imagine the mode in which place establishment can occur in physical space, architects and designers must be able to capitalize on opportunities presented by digital technologies. These are embodied by the association that is made between an individual’s physical body and their digital technologies, which develop a threshold of connection between the digital, and the physical.

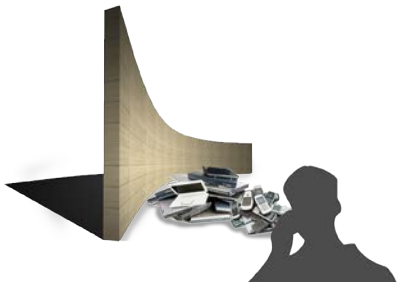


Figure 2.1- Conceptual diagram representing architecture, technology, and society. Technology is represented as a separation or barrier between society and architecture.

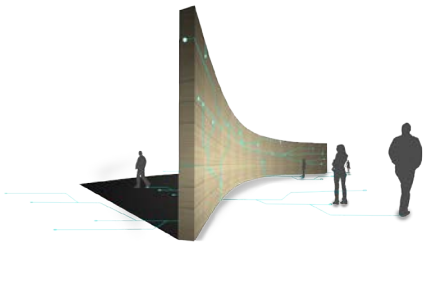


Figure 2.2- Conceptual diagram representing architecture, technology, and society. Technology represented as an integral component of architecture, linked society & space via direct interaction

Every time a mobile phone vibrates in someone's pocket that vibration has manifested an aesthetic experience that briefly connects the physical environment with the digital realm. Just as Meiss described the physical aesthetics of a space as the beginning point for developing a traditional sense of place, this threshold connection can be described as the juncture for developing digital place.

2.2 The Language of Digital Design

2.2.1 Defining the Language of Digital Design

The barrier being established between architecture and the inwardly focused orientation of society on their mobile devices play a part in this interference between space and place. Remei Capdevlia-Werning writes of how people's relationships with buildings are not solely practical, but also cognitive. As an individual uses and interacts with a space they are gradually collecting and discerning an understanding of what that building means and symbolizes. Buildings are firstly understood by the occupant as serving a practical function and only begin to be identified as a symbol (or place) when the user begins to envelope meaning as to what that building represents (Bhatt, P.86-87). This understanding or identification of a building as representative to something beyond its utilitarian purpose is a cognitive exercise that requires the orientation of the individual to develop meaning in space.

Chris Bangle describes a similar phenomenon in car design. New age, digitally integrated vehicles will require a formal language that begins the communication between built object and intended user. Informing a similar type of cognition towards vehicles of the future that architecture should also hope to achieve.

> "People will expect a clear language of values and responsibilities expressed by the shape of the [buildings] in their lives, and [architectural] design will need to know how to signal certain identifying clues without resorting to stickers."
> (Bangle Qtd. in Lynn & Gage, p.79) Parenthesized words replace the word "car" or "cars"

A building might begin to formalize opportunities through the visual language and representation or manifestation of digital technologies in built form. This relates to the way in which buildings are not only designed, but also constructed as something that is innately representative of the digital technologies and systems that have created them and are at work within them. People will need to be engaged by built form in a way that is much more inclusive of both their physical bodies and digital identities. A language of design that representative and inclusive of digital processes may begin to address their reorientation towards built form and promote that cognitive investigation towards place making.

2.2.2 Formal Language of Digital Design

> "Digital computation has given architects new creative opportunities with which to access [the] geometrical space." (Burry & Burry, P.8).

Architecture in the digital age is privy to a perception of space and relational proximities altered by technologies with the ability to create advanced computational models for

design exploration and visualization. These models allow an architect to formalize an idea (design) in a virtual world that does not abide by the laws of physical space, much like the digital realms that now occupy much of the high-tech nomads attentions. The translation of these digital (virtual form) computational models into the analog (built form) final product has become an intensified field of investigation in Architecture. One that has begun to re-imagine things such as structure and the capabilities of material systems manifested in buildings taking on forms previously unimaginable. Architecture is now capable of realizing buildings, which are representative of the digital apparatus of their derivation. Architecture that is formally representative of the technologies that have enabled its conception and successfully translated into physical space.

> "Software, borrowed from a variety of design disciplines, is enabling the production of a new language of form." (Lynn & Gage, P. 104)

2.2.2.1 Precedents in Formal Design Language

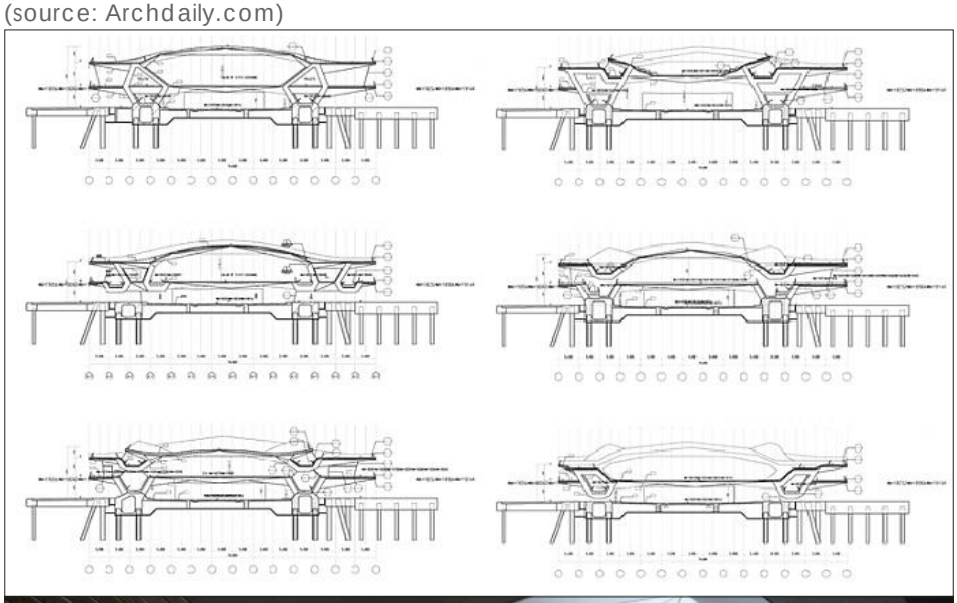
Yokohama International Port Terminal | FOA

A competition for the Yokohama International Port Terminal was established with the intention of developing a waterfront project that would become an architectural experiment in the promotion of a unique adventure in architectural and urban design. This idea of adventure became a driving force in the winning submission by Foreign Office Architects (FOA) who envisioned the pier as a system of continuously flowing circulation. The project becomes an extension of the landscape as circulation paths raise and fall above and below "grade" encompassed by a similarly fluid shell of structure and support to form a continuous surface that wraps the pier. The project strives to re-define the function and purpose of an inherently infrastructural project, as an extension of the city and the public domain that would ensure the project become an integral component of the cities waterfront and urban life.

The utilization of folded geometries allows the circulation paths to form the walls and roof of the project with the end result being the unification of flows between the various levels and programmatic considerations of the project. Principal architects Alejandro Zaera-Polo and Farshid Moussavi developed their vision for the unified landscape as a: "… Hybridization of infrastructure, landscape and architecture…" enabled by "…The integration of computer-aided design into the practice of architecture…" (Sakamoto & Kubo, vii). The digital technologies utilized by FOA in the creation of this project have enabled the vision of the flowing landscape to become reality. The form and intention of the original design are able to translate through the capabilities allowed architects by digital modeling software to engross the formal language of the Yokohama International Port Terminal in dialectic between the analog and the digital.

A reduced material palette of steel, wood, and landscape materials (such as grass and trees) compliment the unified feel of the project while helping to define spaces of different use and function, namely public and private space, without alienating one from the other. Benches and stairs are formed from the folds of walls meeting paths and then back into walls, which will eventually wrap overhead and become ceiling. The complexity of the project is lent a feeling of simplicity and clarity as the continuous surfaces bend and meld

Figure 2.3- Precedent 1 | Yokohama International Port Terminal
(source: Archdaily.com)



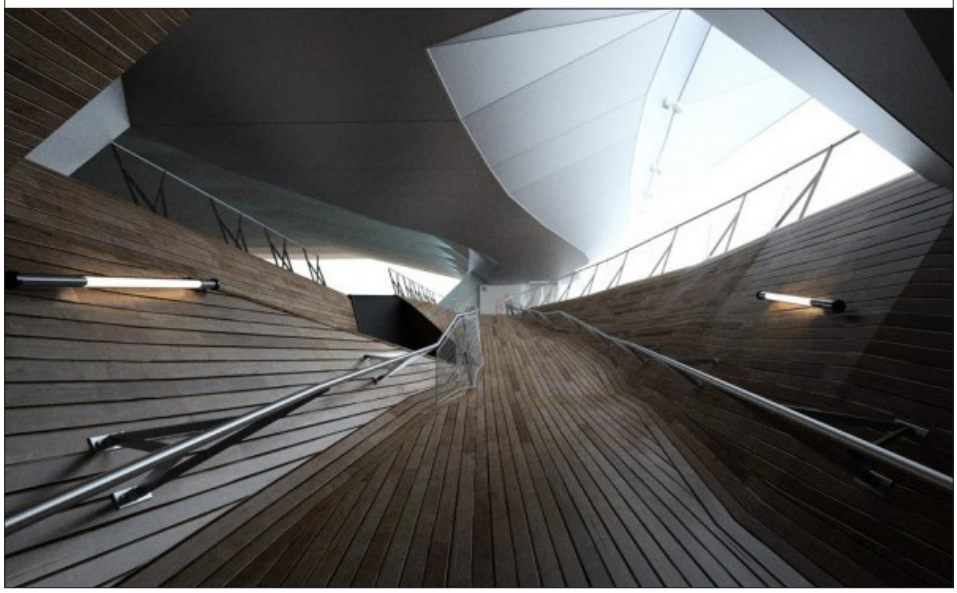


Figure 2.4- Precedent 1 | Yokohama | Circulation & Structure
(source: Archdaily.com)

into one another. The successfulness of the project is exhibited in the ability of the public space to become a unified whole with the city that it serves (Furuto, Alison. “Think Space: ‘Alejandro Zaera-Polo Never Planned to Win Yokohama Port Terminal’ Competition”).
The translation between conceptual and built form through digital processes allows the terminal to achieve its formal, programmatic, circulatory, and structural unification. A project informed by digital processes should be expressive of the nature for which it was derived and develop a formal language that is representative of that process (Lynn & Gage, Preface).

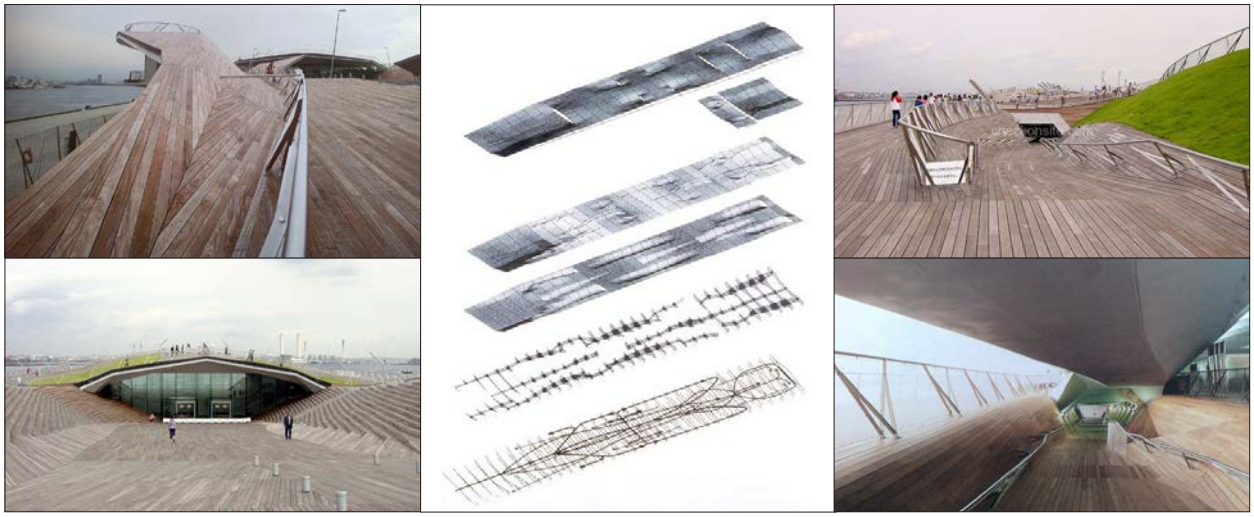


Figure 2.5- Precedent 1 | Yokohama | Folds & Material Treatments (source: Archdaily.com)

Folds Bodies and Boats | Lorenzo Marasso

Figure 2.6- Precedent 2 | Folds, Bodies, and Boats (source: Lynn & Gage, P.56)

Lorenzo Marasso’s “Folds, Bodies, and Boats” theoretical project is an exploration in digital design as an embodiment of an architecture that is representative of the process of its creation. He draws inspiration from the smooth curvilinear forms of the boat hull and sails that are able to be formalized through digital design software and imagine space as an unified flowing surface.

Utilizing a Voronoi cell structural system the design is capable of redirecting loading and structural issues through the flowing surfaces and curvilinear columns. Marasso posits “We

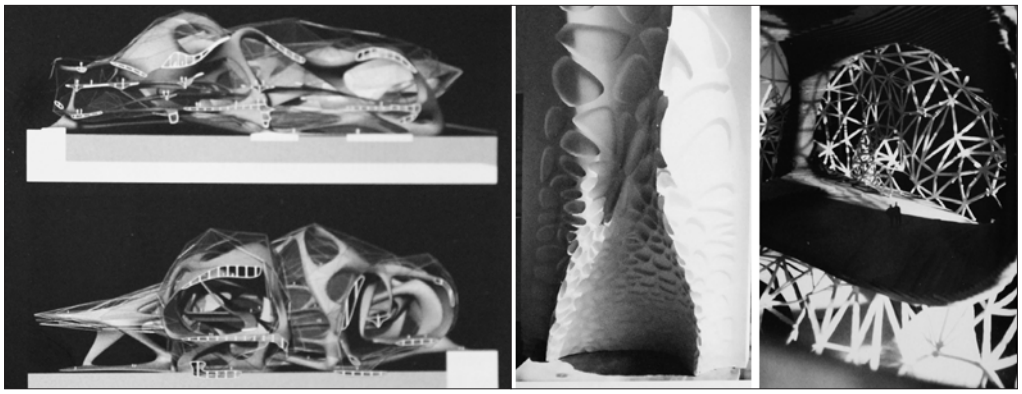


Figure 2.7- Precedent 2 | Voronoi cell structure and formal composition
(source: Lynn & Gage, P.56)

may consider form to be a composite whole and no longer the sum of parts" (Qtd. In Lynn & Gage, P. 56). The composition of that structural system allows the project to be seemingly self-supportive without the requirement of an additional formal structural grid.

Marasso proposes that this is the next step of digitally empowered architecture. Architecture with the ability to express itself in structurally stable, Euclidean geometries that are capable of morphing and being calculated to the same degree of precision as the computer generated forms manipulated on the screen. Architecture in the digital age may begin to evolve beyond the limits of the simplified structural grid as materials and construction practices continue to grow and take on the possibilities that are now possible through design and analysis software. This evolution could see a return of responsibilities to the architect as a formalizer of precise structural systems capable of fluidly transferring design intention into built reality (Lynn & Gage, P. 56-57).

2.2.3 Performative Language of Digital Design

Smart (performative) materials and interfaces have begun to establish dynamic, responsive environments through the integration of technology systems in built space. Much of the work that has been done in the field of smart material research and its applications in architecture has been through small-scale installations and experiments. These experiments capitalize on situational opportunities for space to become an active system, capable of responding to various types of stimuli (NG & Patel, P.19). The performative systems compliment the visually representative possibilities of a digital design language into an understanding of architecture as an active environment of digital interaction.

> "Performalism… the capacity of architecture to become an event, to participate in a world, which is more and more often defined in terms of occurrences rather than as a collection of objects and relations." (NG & Patel, P.5)

These installations begin to imagine the possibilities in space informed by digital technologies. This is architecture imagined as a temporal experience, kinetic, operable space directly interacting with its occupants and environment.

2.2.3.1 Precedents in Performative Design

Carbon Nanotube Technology | Deacon Yeadon

Carbon nanotube technologies such as the example shown by Deacon Yeadon explore how standard building façade materials could be infused with digital information to become programmable surfaces reacting to building/ occupant requirements. This material is electrified allowing charged colour pigment to flow through its microscopic fibrous surface. The resulting patterns and arrangements suggest nearly limitless possibilities for information display and communication (NG & Patel, P.66).

The realization of such materials suggests that architectural space can become entirely digitally integrated with real time displays. The opportunities provided by displays such as carbon nanotube technology suggest possibilities for growth towards the immense potential for material development in architecture. Materials capable of transforming space into a constantly evolving and visually reciprocal environment.

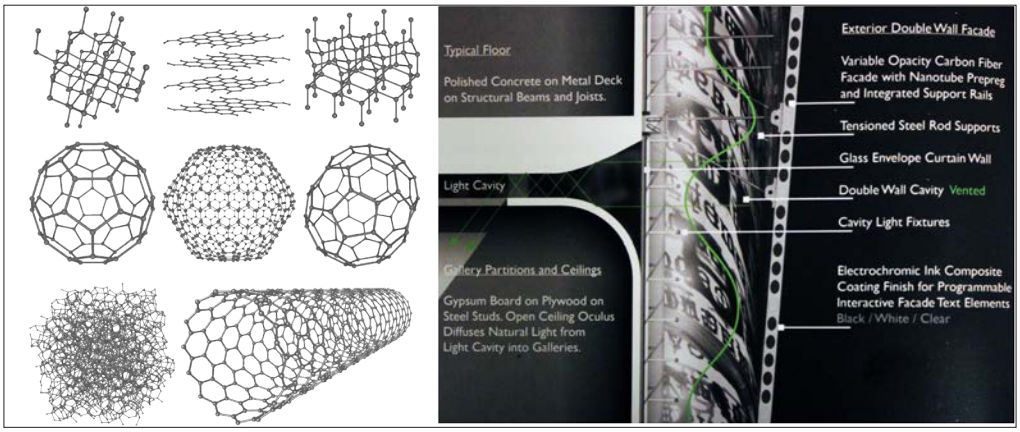


Figure 2.8- Precedent 2 | Carbon Nanotubes (source: NG & Patel, P.66)

Symbiosis-O | Kart Ojavee & Eszter Ozsvald

A “collection of programmable textile surfaces” designed by Kart Ojavee and Eszter Ozsvald is composed of a woven fibrous material integrated with flexible electronics capable of reacting to either physical touch or digital signals. The flexible electronics are capable of being programmed to respond to physical stimulation which reads as a direct feedback of whatever interacts with it (such as the hand-prints seen in the images) or through a more sophisticated read-out of digital signals sent to the façade in the form of a downloadable program from a user’s phone or laptop. When an individual interacts with the system (either through touch or digital signal) the surface maps and changes color in response to that interaction as a visual manifestation of digital and physical stimuli. The eventual goal being the creation of environments that people and environmental conditions might actually directly interact with actively changing and adapting with the usage of space and developing relationships between environment and occupant (NG & Patel, P.38-39).

