THE AGENCY OF INFRASTRUCTURE FROM DESERT TO OASIS

by

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"Infrastructure is much more important
than architecture."

-Rem Koolhaas

I. A B S T R A C T

Underlying city infrastructures organize and manage complex systems of flow, movement, and exchange. As a fundamental building block, city infrastructures also set the stage for future development and occupation of communities and cities. However, when developed as a mechanism primarily devoted to solving transportation engineering issues, they can contribute to the creation of inhospitable places in a city. This thesis project primarily explores how transit infrastructure, specifically the development of the new Ontario Transit Line in Toronto, Ontario, can act as a public agency to reinvigorate the transit desert community of Thorncliffe Park. Specifically, the project examines train line infrastructure under the following lens: as a community builder and public amenity; as a spatial definer and connector; and the train line as an animator of the public realm. This thesis will argue that infrastructure, conceived as architecture, through a lens of agency can still provide efficient access and diverse modes of transportation to other parts of the city, while simultaneously creating a more connected, integrated, and engaging community fabric.

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IV. I N T R O D U C T I O N

Infrastructure has grown in complexity vis-à-vis the current urbanization of the world. It is both a response to, and generator of horizontal and vertical forms of development. Although it is often relegated to a mere background or an unseen substructure of urban development, underlying city infrastructures have the ability to organize and manage complex systems of flow, movement, and exchange, they have the potential to suture the city together. Conversely, when left unchecked and designed independently of demographics and transportation supply and demand, areas of a city can become transit deserts: a condition characterized as areas that lack adequate public transit service and that contain populations that are deemed transit dependent. When ignored, transit deserts can also contribute to the creation of inhospitable places in the city. North American cities typically address the issue of transit deserts through large scale transit infrastructure initiatives that attempt to bring access to public transit; however, designing transit infrastructure systems in isolation has also led to the creation of dead, unattractive, void space in the urban fabric.

Under this lens, the role of the urban fabric is an increasingly contested space: Is transit infrastructure about moving trains, cars, and people or can it be used as a catalyst for building more engaging, connected, and inclusive/resilient communities? The thesis explores how transit infrastructure, specifically

the development of the new Ontario Transit Line can act as a public agency to reinvigorate a transit desert community in Toronto, Ontario. By providing efficient access and diverse modes of transportation to other parts of the city, this thesis strives to create a more connected, integrated and engaging public realm for the city and community. As such, this thesis will investigate the implementation of an infrastructural process that focuses on and promotes engaging human transactions and encounters while simultaneously addressing the need for sustained public transit initiatives.

Chapter: 01

TRANSIT INFRASTRUCTURE

1.1 WHAT IS INFRASTRUCTURE?

Over the next decade, the Canadian government is planning on investing \$180 billion over 12 years for projects that will build modern, resilient, and green communities for Canadians. These infrastructure investments are set across five priority areas; public transit infrastructure, green infrastructure, social infrastructure, trade and transportation infrastructure and rural and northern communities Infrastructure.¹ According to Canada's official plan, the aim of these investments will help to improve commutes, cut air pollution, strengthen communities and grow Canada's economy.²

The term "infrastructure" covers a wide variety of diverse systems and networks. These are governed by differing physical characteristics, uses, ownership patterns and life cycles. Various types of infrastructures have different relationships to the society and economy that they serve and support. Some, like public transit, are concerned with delivering people to centres of employment, recreation or education and training. Other infrastructures are used to transport goods and services to and from centres of production or economic activity. And some infrastructure, such as a utility or water treatment, is used to support a region's or

1 Government of Canada, Infrastructure Canada. "Government of Canada." Infrastructure Canada. / Gouvenement du Canada, December 22, 2020. <https://www.infrastructure.gc.ca/plan/about-invest-a-propos-eng.html>.

2 Government of Canada, Department of Finance. "Infrastructure." Budget 2017: Budget in Brief, March 22, 2017. <https://www.budget.gc.ca/2017/docs/themes/infrastructure-en.html>.

a community's quality of life, by underpinning safe, healthy and sustainable living conditions for people and enterprises.³

Under the broad umbrella of infrastructure, the transportation sector is an important component of the city as a tool for social and economical development. This is even more so in a global economy where economic opportunities have been increasingly related to the mobility of people, including information and communication technologies. A relation between the quantity and quality of transport infrastructure and the level of a city's / community's development is apparent. High-density transport infrastructure and highly connected networks are usually associated with high levels of development. When transport systems are efficient, they result in positive multiplier effects such as better accessibility to markets, employment, and additional investments. When transport systems are deficient in terms of connectivity or reliability, they can lead to reduced or missed opportunities and lower quality of life. ⁴ It is also imperative that alternative modes of public transportation be introduced in a society where travel is heavily dominated by the automobile and where the foreseeable depletion of fossil fuels

3 Fenn, Michael, The Residential and Civil Construction Alliance of Ontario: *The Impact of Infrastructure on Ontario's and Canada's Future*, (2017): pg 11

4 Rodrigue, Jean-Paul, Brian Slack, and Claude Comtois. *The Geography of Transport Systems* Third edition. Abingdon, Oxon: Routledge, 2013.

awaits the tipping point. Recognizing this importance, the need to invest in transit infrastructure has reached a point of broad consensus in Canada. It is important to recognize that If built properly, infrastructure lasts a long time. Good infrastructure decisions can serve the people well for decades, economically, socially, and environmentally. Poor or short-sighted infrastructure can burden us and those who follow for generations.⁵

5 Fenn, Michael, The Residential and Civil Construction Alliance of Ontario: *The Impact of Infrastructure on Ontario's and Canada's Future*, (2017): pg.7

1.2 TRANSIT ORIENTED DEVELOPMENT (TOD)

As noted within, the importance of infrastructure to Canada's future is widely accepted. The need to invest in infrastructure of all kinds – both to make up for past neglect and to build the next generation of infrastructure – has finally reached the top of the public agenda.⁶ However, investing in transit infrastructure is only one of the components required to make positive changes in community / city building and environmental stewardship. In order to have a more substantial impact, large scale infrastructure initiatives must be complemented by broader urban design strategies that would foster the uptake and use of these endeavours. For example, neighborhood scale, community level and building level planning and design approaches, such as density, diversity, and connectivity are crucial in creating urban environments that are less dependent on cars.⁷

Transit stations and their surroundings are often subjected to ambitious development and redevelopment plans. A complex set of factors—as diverse as the promotion of sustainable transport and land use, the stimulation of local economies, technological and institutional change, the business cycle, and the spatial impact of

6 Fenn, Michael, The Residential and Civil Construction Alliance of Ontario: *The Impact of Infrastructure on Ontario's and Canada's Future*, (2017): pg.12

7 Paulhiac Scherrer, Florence. "Assessing Transit-Oriented Development Implementation in Canadian Cities: An Urban Project Approach." *Journal of planning education and research* 39, no. 4 (2019): 469–481.

globalization—drives these initiatives. In recent years, a popular approach to these development initiatives has emerged, known as Transit Oriented Developments (TOD). Primarily, TODs are activity centers established around transport nodes. They combine a broad mixture of land uses, including medium to high density housing, employment, retail, commercial and community facilities. TOD has attracted the interest of politicians, environmentalists, real-estate developers, and other groups in recent times because of its perceived benefits. TOD, as one of the more visible forms of smart growth, is increasingly viewed as an antidote to traffic congestion and the isolation and detachedness felt in many suburban communities. Most TOD designs claim to help enhance urban sustainability agendas through place-making, helping to improve the reputation and aesthetic values of cities. It has also been linked to social goals including increased ridership levels, formation of civic and public spaces, and in itself is a hub for community development.

