

# Redeveloping the Avenues

by

R O B E R T M I C A C C H I

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*Author's Declaration*

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

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

### *Abstract*

The goal of this thesis is to investigate and propose housing that increases density while offering a better quality of life for citizens inhabiting Toronto's Avenues. This thesis compares three different building prototypes, all of varying scales and typological characteristics. The viability of each prototype is discussed with regards to the current economic and regulatory conditions within the city, as well as the varying quality of life that each prototype creates.

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**fig 1.1 2nd Arrondissement, Paris**

This neighbourhood is made up of mid-rise buildings with retail at grade and residences above. The streets are enjoyable to walk, the retail spaces attract top-tier businesses, and the housing above is highly desirable. Paris has been built under planning regulations that has helped maintain its position as a world class city.

## 1.0 Introduction

### **The Scenario**

The City of Toronto is forecast to have 3.08 million residents by 2031, which is an increase of 500,000 over the next 20 years. Much of this growth, according to the Avenues and Mid-Rise Building Study by the City of Toronto, is favored to occur along the Avenues or Main Streets in the form of Mid-Rise Buildings. The Avenues amount to approximately 324 km of property frontage, and about 200 km can theoretically be redeveloped into mid-rise buildings.<sup>1</sup>

Buildings erected after the Second World War in North America have generally been detrimental to mixed use dense urban neighbourhoods, or more commonly referred to as “downtown”. Buildings after the wars compliment car-dependent mono-zoned developments. By 1961 Jane Jacobs published *The Life and Death of Great American Cities*, an important marker in the reaction against this new car-scaled building era, and after decades of decay and exodus, the inner cities are gaining popularity with the housing market. Real Net Canada Inc. has recorded about 15,000 new condominium suites per year since 2007 in the GTA, and are predicting 19,000 new condominium suites for 2011. Urbanation Inc. released similar statistics, and adds they’re seeing all this with a vacancy rate for downtown condos of less than 1%.

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<sup>1</sup> City of Toronto, comp. Avenue and Mid-Rise Buildings Study. Toronto, 2010. Print, p i.

*This study begins to uncover the true problem facing the city today, which is not so much that we don't know how or what to build today to make a great city, rather it's usually not feasible to create the ideal buildings for our city.*

## The Problem

After years of suburban growth around the periphery, developers are shifting their attention back to the city center. With new developments comes a welcomed increase in wealth and population to the city's core, however these buildings, many of them being high-rise point-tower types, are also drastically changing block morphologies, and the results are raising questions about how we're rebuilding our central neighbourhoods. We've seen how certain building types and block morphologies have created well loved, or problematic neighbourhoods. For example, the Annex commands some of the highest real-estate values and most well loved streets while St. Jamestown is generally considered undesirable by the housing market and unsafe to walk at night. Discussion and analysis of why certain neighbourhoods work better than others have already been explored by Jane Jacobs, Jan Gehl and their contemporaries, and thanks to their work planners are beginning to favor urban mid-rise neighbourhoods more and more.

Despite this, high-rise condominiums and three-storey low-rise buildings continue to pop up across the city, and sadly the mid-rise rarely appears, a type more favorable to the urban writers and activists mentioned above. In May 2010, the City of Toronto published the *Avenue and Mid-Rise Building Study* as an initiative to encourage this scale of building. It puts forth a set of typological characteristics that generally make for good mid-rise buildings, which is expected content for this type of document, but more interestingly was the recognition that certain socioeconomic conditions, policies and regulations make high-rise and low-rise buildings the choice types for developers today in Toronto. In other words, the study begins to address why mid-rise development is often not feasible under today's development "rules". This study begins to uncover the true problem facing the city today, which is not so much that we don't know how or what to build today to make a great city, rather it's usually not feasible to create the ideal buildings for our city.

A significant amount of effort was put into this thesis to understand the economics behind low, mid and high-rise buildings. Surprisingly mid-rise buildings, compared to high-rise buildings, are cheaper to build per-square-foot, can have lower monthly maintenance fees, and can be built quicker which is less risky to developers. This is why many world class cities, including Paris, Berlin, and Vienna are filled with mid-rise buildings. These are the most profitable developments for investors, and the city is reaping the benefits Jan Gehl writes so fondly of.

Toronto's urban development has been soured by rules that were designed for more suburban or high-rise developments in mind. The special mix of regulations and code-requirements that hang over the city burden mid-rise buildings with unfair parking requirements more appropriate for suburban or car dependant neighbourhoods, redundant amenity spaces such as party rooms and resident only gyms, not to mention garbage, loading and fire exiting requirements that are out of scale with mid-rise buildings. Sadly the cost of these burdens can only be covered with the economy of scale that comes with the high-rise condominium complexes.

Low-rise buildings cannot support the density that a bustling urban amenity requires, and the high-rises are synonymous with social problems and neighbourhoods lacking a sense of community. The planners and some developers now appreciate the virtues that come with mid-rise neighbourhoods, however our rules have yet to be rewritten to encourage this building type. A city with more mid-rises would offer a higher standard of living, and more favorable economics for inhabitants and investors.





### **Thesis Statement**

The goal of this thesis is to investigate and propose housing that increases density while offering a better quality of life for citizens inhabiting Toronto's Avenues. This thesis compares three different building prototypes, all of varying scales and typological characteristics. The viability of each prototype is discussed with regards to the current economic and regulatory conditions within the city, as well as the varying quality of life that each prototype creates.



## Argument Background

The original motivation for this thesis came from my personal experiences during undergraduate work experiences and travel. While working for Toronto's famed condo designers, Architects Alliance, there was often a feeling of helplessness as an intern architect. The buildings we worked on were planned as business plans, working around the same condo formula. The schematic design phase had little room for expression. At the end of this work term, I travelled to Berlin where I stayed with friends. Their four bedroom apartment spanned the entire building width, with a quieter inner courtyard the bedrooms looked onto. It was a mid-rise building similar to what Project Lisa (section 4.3). I had never seen apartment buildings well-to-do middle-class people chose to raise families in. I thought they were brilliant, and couldn't understand why we were building point tower condominiums in Toronto.

While compiling the thesis argument, I met with Dermot Sweeny who explained how mid-rise buildings can be feasible despite planning and code regulations within Toronto. He believes we could build better a better quality of life and better neighbourhoods that balance better urban economics with mid-rise buildings.