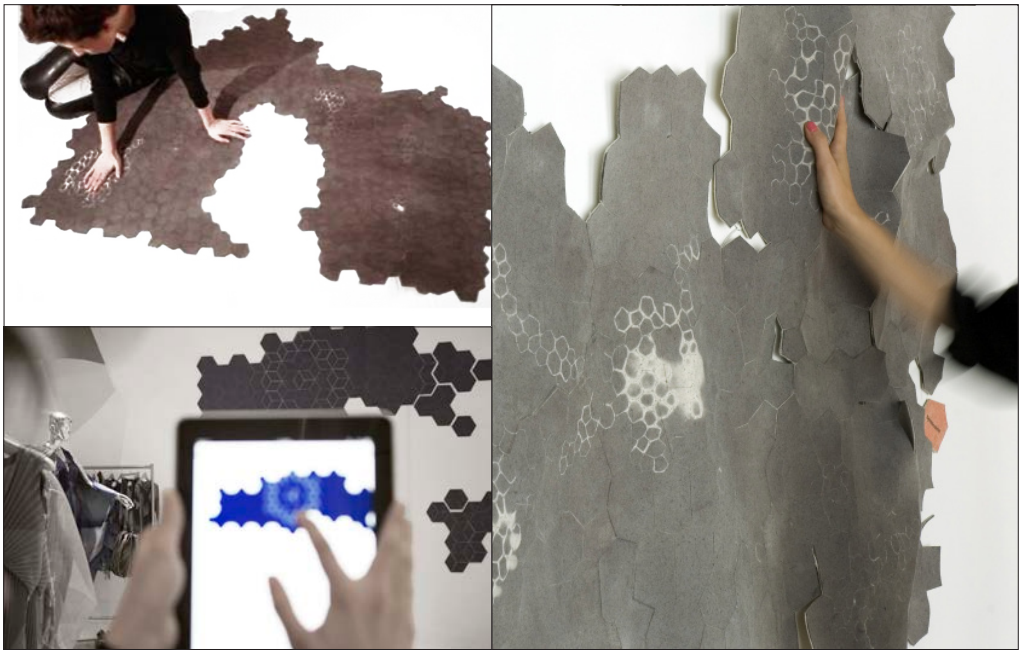


Figure 2.9- Precedent 4 | Symbiosis-O (source: Symbiosiso.com)

Hylozoic Ground | Philip Beesley

Hylozoic Ground by Philip Beesley moves beyond two-dimensional experiments and envisions an entire room that might be informed by systems capable of reading the occupants and buildings requirements through the integration of digital technologies that modify the physical space. Proximity sensors and motion detectors trigger reactions within the system of hanging armatures and kinetic structure to make the room come to life as the occupant engages it. This life-like state once again removes the individual from their own introspections and invites them into the space to explore and interact with a built structure that seems to realize and respond to their actions. A relationship can be developed between occupant and installation as the room appears to adjust and react to the actions of the observer who now feels like much more than an observer and more along the lines of an operator or participant within the environment (NG & Patel, P.30-31).

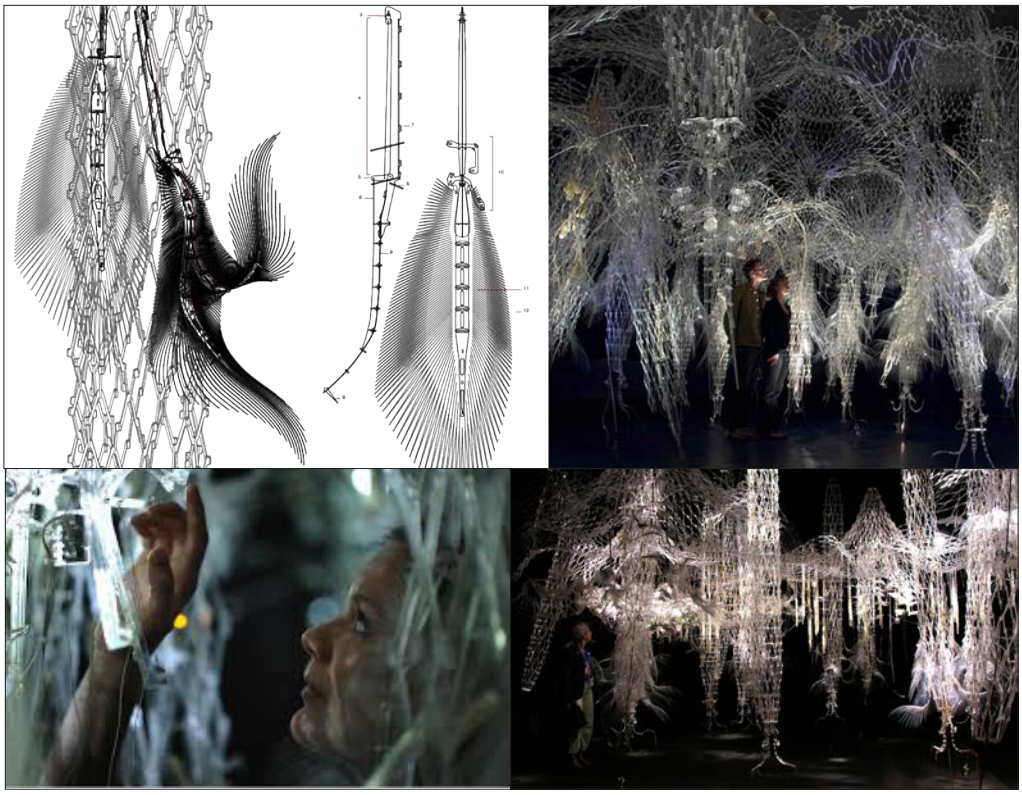


Figure 2.10- Precedent 5 | Hylozoic Ground(source: NG & Patel, P.30)

2.2.4 Digital Design Language Towards Digital Place

All of these precedents discuss the direction of possibilities and potentials being explored in architecture informed by digital technologies. The language of digital design exists in the collaboration of these conceptual models and built works. It begins to encompass an understanding that space is no longer bound by the restrictions of rigid structural systems. The previously understood notion of what is likely or achievable with built form is no longer limited to a basic translation between the digital model and physical form. The cultivation of a language of digital design in architecture could be the key to moving towards the creation of space equipped with the capacity to re-engage the high-tech nomad with architecture to develop an understanding of physical space as *digital place*.
The creation of digital place is necessary in light of societal shifts brought forth by digital technology. The question that remains is how can architects begin to understand when, where, and what these spaces informed by digital design could or should become through the development of strategies for an investigation in digital place making.

3.0 Theory

3.1 Three Scales of Recombinant Theory

A precedent in architectural theory which discusses the integration of digital systems in architectural space, recombinant design theory. Recombinant strategies in architecture have been established through principles of recombinant urbanism which have in turn been established through practices in recombinant biological theory. These theories evolve independently, developing an understanding of recombinant theory as a methodology of engaging with design at multiple scales of investigation.

3.1.1 Biological Theory as Precedent

Recombinant design theory, first hypothesized by biologists Francis Crick, James Watson, & Maurice Wilkins, describes the manipulation of DNA strands to change their form and take on new purposes. This type of DNA manipulation also referred to as DNA splicing, describes the act of intertwining the DNA of one organism into the DNA of another. The genetically engineered super organism is then introduced to a larger biological infrastructure, which shall be referred to as "the specimen" (Horan, P.1-10).

In the diagram shown are bacteria cells that are being modified to produce a specific protein. That protein will continue to form naturally within the specimen, allowing it to address and adapt to the new requirements of its circumstances. The methodology of recombinant DNA modification is effectually the creation of an agent of change, engineered for the production of desired results, within a specimen. The introduced agent of change re-enforces the original entity while stimulating new growth in response to an opportunity or necessity for development (Horan, P.1-10).

Given the language and theoretical derivation of recombinant theory, as a mode of translating an understanding of entities that grow, shrink, and adapt to circumstantial requirements, the bridge into a discussion of architectural and urban thinking starts to become clear. Similarly to the biological adaptation of organisms, architectural and urban environments experience the effects of expansion and contraction due to numerous

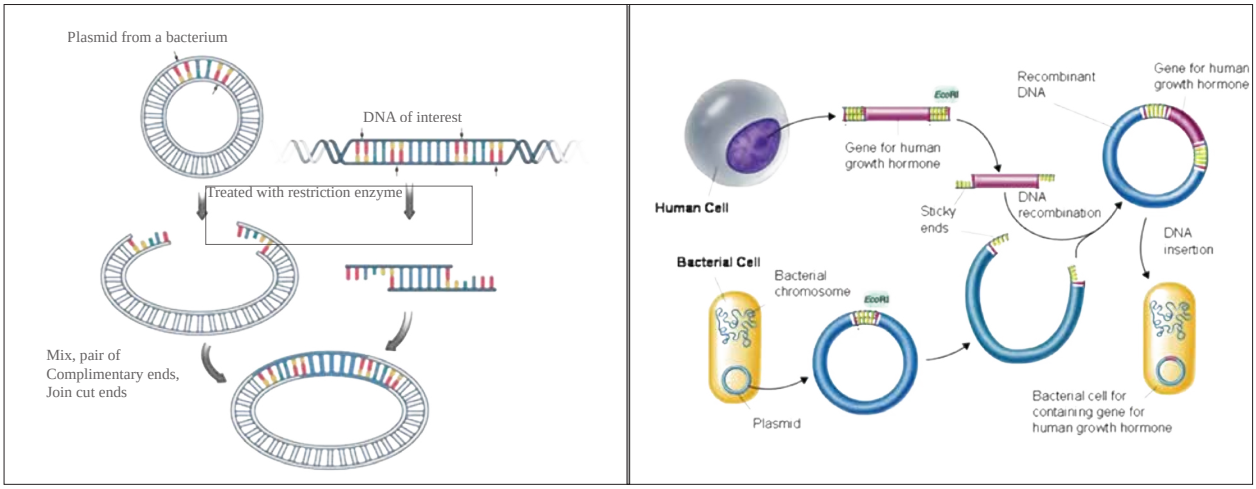


Figure 3.0- Recombinant DNA modification (source: goldiesroom.org)

circumstantial requirements over time. This expansion and compaction of space, function, form, and purpose relate directly to the issues discussed previously relating to place and the role of architecture in the digital age. The understanding of recombinant methodology in architecture will set up strategies for the engagement of place making in the digital age.

3.1.2 Urban Design Theory as Precedent

Recombinant theory as it applies to urbanism involves the study of the city as a whole that is composed of a network of parts or fragments. Each fragment of the urban fabric affects the next and therefore the engagement of design on any one part must be mindful of its impacts on the others (Shane, P.9). To connect the theory metaphorically with that of its biological derivation, these fragments could be viewed as the organs and support structures that compose a living body in which impacts of deficiencies or augmentations to one support structure would have fundamental affects on the functionality of the whole.

Kevin Lynch posited in his book "The Image of the City" (1960) that people orient themselves in relation to urban space via mental maps. These maps are created by traversing and identifying with the composition of five key elements that compose urban space. The weight and impact of each element's recognition respectively varying between each observer and their familiarity with a given location are; paths, edges, districts, nodes, and landmarks (Lynch, P. 46- 48). Districts mentally recorded and recalled as larger areas identifiable through common themes and elements; demarcating one area as distinct from its surroundings. Districts may be entered and explored by an individual (Lynch, P. 47). Edges might be boundaries that either physically separate, or visually segregate various districts. These could be things such as rivers, lakes, railroads, edges of development, walls, etc., that will signify either a dividing line from one district to the next or a barrier that physically or mentally cuts districts off from one another (Lynch, P. 47). Landmarks are visual linkages that one may not enter, but use as a point of reference and orientation from a distance. Those linkages could be smaller things such as signs, artwork, sculpture, hills, and significant buildings or much larger things that could be viewed from afar and provide a sense of location and orientation, such as mountains or skyscrapers, in relation to the larger urban fabric (Lynch, P.48). In Lynch's composition of the fragments of a city these three elements compose the individual fragments while the next two, paths and

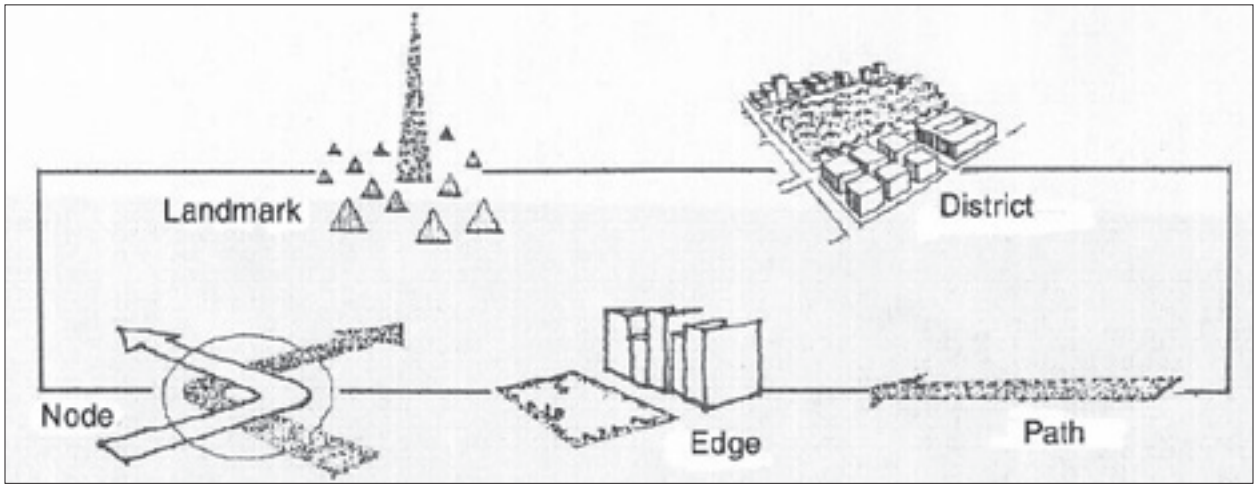


Figure 3.1- Kevin Lynch's diagram of the five key elements (source: flickr.com)

nodes, develop the linkages and connections between each. Paths and nodes, being the most prominent and direct means of orientation, relate to walkways "…The channels along which the observer customarily, occasionally, or potentially moves," (sidewalks, streets, trails, bridges, tunnels, etc.) and a nodal entry or exit points "…The strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is traveling." (Lynch, p. 47)

Lynch portrays an understanding of urban fabric as a composed by these five elements through which people move and experience their built environment. Through that navigation people start to accumulate mental maps of space and forms, which begin to formulate place relationships between people and urban fabric. The mental mapping exercise that Lynch describes is one that requires the engagement of the people with the context of their environment. An engagement, which as discussed in the previous chapters has been somewhat impaired by digital technologies and the ease of way finding, navigation and social filtering that those technologies enable.

William J. Mitchell, who built upon Lynch's image of the city, had the advantage of studying the urban environment when digital technologies were beginning to influence a future image of the city. His work looked at ways of thinking about urban fabric as living organism in which the nervous system, as facilitated by the possibilities of digital communication technologies, could enable cities to adapt to the needs of its inhabitants in real-time (City of Bits, Mitchell, P.27-44). This nervous system may begin to be imagined as a path, or paths, of connectivity that would transport people, information, and data throughout the fragments of a city and become a means of direct engagement between digital and physical flows of information. This is an image of the city enlightened by the connectivity allowed by digital technologies. Technologies that could inform changes to the flows and networks of a city, informed by constantly updating requirements much like the genetically engineered bacteria cells and performative installation projects discussed previously.

3.1.3 Architectural Theory as Precedent

Recombinant theory in Architecture encompasses the splicing of analog entities with digital practices that can work to reinforce one another in the creation of digital place. If recombinant urbanism can be understood as the study of a city as a series of organs and support systems that compose a biological being, then recombinant architecture can be understood as the study of the cells and microscopic relationships between them (buildings and site) that compose those organs and systems. The nervous system of a city, that is to say an integrated network of digital flows and communications, would be linked to not only the organs of the living entity but also to every respective cell that compose them.

In his book "Digital Places" (2000) Thomas A. Horan builds on William J. Mitchell's adaptation of recombinant theories in urbanism and outlines four design considerations in architecture, which work to assist in the formulation of meaningful, digitally entwined places that are meant to establish connection between the physical and the digital.
Those four criteria being: fluid locations, meaningful places, threshold connections, and democratic design (Horan, p.3).
A fluid location is one that addresses the evolving needs of a society to perform "day-to-day activities anywhere at any time " (Horan, P.5). With the ability to perform tasks that

were never before possible from any location of an individual's choice, such as banking or making a phone call, architectural space must now be able to provide formal opportunities for those tasks to take place. The provision of space capable of facilitating these new programmatic requirements can provide opportunities for the activation of space and promote the re-engagement of people with the formal and aesthetic qualities of space. If architects can successfully provide fluid locations in light of these developing spatial requirements then those spaces will become inherently meaningful locations of occupation.

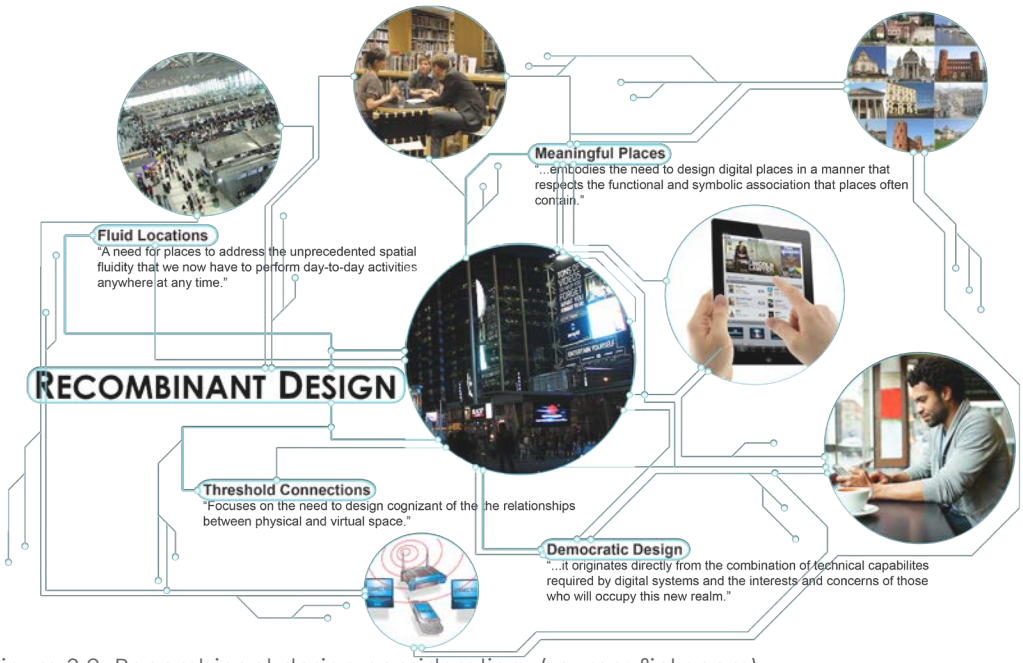


Figure 3.2- Recombinant design considerations (source: flickr.com)

Horan also posits that the formulation of meaning in space "...embodies the need to design digital places in a manner that respects the functional symbolic association that places often contain." (Horan, P.5). This relates too much of the previous discussion on place establishment. It engenders an understanding that a site or location will most often be situated within a context of existing relationships associated to a symbolic appreciation of use. These may be previous uses, or new uses that require consideration in the design of places informed by digital practices of the contemporary occupant. Threshold connections, which were touched upon briefly earlier in this dissertation, "Focuses on the need to design cognizant of the relationships between physical and virtual space." (Horan, P.6). With the possibilities of digital technology integration into built form evolving so rapidly it is going to be more and more difficult to define where the boundaries between digital and physical space should or even could merge. This criterion will rely heavily upon the decisions made pertaining to what types of activities are to be provided for within a space as well as to how those activities are to be accommodated. Only once an understanding of how, and for what purposes, a space has been established can the architect begin to develop the manner of opportunities through which the threshold of digital and physical will be bridged. Democratic design, the fourth criteria, "...originates directly from the combination of technical capabilities required by digital systems and interests and [the] concerns of those who will occupy this new realm." (Horan, P.6). The high-tech nomad will require spaces of previously unimagined technological capability.

Returning to Mitchell's nervous system in the conception of a networked city it becomes apparent that architecture should also be capable of connecting and communicating beyond its physical boundaries. These connections will establish a broader swath of connectivity to promote place and link places into a network of interactions.

3.2 Digital Place

Through the discourse of what makes a place and the implications of digital technologies on that dialog it has become apparent that the traditional understanding of place is evolving hand-in-hand with the technologies of the digital age. Digital place(s) may begin to be understood as a network of subsidiary places that connect to encompass a larger image of the built environment and an even larger image of the urban fabric.

> "Place exists at different scales. At one extreme a favorite armchair is place, at the other extreme the whole Earth."(Tuan, P.149).

Recombinant theory as it relates to those multiple scales of space relation and place making can help to put together design considerations at each scope of investigation. The urban scale as it relates to the breakdown of cities spaces, places, and connectors, the linkages that exist between them, and the understanding that digital technologies may be capable of providing another layer of connectivity between those spaces and places. The architectural scale that begins to be informed by urban conditions of site encompasses a vision of place(s) connected through the context of urban composition. Finally, the cultivation of a digital language in design contributes to the creation of digital places for the technically nomadic. These digital places engage in fluid discussion between digital and physical environments.

The design project that shall come out of this discussion can be understood as an exploration in digital place making. A new proponent of built form cannot be simply forced into the urban fabric. It must be cognitive of existing conditions and opportunities presented within the complexities of existing places and begin to work in strengthening those relationships.