To achieve a successful transit-oriented development, there are key issues that need to be addressed to maximize transit ridership. Firstly, the concept of service area coverage and access walking distance to transit service at both trip ends. Research conducted by the Transportation Research Board of Washington DC found that travelers perceive access walking distances as being more onerous

than in-vehicle times. A transit trip typically involves walking to a transit stop or station, waiting for a bus or train to arrive, traveling on one or more transit vehicles, transferring between vehicles and walking from transit to the final destination. Elements of the built environment also influence transit ridership, and this is directly related to their influence on accessibility and perceived convenience of walking. Pedestrian-oriented designs generally reduce trip rates and encourage non-auto travel in statistically significant way.⁸ Research also shows that transit use depends primarily on local densities and secondarily on the degree of land use mixing.⁹ Also, the network of streets and walkways must be scaled to the convenience and comfort of the pedestrian. This includes direct, well-connected, safe, and visually interesting sidewalks without any gaps or major barriers.

As such, TOD is based on development above or around an existing, planned or yet-to-be planned piece of transport infrastructure, the path chosen will affect the level of complexity involved. TOD's mission statement to help increase ridership and create walkable cities is an optimistic move to help solve the 'Transit Desert' problem mentioned in the previous chapter. These developments, in theory

8 Cervero, R., and K. Kockelman. *Travel Demand and the 3Ds: Density, Diversity, and Design*. *Transportation Research D*, Vol. 2, No. 3, 1997, 199–219. Pg-203

9 David F. Crowley, Amer S. Shalaby, and Hossein Zarei, *Access Walking Distance, Transit Use, and Transit-Oriented Development in North York City Center, Toronto, Canada*. Pg 97

could provide transit, economic and social centers that can generate a renewed interest in a neighborhood. However, there is evidence of TOD unintentionally increasing levels of economic segregation and leading to gentrification, as it usually increases land property values which can displace poorer residents and lower-income economic activities. While presented as a public centric endeavor, TOD are controlled by a range of stakeholders, and viewed as an important real estate development model, and ultimately these structures actually work against the robust, diverse communities that were its initial goal. TODs end up being marketed to upper income households who can afford the higher cost of development in transit zones, while low- and moderate-income households, for whom transit is often an essential service, have not been well provided for. So, although TOD can provide increased density and street presence, it also brings other concerns such as gentrification, privatized amenities, minimal focus on public realm / public spaces, etc. Nevertheless, it is possible for the TOD model, with thoughtful planning and design, to set up a transit station can act as a catalyst for densification and demand for land-use development, ultimately resulting in vibrant precincts that can bring a fresh dimension to the urban fabric of cities.

Compact

In a compact city, activities are located closer to one another, requiring less time and energy to connect. When all the principles are applied collectively, a thriving compact city is created.

Densify

By building up instead of out, cities absorb urban growth in a more compact way. Density supports a lively mix of activities and better transport services, but also requires that the transport systems can handle the increase in people.

Transit

Public transit connects and integrates more distant parts of the city. Transit corridors are the natural places where densification should begin. High quality transit is critical to create a prosperous and equitable city that is easily accessible by all.

Connect

A city needs a tight network of streets and paths for pedestrians and cyclists as well as public transit. Creating highly permeable places allows for a variety of mobility options that make trips more direct.

Mix

A connected city becomes more animated when there is a mix of activities along the streets and paths. Different uses encourage shorter trips and more lively neighborhoods.

Fig 1: *Principles for Transport in Urban Life.*

Source: Institution for Transportation and Development Policy.
Edited by Author

Cycle

Like mixed uses, cycling activates streets and provides people with an efficient and convenient way to travel for medium distances. Cycling increases a person's access to a larger area, as well as increases the coverage of transit.

Shift

With the above principles in place, getting people out of their cars becomes easier but is not enough. Pricing and traffic reduction tools encourage people to shift away from cars.

Walk

When all the principles come together, the results are most keenly felt by the pedestrian. Vibrant, active streets where people feel safe are fundamental to the successful twenty-first century city.

1.3 TRANSIT ORIENTED COMMUNITIES (TOC)

Current TOD aims could be seen as defining armature for a fundamental rethinking about how we build communities. Out of this thinking comes a new approach to transit development, Transit Oriented Communities (TOC). With similar goals as the TOD model, TOC aims to further strengthen the connection between the transit station and surrounding context. One of the biggest limitations of the current TODs is that not enough attention has been paid to making them pedestrian friendly places. Trips to the store, to the park or access to other amenities should be both negotiable on foot and a delight to those walking.¹⁰ To address this, the TOC mission statement aims to create walkable streets, creating places for people, making connections through the neighbourhood, providing amenities and services and providing efficient transportation services.

The TOD and TOC model both have similar goals dealing with creating high density areas and encouraging an increased use of public transit. However, The TOC approach goes beyond the traditional TOD model, which typically concentrates on a single development, to focus on shaping vibrant communities around transit. TOCs are aimed to work at the scale of the community, and its

¹⁰ Dittmar, Hank., and Gloria. Ohland. *The New Transit Town : Best Practices in Transit-Oriented Development* Washington, DC: Island Press, 2004. pg 20

residents. By connecting communities, destinations, and amenities through improved access to transit, TOCs promote walkable and bikeable communities. The TOC model is still in its infancy, nevertheless its potential benefits, and how it addresses the shortcoming of TODs is an interesting concept to explore. The use of transit as a catalyst to sponsor uses that go beyond the traditional notion of the station, which is a TOC school of thought, is a concept the following chapters aim to explore.

1.4 TRANSIT DESERTS

Public transportation is vital to the health of cities. Playing a key role in the urban fabric, there are several aspects of an equitable transportation system, such as providing high-quality services, with emphasis on access to economic opportunity and basic mobility to all communities, and equally prioritizing efforts to both revitalize poor and minority communities and expand transportation infrastructure.¹¹ These facets of equitable transportation systems are crucial in the foundation of a true pluralistic society that affords access and opportunities for all.

Planning and zoning redevelopment agendas may have well-meaning intentions in terms of increasing density and finding opportunities for redevelopment, it may, intentionally or unintentionally, result in a forced shift of migration away from the city core, thereby creating a sub-population of people who more heavily rely on public transport. Transit-dependent populations mark a notable group of people who are often excluded from access to employment opportunities, access to retail options, and overall participation in society. This generally occurs in areas where subway and rapid-transit options are insufficient, bus routes are under-resourced and overburdened, residents have to walk a longer distance to the nearest transit hub and there is poor bike, sidewalk, or road infrastructure. These areas are often

¹¹ Jiao, Junfeng, and Maxwell Dillivan. "Transit Deserts: The Gap Between Demand and Supply." *Journal of public transportation* 16, no. 3 (2013): 23–39. pg 24

referred to as transit deserts, where the absence of public transit creates barriers to viable employment and accessibility to cultural networks, which eventually plays a major role in increasing social inequality.¹²

A neighborhood does not have to be in the suburbs to be a Transit Desert. This manifests in neighborhoods that through density, land use and physical form don't encourage walking and easy connections. For example, communities may have access to public transit, but are still considered Transit Deserts if the access is difficult, with riders traveling more than a 500m from point of departure to a transit stop and met with long wait times once at the stop. Furthermore, and most significantly, is the factor of demographics. If there is no unmet demand or potential ridership, there is no Transit Desert. In other words, communities with a high level of access to personal automobiles, but no access to public transit do not qualify.