The City of Toronto's *Avenue and Mid-Rise Building Study* provided guidelines for mid-rise buildings developed along the Avenues. It also highlighted many of the obstacles faced by developers wishing to build mid-rise development in the city today.

Jan Gehl's books explain the merits of certain building and planning configurations. He dissected building types and street design to explain their social effects, documenting how one can create intimate well loved neighbourhoods or failed main streets.

## Structure

This thesis is structured in three parts. Firstly, research was done to determine what makes a good Avenue building, such as how its built form affects society, how feasible it is, and how city planning can affect its morphology. The research is summarized in a grading matrix, the *Avenue Building Criteria*. It serves as a form of report card for the case studies in part two.

The case studies, part two, examine multi-unit residential buildings from around the world. The selection is made up of innovative examples building types, or buildings that are easily adaptable to a Toronto Avenue. Each building was then evaluated with the criteria from part one.

A list of good building characteristics are distilled from the case studies to inform three projects drawn in part three. These three projects, named Amy, Tim, and Lisa propose different housing solutions on the same site at 890 Dundas Street West (A few blocks West of Bathurst Street).

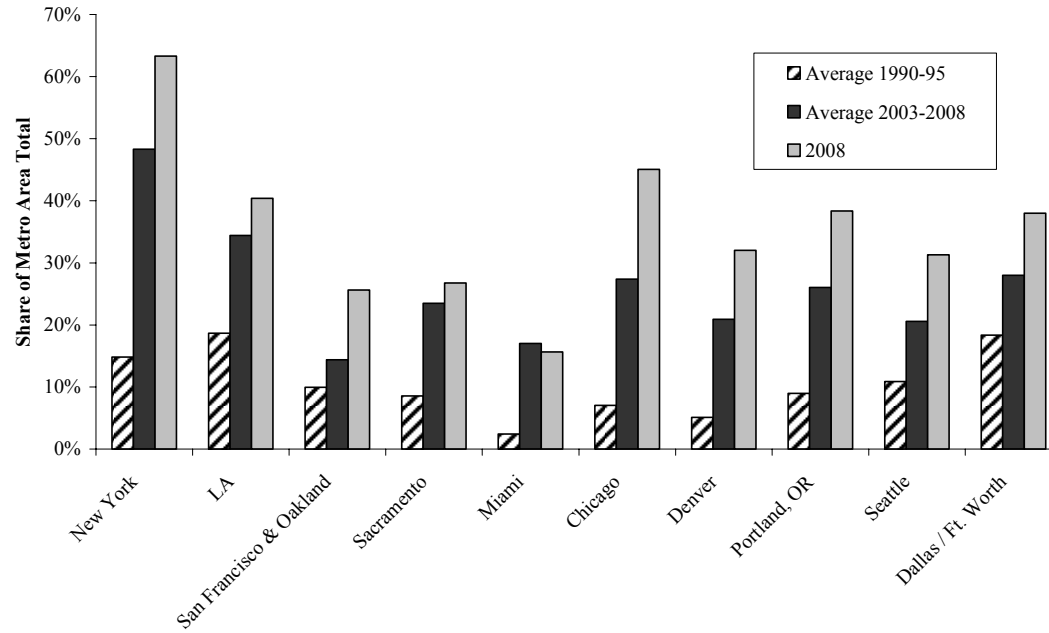
## Project As Thesis

The argument of this thesis is revealed in chapter 4.0 (part three). The knowledge from the earlier chapters informs the design decisions made during the creation of projects Amy, Tim, and Lisa. Each building explains the advantages and disadvantages synonymous with three different building types. This thesis is not necessarily presenting one perfect building, for example four different parking configurations are discussed for Lisa, rather this thesis is illustrating the resulting conditions these buildings and various configurations can create, in the hope that we will make more conscious decisions of how we build Toronto's future.

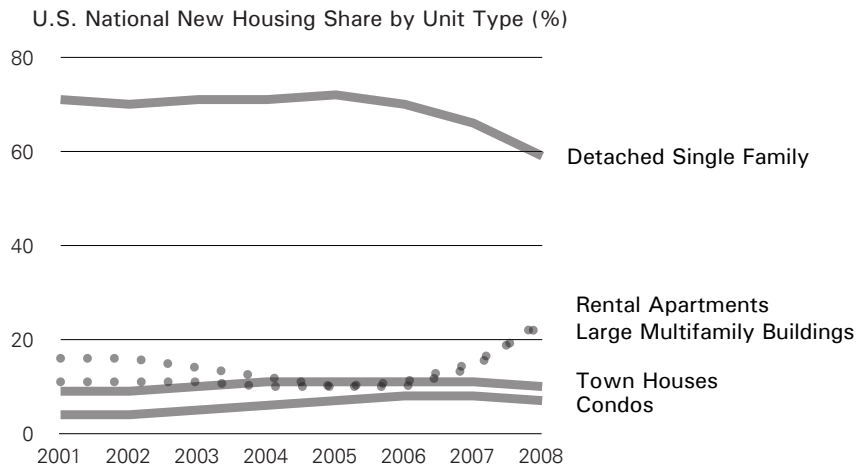


## 2.0 Avenue Development Criteria

**fig 2.1.1**  
**Central City Share of Residential Construction**



**fig 2.1.2 Changing Housing Types**  
 U.S. National New Housing Share by Unit Type  
 by percentage



## 2.1 Housing & Demographics

### **Accommodating Growth**

The City of Toronto is forecast to grow to 3.08 million residents by 2031, which is an increase of 500,000 over the next 20 years. This will provide opportunities for many new buildings in the city, and potentially a rebuilding of many parts of the existing Avenues.