4.0 Opportunity

4.1 A Vehicle for Establishing Digital Place(s)

As discussed previously, a successful project engages with context that reaches much further beyond its own borders and is complimentary to the conditions and qualities of that context. Architects are rarely afforded the opportunity to select the most appropriate site for which a project is to be implemented which means that site conditions are usually engaged with in a purely responsive nature as a set of given parameters. As it so happens, this thesis is not bound by a client or any other entity that may dictate any one particular site. The ambiguousness of potential site requires that a methodology for site selection be established that is in-line with the goals and orientation of this thesis. What is the most opportune mode of design exploration for an investigation into digital place making?

Infrastructural systems and buildings are the foundation of any functional city. They are the first large scale constructions that lay the groundwork for urban development. They set up networks of flows and orientation that establish the skeleton for growth. When the function of things such as industrial centers become no longer necessary either through the development of new technologies or a shift in location and proximity to resources the frameworks of those buildings and systems are often left abandoned. Those abandoned fragments of a city remain as a representation of the historical influence that certain technologies and processes have had on the city's development that could begin to establish deeply meaningful relationships between past, present, and future.

4.1.1 Precedents in Infrastructural Projects

Duisburg-Nord Landscape Park | Latz + Partner

Industrial revitalization projects such as the former Thyssen Steelworks blast furnace in Duisburg Germany designed by Peter Latz, Latz + Partner, in 2002 is now the site of a 570-acre public park mega-structure. A re-imagination of the complex drawn from it's historic past function as an industrial core of the city into an established mode of pedestrian movement and interaction established throughout the site. The interpretation of the previously abandoned rail lines that connect from North to South and East to West formulate a multi-level engagement of new program and use as a series of paths and walkways which has given the complex new life.

The park incorporates the engine houses, mill buildings, bridges, gas tanks, empty coke and ore bunkers, and fragments of the previous service rail line that have been re-integrated as public space that capitalizes on the "combination of industry and nature [which] results in an experience rich with memories, association, and feelings." (Peter Latz, qtd. Reed, P.124). The Duisburg-Nord Landscape Park revival has returned life to a component of the city that was once integral to its daily function and can once again become a place enriched with daily activity and interaction.

Figure 4.0- Precedent 6 | Duisburg- Nord Landscape Park (source: Reed, P.124- 131)

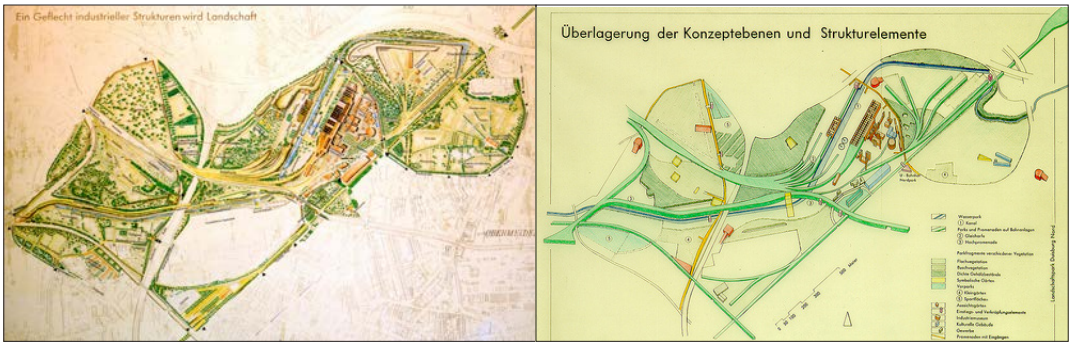


Figure 4.1- Precedent 6 | Duisburg- Nord a connector of urban fabric (source: Reed, P.124- 131)

Figure 4.2- Precedent 6 | Duisburg- Nord a new life (source: Reed, P.124- 131)

New York High Line- James Corner & Diller Scofidio + Renfrew

Figure 4.3- Precedent 7 | New York High Line (source: flickr.com)

The New York High Line utilizes a 1.45 mile-long stretch of what was once the West Side industrial railway that suspends over the streets and through the built fabric of New York City. Identified as an important entity within the urban fabric that was to be re-imagined, reprogrammed and re-integrated with its context. The new concept for the railway was decided via an open design competition held in 2003. The original rail line served as freight transport and connected from Gansevoort Street up to 34th Street riding above the urban deck of the city and through the built fabric that has formed around it since the 1930s.

Figure 4.4- Precedent 7 | New York High Line | Within the built fabric (source: archdaily.com)

The project engages with the idea that even abandoned infrastructure is capable of becoming something rich and desirable for a city and its inhabitants. The immense impact that the West Side industrial railway has made on the development of the urban fabric around it allows the newly imagined high line to holistically integrate with and enhance the built fabric. The New York High Line provides an alternative form of pedestrian transportation and exploration capable of telling a whole new story about the city through which it weaves.

Figure 4.5- Precedent 7 | New York High Line | Maintaining the essence of place (source: archdaily.com)

One of the great successes of the High Line is that its designers worked meticulously to maintain the character of the infrastructure that it rides upon. Any rails that were removed in the initial testing of the structural integrity and assembly of the new park scape were documented so that they could be replaced once again in their original locations as design elements and features of the landscape (Cilento, Karen. "The New York High Line officially open"). Considerations made in the maintaining of the original functional components of the High Line allow for the new parks and design elements to work with the existing identity of place that has developed through time. This is not simply the utilization of a convenient structure but the preservation of the memory of a time and age of technology that has shaped the fabric of New York.

Skuru Park Bridge – BIG conceptual project (2012)

Figure 4.6- Precedent 8 | Skuru Park Bridge (source: big.dk/#projects)

Skuru Park Bridge by Bjarke Ingels Group (BIG) is a conceptual design project which works to redefine the way in which a piece of infrastructure can be imagined as not only something serving a utilitarian function, but as infrastructure capable of becoming a place of desire and occupation. The project addresses issues related to the neglect of natural or existing contexts of a site through the single purpose mindset of getting vehicles from one side of a river to the other. A consideration based on the idea that infrastructure projects are all too often treated as purely utilitarian with little consideration for the natural or pedestrian environment (Bjarke Ingels Group. "SBR- Skuru Parkbridge).

The Skuru Park Bridge imagines a vehicular overpass spanning a river as something that could become a valued component of the urban fabric. In this project BIG allows the vehicular traffic to pass overhead while a large arched landscape bridge joins the natural landscapes on either side. Bjarke Ingels describes this as "…A new form of social infrastructure," that will promote the integration and use of the park bridge as a social stimuli for the people who live and work on both sides of the river (Bjarke Ingels Group. "SBR- Skuru Parkbridge).

Figure 4.7- Precedent 8 | Skuru Park Bridge | Social Infrastructure (source: big.dk/#projects)

The concept of social infrastructure promotes a way of thinking about existing infrastructural entities that may be currently under utilized or considered obsolete throughout the urban fabric of contemporary cities and social networks. Things that are often viewed as obstacles, or as Lynch described them edges, can begin to be imagined as opportunities for the stitching of districts, capable of physically unifying previously segregated city fabric.

Figure 4.8- Precedent 8 | Skuru Park Bridge | Stitching districts (source: big.dk/#projects)

4.1.2 Infrastructure as Opportunity

Throughout the linear narrative of a city, Infrastructural projects will be developed to serve the various necessities of their age. Their functional necessity may lapse and leave seemingly blighted areas of abandoned or underutilized space. However the fragmented identifiers of their existence begin to be perceived as landmark sites capable of developing deeply meaningful memory association with times past and impacting the future development of urban fabric around them. The projects discussed explore the power of that place association through the re-imagination of large infrastructural projects.

This representation invokes an understanding of infrastructural projects as having the ability to be perceived as venerable entities of a city even after their utilitarian functionality may have lapsed. "…Buildings take on the qualities of the place [over time] wherein they are sited." (Mostafavi & Leatherbarrow, P.72). Obsolete or underutilized infrastructure could potentially be the most powerful opportunity for an architectural exploration of digital place making. These projects continue to impact and absorb the qualities of their context through already established place relationships in the course of their influence on the development of a city.

Therefore, the site for design exploration most suitable for this dissertation will be one that has grown with, and been instrumental in, the shaping of the urban fabric that is its host. This site should be one that did play (past), does play (present), and will continue to play (future) a pivotal role in the function and servicing of its context but may as of yet be underutilized in its potential to become a place of its own. This underutilization may be due to a loss of, or shift in, functional requirements that can allow this space to be re-imagined and reintegrated with its context in light of digital technology systems and processes. Through the recognition of such potential, the design exploration will re-establish existing, and develop new (digital) place relationships.

4.2 The Urban Transportation Node

William Mitchell's discussions of the networked, digitally integrated city are focused on the linkages that are established by the movement and transportation of people through urban fabric. The issue of urban transportation and pedestrian modes of circulation surfaces as a fundamental proponent of how a city, site, and project will be engaged, interacted with, and understood by its population. These modes of circulation (*paths*) all have beginning and end points (*nodes*) through which an individual may enter or exit. The entering and exiting of those nodes can provide an opportunity for architecture to capitalize on an interval of time that incorporates moments of rest and movement through urban and architectural form.

The maps shown (figures 4.9- 4.12) describe the complexity and intricacy of public transit in multiple cities. The layering and intersecting of lines and systems develops a network of people moving into, out of, through, and around city centers. Wherever these lines cross and connect to one another there is an option for interchange between different modes of transport and various pathways of navigation. These are urban transportation *nodes*. These urban transportation nodes embody the entry and exit points that feed pathways

of pedestrian flow and movement. This multi-layered, multi-modal form of infrastructure will become the vehicle for design exploration informed by a digital language of design in architecture to provide for the high-tech nomad through the formulation of digital place(s).

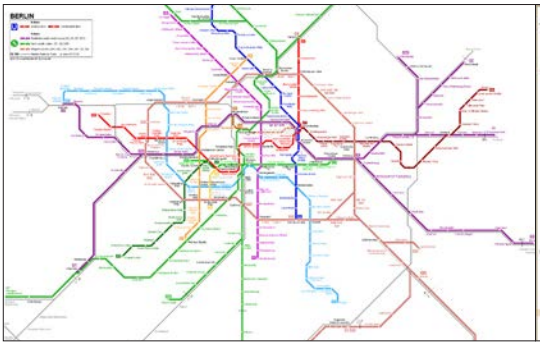


Figure 4.9- Berlin Transit (source:pixopark.com)

Figure 4.10- London Transit (source: pgoh13.com)

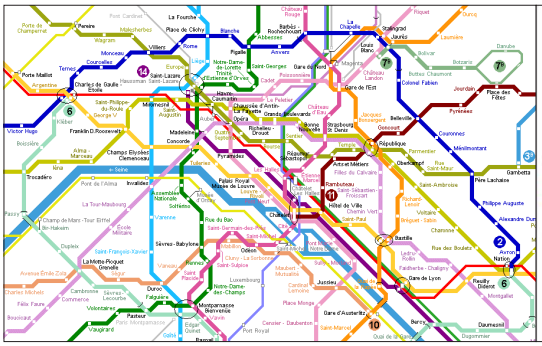


Figure 4.11- Paris Transit (source: urbanrail.net)

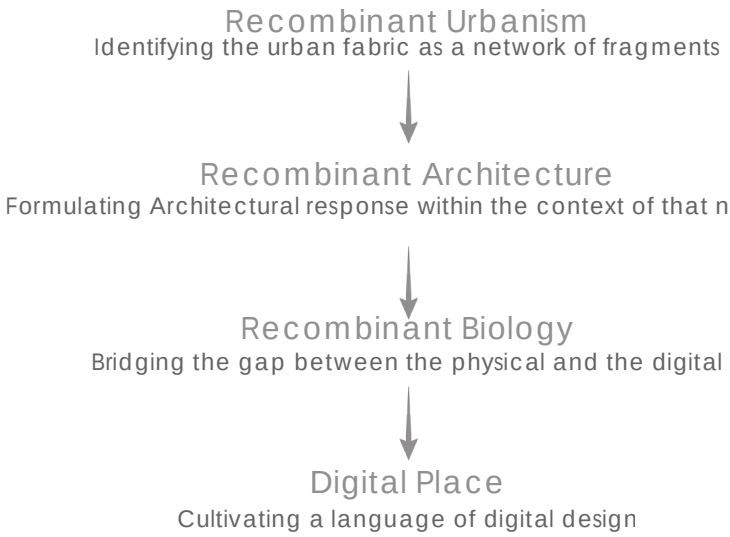
Figure 4.12- Montreal Transit (source: cat-bus.com)

5.0 Design Exploration

5.1 Project Introduction

The static (or interference) that technology has created between a technically nomadic society of high-tech occupants and architectural space has been explored as a moment of opportunity for Architecture to adjust and adapt to societal need. A language of digital design can begin to formulate in architectural explorations of space, working to provide for the new modes of being established by a technologically oriented society towards digital place making in Architecture.

The discussion of recombinant theory has looked at how those requirements can be formulated through a series of scales of investigation that look at the city as a networked system of fragments. How buildings begin to work within and strengthen relationships between those fragments, also how the integration of technology systems and considerations of new uses can establish and fortify relationships of *place* in the design of space and form. The establishment of criteria for choosing an appropriate site to perform an investigation of this type of place making exercise has set up the complete framework for this project exploration.



At the urban scale of investigation; a master plan for design will be developed within the context of the city of Toronto. Moving into the building scale of design investigation as formulated within that master plan. The design of the project shall work to stitch and unify the contextual area of its site. Finally down to the scale of threshold connections, which discuss the actual bridging of the gap between digital and physical to promote digital place making in high tech society. The bridging of that gap through the formulation of a digital language in design aims to once again create architectural space capable of becoming "…a site where human modes of being are well provided for…" (Heidegger qtd., McCullough, P.176).

5.1.1 Project Context | Transit Toronto

The current population of Canada is approximately 34.3 million. By 2031 Canada's population is expected to rise to approximately 43.9 million. Of that current 34.3 million people 13.5 million reside in Ontario. By 2031 that number is projected to grow to 17.4 million in Ontario alone. Of that 17.4 million, 4.2 million will reside in the city of Toronto, a city that is already experiencing the strain of an overworked, under-developed public transportation system (Ontario Population Projections Update, Statistics Canada). Throughout its development the city has proposed and attempted to establish a network of public infrastructural transit that would service its core and extremities. In its current state, this is the network of Toronto subway lines.

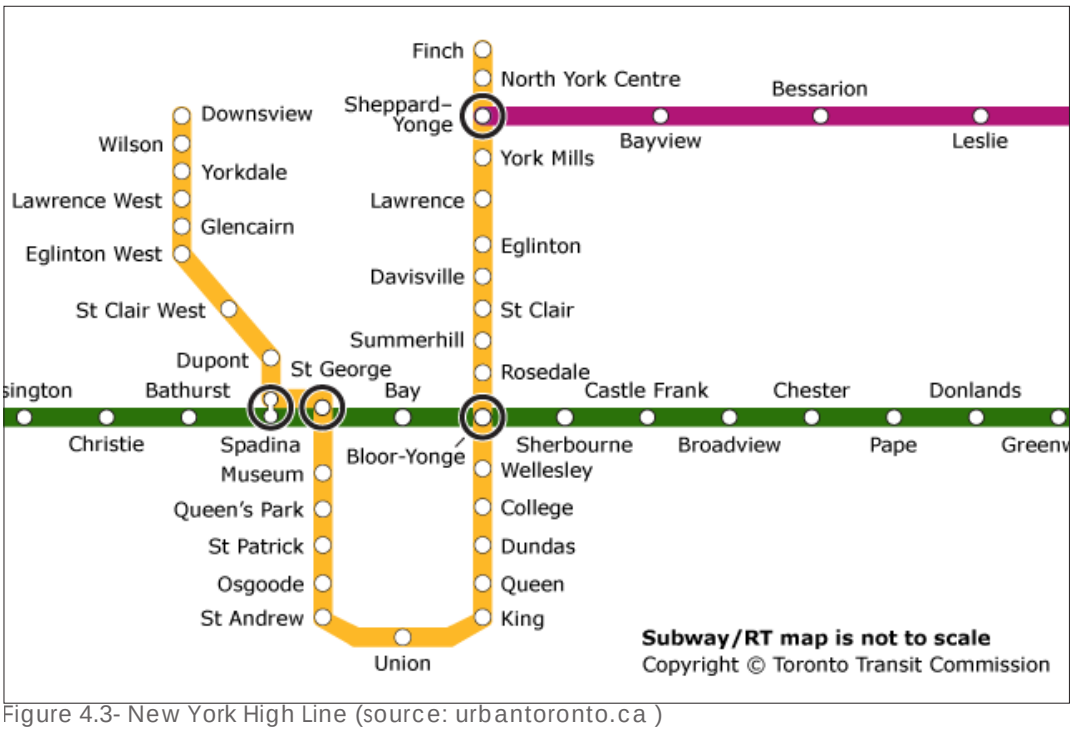


Figure 4.3- New York High Line (source: urbantoronto.ca)

Although these subway lines are supported by a series of streetcars and buses, those modes of public transport have to contend with the also over-congested network of roads and highways running through the city core. This could potentially be alleviated by the implementation of a sophisticated network of transit allowing for the combination of vehicular parking, bus route drop off, and streetcar intersection at nodal entry points. These nodes have the potential to not only service the utilitarian function of loading and unloading public and personal transit vehicles, but could also be imagined as places of interaction where the physical needs of the city meet the digital needs of its people.

The following maps reveal historical proposals of Toronto's transit network and identify the opportunities for expansion in the context of the cities development. These maps will help to define the specimen of design study through the identification of a transit expansion plan resonating the needs and desires of Torontonians in a downtown relief transit line. That downtown relief line is highlighted on each map to make clear connections over one hundred years of Toronto Transit proposals and analysis.

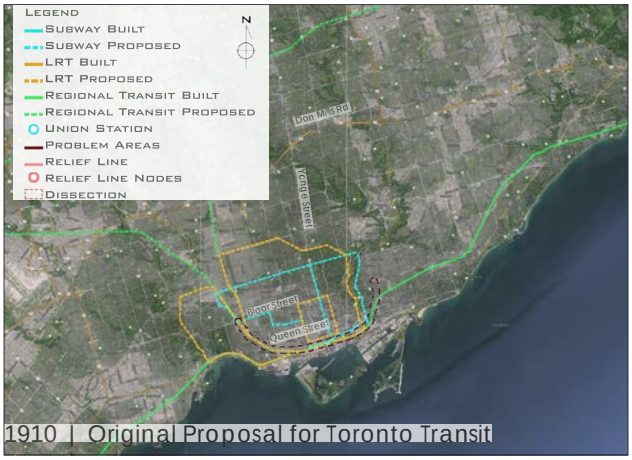


Figure 5.0 (source: Levy, P.34) | In 1910 this proposal would see Toronto begin to develop a series of subway and LRT systems. Potentially developing a series of loops and alternate routes that would feed off of existing rail lines, and the initial proposal.

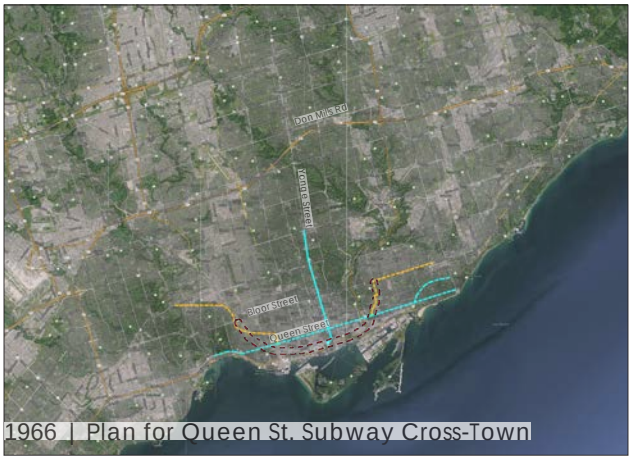


Figure 5.1 (source: Levy, P. 94) | MTTPR (Metropolitan Toronto Transit Plan Review) was commissioned to study this Queen line, AS A PROPOSAL for a Queen Street cross-town subway.

Figure 5.2 (source: Levy, P. 105) | MTTPR- Existing subway and proposal for expansion 1969. The Queen Street cross-town line is still considered an integral component of the downtown network.