With this in mind, the demographic characteristics of the potential ridership of these transit deserts are most often people of low income, immigrants, minorities and ultimately, those without cars.¹³ This demographic has social, cultural, and

¹² Allen, Diane Jones. *Lost in the Transit Desert. Race, Transit Access, and Suburban Form*. Basingstoke: Taylor & Francis Ltd, 2017, 147

¹³ Jiao, Junfeng, and Maxwell Dillivan. "Transit Deserts: The Gap Between Demand and Supply." *Journal of public transportation* 16, no. 3 (2013): 23–39. pg 24

economic particulars that are often hindered through insufficient and limited public access to transit.

Transportation planning's primary focus is mobility, where speed and volume are the dominant factors for the evaluation of efficiency. When speed and volume become primary concerns of transit, cities often focus on creating more lanes, more roads, more overpasses, and more interchanges, but without a lot of focus on where and why transit is needed in particular areas. Transit Deserts, the unintentional by-product of these transportation strategies, can be addressed by focusing on accessibility and the ability for systems to connect where people live, and to the economic opportunity they must access, especially for the low income and immigrant communities, who most often have little choice in where they reside.

Transit Deserts, in essence then, are about geographic vulnerability in regards to access to employment, education, health, recreation, and other services that impact quality of life. When the place in which one resides not only lacks the necessary resources, but also lacks the transportation systems that allow access to resources in other areas, it renders its inhabitants in an unfair and difficult

situation.¹⁴ Therefore, the agency of infrastructure should be viewed beyond its traditional scope of road, highways, and car-centric approaches because it wields incredible power in the way it shapes an inhabitants life, connecting or isolating their experience in the city. It is also reasonable to assume that this power, if used correctly can act as a catalyst for broader social agendas and be a part of the solution that can address other 'desert' type conditions that might exist in a community. For example, the introduction of transit infrastructure, for those who desperately need it will not only change lives through access to jobs and opportunities, but it will most likely change the environment through the possible lessening of driving by all residents in the community. This in turn might result in a decreased need for parking lots, which in turn would provide room for other activities including parklets and other gathering spaces that are lacking in the community.¹⁵ In other words, transit infrastructure is more than a system for moving vast quantities of people efficiently through the city. It is an opportunity in and of itself for community building and transformation.

Here, thoughtful urban planning has the ability to foster interaction of

¹⁴ Allen, Diane Jones. *Lost in the Transit Desert. Race, Transit Access, and Suburban Form*. Basingstoke: Taylor & Francis Ltd, 2017. pg 152

¹⁵ Ibid, 146

residents by facilitating pedestrian movement, increasing the physical space opportunities to provide transit, and increasing access to needed services. Also by providing community specific amenities, there is a chance that people would not need to travel large distances in the first place, reducing the load on public transportation. In order to begin addressing these deficiencies, when evaluating Transit Desert communities specifically, responses should ideally integrate a degree of adaptability, flexibility, and concern for racial equity. It is critical that it recognizes the cultural overlay, history of place, and the people that live therein.¹⁶ Understanding the ways in which architects and planners can approach the future of infrastructure with flexibility and openness, will help remind the people of the great potential benefits that thoughtful, inclusive and foresighted decisions on infrastructure promise for all of us.

¹⁶ Allen, Diane Jones. *Lost in the Transit Desert. Race, Transit Access, and Suburban Form*. Basingstoke: Taylor & Francis Ltd, 2017. Pg 147

Fig 2: *Concept Render : Thorncliffe Park, mapping a network of infrastructure*

Source: Author

Chapter: 02

M A C R O C O N T E X T A N D S I T E

2.1 GREATER TORONTO HAMILTON AREA

The City of Toronto, situated in Southern Ontario, is the largest municipality in Canada in terms of population, at 2.93 million people (Statistics Canada, 2016). As part of the Greater Toronto and Hamilton Area (GTHA) and Greater Golden Horseshoe subregion, it is also the largest urban region in Canada and serves as a financial and commercial hub at its downtown district. The city's geographical boundaries consist of large transportation corridors and natural water bodies. As seen in figure 2, it is bounded by Lake Ontario to the south. Steeles Avenue to the north, Etobicoke Creek and Highway 427 to the west, and Rouge River to the east. The Gardiner Expressway and Don Valley Parkway are municipal expressways that connect to Highway 401 – a provincial highway that runs through the northern portion of Toronto. Rapid transit within Toronto is provided by Toronto Transit Commission (TTC) subway lines with an orientation and emphasis to serving Toronto's downtown core. The inner rapid transit is connected with commuter rapid transit – GO Transit – primarily at Union Station.

Increasingly, concerns about transportation gridlock are receiving greater attention at all levels of government, driven in large part by the obvious gap between growth in population and commercial/cultural activity on one hand,

and expansion of the transportation system on the other. Between 1986 and 2001, population of the Greater Toronto Area and Hamilton (GTAH) grew by 33 percent to about 5.4 million persons. By 2031, it is expected to increase by another 2.6 million, or almost 50 percent.¹⁷ Since 1986, however, investment in infrastructure, including transportation, has not kept pace with the overall growth of the region, a perception that is reflected in rising levels of congestion and frustration of all types.¹⁸

¹⁷ Statistics Canada report 2016

¹⁸ Ratti, Nicole. *Not All Hubs Are Created Equal: An Analysis of Future Mobility Hubs in the Greater Toronto Area*. Report. School of Urban Planning, McGill University. Montreal, ON, 2017.

Fig 3: The GTHA Municipalities map

Source: Government of Canada Open Government Municipal Boundaries dataset.

2.2 T O R O N T O T R A N S I T

As with most North American cities, transportation supply characterized Toronto's post-war era with an emphasis on supply planning, that is, building and providing roads, expressways and highways. The Yonge-Spadina subway line opened in 1954 and the Bloor-Danforth line opened in 1963. In the 1970s, the emphasis shifted away from high density inner city transit to lower density commuter transit in the outer suburbs. GO Transit formed the key mode of suburban commuter transit to and from Toronto's downtown. Growth followed the transportation corridors with high-rise apartment development on the edges of the highways. As a result, urban sprawl stretched outward along highways and GO Transit commuter rail lines leading to increased suburbanization in the Greater Toronto Area. Density and urbanization followed along the path of the transit line.

1882

1891

1949

1960

Yonge and
Dundas

1965

Bloor and
Dover st.

Until the Canadian government's announcement to invest, progress in updating transportation infrastructure in the GTA was halted. Left to stagnate, age, and become overburdened, the stations have become outdated and don't measure up against contemporary designs. Areas around stations is underutilized, and walkability is not addressed properly. As the TTC and Metrolinx continues trying to expand its infrastructure to meet the demands of a growing urban population, its progress leaves much to be desired. Past decisions made without the foresight of urbanization, globalization, and technological innovation are being revealed to be inadequate.

Fig 4: *History of the TTC Collage*

Source: Author

1

2

Fig 5: *Current Condition of TTC Subway Station*

Source: Google Image Search

- 1- Queen Station, Platform View
- 2- St. Clair Station, Exterior View
- 3- Donlands Station, Exterior View
- 4- St. Clair Station, Bus Platform Level
- 5- Davisville Station. Platform View

2.3 O N T A R I O L I N E

The Ontario Line previously known as the Regional Relief Line is set out to fill the principal missing component in the basic rapid transit network. Its purpose is to relieve not only the subway system as a whole but also Union Station by establishing GO transit shoulder interchanges east and west of Union Station. The plan proposes 15 potential stations between Ontario Place and Ontario Science Centre and potential links to GO Transit and TTC Lines 1 and 2. Over half of the route is planned to run underground through new tunnels, with the remainder running along elevated and at-grade rail corridor sections of track.¹⁹ Three stations at the northern end of the line – at the Science Centre, Flemingdon Park and Thorncliffe Park are projected to see more significant benefits when it comes to travel time savings. This thesis will use the Ontario Line proposal as case study to explore how a new rapid transit station can foster programs other than transportation that can positively benefit these low-income, immigrant communities.