According to the city's "Avenue and Mid-Rise Building Study", the Avenues amount to approximately 324 km of property frontage, and about 200 km can theoretically be redeveloped into mid-rise buildings. If only half of these properties were to be developed as mid-rise buildings, those buildings could house half of this growth.<sup>1</sup>

### **Intelligent Densification: Reurbanization**

Reurbanization is an intelligent way to accommodate growth, improving existing urban infrastructure such as transit, sewers, water, power distribution, telecommunications, among others. All of these are already in place, some may need upgrades, but are still less costly and less resource intensive than introducing new infrastructure on the urban fringe. Expanding our cities usually requires development of farmland, and getting to these fringe neighbourhoods increases our dependence on automobiles.<sup>2</sup>

When we don't invest within the city, and spread our resources thin over the countryside, the results are often unsatisfying. Jane Jacobs wrote, "... new developments spreading beyond the cities are reducing the city and countryside alike to a monotonous, un nourishing gruel..."<sup>3</sup>

### **The Growing Urban-Housing Demographic**

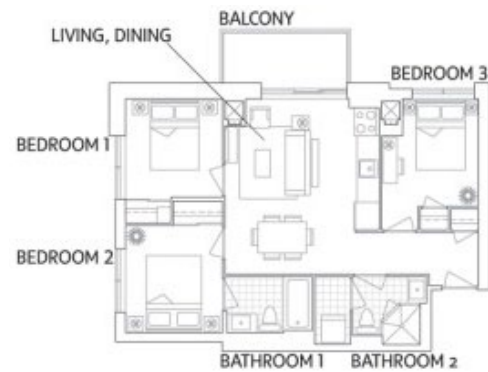
An article in the Toronto Star wrote about a new demographic that are helping ease the gridlock in the city. They are referred to as the 'Condo Commuters', "...the coffee-clutching foot soldiers

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1 City of Toronto, comp. Avenue and Mid-Rise Buildings Study. Toronto, 2010. Print, i.

2 City of Toronto, comp. Avenue and Mid-Rise Buildings Study. Toronto, 2010. Print, 4.

3 Jacobs, Jane. Death and Life of Great American Cities. New York: Modern Library, 1993. Print, 7.



**fig 2.1.3 The Three Bedroom Unit**

Although the condominium market in Toronto is currently made up of one and two bedroom units, there are a handful of three bedroom units that make it to market. This very cosy 820 sq. ft. 3 bedroom, 2 bathroom unit is not an ideal place to grow a family, when similarly priced units further from the town center offer twice as much room. Condominium units downtown are priced at \$450-600/sq. ft. which limits the average families budget of \$400,000 to 800 sq. ft.. Condominium building types popular in Toronto limit units to one exterior wall for windows, or at best two walls around corners as seen above. This limits the amount of variations in the floor plans. Above, the living room/kitchen/dining room also acts as the hallway to the bedrooms. There is little privacy or distance between those socializing in the common space, and those trying to sleep.



in the city's fight against an automobile addiction choking our roads."<sup>4</sup> A growing demographic is choosing to live in areas of the city that allow freedom from the car. These areas are typically zoned for mixed-use, allowing residents to be within walking distance to their employers or other day to day destinations. The demographic of those choosing to live in a non-car-dependant neighbourhood is small, but growing.

The U.S. Environmental Protection Agency published a report, finding the "...acceleration of residential construction in urban neighborhoods reflects a fundamental shift in the real estate market. Lower crime rates in central cities and changing demographics are often cited as forces driving this change. The increased demand for homes in walkable communities close to high-paying jobs has also been documented by a number of studies..."<sup>5</sup>

According to Kaid Benfield, director of the Smart Growth Program at the Natural Resources Defense Council, much of the shift is from aging baby boomers and young people is tied to environmental issues. "There has been a lot of thought given at all levels of government and among the consuming public to what our environmental footprint is, and what the shape of our communities ought to be. The experience with sprawl over the last few decades has produced a reaction."<sup>6</sup> This demographic is conscious of their car usage, informed by a mix of environmental concerns, financial drawbacks, and stress of daily commuting.

### **Changing Housing Needs**

In an ideal world housing would be offered that meets our current social criteria and can be adaptable to respond to changing social demands. Social structures of families have changed considerably in the past decades. The average nuclear family continues to decline, however the typical suburban house plan is still designed for the needs of this social structure. Editor of *InDetail* magazine, Christian Schittich writes, "It isn't as if today's variety of lifestyles imposes an imperative for specialized floor plans. Rather, what we need are flexible types that make it possible to react to changing life circumstances by simple means."<sup>7</sup>

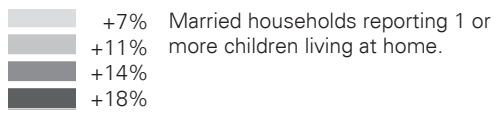
In contrast to suburban development, many of the downtown condominiums being put up today are built exclusively for singles or childless couples, which comes with its own problems. Only a handful of three bedroom (or more) units are currently offered in high-rise condominiums, but they are generally too small and poorly laid out. Toronto is building a city that segregates housing types, which impacts where parents choose to raise their children within the city.

4 Kalinowski, Tess. "'Condo Commuters' Can Ease Gridlock." *TheStar.com*. 16 Jan. 2010. Web. 8 Mar. 2010. <<http://www.thestar.com/printarticle/751566>>.

5 Residential Construction Trends in America's Metropolitan Regions. Rep. no. EPA 231-R-01-002. 2010 ed. United States Environmental Protection Agency. Print, 1.