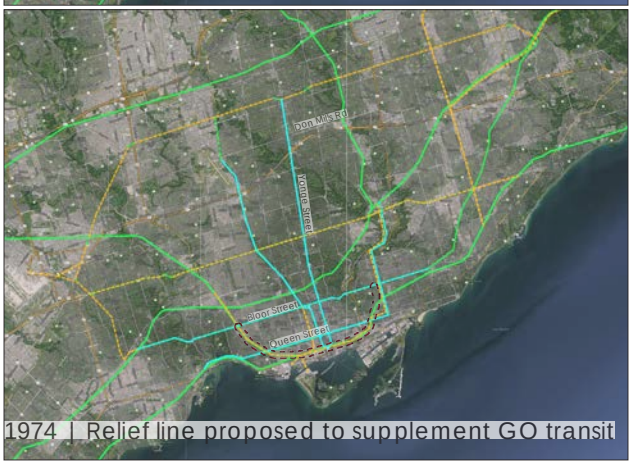


Figure 5.3 (source: Levy, P. 118) | MTTPR- The cross-town line proposed to be moved off of Queen Street, further South as light rail transit (LRT) along the existing industrial/ regional transit rail corridor, published in 1974.

This Proposal also envisions LRT connections to the Toronto waterfront.

Figure 5.4 (source: Levy, P. 160) | ARTS (Accelerated Rapid Transit Study) performed a study in the early 80s, which published its findings in 1985 with similar results to the MTTPR.

The Queen Street Line is once again discussed as well as the LRT option along the existing rail line. Together operating as a looped system with multiple transfer nodes.

1985 | Proposal shows intent for downtown relief line

Figure 5.5 (source: Levy, P. 158- 178) | Constructed subway as of 1992. Instead of developing the Queen Street or LRT cross-town relief line Transit Toronto is serviced by only one inner city cross-town along Bloor Street.

1992 | Existing Subway and Regional Transit

Figure 5.6 (source: Levy, P. 178) | The discussion of cross-town links resurfaces in this 1992 proposal but shows disjointed connectors that do not tie into existing lines. These are mostly closed loop systems with minimal points of transfer.

1992 | Proposal for Expansion Queen street cross-town

Figure 5.7 (source: Levy, P.184) | A proposal in 2000 removes even those disjointed cross-town links and instead only proposes an out of town link to Scarborough. Bringing even more people into an already over congested transit system.

2000 | Proposal, No LRT or downtown relief line

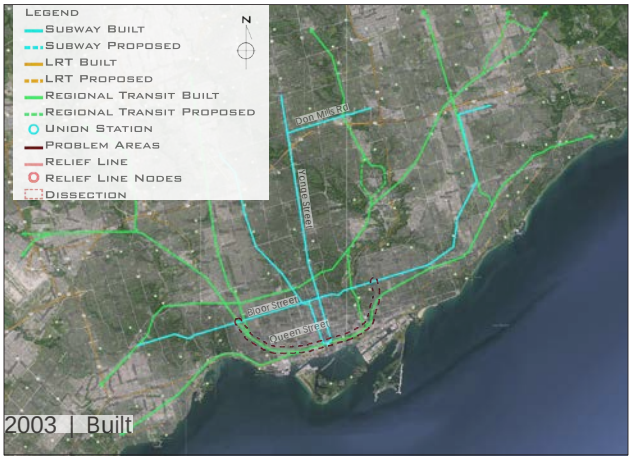


Figure 5.8 (source: Levy, P. 186- 187) | Subway and regional transit as constructed in 2003.

Figure 5.9 (source: Levy, P. 186-187) | A 2003 study by MTTPR shows the over-loading of existing systems as well as possible areas of concern for the future.

A majority of these problems are shown to be afflicting the peripheral nodes of existing systems as well as an immense pressure on cross-town linkages and downtown services.

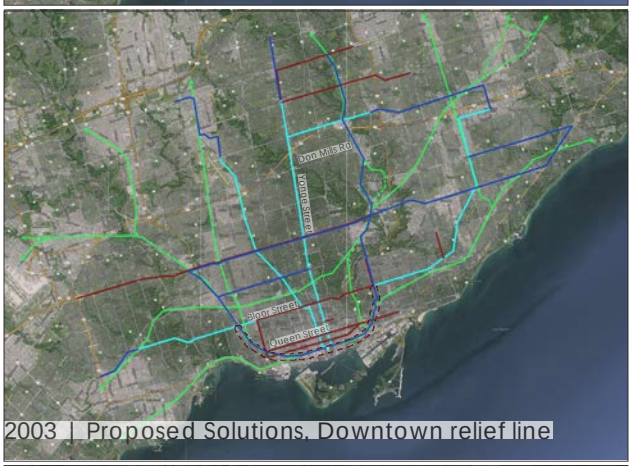


Figure 5.10 (source: Levy, P. 186-187) | The solutions for congestion problems are again shown to be best handled through the implementation of the existing industrial rail line as LRT as well as multiple East-West and North-South connector lines.

A focus on multiply intersecting lines represents an image of Toronto Transit as a networked system.

Figure 5.11 (source: Levy, P. 193) | The 2007 Transit City proposal does incorporate multiple cross-town links but fails to recognize the vision for a downtown relief line.

The largest critique of this proposal being that adding these Northern cross-town lines will only complicate the pressure on the downtown system.

Toronto is currently undergoing a large transit expansion being planned and executed by Metrolinx. The Metrolinx plan does outline that a downtown relief line will be implemented but that the actual route and nature of this relief line is as of yet undecided. It is also slated to begin development in the second or third stage of construction, which means that the main focus is currently being place on the northern cross-town links which as shown in the maps above may only add to the problems persistent in the downtown core. The master plan of this project exploration will therefore formulate the downtown relief line, as the largest scale of design consideration through which the design of a specific site to be identified along that line will be selected and explored in an effort to formulate digital place.

Figure 5.12- Metrolinx Transit Expansion Plan (source: Metrolinx.com)

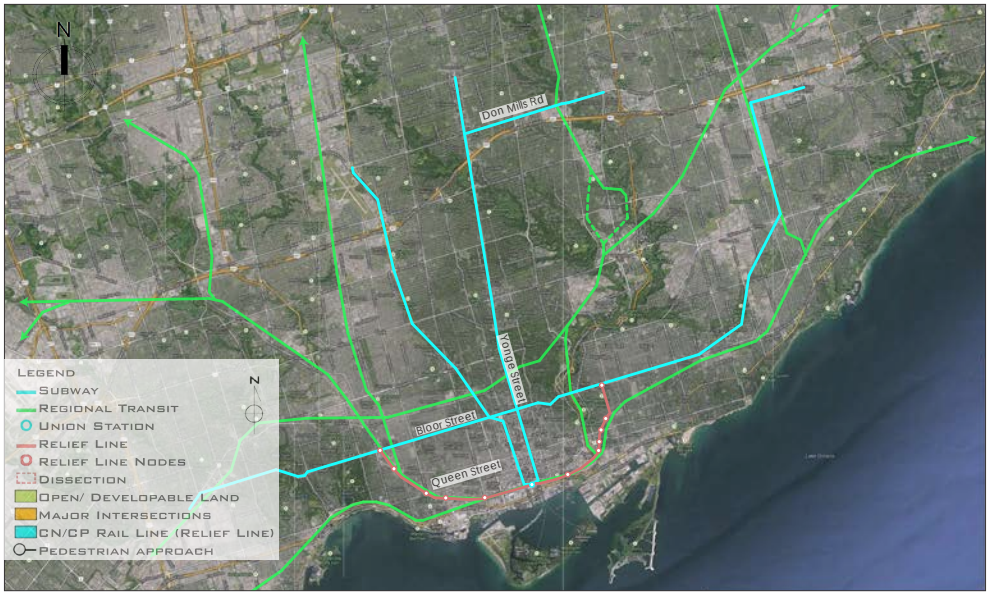


Figure 5.13- Diagram | The Downtown Relief Line

5.2 Urban Scale | Master Plan: West Toronto Rail Corridor as a Transit Relief Line

The West Toronto Rail corridor has been identified as the specimen for study at a master plan scale of this design exploration. Identifying the nodal opportunities throughout that specimen will help to break down the options of specific sites for a more detailed investigation. The diagrammatic maps shown in figures 5.14- 5.25 look at nodes 1- 12 as labeled in figure 5.13. These diagrams portray a number of aspects that give an overview of the variable and invariable conditions affecting each node. Components such as open or underutilized space, existing public transit and pedestrian traffic, major intersections of existing roadways, and larger flows of personal transport such as the Don Valley Parkway and Gardiner Expressway. Each node has been selected at a point where major flows of public and personal transport intersect with the previously outlined specimen. These 12 nodes would best serve the flows of people into and out of the relief line and are therefore the best possible sites for further design exploration.

5.2.1 Identifying Nodes & Taking a Dissection

The selection of the specific node that will be studied further shall be guided by the desire to work on a node that portrays the most invariable conditions shared between all 12. For that reason, nodes such as the ones identified at Union Station, Bloor West, and Danforth East will not be engaged as each would require a vastly different approach to design due to variables acting on each site. By studying the typical condition of a majority of nodal locations the design exercise will be able to give a much more cohesive picture as to the intention and opportunities that the relief line could offer as a whole. For this reason the dissection outlined in the map below, Dundas Street West Node, has been selected for more detailed analysis. The Dundas Street West node not only maintains the desired invariable conditions of majority, but also, as a peripheral node along the specimen could be seen as a catalyst of design. The first phase of development that could then grow within the specimen and stimulate new growth in Toronto as an agent of change

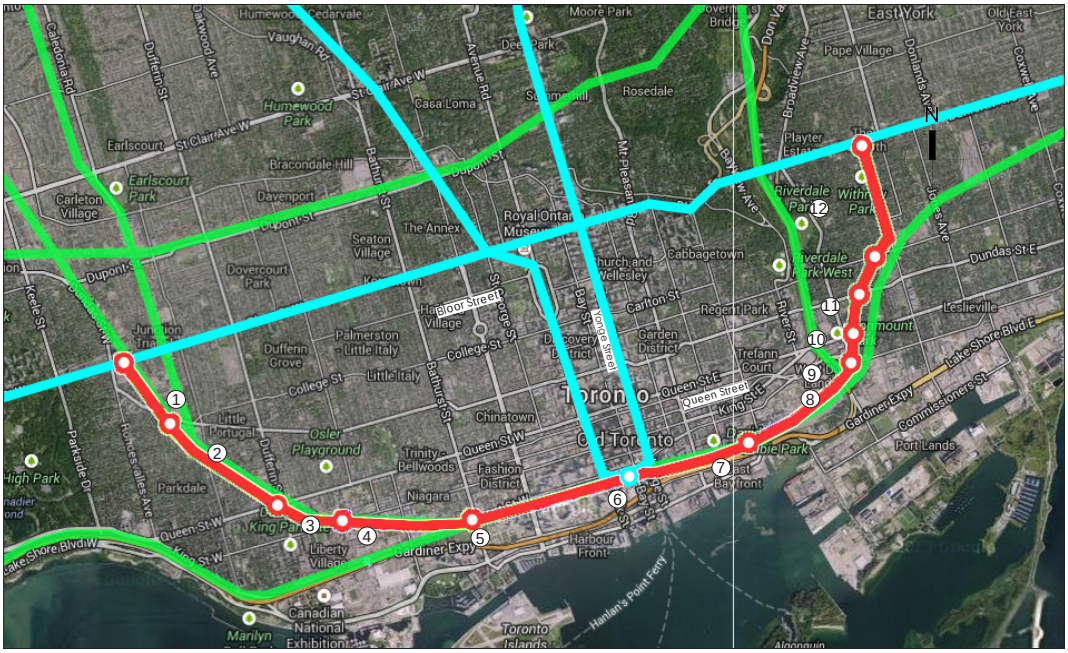


Figure 5.14- Diagram | Possible Urban Transportation Nodes

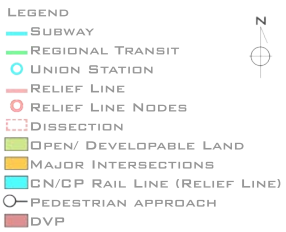


Figure 5.15 - Bloor Street West Node

Figure 5.16 - Dundas Street West Node

Figure 5.17 - Queen Street West Node

Figure 5.18 - King Street West Node

Figure 5.19 - Bay Street West Node

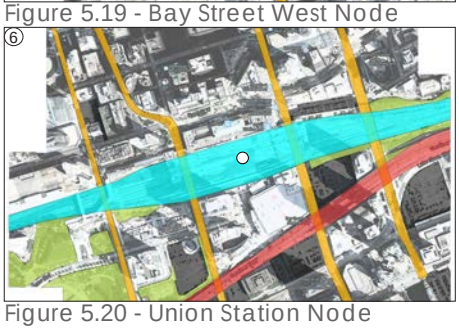


Figure 5.20 - Union Station Node

Figure 5.26 - Danforth East Node

Figure 5.25 - Gerrard Street East Node

Figure 5.24 - Dundas Street East Node

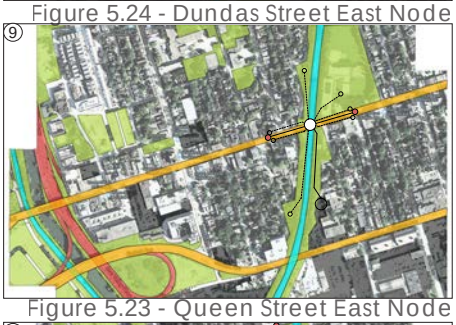


Figure 5.23 - Queen Street East Node

Figure 5.22 - Eastern Street East Node

Figure 5.21 - Distillery District Node

5.3 Site & Context | Nodes within Nodes

Figure 5.27 shows some site images of the site surroundings and outlines the existing sectional relationships of the area. The existing sections shown in figure 5.28 show that the rail corridor exists on grade with the existing park and residential of the surrounding area with only a single bridge to traverse from West to East that is both a very high traffic vehicular and pedestrian bridge.