¹⁹ "Ontario Line." Ontario Line Subway. Accessed November 25, 2020. <https://www.infrastructureontario.ca/Ontario-line/>.

Fig 6: Ontario Line, Proposed Alignment

Source: Metrolinx Official Website

2.3 ONTARIO LINE

Fig 7: Ontario Line Station Locations Collage

Source: Author

2.4 THORNCLIFFE PARK: TORONTO'S TRANSIT DESERT

Thorncliffe Park is a planned community, completed in the late 1960s. These inner suburbs are northeast of the Toronto core and they sit on the west side of the Don Valley Ravine. As a neighbourhood favoured by recently arrived immigrants, the communities are anchors for numerous new Canadians. In Thorncliffe, roughly 45.5 per cent of households are below the low-income measure, more than twice the portion for Toronto as a whole. Residents are more dependent on public transit than the rest of the city, with about 45 per cent commuting by transit, compared to about 37 percent of all Torontonians. The residents of these communities are eagerly anticipating the new Ontario Line that will run through their neighbourhood. In an interview, one resident claimed that the rest of the city doesn't "know that we exist, this neighbourhood exists." The residents want to be connected, especially as a neighbourhood that houses a large population of newcomer families. Many of whom search for jobs and resources in the downtown core. The Ontario Line is set to provide rapid transit to the low-income, immigrant communities in Thorncliffe and Flemingdon Park. However, these neighborhoods will have the train running on an elevated guideway, along Don Mills Road and Overlea Boulevard, both of which are lined with strip malls, fast food restaurants and apartment towers.

Fig 8: Thorncliffe Park, ESRI High Resolution Image Stich

Source: Author

Fig 9: *Public Transit as a Percentage of Commute, GIS mapping*

Source: Author, created using Canada 2016 Census data set

Fig 10: *Income Brackets, GIS mapping*

Source: Author, created using Canada 2016 Census data set

Fig 11: *Percentage of Immigrant Families, GIS mapping*

Source: Author, created using Canada 2016 Census data set

Fig 12: *Toronto's Transit Deserts, GIS mapping*

Source: Author, created using Canada 2016 Census data set

Chapter: 03

THEORETICAL BACKGROUND AND RESEARCH

3.1 I N F R A S T R U C T U R E A S A R C H I T E C T U R E

Understanding the role infrastructure plays in building the city is much more commonplace than understanding infrastructure as architecture. Infrastructure has often been perceived through the pervasiveness of roads and highways, the remoteness of power plants and landfills, communication networks overhead and sewers below ground. Yet, for all the monumentality of these projects and their positivistic undertones, this drive-by understanding gives us only a small glimpse of what it actually takes to support urban life. Generally, people spend very little time thinking about where our water comes from, or how our power is produced, where our food is grown, or how far it travels. Similarly, other basic infrastructure like the street or sidewalk are seen more as utilitarian components of the city, as opposed to taking on a more catalytic role in the support of the public realm.

Infrastructure does not exist in a disciplinary vacuum nor does it separate itself from its surroundings. Infrastructure is not asocial nor is it apolitical. It can divide as much as it can connect. It is fragmented while remaining continuous. Nor is infrastructure neutral; it can exclude as much as it can integrate. It produces externalities, has unplanned effects, and is often affected by forces beyond

its boundaries.²⁰ Ironically, the scale and vastness of infrastructure make it imperceptible to the naked eye but its effect, from connection to segregation — are usually prevalent and visible, consciously, or not. Therefore, infrastructure is not divorced of social systems, nor independent of natural environments. More than just steel, cement, and asphalt, infrastructure forms distinctively complex, urban ecologies, a vast and immense landscape of biophysical and geospatial systems, an expansive field of resources, services, and agents that together support the landscape of contemporary urban life.²¹

At the scale of transportation, freeways, streets and public transit lines are recognizable pieces of city infrastructure. As systems, they form the backbone of urban spatial patterns. They generate distinctive vectors of movement but also contribute to intermodal networks of mobility. Yet, the modern separation of land uses, and the axial focus of roadways create new and contested surface conditions. They cut across large swaths of pre-existing grounds and indivisible systems, resulting in friction and fragmentation, both of which can be generative

20 Hung, Ying-Yu, Gerdo Aquino, Pierre Bélanger, Julia Czerniak, Adriaan Geuze, Alexander Robinson, Matthew Skjonsberg, The Infrastructure Research Initiative at SWA, and Charles Waldheim. *Landscape Infrastructure : Case Studies by SWA* 2nd. ed. Basel: Birkhäuser, 2013. pg 50

21 Ibid

and destructive.²²

The presence of infrastructure remains largely invisible or imperceptible until the precise moment at which it breaks down or fails. Floods, blackouts, traffic congestion and the creation of 'Transit Deserts' serve as a few reminders of the fragility of this invisible background that our lives depend upon. Rarely, do we stop to interrogate the functioning of this superstructure, but recent events, such as the rapid urban sprawl, the need to travel to the city core for work, dependence on the auto-mobile and subsequently the spike in green house gas emission, call into question the foundation upon which future infrastructure systems are conceived.

As building blocks, infrastructure helps set the stage for future acts to come, but too often it is conceived under a lens of engineering whereby technical aspects are privileged. The challenge with this conception of infrastructure is that it often does not consider the potential for infrastructure to begin assuming other roles in city building and as an architectural tool. In his work *Points + Lines: Diagrams and Projects for the City*, Stan Allen describes the practice of infrastructural urbanism as a way to renew architecture's potential, returning it to instrumentality with

²² Hung, Ying-Yu, Gerdo Aquino, Pierre Bélanger, Julia Czerniak, Adriaan Geuze, Alexander Robinson, Matthew Skjonsberg, The Infrastructure Research Initiative at SWA, and Charles Waldheim. *Landscape Infrastructure : Case Studies by SWA* 2nd. ed. Basel: Birkhäuser, 2013. pg 24

concrete proposals and realistic strategies, while distancing itself from a purely semiotic role. He argues that to reach this stage, two claims can be made. First, that "infrastructural urbanism understands architecture as material practice – as an activity that works in and among the world of things."²³ By immersing in the world of things, architects can reconceive rebuilding the contact with the real. Second, "is for a practice engaged in time and process – a practice not devoted to the production of autonomous objects, but rather to the production of directed fields in which program, and activity can play themselves out."²⁴ These infrastructures, working with time and space, can be flexible and anticipatory. By specifying what must be fixed and what is subject to change, they can be precise and indeterminate at the same time.

To define architecture as a material practice it is necessary to improve its relationship with performance, beyond its initial purpose / occupancy, but differently than other material practices such as engineering, without leaving questions of meaning entirely behind. It is difficult, maybe impossible to accurately predict future events. However, by learning from past mistakes, and using predictive, rather than prescriptive methods of design, architecture has the opportunity to create

²³ Allen, Stan. *Points + Lines : Diagrams and Projects for the City* 1st ed. New York: Princeton Architectural Press, 1999.pg 52

²⁴ Ibid

infrastructures that collectively underpins and upholds the ongoing urbanization of the twenty-first century.²⁵ The aim is not expression, either the point of view of author or a collective, but rather condensing, transforming, and materializing concepts that continuously evolve over time²⁶.