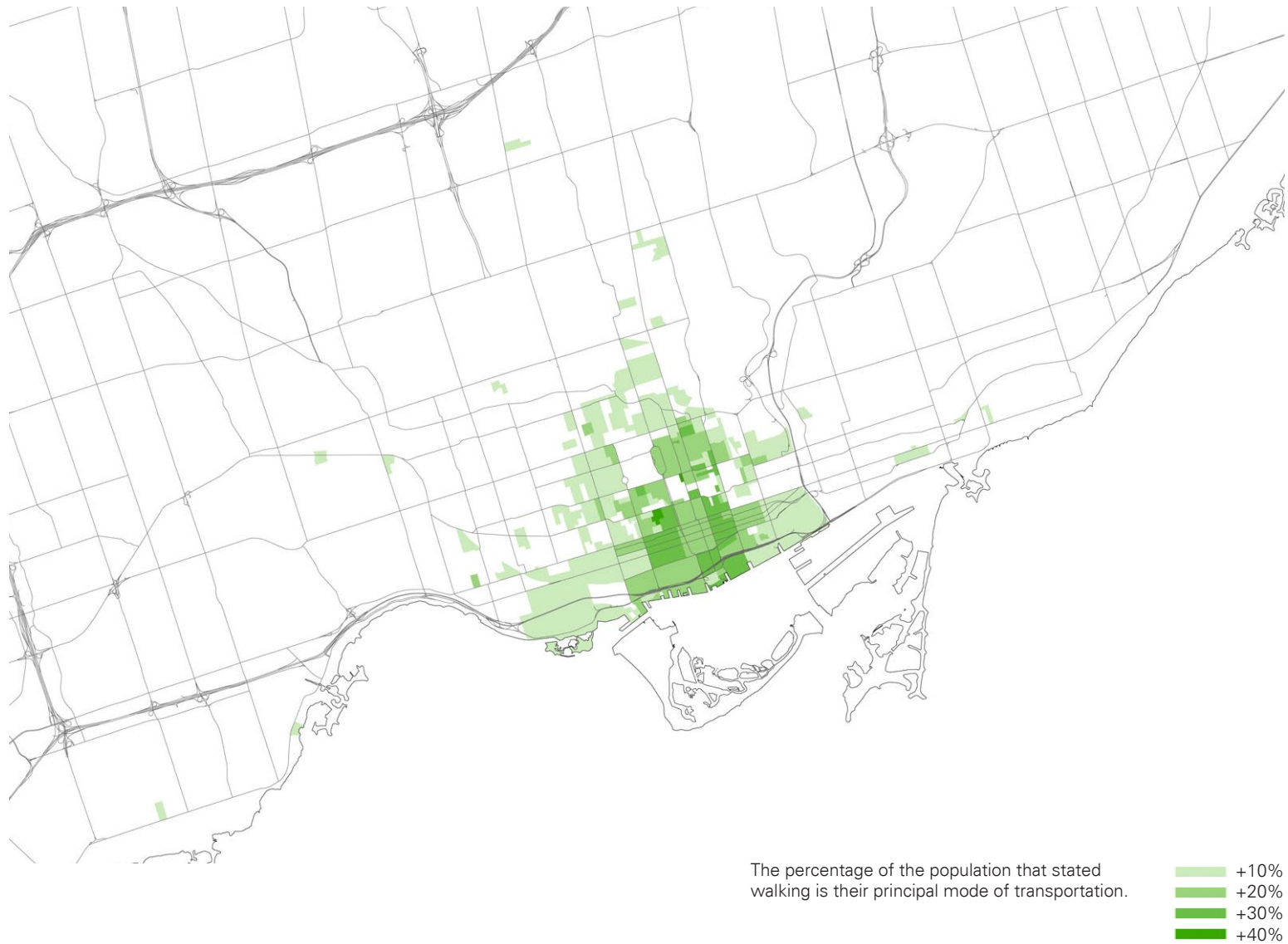
6 Nelson, Gabriel. "'Smart Growth' Taking Hold in U.S. Cities, Study Says." *New York Times* 24 Mar. 2010. Print.

7 Schittich, Christian. *In Detail: High-Density Housing Concepts, Planning, Construction* (In Detail (englisch)). Boston: Birkhäuser Basel, 2004. Print, 9.



**fig 2.1.4 Childless Condominium Neighbourhoods**

City center offers mostly one or two bedroom units, which creates an island of childless households. Parents migrate to the periphery to raise children, where three bedroom or greater units are more common.



**fig 2.1.5 The Condo Commuters**

Areas with high densities of dwellings per hectare and amenity per hectare (amenity mapped below) coincide with areas that have more pedestrians. Lower density areas, not surprisingly, are less likely to have pedestrians. Walking is the cheapest, lowest carbon footprint, healthiest, and most socially engaging mode of transportation.



**fig 2.1.6 Education Amenity**

A map of schools, colleges and universities within the city.

City of Toronto Digital Orthophotos [computer file]. Toronto, Ontario: Land Information Toronto, 2006.



**fig 2.1.7 Commercial Amenity**

A map of commercial amenities including retailers, entertainment venues, restaurants, cafés, bars, etc. As mentioned above on the *Condo Commuter* map above, higher densities of amenity and housing contribute to pedestrian biased citizens.

*“...although the physical framework does not have a direct influence on the quality, content, and intensity of social contacts, architects and planners can affect the possibilities for meeting, seeing, and hearing people - possibilities that both take on a quality of their own and become important as background and starting point for other forms of contact.”*

*Jan Gehl - Life Between Buildings*

**fig 2.2.1 Cars and the City**

Examples of four different cities and how their public space and city life have been affected by automobiles.



**The Pre-Vehicle City**

The public realm is mostly made up of necessary activities. No vehicles makes walking more enjoyable on streets, but also the only choice.



**The Reclaimed City**

A city that understands that public space and city life are optional, and city spaces must be carefully designed to invite walking, cycling, and staying.



**The Cohabitation City**

The public realm has been confined to small sidewalks at the edges of the streets.



**The Abandoned City**

The public realm has been neglected to the point that people have given up on city life altogether.

## 2.2 Society and the Built Form

### Human Interaction

Jay Walljasper writes in “The Great Neighborhood Book” that humans have evolved as social creatures, and day to day contact as simple as “... a smiling face, laughter in the air, a hearty hello can make all the difference between a good day and a dull, disappointing day. ... The chance to exchange greetings with acquaintances, or even strangers, makes us feel happy and safe.”<sup>1</sup> The belief that the majority of humans need a certain level of human interaction, is reflected in Jan Gehl’s research and writings. He does not argue that a well designed public space can automatically create friendships between residents, rather it influences citizens chances of “low-intensity” contact, such as the simple hello, or eye contact that Walljasper so fondly writes of. Low-intensity contact, according to Gehl, can maintain already established contacts, or leads to “chance contacts”, and “acquaintances”. These contacts are a source of information about the social world outside, they are a source of inspiration, and offer a simulating experience to street life.

An example of an environment where no low-intensity contact is permitted would be an apartment block, located along busy multi-lane roads. Here there may be spaces where people can pass by each other, but it would be in a dark corridor without windows, in the parking garage, or along the scarcely used sidewalk along the busy road. These places are usually empty, limiting social interaction to private home gatherings, bars, community meetings. The problem with limiting social interaction to these environments is that they occur less frequently, require more planning, often cost admission or a minimum time commitment, and occur within a space with higher contact intensity.