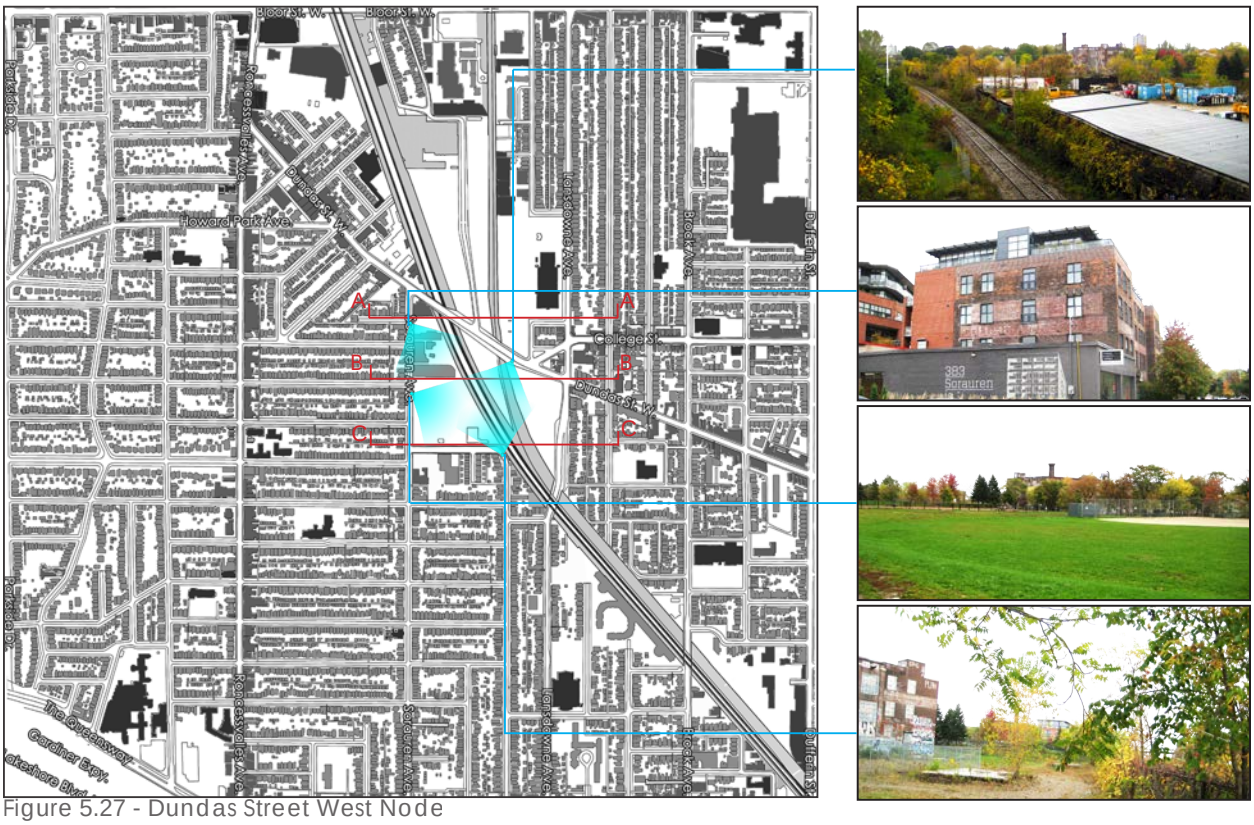


Figure 5.27 - Dundas Street West Node

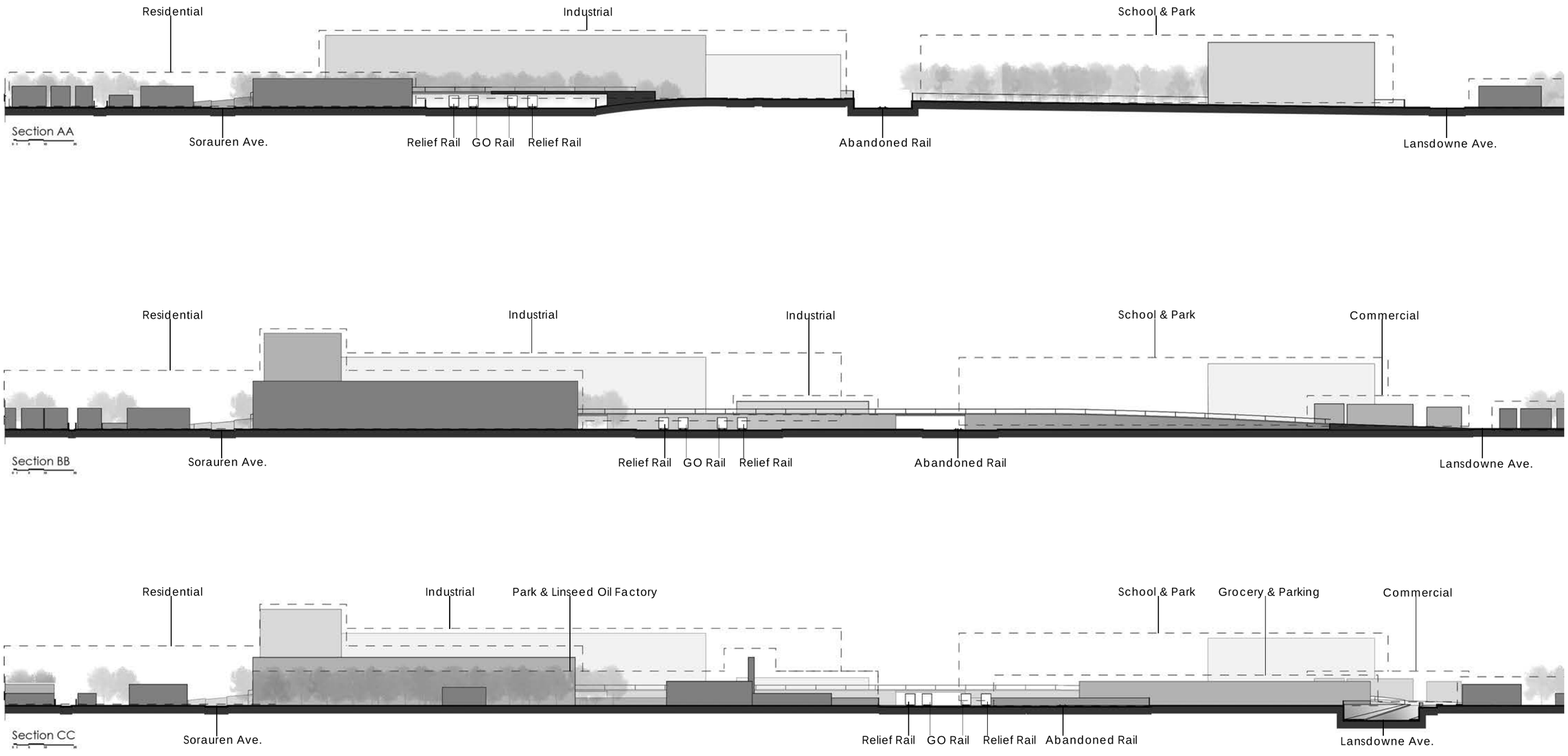


Figure 5.28 - Dundas Street Node | Existing Sectional Relationships

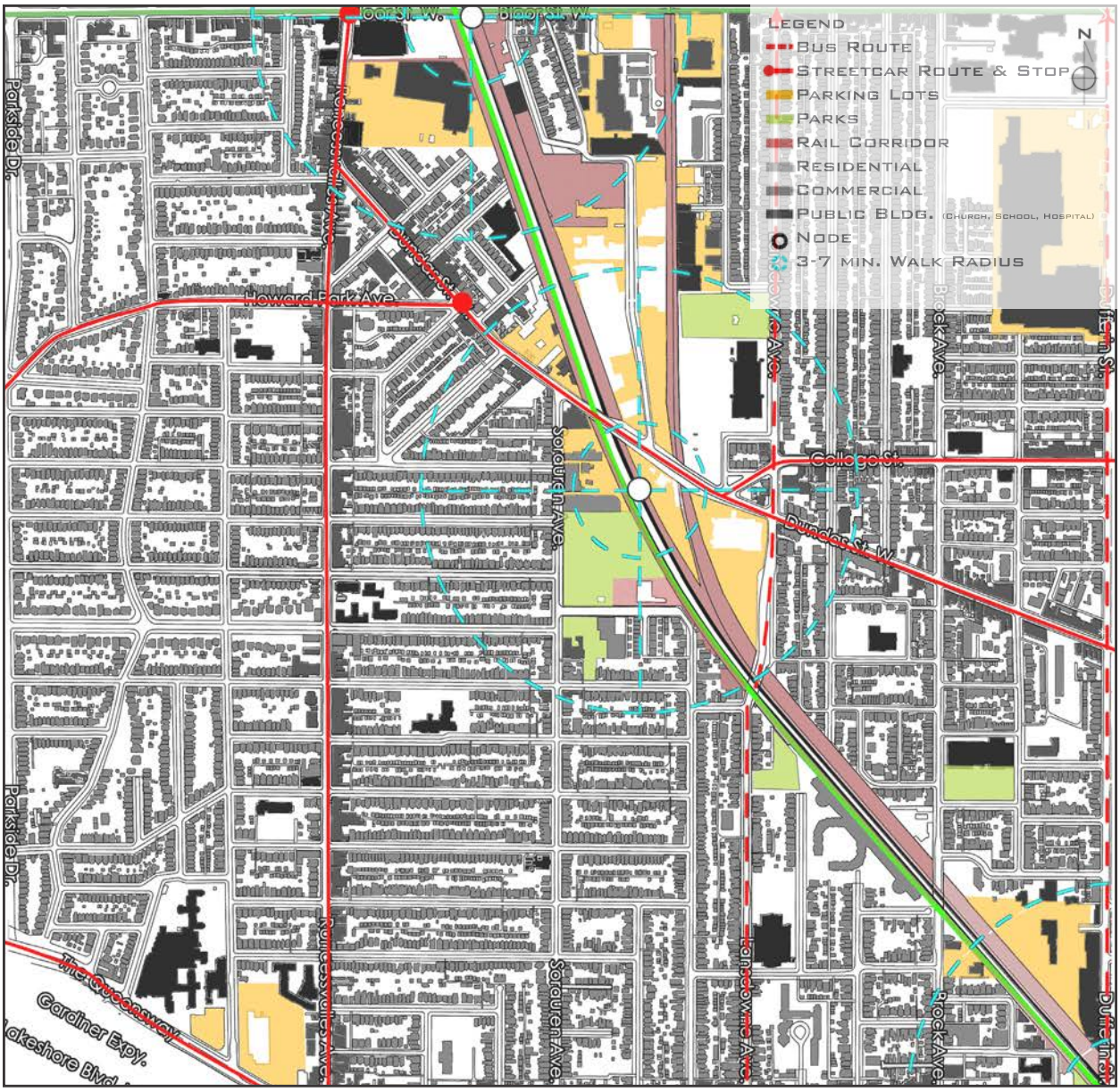


Figure 5.29 - Dundas Street Node | Existing Transit & Land use

In figure 5.29 we see that the site is located just off of the periphery of a series of existing Toronto Transit bus lines and streetcar routes that overpass the West Toronto Rail Corridor. The site is situated within a predominantly residential area with the main streets being lined by low rise commercial and pockets of parks and parkettes.

Figure 5.30 identifies a possibility for the areas demarcated as parking lots and parks to be addressed as potential land for development. Area #1 connects directly to the existing flow of transit established on site and could begin to pull that transit into the site. The existing rail line currently acts as a segregator or barrier between the West and East portions of the site, which means that Area #2 on the Western side of the rail corridor, which is currently a large open park space, remains closed off from the Eastern portion due to a lack of pedestrian modes across. Area #3 to the Northern portion of the Dundas West node is currently comprised of mostly industrial buildings that have taken up the square footage along the rail corridor but is also home to the West Toronto Rail Path. A walking and cycling

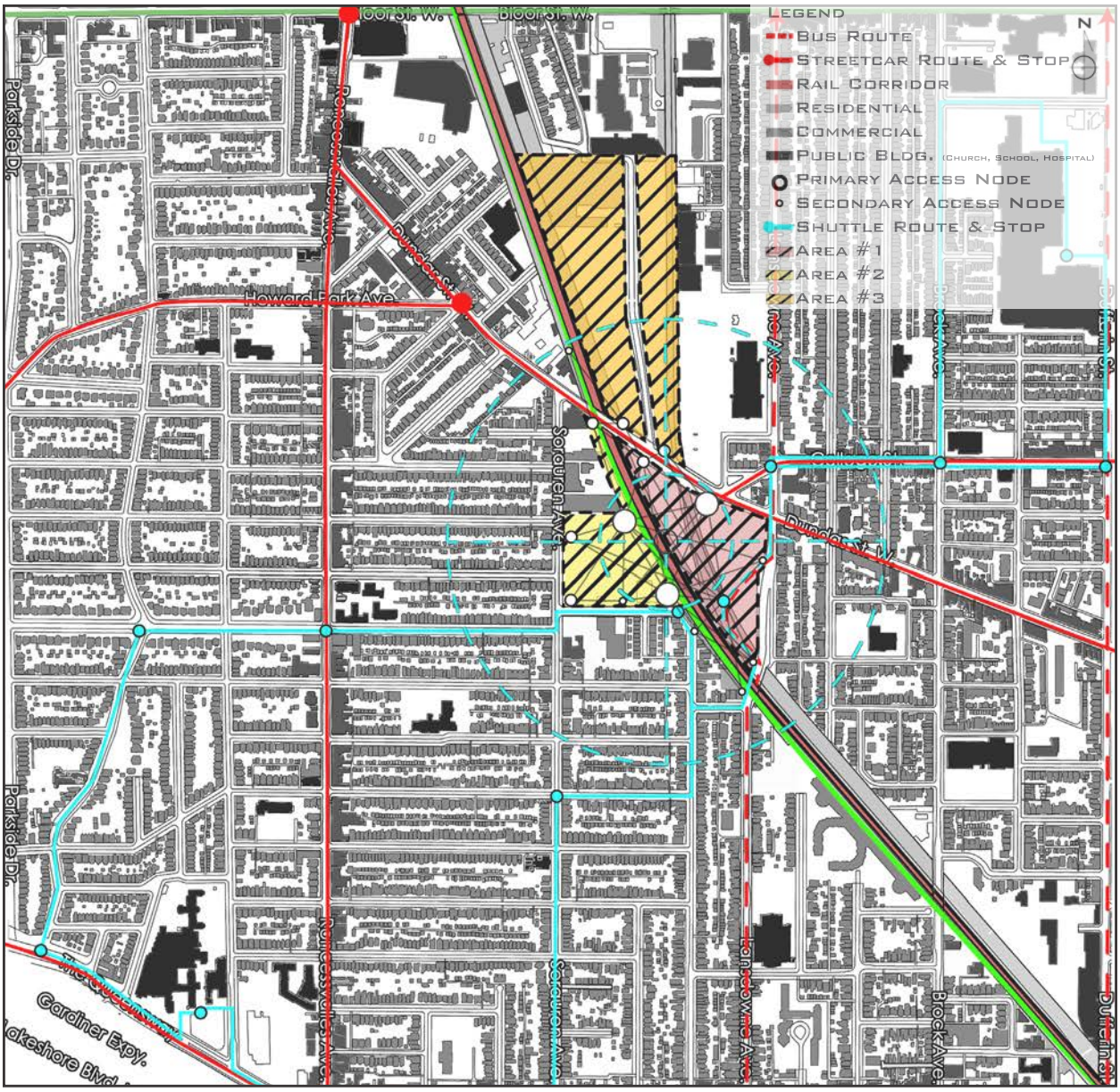


Figure 5.30 - Dundas Street Node | New Transit & Area Definition

path that currently only reaches from Bloor Street down to Dundas Street where it is cut off by the lack of connection South towards the city center. This path network could potentially become an integral component of the re-imagination of the West Toronto Rail Corridor as a transit relief line, adding another mode of pedestrian movement along the specimen and between each urban transportation node.

5.3.1 Design Components: Paths, Bridges. & Tunnels

Taking a closer look at the site, relationships of movement and potential circulation begin to emerge. Just as the Dundas Street West intersection with the rail corridor can be understood as a node along a pathway of movement the site itself begins to reveal nodes of access and exit. These nodal relationships begin linking the existing context of the site with its surroundings. The diagrams shown (figures 5.31 to 5.35) reveal that there are three potential access nodes within the site. The integration of a vehicular connection, including a

possibility for a new bus stop, into the site could potentially set up a fourth node that would link personal transport users with the relief line. The main understanding developed in these diagrams is that each node shall link to the others. The site shall develop as an urban transportation node that links multiple flows of pedestrian and vehicular traffic.

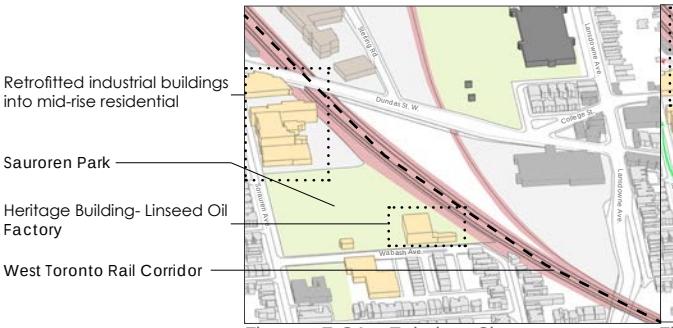


Figure 5.31 - Existing Site

Figure 5.32 - Existing Circulation

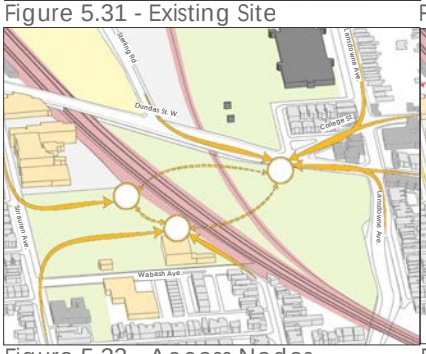


Figure 5.33 - Access Nodes

Figure 5.34 - New Bus Route

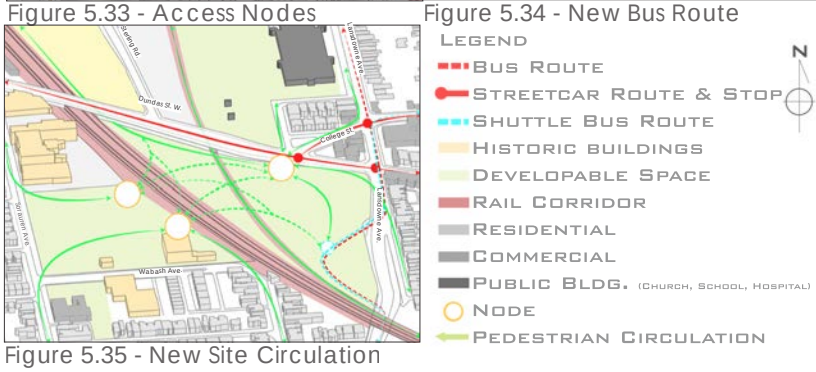


Figure 5.35 - New Site Circulation

Although the site is predominantly bordered by residential housing the buildings highlighted in yellow represent buildings that are protected as heritage sites. In fact the area previously identified as area #2 (figure 5.30) is composed almost entirely of heritage buildings. The bank of buildings on the northwestern corner of the site have all been converted into mid-rise residential blocks that work to maintain the character of the heritage construction. This once again signifies the importance of these buildings and the innate connection that a population extends to built fabric, as it is understood through time. The Linseed oil factory highlighted and labeled in the diagrams (figures 5.31 - 5.35) is yet to be retrofitted and will therefore be incorporated into the design considerations of this thesis exploration still to be developed. The project site maintains a rich plethora of heritage buildings that have been established by the historical use of the West Toronto Rail corridor as an industrial transportation route. This rich context must be carefully navigated to ensure that the project proposal is capable of re-enforcing and strengthening the identity of the area.

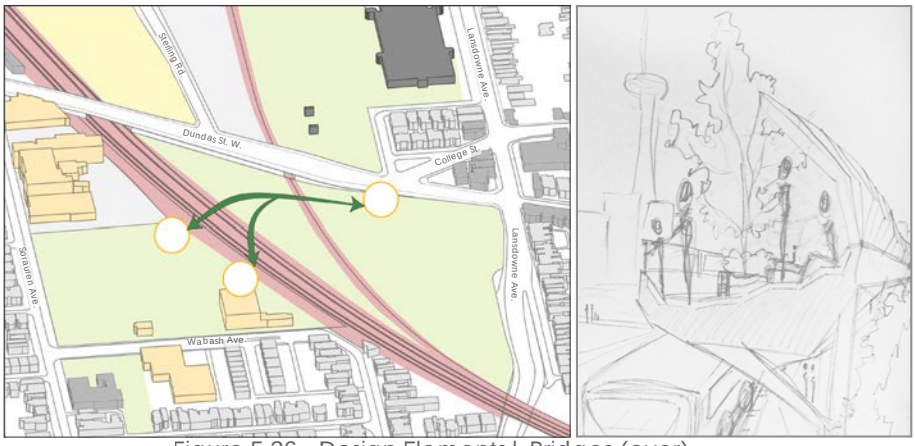


Figure 5.36 - Design Elements | Bridges (over)

Figure 5.37 - Design Elements | Paths (through)

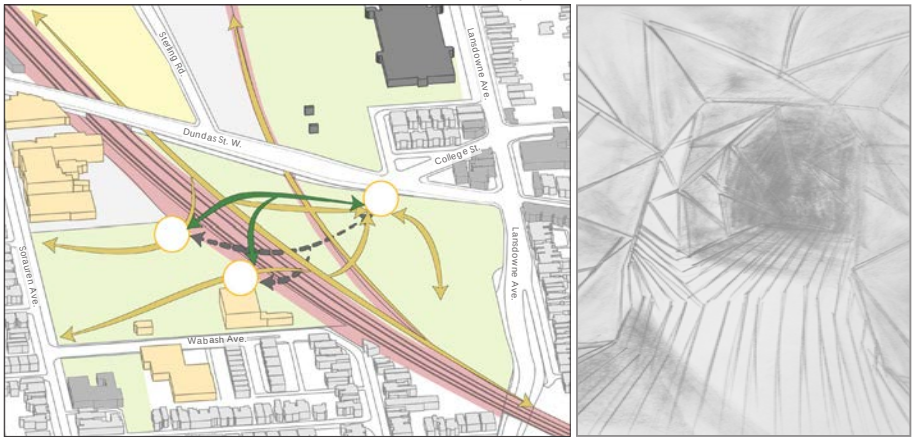


Figure 5.38 - Design Elements | Tunnels (under)

To begin linking the internal nodes of the site, a series of bridges, paths, and tunnels will be developed to create a continuous flow of movement into and out of the site while simultaneously providing a mode of entry into the proposed relief transit line. It is the development of those bridges, paths, and tunnels linking the nodal access points of the site that will be the focus of design. An experience developed through movement and connection capable of stitching the existing fabrics together and developing strong relationships between new and present. Each of the three levels, defined as bridges (above), paths (through), and tunnels (below), shall develop its own language of representation and begin to support digital and physical interaction between occupant and space in different ways (see figure 5.39).

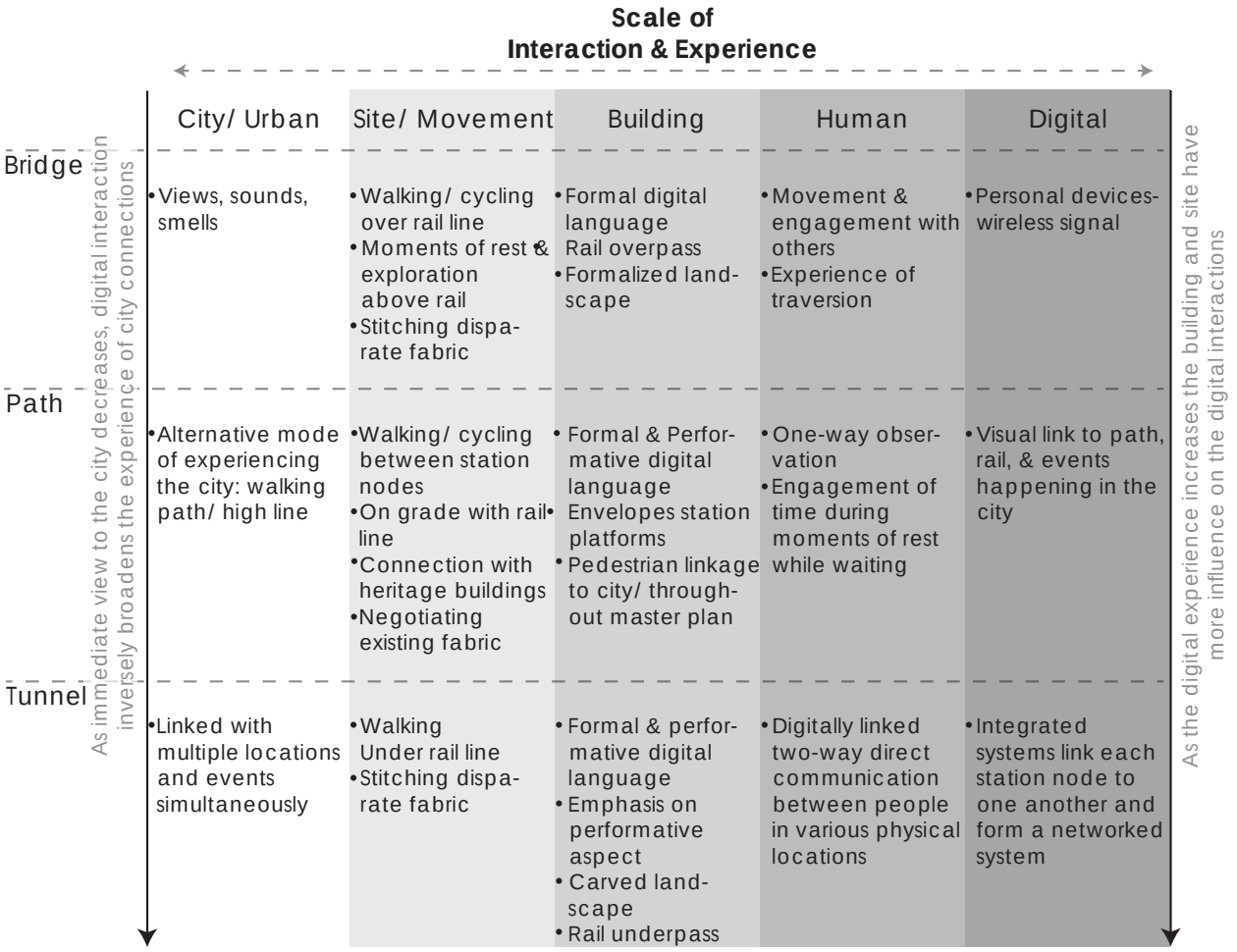


Figure 5.39 - Visual Breakdown of Project Objectives

Initial proposals for the formulation of these three design elements focused directly on the nodal relationships and linkages as outlined in the diagrams above. Efforts made to enforce the possible connections directly between these nodes proved to develop interesting sectional relationships. The levels however, lacked an ability to resolve the moments where one level would meet another and struggled to resolve geometric deformations in what was intended to be a fluid, holistic experience of movement and engagement throughout the site and project. These deficiencies lead to a new way of thinking about the site and the building as a unified composition.