Fig 13: *Conceptual Render: Transit, pedestrian, and connection routes through Thorncliffe Park*

Source: Author

25 Cuff, Dana, and Roger Sherman. *Fast-Forward Urbanism Rethinking Architecture's Engagement with the City* 1st ed. New York: Princeton Architectural Press, 2011., pg 122

26 Allen, Stan. *Points + Lines : Diagrams and Projects for the City* 1st ed. New York: Princeton Architectural Press, 1999. pg 53

3.2 N O D E + P L A C E

Critical to the notion of infrastructure as architecture and the idea that architecture can pro-actively anticipate evolution is the idea of node and place. Node and place is a model theorized by Luca Bertolini, a professor of Urban Planning at the Amsterdam Institute for Social Science Research. His research finds that the increased decentralisation of cities has led to unresolved issues, such as high rates of consumption of non-renewable resources, high levels of spatial segregation and other social costs.²⁷ The flow of people passing through stations are a direct result of people living in a certain place, travelling to another place for work, and then a third place for spending their free time. However, the fact that all these people pass through public transportation nodes does not necessarily mean that people are interacting with each other. Bertolini argues that these intense and diverse flows of people do have the potential of translating into equally intense and diverse patterns of human interaction, if the right conditions are met.²⁸ The important prerequisite here is that the transportation node should not be considered separately from its urban surroundings, or the place of activities.

For all of the perceived potential of TODs and TOCs, the integration of

27 Bertolini, L. "Spatial Development Patterns and Public Transport: The Application of an Analytical Model in the Netherlands." *Planning, practice & research* 14, no. 2 (1999): 199–210. pg 199

28 Roberto P. Camagni, and Carlo Salone. "Network Urban Structures in Northern Italy: Elements for a Theoretical Framework." *Urban studies (Edinburgh, Scotland)* 30, no. 6 (1993): 1053–1064. pg 1054

transport and urban development at station areas, is a complex undertaking. The complexity arises due to the dual nature of a station as both 'nodes' and 'places.' They are, or may become, important 'nodes' in both transport and non-transport (e.g. business, consumption) networks. Conversely, station areas also identify a 'place,' a both permanently and temporarily inhabited area of the city, a dense and diverse conglomeration of uses and forms accumulated over time, which may or may not share in the life of the node.

A 'node' can be defined as a point where subsidiary parts originate or centre. Together with 'lines' or 'channels,' nodes are the basic component of a network, the point where the line converge, interconnect or interrelate. The 'network' has both a concrete meaning as a fabric or structure of lines and wires, and a more abstract meaning as an interconnected or interrelated chain, group or system. The first definition talks about infrastructural systems (highways and railway networks, sewage systems etc.) and the other deals with the spatial interaction among urban places, economic activities and people.²⁹

Transit station as 'place' holds a dual intent, it exists as both a 'space' (physical

29 Roberto P. Camagni, and Carlo Salone. "Network Urban Structures in Northern Italy: Elements for a Theoretical Framework." *Urban studies (Edinburgh, Scotland)* 30, no. 6 (1993): 1053–1064. pg 1054

surroundings) and as an 'atmosphere.' Material, quantifiable properties that make up a space coexist with immaterial attributes as evoked by the term atmosphere. From this perspective the transit station takes up an important place in the city, establishing a space and atmosphere that sustains various urban activities.³⁰ A by-product of a traditional TOD is the creation of clearly defined boundaries where real estate build-up takes place. In other words, a concentration of building activity is seen to be a physical intensification (a node) rooted in the idea of contributing to the creation of place. However, the node / place model argues that the transit station as a place has uncertain boundaries, and that the influence of a station may go far beyond its immediate surroundings. The more fluid boundaries associated with a public amenity like a train station, instead of a predominantly private undertaking like a mixed use development on a parcel of land, present opportunities for the station to become more than merely a concentration of built form.³¹ The focus then is not to simply create a transit station as a landmark, but also to consider the station as an integral part of the transit network deployed as part of a holistic initiative in community building.

30 Bertonlini, Luca, and Tejo. Spit. *Cities on Rails the Development of Railway Stations and Their Surroundings* 1st ed. London ;: E & FN Spon, 1998. pg 11

31 Ibid

Node Value

Network Centrality

Train Service

Place Value

Design

Proximity to environments of walking, cycling and buses.

Density & Diversity

Proximity to environments of walking, cycling and buses.

Fig 14: *Node + Place Value*

Source: Author

Viewing transit stations through node-place perspective reveals that both positive and negative interrelations may exist between the two domains. For instance, a high level of accessibility may provide the critical mass of demand for the development of particular activities. In turn, a high density of activities may induce the necessary support for the development of transportation networks. On the other hand, dense patterns of use can make a location's transport infrastructure difficult to expand and adapt. In the same vein, optimization of a station's accessibility by all modes may negatively affect its liveability, and thus its attractiveness.

Analysing a station's identity as both a node and place and understanding how they interact with each other makes it possible to better define the task of implementing a large infrastructural system such as light rail transit (LRT) within an existing city framework. Basically, the unique challenge of the development of node-places is the need to deal, at the same time, with both transport and urban development issues. From a transport development point of view, there is a need for flexible accommodation of growing infrastructure capacity and the furthering of both physical and organizational integration of different transport modes.³² From a property development point of view, there is a need to understand the specific

³² Bertonlini, Luca, and Tejo. Spit. *Cities on Rails the Development of Railway Stations and Their Surroundings* 1st ed. London ;: E & FN Spon, 1998. pg 214

urban context, its demographic, the strengths and weaknesses of the location, the integration of community amenities and to provide good accessibility to the station that can promote increased ridership. Therefore, the design section of the thesis understands transit infrastructure as both, an important node and place within the city where multiple systems such as public and private transportation, pedestrian life, and civic buildings intersect.

Chapter: 04

D E S I G N

4.1 DESIGN AIMS

Imagine a region made up of a network of great neighborhoods, places where residents of diverse incomes, ages, and backgrounds have the option to walk to nearby shopping, parks, and schools, where streets are safe to walk along and public spaces are inviting and frequently used and where people can choose to take a train or bus to their destinations as easily and conveniently as a car. Imagine, as well, a region where job centers are convenient for employees around the clock, and are linked to a network of neighborhoods and revitalized by high-quality, site sensitive, efficient transit.

Transit infrastructure has the power to significantly alter the urban fabric, but more importantly, there is potential for it to be implemented in a manner that revitalizes neglected and isolated neighbourhoods. To this end, the structure of this thesis is based on exploring how infrastructure might act as a public agency to reinvigorate a transit desert community in Toronto. More specifically, it focuses on the following infrastructures often associated with a transit infrastructure project:

- 1) The transit line;
- 2) Neighbourhood Connections;
- 3) The public realm and major public amenities; and,
- 4) Utilities

To begin addressing this, the aim is not so much to propose specific buildings on given sites, but to construct the site itself, creating an armature that sponsors future growth projects for the community and the city. The intention is to explore how a more thoughtful and integrated approach to architecture and urban planning based on a more nuanced interpretation of infrastructure can revitalize an existing neighbourhood, and set up possible future conditions. The process of this project begins with defining itself. It looks to define problems, opportunities, and goals; to determine the site area and the scope of design. It looks to give the street back to the pedestrian and provide amenities for the community that they are currently lacking. Ultimately the aim is to address the transit desert by not simply dropping in a trainline but rather using the train line as a catalyst to begin creating an urban oasis for all to enjoy.