When citizens live in environments where there is no low-intensity contact, “...the boundaries between isolation and contact become sharper – people are either alone or else with others on a relatively demanding and exacting level. Life between buildings offers an opportunity to be with others in a relaxed and undemanding way.”<sup>2</sup>

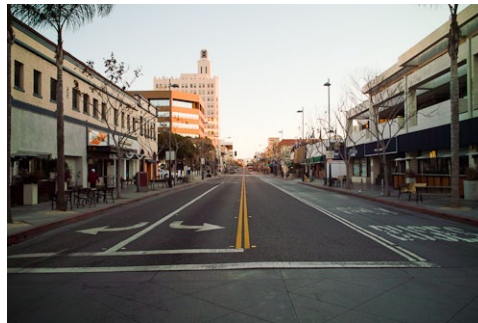
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1 Walljasper, Jay. Great Neighborhood Book. New York: New Society, 2007. Print, 10.

2 Gehl, Jan. New City Life. Copenhagen: Danish Architectural, 2006. Print, 17.

**fig 2.2.2 Narrow Streets**

David Yoon, a resident of Los Angeles, uploads photoshopped streetscapes to his blog "Narrow Streets". His website notes that he was off-put by the width of his hometown streets, after walking much narrower ones in Paris.





## Planning for Pedestrians

Contact of any sorts is almost impossible when driving in an automobile, enclosed behind glass and metal, moving past others too quickly to communicate even a quick “hello”. When planning for low-intensity contact, it is implied that one is planning for the consideration of the pedestrian realm. Gehl believes life takes place on foot and writes, “only on foot does a situation function as a meaningful opportunity for contact and information in which the individual is at ease and able to take time to experience, pause, or become involved.”<sup>3</sup>

A city that is made up of streets that are solely designed for automobile use, on sees few people, if any, because outdoor stays are more or less impossible. The following paragraphs address common considerations lacking in new streets, or considerations that often are removed on older streets in leu of vehicular traffic efficiency.

## The Importance of Scale

The dimensions of the street can either make it feel expansive or cold, or small and intimate. The blog *Narrow Streets*, showcases images created by its editor, David Yoon of Los Angeles, illustrating two versions of the same street. The contrast between the two versions reveal how dimensioning can create an intimate or cold street.

In *Life Between Buildings*, Gehl writes, “The relationship between distance and intensity, closeness and warmth, in various contact situations has an important parallel in the prevalent perception of architectural dimensions. In cities and buildings projects of modest dimensions, narrow streets, and small spaces, the buildings, building details, and the people who move about in the spaces are experienced at close range and with considerable intensity. These cities are spaces are comparably perceived as intimate, warm and personal. Conversely, building projects with large spaces, wide streets, and tall buildings often are felt to be cold and impersonal.”<sup>4</sup> He then associates the automobile city with large scale things, such as oversized signs and billboards, with poor build quality but large enough for viewing from a car. Sadly a city built this way has less to offer to the pedestrian, who is experiencing the city at a distance much closer to buildings, and notices finer details when walking at a slower speed. The pedestrian city, in contrast, offers closely spaced buildings, good areas for outdoor stays, etc. Here it is possible to see and interact with people, and appreciate finer building details.

Gehl’s pedestrian city takes critical account of acceptable walking distances. This is an understanding that to encourage or prefer to walk over driving, the distance to a destination has to feel close enough, and this may not necessarily be based on a quantitative distance. He writes it is an “interplay between the length of the street and the quality of the route, both with regard to protection and the stimulation en route.”<sup>5</sup>

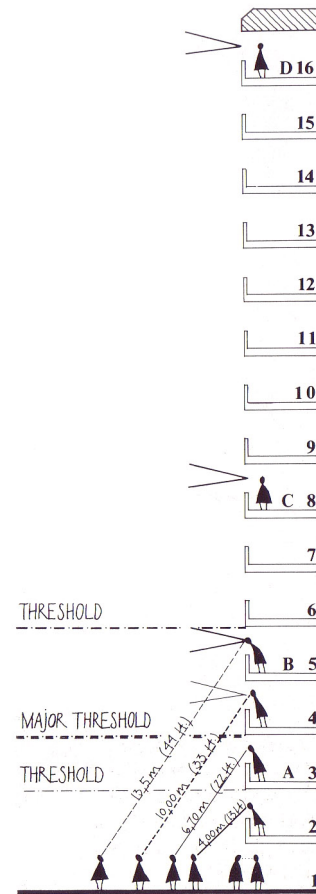
Our cities are built with an intended scale, usually either for pedestrians or automobiles, or some combination of the two, but proper and efficient dimensioning contributes to acceptable walking distances and intimate streets.

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3 Gehl, Jane. *Life Between Buildings: Using Public Space*. 6th ed. Copenhagen: Danish Architectural, 2008. Print. p 74.

4 Gehl, Jane. *Life Between Buildings: Using Public Space*. 6th ed. Copenhagen: Danish Architectural, 2008. Print. p 73.

5 Gehl, Jane. *Life Between Buildings: Using Public Space*. 6th ed. Copenhagen: Danish Architectural, 2008. Print. p 141.



**fig 2.2.3 Height and Connectedness**

Occupants within a building have a relationship to the street at lower storeys. Above the fifth floor occupants lose any sense of connectedness to the happenings on the street.

## **Eyes on the Street**

According to Jane Jacobs, we experience our city from the sidewalks. From here we view the buildings, observe other citizens, we peer into shop windows, we smell foods. However before a city's streets can achieve popularity and success, citizens must feel safe walking on them. Having "eyes on the street" increases safety. Residents, shop keepers, and office workers with windows viewing onto the street, can observe the happenings on their street. On an evening with only one pedestrian on the sidewalk, that pedestrian can feel safe if they can see others nearby, within the buildings. Although conversely a the same pedestrian would feel unsafe on a street with no windows, with windows leading into dark uninhabited spaces.