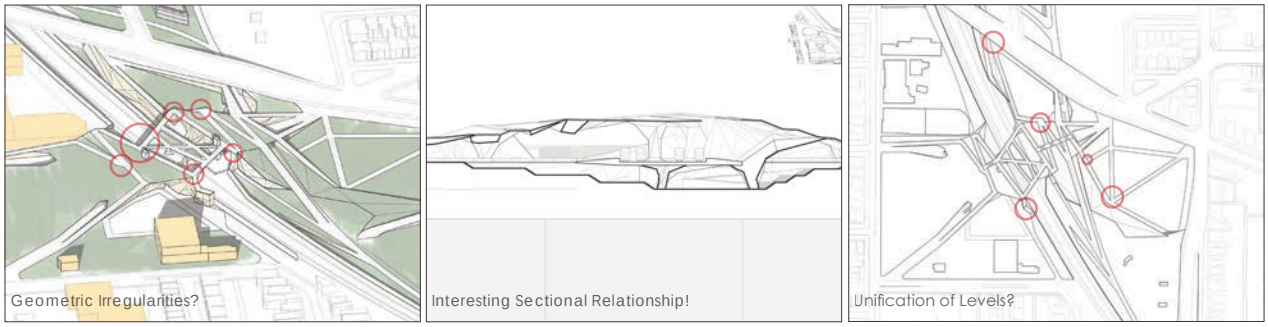


Figure 5.40 - Initial Design Explorations

5.4 Building Scale | Form of Digital Place

In order to ensure that the final project exploration would build that holistic, fluid experience of form, a reconsideration for the methodology of design exploration was necessary. To begin to incorporate all three design elements into a cohesive built form the project began to be shaped by the folding and wrapping of a single surface. Paper modeling and sketching exercises were the first step in that formal development.

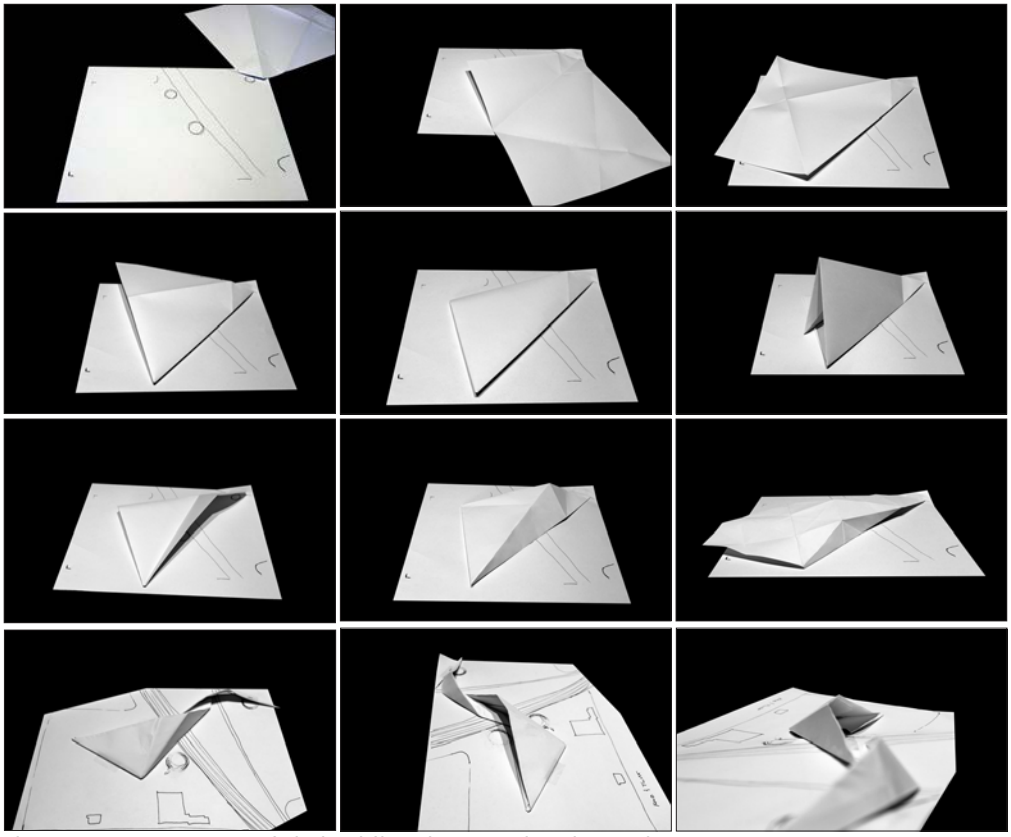


Figure 5.41 - Paper Models | Folding | Wrapping | Carving

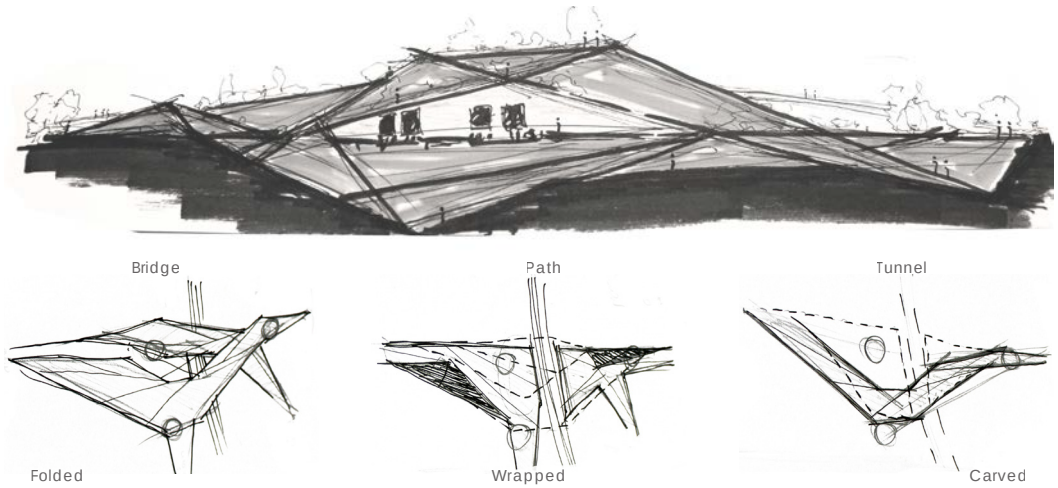


Figure 5.42 - Sketches | Folding | Wrapping | Carving

As the abstracted formal exercise of the folded paper models and conceptual imagery of the drawings were extrapolated via digital modeling software, the surface began to formulate more accurately defined geometries embodying functional spaces with dimensions and scale. Through the process of translation between analog and digital medias the formal exploration begins to take on properties allowed by both the freedoms and precision of the digital apparatus. The folded surface that is to become the envelope of the building and the formation of the entire site in its contextual setting is able to become infinitely complex geometrically, while maintaining rationality as it translates from an abstract shape into a functional built form.

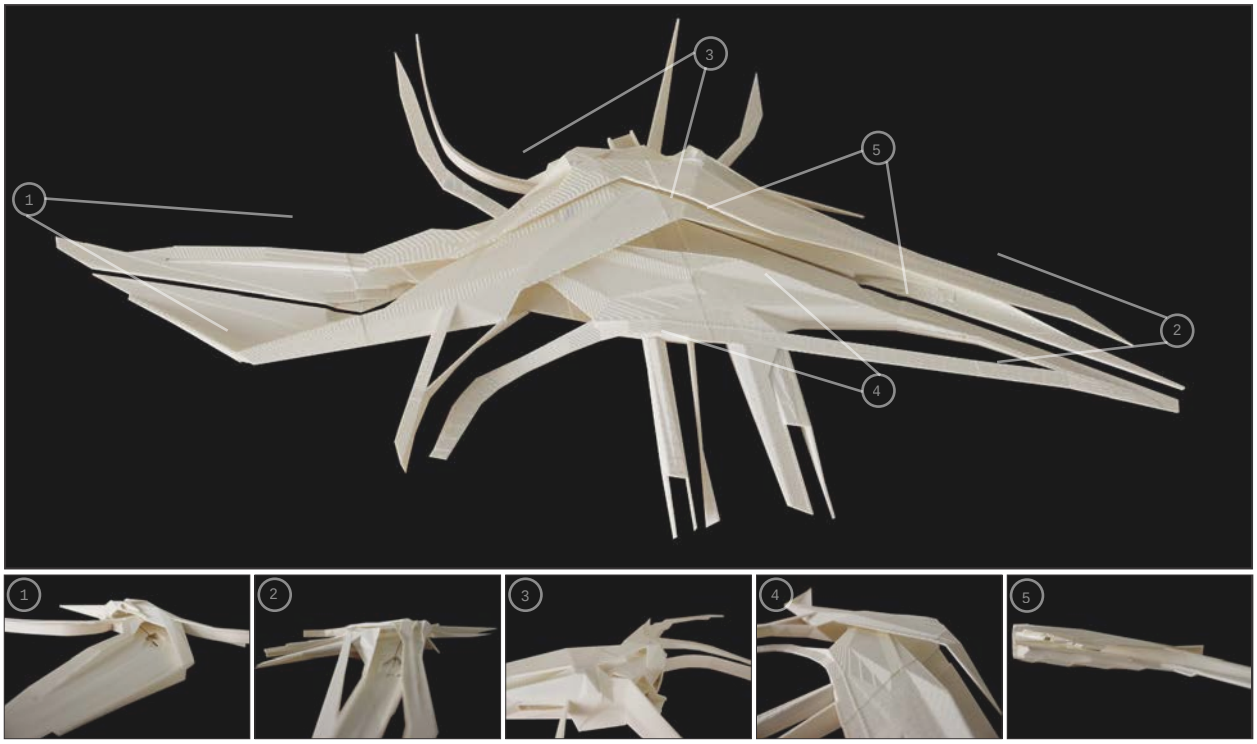


Figure 5.43 -Sectional Model | Formal Representation

The translation of analog practices into digital processes has yielded a formal expression representative of its derivation. This 3D printed physical model is still an abstracted idea of built form that aims to capture the complexity of the digital building in a physical manner.

The folded surface begins to inform the moments where paths, and bridges might translate from exterior to interior conditions and formulate the enclosed space of the transportation node in a manner that addresses the existing site context and landscape as a unified composition. Bridges now meet paths in a manner that completes the folding process and provides connections from either side of the rail corridor and multiple points of the path. The folded plane of the bridges will visually flow from overpass (bridge) to pass-through (path) as a fluid connection of pedestrian movement. Structurally the surface will continue to wrap underneath of the path level and articulate the space of the tunnels to carve out their formal identity.

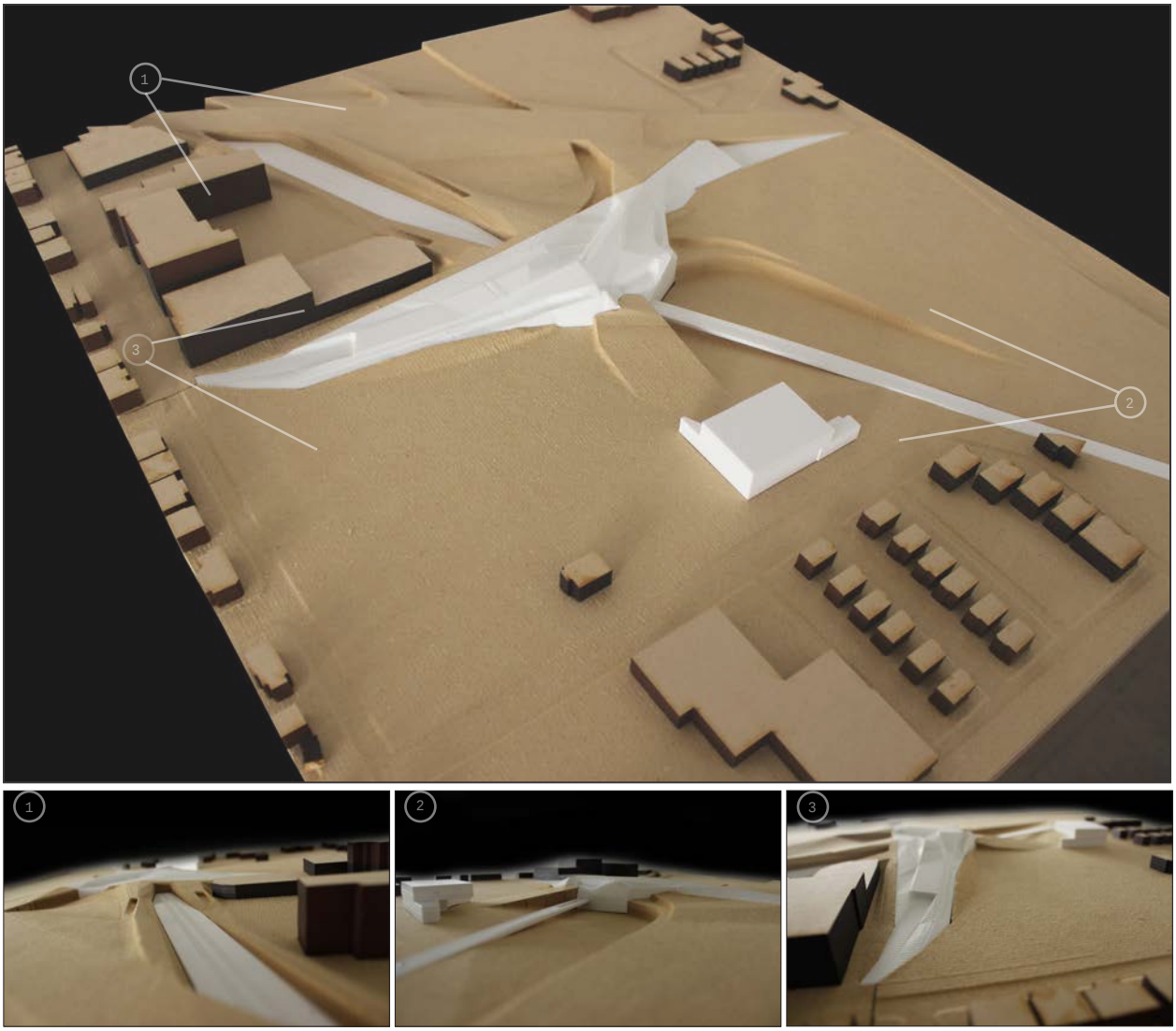


Figure 5.44 - Formal Relationships between building and site | Physical Massing Model

The photographs shown (figure 5.44) represent the final massing of the built form. The landscape is shown forming up to the edges of the building and developing a fluid transition from landscape to built form and back again. The existing Linseed Oil Factory identified previously is shown here as an integrated component of the design proposal. A cutaway reveal of the landscape leads to the edge of the factory where one of the main pathways push directly through the buildings North and East walls. Visitors of the site will pass through this heritage facility and view it as a rehabilitated entity integral to the functionality of the project and the relief line as a whole (see figure 5.46).

The space that is developed through this folding, wrapping and carving has set up the formal language of the project as a signifier of digital place through its representation of digital language. These spaces are at the moment blank canvases for the integration of digital systems that will begin to communicate through, and with the user's technological devices developing the project as a symbol of digital place.

Sinking the existing rail lines that currently act as freight train and regional GO transit below grade (shown in figures ___) has been done to promote a focus of the grade condition as a pedestrian realm of occupation. Electrified rails and smaller, more frequently running trains will now transport information, data, and people throughout the city. This electrified rail system will also establish a new purpose for the identified Linseed Oil Factory as well as other currently abandoned heritage buildings that exist near the other nodes along the rail corridor. Those electrified rails will require housings for operational equipment which is to be housed in these facilities. This retrofit of abandoned buildings as support for the new function of the corridor aims to not only facilitate a necessary component to the operation of the new system, but also maintain the character and purpose of their original service. Paths can also begin to engage these buildings by passing through them. The users of this system will be able to experience these currently inaccessible fragments of the city and gleam an understanding of how the new system functions as an infrastructure of its own.

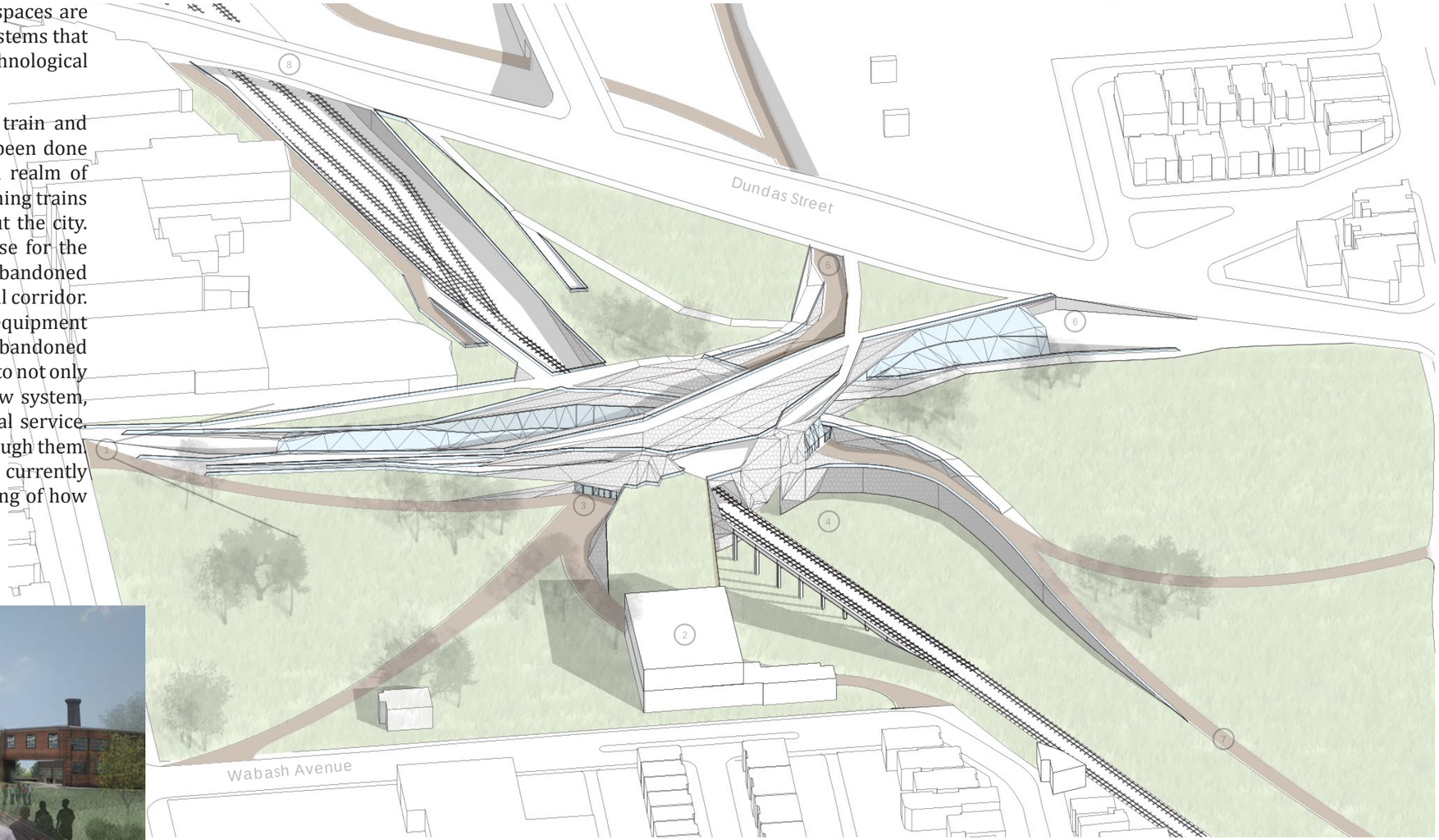


Figure 5.46- Master Axonometric

1. West Entrance | Path & Bridge
2. Linseed Oil Factory | New Power Station
3. West Park Entrance | Path
4. Amphitheater Space | Train Bridge Overpass
5. Extension of West Toronto Rail Path | Under Existing Bridge
6. East Entrance | Path & Bridge
7. Continuation of West Toronto Rail Path
8. Existing Dundas Street Overpass

Figure 5.45 - West Entrance | Park, Bridges, & Paths

Bridges | Digital Identification: At a very basic level, bridges will allow pedestrian traffic to pass over the rail corridor. Drawing on the example of the Skuru Park Bridge by Bjarke Ingels Group (BIG), these bridges will also work to engage the user in a rich experience of movement that aims to pull the landscape from one side to the other. Stitching the two currently disparate halves of the site into a unified convergence of landscape and built form. Just as the Duis-burg Nord Landscape Park achieved, this traversing over the rail corridor shall allow the user a multitude of vantage points and moments that might promote rest and observation as a chance for the project to generate place relationships with its casual passersby. Bridges will not do work to engage the high-tech nomad other than through their formal composition representative of "a clear language of values and responsibilities expressed by the shape of the [building] "(Bangle Qtd. in Lynn & Gage, p.79).