4.2 SITE ANALYSIS

Thorncliffe Park was developed in the 1960's following urban planning ideals that promoted distinctly separated land uses. The use of the automobile was in full swing and the assumption that everyone would own a car in these neighbourhoods was prevalent. Figure 15 and Figure 16 show how the land uses are clustered. When uses are clustered like this it takes a long time to walk from place to place, favouring automobile or transit users. The concentration of a single land use also causes associated adjacent areas to be underutilized. The office and industrial area along Overlea Boulevard are in use through the workday, but it is a dead zone to the night, as there is no variety of program that can sustain life at all times. The residential high-rise community is relatively isolated by the parkway and Don Valley ravine to the south and east, and the CN rail corridor to the north. The only access in and out is through four roads, including the pedestrian unfriendly Leaside and Overlea Blvd. bridges. These buildings were designed to maximise density while leaving generous amounts of open space for recreation and parking. However, car ownership is low in Thorncliffe park, so a large number of these parking lots are underused, and have the potential to be activated in more interesting ways.

According to interviews carried out by the *Active Neighbourhood Report*

2015, the residents expressed various ways in which they would like to see their neighbourhood revitalized. They are hoping to reclaim underused spaces such as empty parking lots and activate them with amenities and activity spaces. They are also interested in creating spaces to hold community markets and sell goods that are ethnically unique to the community. Lastly, they want to improve the pedestrian and cycling lanes to better connect the neighborhood and safely encourage walking and biking. Keeping these concerns in mind, the introduction of a transit line can provide an opportunity to make up for past neglect and can potentially provide a mix of uses and connect various parts of the neighbourhood together.

Fig 15: *Land Use Axo Drawing*

Source: Author

Fig 16: *Land Use Panoramic Street View*

Source: Author

Bus Stops and Major Roads

Sidewalk, Trails and Bike Lanes

Fig 17: Community walkthrough, site analysis on trace paper

Source: Author

4.3 IDENTIFYING THE DESERTS

“Transit Desert” is a concept defined in previous chapters and is evident in Thorncliffe Park. Although a relatively inner suburb of Toronto, it still lacks adequate transportation to the downtown city core. The bus infrastructure is overburdened due to the increased density the community has seen over the years. The proposed Ontario Line is aimed at helping the base concern regarding mobility. However, access to transportation is not the only issue the community faces.

There are three types of “deserts” that can be identified within the community.

- 1) Transit Desert
- 2) Social Desert
- 3) Economic Desert

The Social Desert:

The social desert deals with the lack of public places in the community. Despite being an area with rich demographic and varying age groups, there is no adequate access to public spaces. Many of the commercial and residential buildings that could potentially contribute to the public realm are instead surrounded by surface parking lots. Not only do these lots take up significant amounts of land

Fig 18: *Missing Amenities*

Source: Author

destined primarily for sporadic car use throughout the day, the end result for the community are undesirable left over void spaces. To add fuel to the fire, the sidewalks and bike lanes are given minimal priority and the roads are dominated by the automobile. The neighborhood is flanked by the Don Valley Ravine, but it is difficult to access, hidden behind tall residential buildings (Figure 20). In order to not exacerbate these existing issues with the introduction of another large scale transit infrastructure, it will be important to begin thinking of the transit line as a place in and of itself early in the design process. Conceived under this guidance, it will provide a unique opportunity to set up an active public realm around the station site, where community residents and those who are visiting can enjoy.

The Economic Desert

Furthermore, most people in the community find themselves in a position whereby they have to travel downtown for work, and as such there is a lack of local commercial opportunities for the residents. Existing commercial buildings cater to industrial offices, or franchise operations, and do not provide to small business. This leads to the third type of desert, economic desert. Here the need is to create a platform where economic activities can take place that will benefit the residents and stimulate the neighbourhood's economy. Currently the people turn

to setting up temporary stalls in the large empty parking lots or selling things out of their car. Historically, centers of commerce were clustered around transportation nodes, and thus the same principle can be applied here, to create a community driven, commercial venture that is fostered by the train line. The long-term aim of the following design interventions would be to bring people from all parts of the city into the neighbourhood, instead of the residents traveling away to look for amenities and work.

Fig 19: Overlea Boulevard Existing Street Conditions, Street View

Source: Author

Fig 20: *Residential Street View*

Source: Active Neighbourhood Report, 2015

Fig 21: *Residents selling goods out of their cars.*

Source: Toronto Sun Article, 2018

4.4 IDENTIFYING THE VOIDS

Urban voids are all areas in a city, whose functions and designs have not yet been realized. These may be reserve areas, fallow land, distance spaces, areas between buildings, large parking lots and driveway or unused properties. All these areas do not fulfill any concrete function in the urban system, and therefore should be subjected to a re-investigation into its presence in the city.

Many of these types of urban voids exist across Thorncliffe Park in various forms and identifying where and how they exist is the first step towards a better utilization of current left over spaces . Four types of voids have been recognized in relation to the site. The first being the edges between buildings and the sidewalk and are often areas with green patches or a line of trees. Second is the void created in-between buildings where large automobile lanes exist. Third is the voids created under or around infrastructure projects, and lastly the voids that exist within large surface parking lots (Figure 22 & 23). These voids are interesting areas of study, they provide a starting point in addressing the issues of the site. Working with these existing voids, the design will aim to prescribe how the gaps should eventually be filled, focusing on addressing the 'deserts' and changing the identity of these voids.

INACTIVE EDGES ●

SPACE DEVOTED PRIMARILY TO VEHICULAR TRAFFIC ●

INFRASTRUCTURE VOID ●

LARGE PLOTS / PARKING LOTS ●

Fig 22: *Types of Voids*

Source: Author

- Inactive Edges
- Space Devoted Primarily to Vehicular Traffic
- Infrastructure Void
- Large Plots / Parking Lots

Fig 23: Location of voids in Thorncliffe Park

Source: Author

4.5 THE ELEVATED RAILWAY

The future Ontario Line, the case study that the thesis is exploring, has proposed the last section of the train alignment to be above ground. These sections include the Thorncliffe Park, Flemingdon Park and Science Center neighbourhoods, which is primarily occupied by low-income, immigrant populations. The city's rationale for having an Elevated train line in these particular neighbourhoods is to reduce the cost of building as they are generally cheaper to construct, and because the neighbourhoods have more space to sustain an elevated guideway as opposed to denser downtown areas.

There are three basic ways in which a train runs through a city, either through below ground tunnels, on the surface or on elevated guideway. Each method has its own pros and cons and should be considered as a site-specific solution. Below ground train lines take up less surface space, and do not contribute to noise pollution. However, they are very expensive to construct, and the excavation process can be disruptive when major streets are closed off to accommodate for construction. On surface train lines are more cost effective, however they create conditions that divide up large areas of land and can be quite loud. Lastly elevated guideways take up minimal space on the ground, leaving way for other urban activities and are cheaper to build. Nevertheless, the areas under and around these

guideways have known to be “ugly dark spaces” and generally unsafe to walk under.