This is an important consideration when designing buildings for the Avenues. Buildings should be programmed such that many commercial and residential units face onto the street, detailed such that their windows have a clear view onto the sidewalks. Also, the mix of retail and residential units should ensure, that after business hours, when these retail units are vacant, the residential units are close enough to the sidewalks to effectively view the sidewalks.<sup>6</sup>

## **Building Height**

Jan Gehl's book, *Life Between Buildings*, the height between an occupant and the sidewalk affects the connectedness to the street. The illustration on the facing page illustrates Gehl's thresholds of connectedness. Interestingly, he believes occupants above the fifth storey no longer have an association with their street.<sup>7</sup>

## **Grass in The City**

The attraction of the 'Tower in the Park' and the popularity of the suburbs were fueled by the idea that social ills were, in part, caused by lack of access to green spaces, fresh air, and other benefits of the countryside. Urban renewal projects pushed for the inclusion of playing fields and open space. The mentality when erecting these projects was "... that much like this must be good for us, as long as it comes bedded with grass."<sup>8</sup> However it didn't take long for the failure of these projects to prove green spaces, among other factors, cannot ensure the success of a new urban development.

One could argue that a single green space or group of spaces within the city are not enough to see the positive affects, however Los Angeles, a city with some of the lowest densities, largely suburban planned, has the highest crime rate of any major city in the country. "Thinning out a city does not ensure safety from crime and fear of crime."<sup>9</sup>

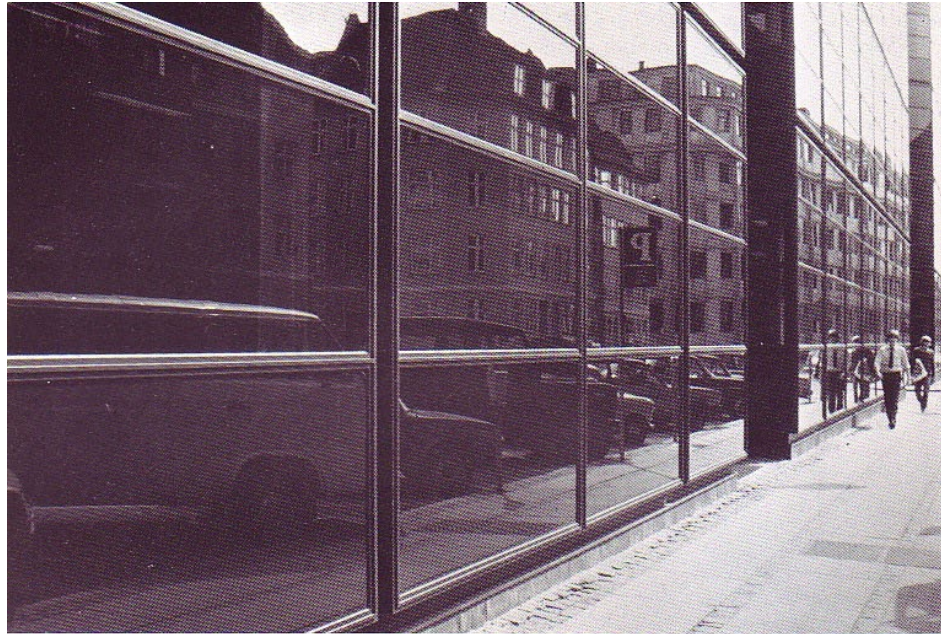
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6 Jacobs, Jane. *Death and Life of Great American Cities*. New York: Modern Library, 1993. Print, 32.

7 Gehl, Jane. *Life Between Buildings: Using Public Space*. 6th ed. Copenhagen: Danish Architectural, 2008. Print. p 100.

8 Jacobs, Jane. *Death and Life of Great American Cities*. New York: Modern Library, 1993. Print, p 7.

9 Jacobs, Jane. *Death and Life of Great American Cities*. New York: Modern Library, 1993. Print, p 32.



**fig 2.2.4 Regular vs. Irregular Façades**

Irregular façades offer places for citizens to rest on, and are more conducive for gatherings.

## Street Façades

Jan Gehl writes, “It is, quite simply, of utmost necessity to be very careful with every single foot of facade or pedestrian route.”<sup>10</sup> When acceptable walking distances are being calculated by citizens, they are not only considering the distance, but also how enjoyable walking that distance will be. That is in part determined by the quality of the facade of the buildings facing the streets.

A building facade with no doors, or windows, and no architectural articulation often is marked by graffiti, possibly a reaction against the nothingness – a primal desire for visual or emotional stimulation of any kind! Jane Jacobs argues these types of buildings contribute to unsafe streets. When discussing a street with no facade articulation she writes, “to build city districts that are custom made for easy crime is idiotic. Yet that is what we do.”<sup>11</sup> Jacobs writes of the importance of ‘eyes on the street’, or people inside the buildings being able to see onto their street. This ensures, even when no one else is present on a street, the lone traveller is less likely to get mugged, if a few people in adjacent buildings are able to see and react to the incident.<sup>12</sup>

Gehl’s writing on street facades includes thoughts on how to encourage ‘zones for staying’ and argues that this is largely contributed to by ‘the edge effect’. He believes, “...if the facades lack interesting details - niches, holes, gateways, stairs, and so on - it can be very difficult to find places to stop. ...Good cities for staying out in have irregular facades and a variety of supports in their outdoor spaces”<sup>13</sup> Humans need places to lean up against, or sit on. Benches and trees can work within these public spaces, but buildings should also contribute to the number of places a citizen can interface with.

The irregular facade is like a crack in the sidewalk, collecting soil and the chance seed. Perfect impermeable surfaces do not, by nature, allow things to stop and collect. Citizens respond in a similar manner to façades with perfect impermeable surfaces. Nooks and irregularities allow people to sit or gather in, which have the opportunity to grow into something more meaningful if the conditions are right. Street façades define the space that make up our journeys through the city. They must be articulated at a scale that is relevant the pedestrian, they must provide eyes on the streets, and they should be irregular.