Figure 5.47 - Master Plan | Bridge Level

1. West Entrance | Path & Bridge
2. Linseed Oil Factory | New Power Station
3. West Park Entrance | Path
4. Amphitheater Space | Train Bridge Overpass
5. Extension of West Toronto Rail Path | Under Existing Bridge
6. East Entrance | Path & Bridge
7. Continuation of West Toronto Rail Path
8. Existing Dundas Street Overpass

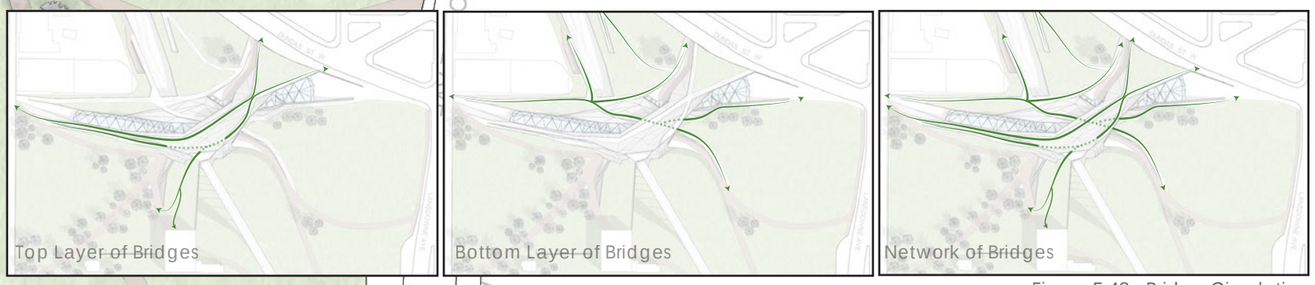
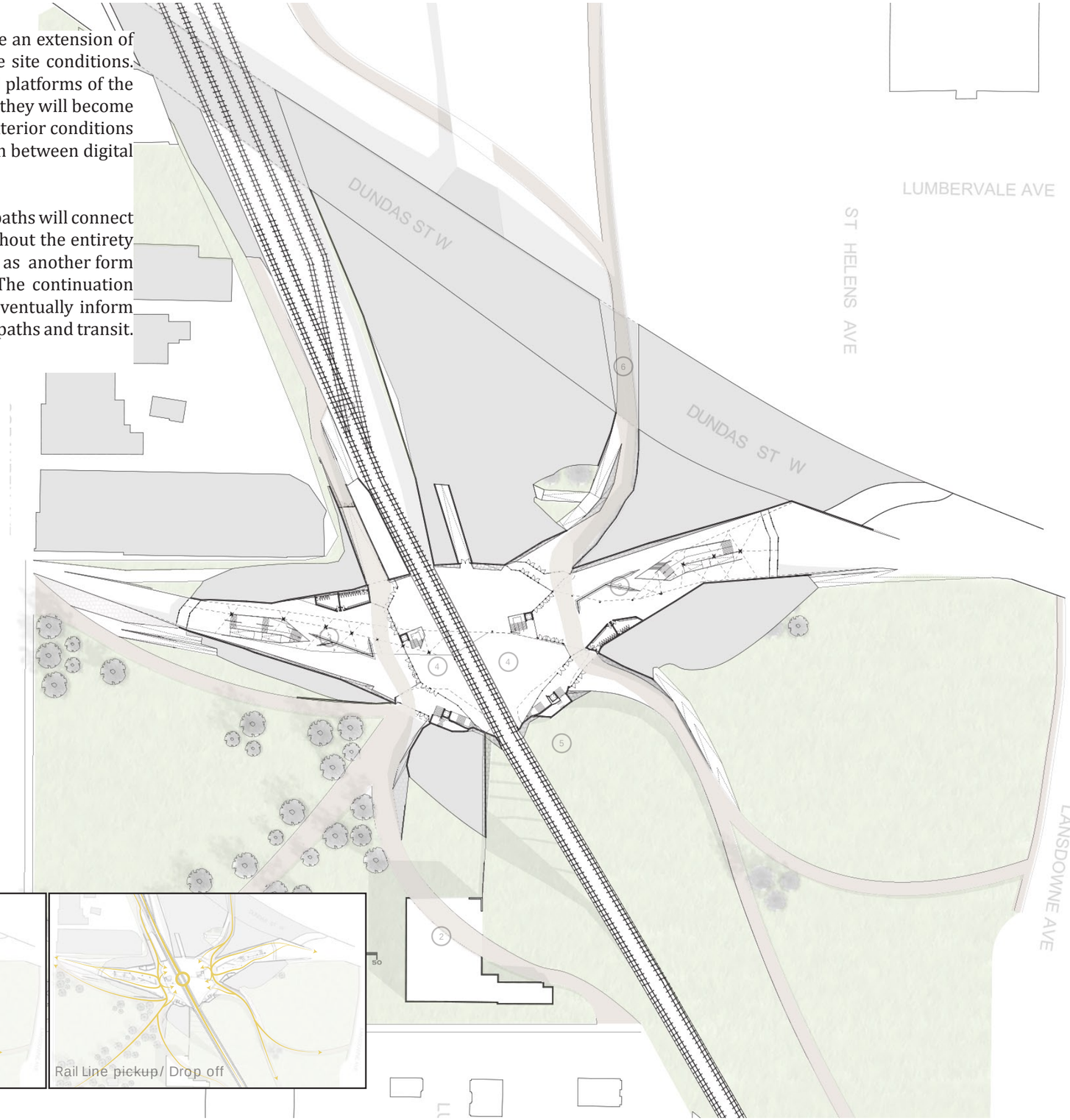


Figure 5.48 - Bridge Circulation

Paths | Digital Engagement: The paths acting within this site will become an extension of the contextual modes of entry and exit informed by existing and possible site conditions. Where the paths converge on the rail line itself will become the individual platforms of the transit stations. At moments in time when paths formulate these platforms they will become encased by built form. Paths will therefore have moments of interior and exterior conditions that will begin to inform potentials for bridging the threshold of connection between digital and physical informed by a digital language of design.

At a larger scale that reaches beyond the borders of the specific project site, paths will connect with and continue the previously identified West Toronto Rail Path throughout the entirety of the relief line. This extended path system aims to utilize the rail corridor as another form of pedestrian flows being promoted by the master plan of the project. The continuation of the West Toronto Rail Path throughout the relief line proposal could eventually inform developments such as the Olympic Sculpture Park to tie into the network of paths and transit.

Figure 5.49 - Ground Floor Plan | Path Level



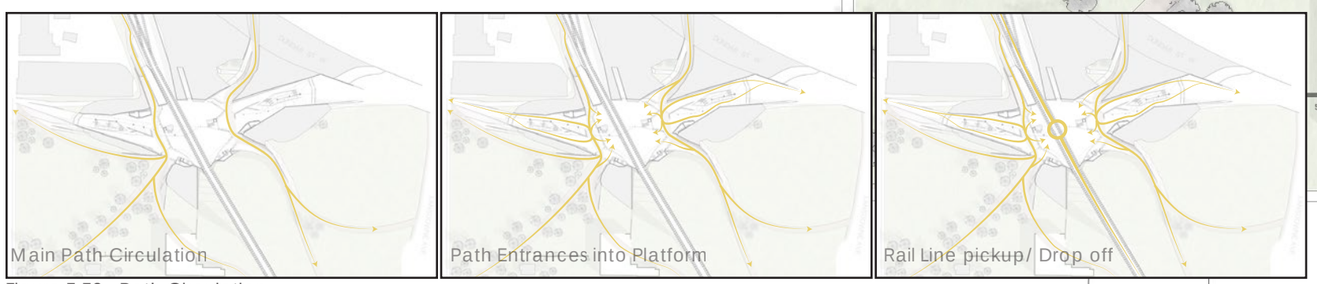
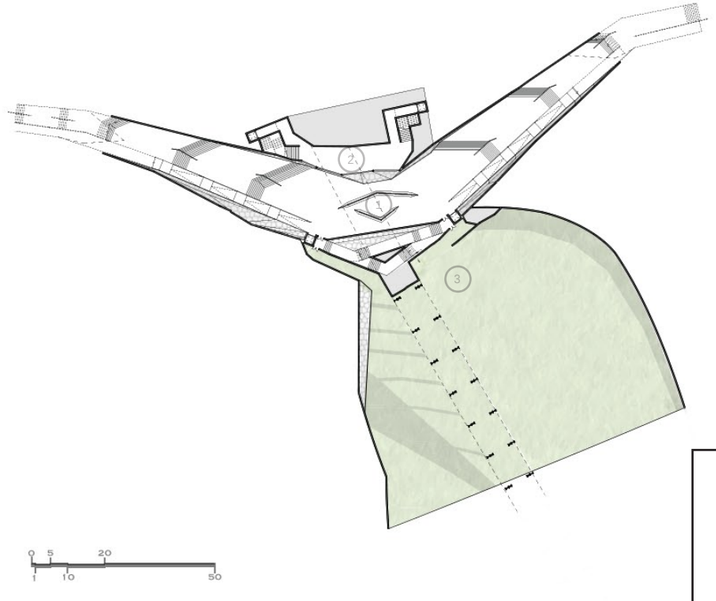


Figure 5.50 - Path Circulation

Tunnels | Digital Interaction: Tunnels shall only exist within the identified transit nodes, providing a second option for the crossing of the rail line. The focus of the tunnels will be to submerge the user in a spatial experience that is wholly defined by relationships with digital technology. An engagement of social interaction of the occupants and built form through digital systems, to be explained further in the discussion of performative aspects of this design exploration,that will link the three levels together and join all subsidiary transit nodes along the specimen in direct communication with one another.

Figure 5.51 - Underground Floor Plan | Tunnel Level

1. Rest Area | Seating
2. Platform-to-Platform underpass | Paid Access
3. Amphitheater



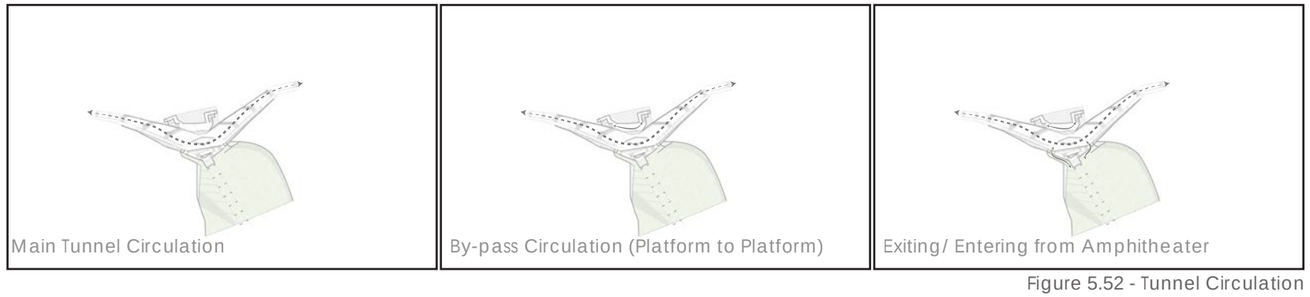
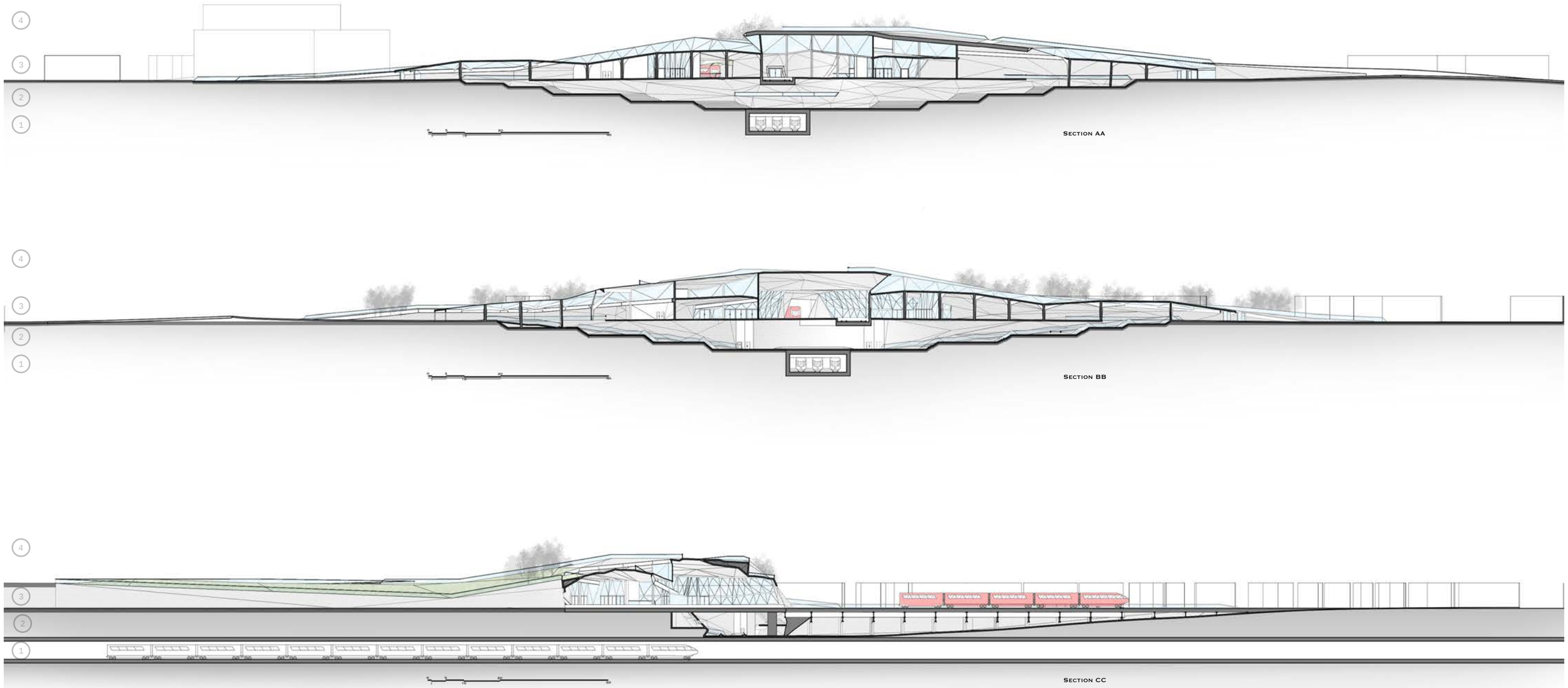


Figure 5.52 - Tunnel Circulation

Building Sections



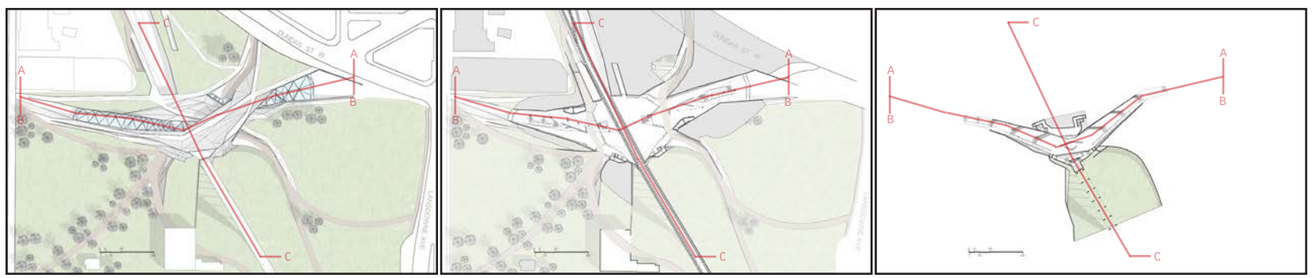
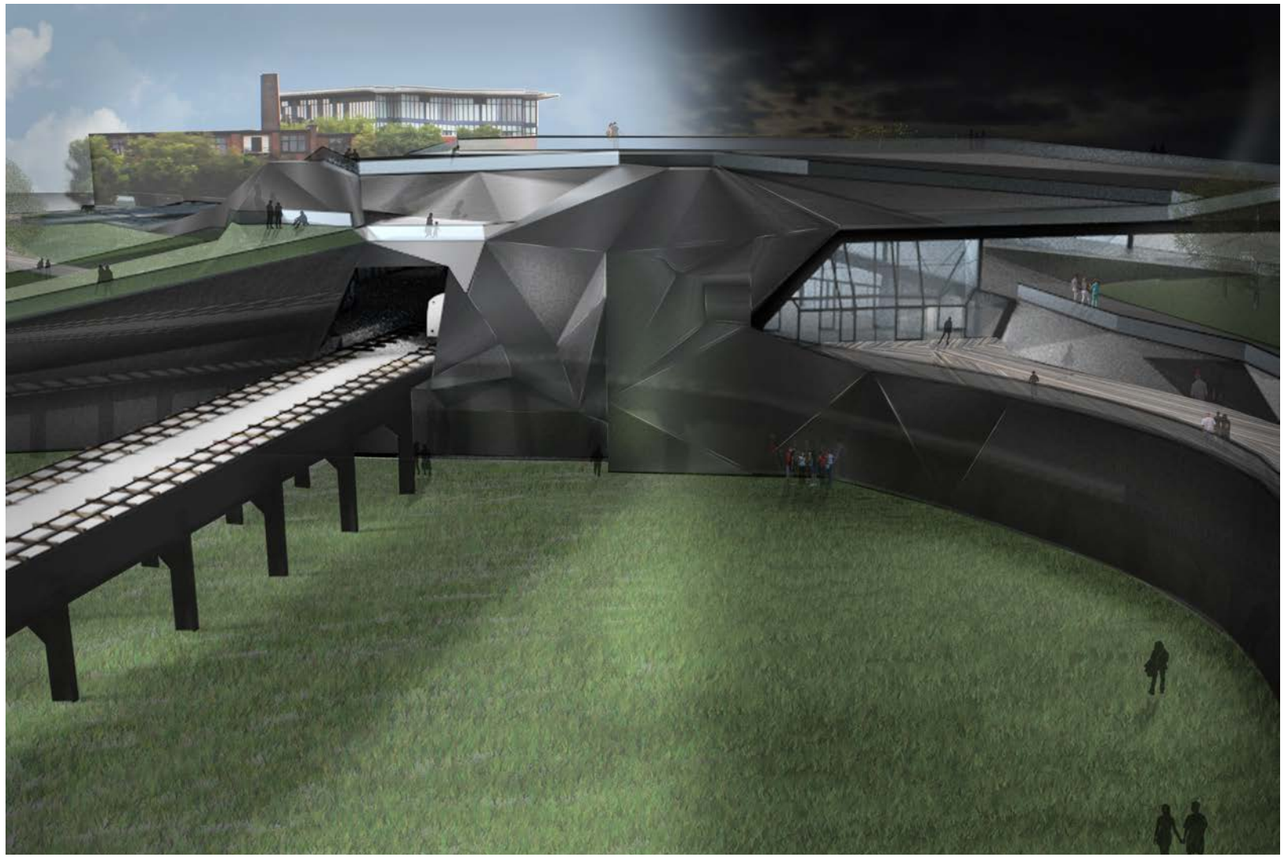


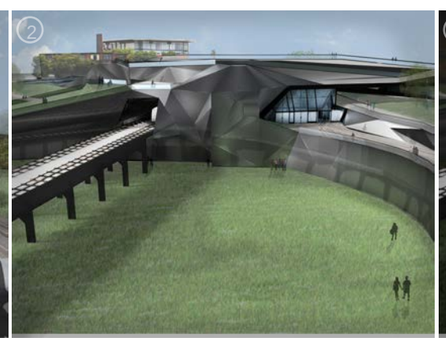
Figure 5.53 - Building Sections

1. Sunken Freight & GO rail | Return of grade to the pedestrian realm
2. Tunnel Level | Carves below rail track to connect East & West
3. Path Level | Exists on rail track grade and connects sites via walking/ cycling path
4. Bridge Level | Traverses over the rail track to connect East & West



5.5 Threshold Scale | Performance of Digital Place

Bridge Level: As outlined through the design component discussion the bridges shall act in a manner that pulls the landscape of the site from one side of the rail corridor to the other. Referencing projects such as the Skuru Park Bridge, Duis-burg Nord Landscape, and Yokohama International Port Terminal in the manner for which the bridges can be understood as both utilitarian infrastructures of crossing, and as a generator for social engagement. As mentioned previously, the bridge level will not impose or interfere with the "normal" digital activities of passersby. This level is meant to be interpreted as a solely formal expression of digital design language that provides for more traditional modes of use and program that could be expected in a traditional park setting.