Regarding Thorncliffe Park, the thesis considers the elevated train line as an interesting solution to explore. If thoughtfully designed, it provides an interesting new condition around which to organize space. The aim would be to place the elevated guideway where large urban voids exist and use it as a tool to create a framework that allows for new programs to activate the underside and associated adjacent areas, while at times creating strategic connections that stitch together both sides of the urban fabric around the train line. By elevating the train, its presence is much more profound than that of a subway line, and therefore has the ability to be a ‘place making’ tool in the neighbourhood.

Fig 24: *Concept Render, Activation of space under guideway*

Source: Author

Fig 25: *Concept Render, Activation of space under guideway*

Source: Author

4.6 DESIGN ELABORATION AND RATIONALE

Infrastructure systems in cities often failed to live up to the promises of those who champion them. Like many urban forms, infrastructure can become obsolete, pernicious or antiquated in how it serves and interacts with the local environment and community. Sometimes the promise of improved accessibility in one part of the city may spawn gridlock in another part of the city or along routes into which they connect. Rarely do infrastructural systems get implemented as both a method of moving people and as a framework to actively sponsor community evolution and growth. As a first step to generate a renewed interest in the potential of transit infrastructure, the design looks to redefine the street conditions and provide access to these systems. Access and walkability are a major component of both TOD and TOC design aims, and rightfully so. When proper access is not provided, people tend to use the automobile to access train stations, instead of walking, biking, or taking other modes of public transit to reach the station. This inevitably leads to the creation of large parking lots that could have served another purpose for the community.

At Thorncliffe Park, the street scape favours the use of the automobile. The major street, Overlea Blvd, running through the neighbourhood is centered around automobile transportation, rather than the pedestrian or cyclist. The central location

of the street, and large plots of parking space that flank either side, makes it an interesting place to run the elevated train line through. The design of the train line will help in reconfiguring the auto centric street that exists now into a pedestrian realm. By analysing how the street is currently structured, and where the priorities lie, gave rise to a series of explorations that were undertaken to examine how more priority might be given back to the public realm and the pedestrian experience. From these studies it became apparent that a careful re-alignment of the street section offered opportunities for the various modes of transportation (vehicular, pedestrian, cyclist, train) to be arranged in a more holistic and integrated way, and to become more human scaled.

Fig 26: Overlea Boulevard existing street conditions

Source: Author

Fig 27: Overlea Boulevard existing street conditions showing location of surface parking

Source: Author

Analysing the street as it exists now also lead to a series of explorations that identified places that might benefit from an intensification of use and place making. Three important nodes were identified along the length of Overlea Blvd. The first node exists at the intersection with connections to the residential and school areas. The second node is located in the middle of the street, flanked with two large parking lots servicing commercial / shopping uses. The third node is located at the intersection with connections to the industrial and commercial district and is also where the street eventually connects to the highway. In all these points, the sidewalks are narrow, and there are no designated bike lanes. A series of sectional studies were undertaken to explore these areas could become more engaged with their context

For nodes one and three, the existing street conditions are quite similar, and therefore employ similar design strategies. The variations all look at pushing automobile traffic to the edges, and providing pedestrian pathways in the center, essentially inverting the street scape. The second node, located centrally on the site, provides an opportunity to create a more dynamic intensification point. The design proposes to push automobile traffic underground for a part of the street, freeing up space above to host other activities. A section of the large parking spot associated

with the shopping mall, that according to the community report remains mostly empty, is repurposed to host the station, and to create a new public realm.

Fig 28: Axonometric drawing of site showing existing conditions and possible intensification points

Source: Author

1 - Street Section + Plan

Residential / School

Fig 29: Overlea Blvd Section at first intensification point

Source: Author

Fig 30: Overlea Blvd Section at first intensification point

Source: Author

2- Street Section + Plan
Commercial / Shopping Street

Fig 31: *Overlea Blvd Section at second intensification point*

Source: Author

Fig 32: Overlea Blvd Section at second intensification point

Source: Author

Fig 33: Overlea Blvd Section at second intensification point

Source: Author

3 - Street Section + Plan

Industrial / Commercial Street

Fig 34: Overlea Blvd Section at third intensification point

Source: Author

Fig 35: Overlea Blvd Section at third intensification point

Source: Author

Fig 36: *Overlea Blvd Section at third intensification point*

Source: Author

Fig 37: Conceptual Render at first intensification point

Source: Author

4.7 THE PUBLIC REALM AND AMENITIES

The public realm is defined as the publicly owned places and spaces that belong to and are accessible by everyone. These can include municipal streets, lanes, squares, plazas, sidewalks, trails, parks, open spaces, waterfronts, public transit systems, conservation areas, and civic buildings and institutions.³³ It is in this realm that people are encouraged to interact; in many respects, the public realm is the living room of the city. Too often the public realm is considered a by-product of infrastructural undertakings, however, it is the public realm that shapes our relationship with our cities and surroundings. It establishes a community identity, local character and a sense of place. Consequently, when viewing infrastructure through the architectural lens, it becomes the planner's role to identify the gaps in public spaces and reclaim these assets for the people. Therefore, it can be argued that investing in the quality of the public realm is vital in creating vibrant and socially inclusive communities. A well-planned public realm can increase physical and mental well-being, enhance public safety, and allow citizens to embrace and celebrate their places and spaces.³⁴

³³ *Healthy Communities and Planning for the Public Realm*. Ontario Professional Planners Institute, 2016. Pg 1

³⁴ Ibid

Addressing the Public Streets:

As explained before, the street is a key infrastructural component of the public realm in urban spaces, however, the primary function, form and prevalence in cities and neighbourhoods often means these are not considered a focal point in relation to public realm design. The thesis proposal aims to acknowledge the importance of the pedestrian within streets, their associated streetscapes, and the relationship with the adjacent built form and land uses. Streetscape elements, such as, plantings, benches, lighting, shade, places for rest and observation and safety, form the toolkit upon which the streetscape is created. Figure 39 maps out where these linear public spaces can exist to provide an enhanced connection throughout the community.

Fig 38: *Initial studies into street amenities design*

Source: Author

Fig 39: Axonometric drawing of site showing proposed pathways and interventions

Source: Author

Fig 40: Model Explorations into site access and the streetscape

Source: Author

Fig 41: Model Explorations into site access and station access

Source: Author

Addressing the Deserts:

Through the site analysis, various deserts were identified. These deserts are going to be addressed through the various interventions in the design proposal. Dealing first with the transit desert, the introduction of the train line, along with supporting infrastructure, will help in sustaining and promoting public transit. However, this will not inherently address the need and desire for multi-modal transportation and access. In the design, the train line is a mechanism for moving people in a multitude of ways. By locating the train line between a linear commercial, community, and institutional corridor below, and a public park in the sky above, that accommodates pedestrians, cyclists, and other people moving strategies such as skating, cross country skiing, or jogging, a multi-layered transportation network begins to emerge on the site. Proper pedestrian access would enable the use of the station facilities and other programs around the site.

The social desert is addressed by reinvigorating the public realm by utilizing the urban voids, especially the large parking lots to create new public spaces. Designing spaces with flexibility can create opportunities for enjoyment of the space. The design tackles the commercial desert by creating a new commercial corridor for more traditional local venues such as cafes, local and local retailers,

etc. They occur beneath the elevated guideway forming a linear corridor that has also made room for arts initiatives, cultural initiatives, and programs that support and celebrate the diversity of the community. This corridor then also reaches out at strategic locations to offer opportunities to frame public spaces and offer amenities to these public spaces and open up opportunities for grassroots community initiatives like markets and pop-up stores. In essence, a gradient is created that moves from more permanent under the train line programs such as station services and local retail shops, to spaces that can be appropriated by the community. If designed appropriately, this could give people a sense of control over their environment, and therefore they are more likely to feel comfortable.