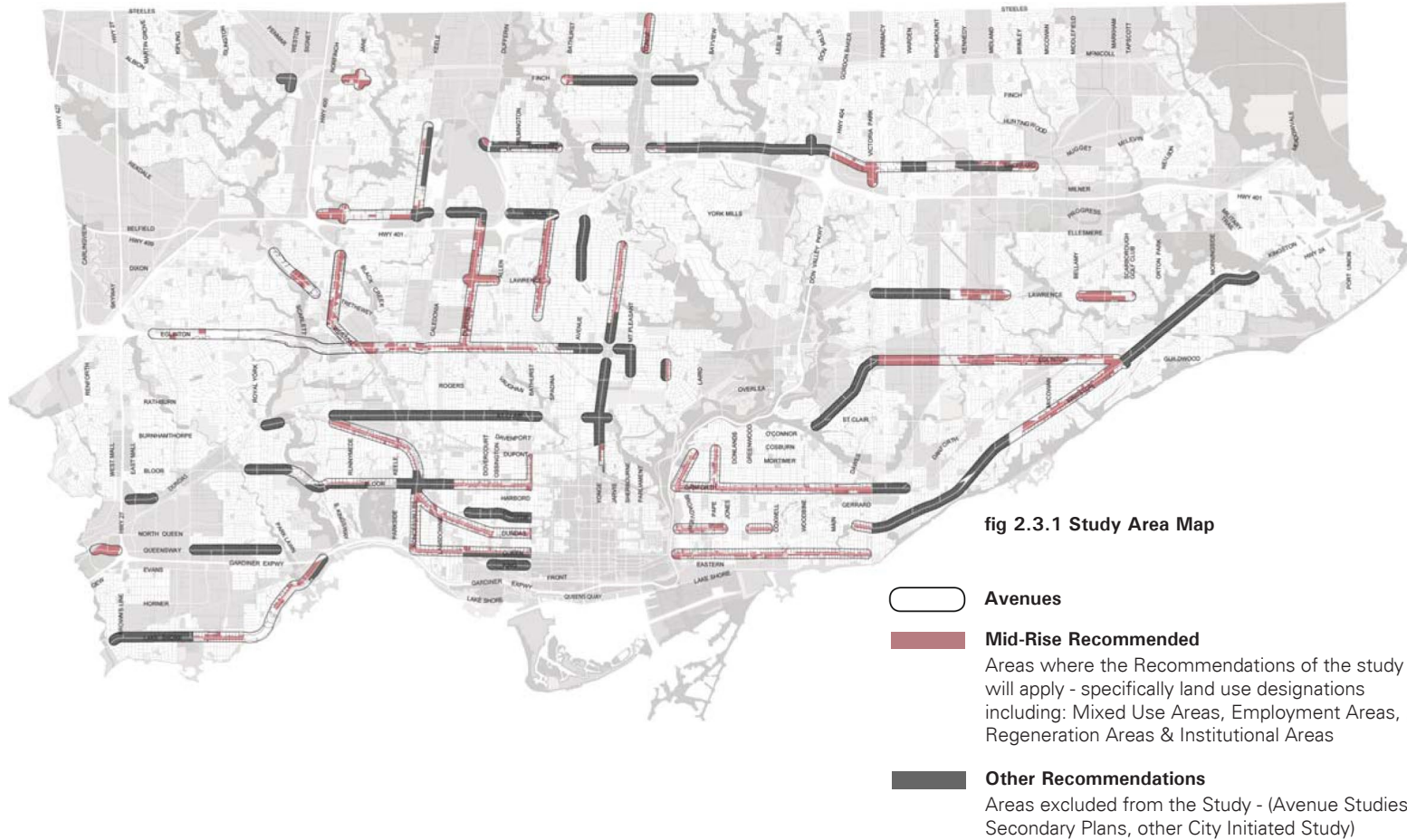
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10 Gehl, Jane. *Life Between Buildings: Using Public Space*. 6th ed. Copenhagen: Danish Architectural, 2008. Print. p 85.

11 Jacobs, Jane. *Death and Life of Great American Cities*. New York: Modern Library, 1993. Print, p 31.

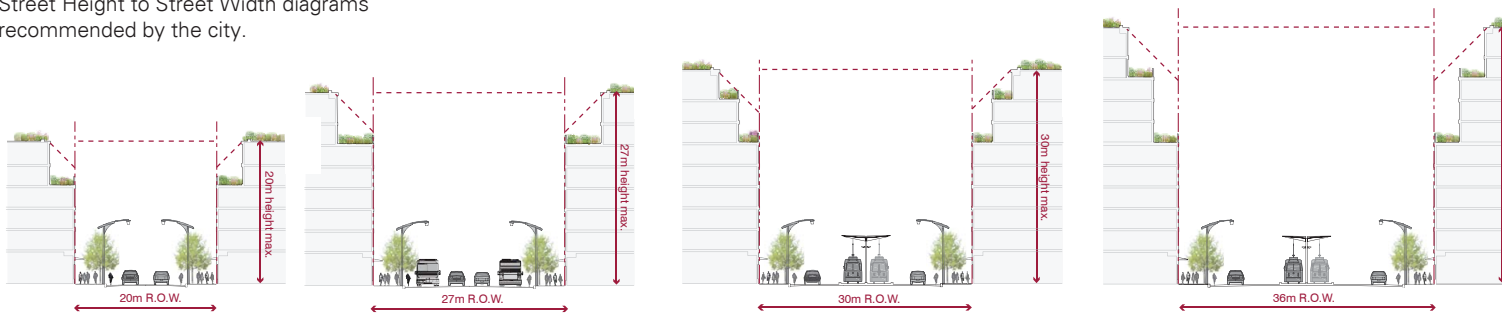
12 Jacobs, Jane. *Death and Life of Great American Cities*. New York: Modern Library, 1993. Print, p 35.

13 Gehl, Jane. *Life Between Buildings: Using Public Space*. 6th ed. Copenhagen: Danish Architectural, 2008. Print. p 155.



**fig 2.3.2 1:1 Ratios**

Street Height to Street Width diagrams recommended by the city.



## 2.3 Planning & the City of Toronto

### Planning's Impact on Development

Development is like a game, where the player must consider conditions such as market demand, cultural expectations of housing, and the economy, in order to win. The rules of this game are dictated by building codes, and city planning regulations. Chapter 2.4 examines how these rules overlaid on Toronto affect the development game, or how these rules affect the built form of winning developments.