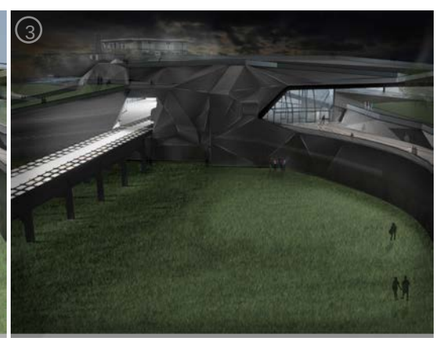
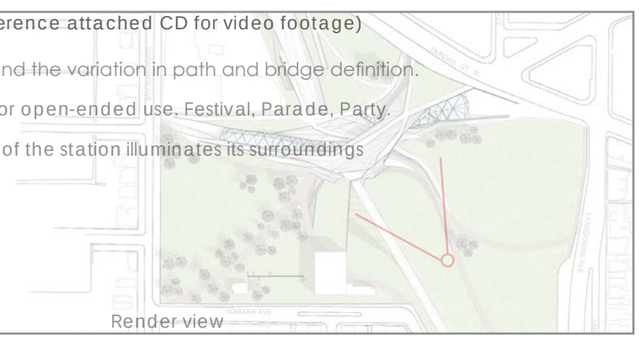


Figure 5.54 - Bridge Level Renders (reference attached CD for video footage)

1. West Entrance. Views of the city and the variation in path and bridge definition.
2. Open Amphitheater style space for open-ended use. Festival, Parade, Party.
3. The ambiance and Transparency of the station illuminates its surroundings



Render view

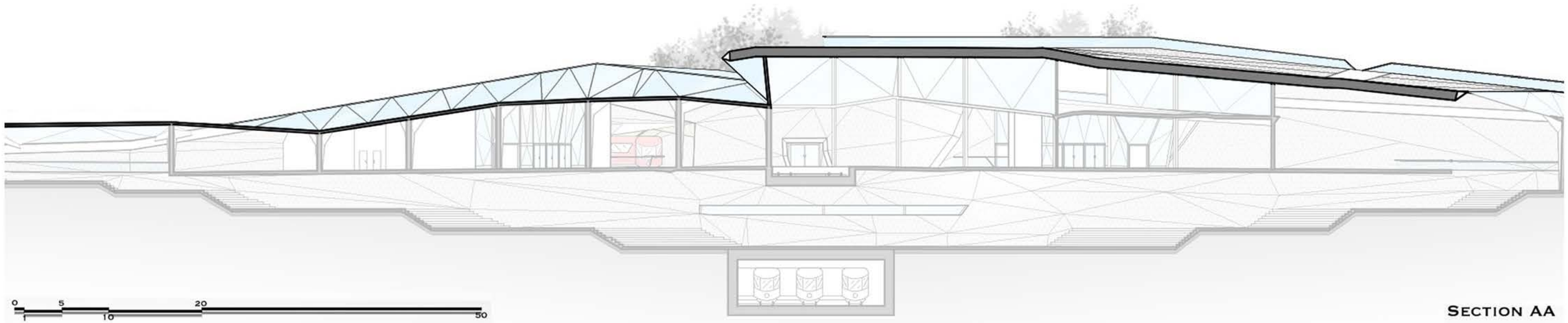


Figure 5.55 - Bridge Level Concept Section | Relevant Precedents

Park Bridge- BIG

Yokohama Ferry Terminal- FOA

Duis-Burg Nord- Latz + Partners

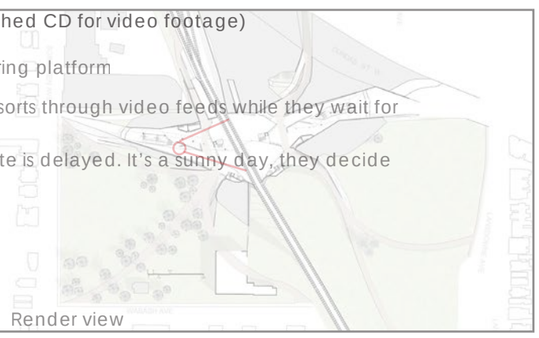
Path Level: The path level that exists as exterior condition will work in much the same way as the bridges. Acting as a traditional path system that links areas of the city through bicycle and walking trails. Again it shall be only a visual representation of digital influences, as displayed where the paths meet the bridges at each subsequent transit node, that inform an understanding of the project and master plan as a symbol of digital place.

The exterior paths will however provide data and information to the interior conditions of the paths in the form of live and stored video streaming. The entirety of the exterior path condition, including bridges, shall be recorded via hidden cameras. The footage that is captured shall then be integrated as a one way surveillance system displayed on the walls of the interior path space via digital panel displays, created using similar technology systems explored in previous chapters. These panels will actively cycle through various interactions and activities taking place throughout the entire specimen as well as information and video feeds going on throughout the city. These external feeds could be anything from traffic updates to live video connectivity with a concert happening in Dundas Square or a protest at City Hall.

When an occupant enters the interior path level of any transit node along the system they will be allowed to gain access to the video feeds. That access shall be provided through a downloaded cellphone application that will allow any occupant within a node to take control of a section of the digital display panels and manually cycle through the footage. This system does work to actively engage the user of space in an indirect interaction between digital and physical space as mediated by their personal technology systems.

Figure 5.56 - Path Level Renders (reference attached CD for video footage)

1. Main pass-through of path level before entering platform
2. An individual engages with the screens and sorts through video feeds while they wait for the next train
3. The individual realizes that their intended route is delayed. It's a sunny day, they decide therefore to take the walking path home.



Path Level Concept Section | Relevant Precedents

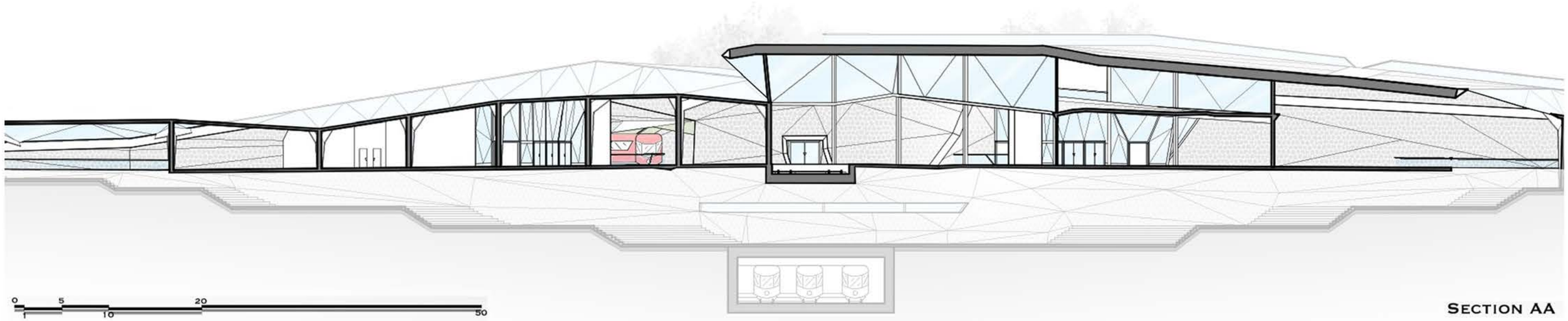
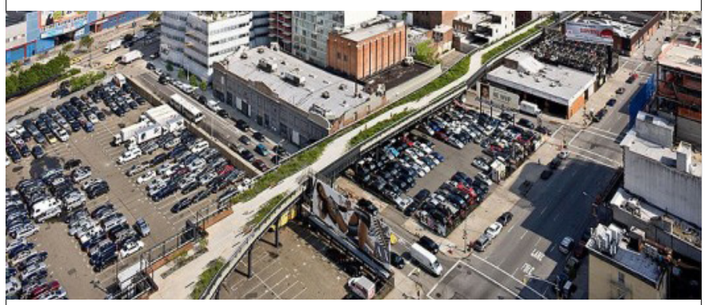
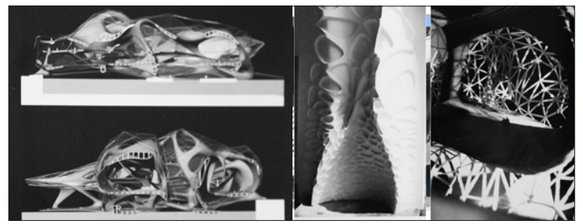


Figure 5.57 - Path Level Concept Section | Relevant Precedents



New York High Line-Corner, Scofidio + Renfrew

Yokohama Ferry Terminal- FOA



Folds Bodies & Boats- Marasso

Tunnel Level: The tunnel levels, as mentioned previously, only occur within a transit node as an alternative link from one side of the rail corridor to the other. This level of each node shall become an experience of immersive digital space. The walls of this space shall become a two-way video display. As an individual walks through the tunnel level the panels that line this space will act in a manner similarly to the symbiosis-O project. The walls will be lined with digitally infused steel panels that sense, record, and display touch and movement. As an occupant grasps a handrail or walks down the steps, the building will record their actions and map their movements as visual displays.

At this level all wireless data transmissions from a user's personal devices will be intercepted. If an individual were to receive a text message while passing through the tunnel they would receive a notification from the building informing them that they had received that message. To access their message or data (whatever it may be) they are required to physically touch the panels of the space. That touch will allow the message or signal to continue its original course of action and be displayed on the user's personal device. This invasion of the user's digital processes is meant to promote both the re-orientation of the user's attention to the built environment, and promote the direct interaction between the user and the space.

The tunnel level of each transit node will record and display these interactions in a similar manner and then transmit the interactions recorded within each tunnel to any one or multiples of other tunnels throughout the system. These interactions and transmissions will happen in real-time and begin to set up interactions between users at different nodes throughout the system. The goal of this interconnectivity is both to promote an understanding of the project (and eventually the city) as a networked digital system, and to promote social engagement of individuals with one another through the activation of physical space.

Figure 5.58 - Tunnel Level Renders (reference attached CD for video footage)

1. Tunnel space & people
2. A man receives a text message and checks his phone
3. In touching the wall to receive his message the man is made aware that someone on the other side can see him. Where is she? How do I get there? What is this place?

Render view

Tunnel Level Concept Section | Relevant Precedents

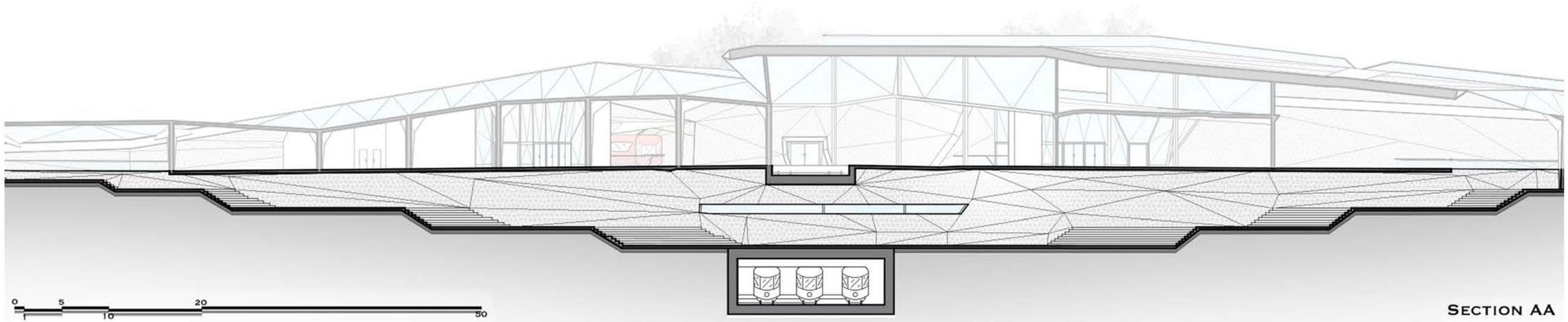
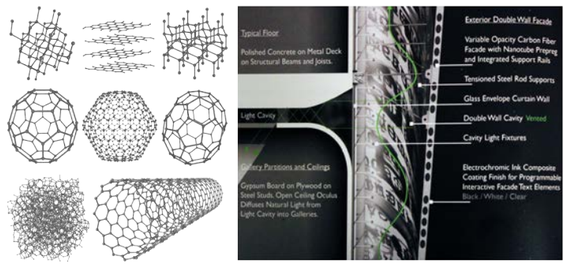


Figure 5.59 - Tunnel Level & Concept Section | Relevant Precedents



Carbon Nanotube Technology- Deacon Yeadon

Yokohama Ferry Terminal- FOA

Symbiosis 0- Ojavee & Oszvald

Conceptual Section | Three Levels | Most Influential Precedents

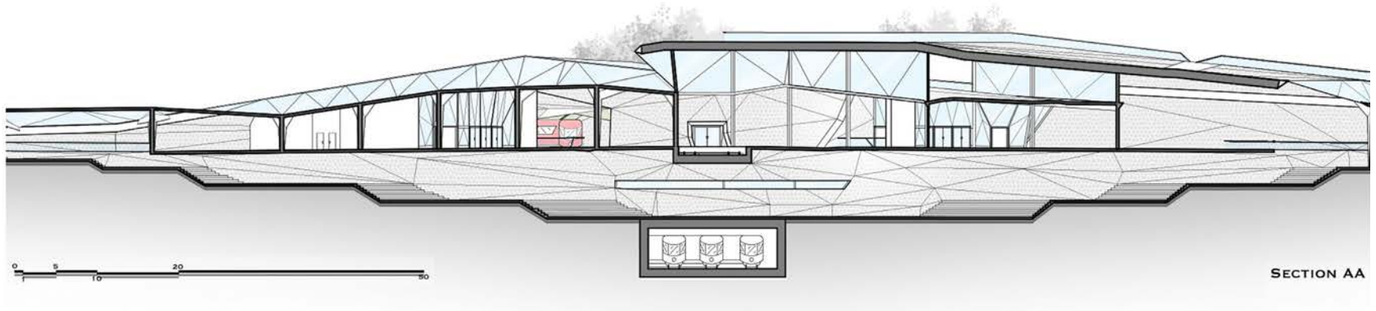


Figure 5.61 - Conceptual Section | Three Levels | Most Influential Precedents

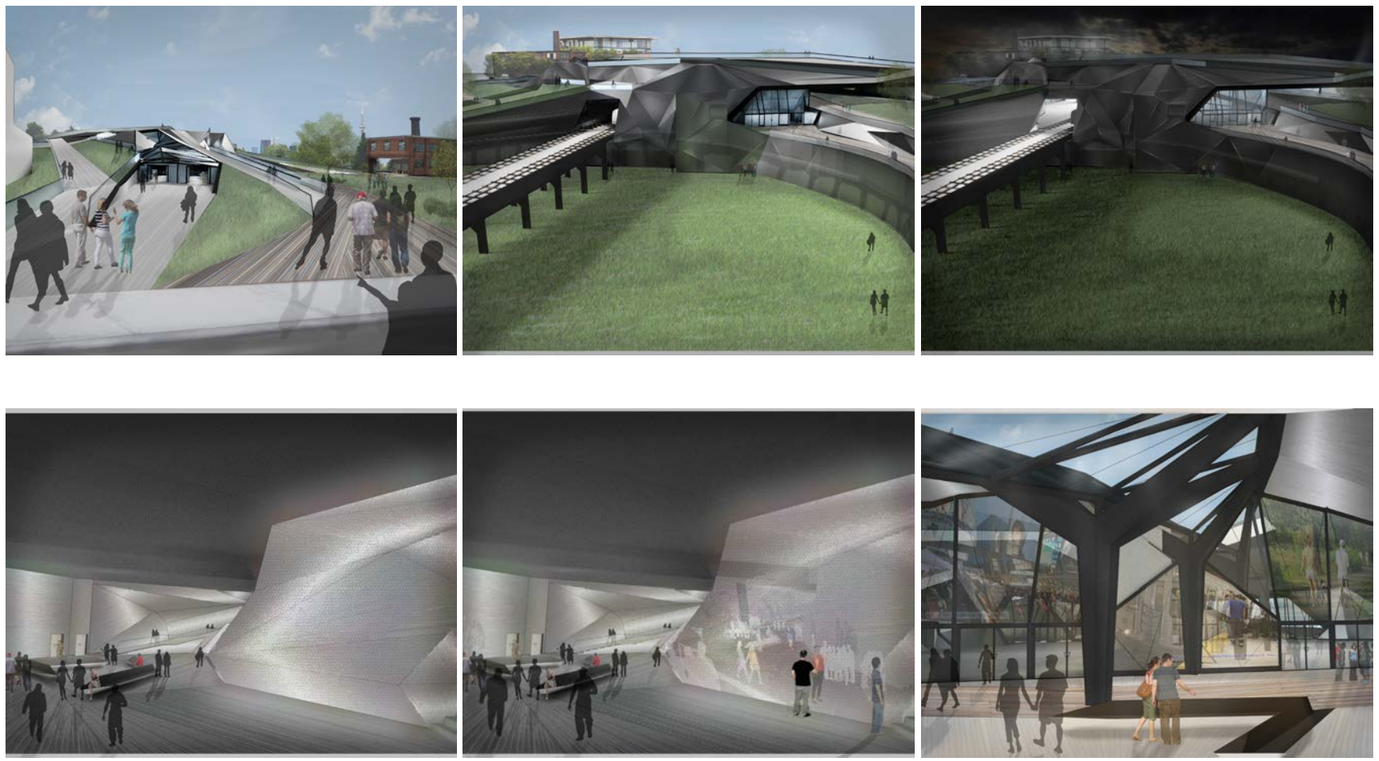


Figure 5.60 - Bridge, Path, & Tunnel Renders

All of these systems and concepts work towards an imagination of how architectural space could begin to cultivate a discussion between digital and physical realities. The systems implemented throughout this design explore visual stimuli that operate in three different ways. The bridge level engages the visual in a traditional sense of proximity and orientation. The enclosures of the station platforms, operating within the path level, engage with a visual form of observation and information collection. While the Tunnel level incorporates a visual form of connectivity and interaction between various spaces and times.

The depth of digital submersion intensifies as one traverses through the project's subsequent levels. Engaging the project in the discussion of place establishment with regards to the changing definition and understanding of place as it evolves with technological, and therefore societal, developments. Through the Formulation of a language of digital design it may be possible to begin to develop architecture, capable of engaging contemporary, high-tech, society in a return to place making. As one's personal devices might begin to communicate and engage with the surrounding environment, and vice versa a new form of interaction between occupants and occupied begins to emerge.

6.0 Conclusions

The advancement and integration of digital technologies into the daily lives of contemporary society has established a perceptual interference between the built environment and its occupants. This interference has been explored as an obstacle in the development of a meaningful experience of space and interaction that must be negotiated before an understanding of place can begin to grow between occupants and occupied. This interference represents a moment in time where the design and understanding of built form, as well as what it means or how it is understood to be a participant of spatial experience, is evolving. It is now the responsibility of the architect to anticipate that evolution and provide responses that meet newly established requirements of form and function.

In an effort to establish a foothold for Architecture to grapple with these requirements the thesis has formed around two modes of engagement; *Formal* language, and *Performative* language, interpreted through various scales of detail and integration. Recombinant theory assisted in formulating these scales as a series of logical steps or progressions through a process that aims at achieving a contextually conscientious methodology of design. The discourse of the thesis has attempted to set up a narrative of time and movement at multiple scales of experience and interaction as a way of negotiating these contexts through the exploration of a project that grapples with the threshold of interference between the physical and the digital. This discussion has formulated in the project proposal through various instances that are all experienced by movement, within, around, and throughout the project levels, site, and master plan.

Reflecting upon the work that has taken place throughout this thesis, and the project exploration, it becomes clear that the final product is not a resolution in itself as to what architecture will or should become in response to the digital age. The result of this thesis has more so become a critique of the ideology surrounding what makes a place, and how that ideology may be changing in light of technological advancements and spatial possibilities. The digital systems explored, which were meant to clarify a perception of space and place may actually have succeeded more so in a manner of bringing forward the true level of complexity that these technologies engender. A potential for the built environment to break free of the limitations and social interferences of personal devices into a world of infinitely linked networks of connectivity and communication between people and space.

Figure 5.63 - Experiential Animation (reference attached CD for video footage)

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