Fig 42: Axonometric drawing of site showing proposed programs and amenities for the community

Source: Author

Fig 43: *Concept Render / Collage of pedestrian paths leading to the site*

Source: Author

Fig 44: *Concept Render / Collage of public spaces*

Source: Author

Fig 45: *Concept Render / Collage of station and surrounding public program*

Source: Author

4.8 A UTILITY NETWORK FOR THE FUTURE

After understanding the neighbourhood, its inhabitants, and the agency of infrastructure as it exists within the urban realm, this final section speculates on how the various themes mentioned in the previous chapters can come together. The design explores how a new social landmark woven together by multivalent programming can intensify everyday public experiences.

It is apparent that infrastructure can play a key role in identifying places and provides an armature for transformations. A certain amount of open-endedness needs to be integrated into these systems to facilitate further development in the future. Keeping this in mind the design of the transit line in Thorncliffe Park is made to support a framework of various activities. The elevated guideway, traditionally used to move a train along, is now designed to put the pedestrian on the top of the hierarchy, while the train is sandwiched between the walkway and the ground plane. This condition allows the creation of a multi-use walkway that can stretch the length of the above ground section of the train line, and provide access at key points through the site (Figure 46). The structure that supports the guideway also serves multiple purposes. It acts as a lighting fixture, illuminating the elevated walkway and the site below, as well as supporting solar panels and

the collection of stormwater that can in turn power and provide irrigation on the site.

Fig 46: Section through the elevated guideway

Source: Author

- Station Program
- Public Program
- Circulation
- Commercial Space
- Green / Open Space

After establishing the elevated guideway, the next step was to create a framework upon which programing can occur. The framework is represented in the design as a series of modular blocks that weave through the site (Figure 48). Some serve a more permanent purpose, such as the station head or vertical circulation, while the others are more temporal, hosting spaces for art exhibits, pop-up markets, concerts etc. This framework responds to, builds on and intensifies at the three major nodes identified in the analysis phase as seen in figure 47.

Fig 47: *Parti drawing : Elevated guideway and significant nodes*

Source: Author

Fig 48: *Module types and Possible Program*

Source: Author

Fig 49: *Parti drawing 1 :Laying down the standard modules*

Source: Author

Fig 50: *Parti drawing 2: Removing modules for outdoor public space*

Source: Author

Fig 51: *Parti drawing 3 : Varying module sizes for various activities*

Source: Author

Fig 52: *Parti drawing 4 : Future condition that further Intensifies the modules*

Source: Author

Intensification at the station head is an important node on the site. In the context of the urban core, the transit station can be seen from many different perspectives. In its simplest form, it is a tool used for the movement of people between the transit vehicle and the street. Specific to the transit structure, user experience has continually proven to be a key factor when making the decision to use public transportation over other alternatives. Due to the fact that the transit station is the specific location where travelers board and exit each vehicle, the design of the station directly influences human interaction with the built environment and creates a unique experience for station users.

Aside from a purely visual approach to design, it is important to establish a clear circulation through and from the station. The station mass designed for Thorncliffe park use a series of ramps to bring people into the station, while also providing connections from the elevated pathway to the platform . With the elevated guideway freeing up the ground plane, the station can now occupy the area and provide additional services such as a daycare, newcomer information services, café and restaurants at the street level.. The inclusion of public programming at the train station has economic benefits for the residents of the neighbourhood. In addition, with the constant flow of people through the station, safety will no longer

be a concern as dead, inactive spaces will no longer exist. The framework here is a more permanent fixture, its agency is to act as a catalyst to promote ridership and provide service amenities to the residents.

Fig 53: *Render of area under the station building and guideway occupied by programs such as a daycare, café and seating / waiting areas*

Source: Author

The second intensification point is located adjacent to the station and is populated by horizontal and vertical circulations. It serves as the backdrop for one of the major public spaces identified in the project. It is connected to the elevated walkway, providing access down and around the site. Here, the framework exists in a more temporal capacity, it merely suggests uses based on occasion and the inhabitation of the people. From hosting sporting events to outdoor concerts (Figure 54), to cultural festivals, the framework can be set up to accommodate various uses. Rather than just stuffing program under the guideway, the key design strategy here is to push and pull these frames to create more flexible spaces. These areas do not exist independently either; they are supported by the elevated guideway that provides, shade, lighting, energy and water. It is here the residents finally have a chance to enjoy a new public realm within their community that isn't centered around density and development, but rather the well being of the community.

Fig 54: *Concept render of public space at night hosting a community concert*
Source: Author

Lastly, programs of commerce, such as market stalls and retail shops are arranged along the third intensification point. A new liner of permanent shops, designed with a scale to support local initiatives, are proposed to activate the blank facades of the existing big box stores, while a complementary row of commercial opportunities are made possible below the elevated guideway. Cultural spaces, that can house art studios, workshop, gallery spaces flank either side of a winding pathway that leads to station. The focus here is to create a circulation that encourages people to walk through these retail areas, stimulating the community's economy and stitching together the urban fabric that exists on both sides of the transit corridor.. The inclusion of retail and commercial programing is commonplace with most transit stations, however it is usually done through franchising and brand name shops. The aim here is to step away from this type of thinking and renting the spaces out to the inhabitants of the community, providing them with opportunity to showcase their businesses and skills, and in turn defying the urban conditions that worked to alienate them in the first place.

As a diverse, multi-ethnic community, Thorncliffe Park became an

Fig 55: *Render of commercial space located under the guideway*

Source: Author

Fig 56: *Render view of ramp leading up to the station with artist workshops on either side*

Source: Author

Fig 57: *Perspective render of elevated walkway*

Source: Author

Fig 58: *Perspective render of elevated walkway above the station, which includes accessible green roof gardens*

Source: Author

interesting case study to explore. Research, experimentation, and exploration into site led to the realization of a layer of infrastructure that deal with people, opposed to the hard infrastructure of roads, bridges etc. Figure 59 is one manifestation of the inhabitation of the communities' residents. Cultural festivals, religious occasions and various other celebrations are given a platform to exist along the transit line. As opposed to the coupling between infrastructure and the city represented by the monumental train terminals, a new relationship can exist between the user and the station. This relationship proposes a displacement from strict functionality to a

multiplicity of overlapping activities from spaces of enjoyment to local retail. The new infrastructural intervention also deals with restructuring the existing, under utilized urban streets, into a network of wide avenues and boulevards to allow for more fluid movement and community interaction.

V C O N C L U S I O N

This thesis journey began with the intention to create a transit station. However, after extensive research into what exactly does infrastructure mean to a city, the goals of the thesis changed. It started to become about connecting a neighbourhood, first within itself, and then rest of the city and the aim was no to construct on the site, but rather to construct the site itself based on the community's needs. The thesis asserted that transit infrastructure can act as a public agency to reinvigorate a disconnected, low-income neighbourhood in the GTA, not only providing efficient access and diverse modes of transportation to other parts of the city, but also by creating an engaging public realm.

The design is largely bound in the experience of the pedestrian journey, the elevated guideway and its associated nodes that perform as an armature for community activities. The understanding is that along with generating large vectors of movement, transit infrastructure can also produce zones of occupation. The anticipated result is a neighbourhood that been revitalized by a thoughtful and flexible framework that can be appropriated and occupied by the people. Using a speculative approach, the design offers spaces under, around and above the trainline so that an infrastructural process can be implemented to promote areas that facilitate engaging human transactions and encounters.

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