### Mid-Rise Avenue Study

In May 2010 the City of Toronto published their Avenues and Mid-Rise Building Study. This report outlined a vision for how the Avenues could be redeveloped to accommodate a growing population within the city without disrupting the cherished Neighbourhoods. This report was shaped by a history of city initiated reports, including:

- \* Main Street Initiative (1987)
- \* Mid-Rise Symposium (2005)
- \* Avenue Studies (2000 - present)
- \* Transit City (2007 - present)
- \* Tall Buildings - Inviting Change in Downtown Toronto (2008 - present)
- \* Toronto Green Standard (2008 - present)

### Performance Criteria

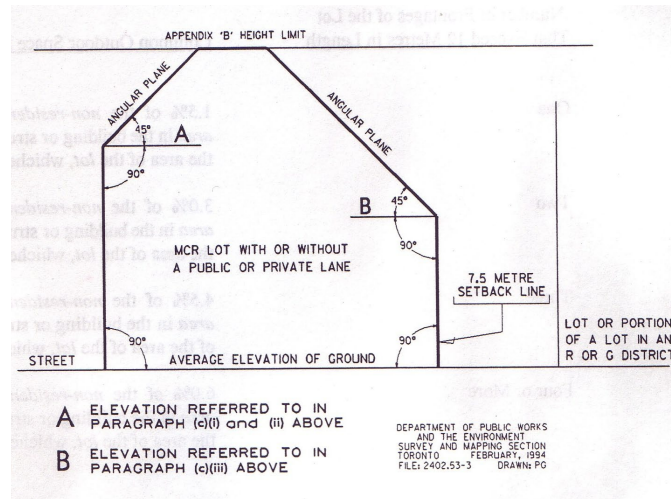
Within the Avenues and Mid-Rise Building Study, a set of performance criteria is outlined, which is a preliminary set of zoning and code requirements specifically created for Avenue mid-rise buildings. Some of the criteria is listed below.

Maximum Allowable Heights determined by lot depth, neighbouring buildings, and Avenue width. The Avenue right-of-ways fall into seven widths: 20, 23, 27, 30, 33, 36 and 45 meters.<sup>1</sup> The width of the street is to make a 1:1 ratio with the height of the proposed building. The thesis case study, for example, is on a site along Dundas Street, which has a 20 m right-of-way width, therefore

<sup>1</sup> City of Toronto, comp. Avenue and Mid-Rise Buildings Study. Toronto, 2010. Print, p 14.

**fig 2.3.3 Setback Restrictions**

A vertical cross section of angular plane and setback restrictions as dictated by Toronto’s Zoning By-Laws. These are the conditions for the Study site of Project Lisa, 890 Dundas Street West.

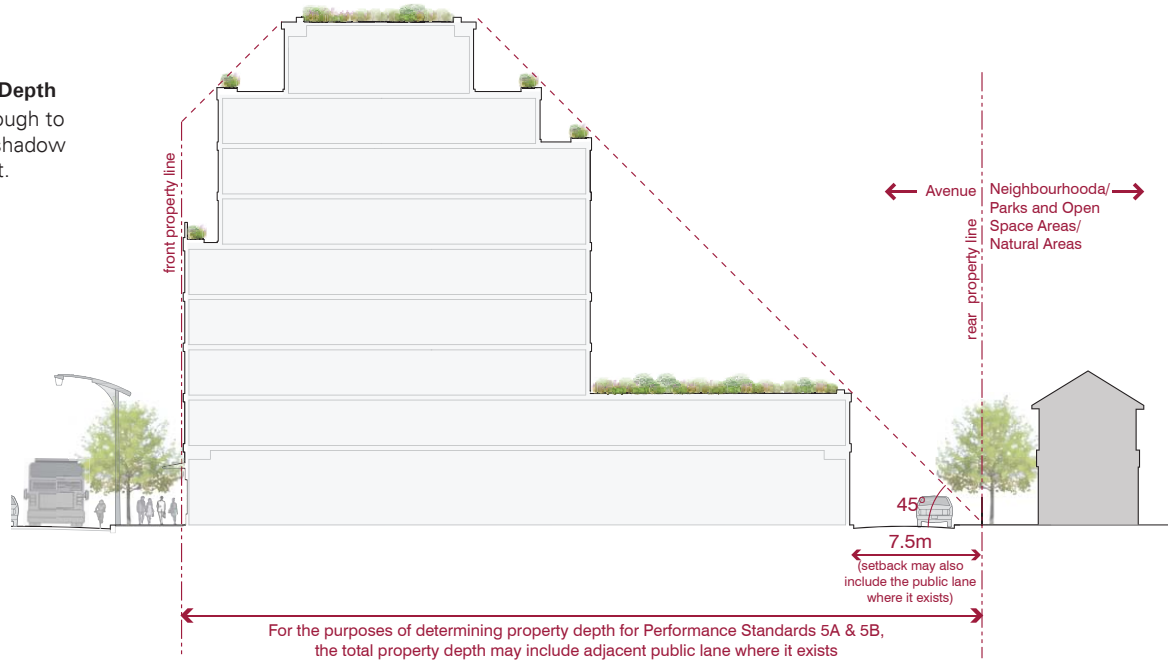


**Street Width & Building Height**

R.O.W.	Mixed Use		Commercial	
	storeys	height (m)	storeys	height (m)
20m	6	19.5	5	18.9
27m	8	25.5	7	26.1
30m	9	28.5	8	29.7
36m	11	34.5	9	33.3

**fig 2.3.4 Ideal Lot Depth**

The site is deep enough to accommodate 45° shadow angles within the lot.





the building height cannot exceed 20 m.

**Minimum Ground Floor Height** is to be 4.5 m to ensure great retail spaces at grade, or easy conversion to retail spaces in the future.

**Angular Plane Building Envelopes** - Building envelopes are determined by 45° angular planes to allow for a minimum of 5 hours of sunlight onto the Avenue sidewalks from March 21st - September 21st.

**Pedestrian Perception Step-Backs**, to reduce the perceived height of taller buildings.

**Front Façade Alignment** to ensure continuous street walls.

**Stepped Massing** - Avenue building massing that steps down towards lower buildings in the adjacent Neighbourhoods (Neighbourhoods are protected residential areas made up of single family homes, duplexes and townhouses).

### **Development Obstacles**

The study also discussed some of the hurdles that mid-rise developers have to deal with. The following are some of the problems and “compliance alternatives” addressed in the study.

**Uncertainty in Process** - “The time and costs associated with obtaining approvals in the context of zoning that is out-of-date with the Official Plan, including re-zonings, Official Plan Amendments, public consultation, negotiations, Section 37 agreements, Ontario Municipal Board hearings and Site Plan Approval and is considerable enough to dissuade developers from considering mid-rise building development as viable.”<sup>2</sup> The study recommends the city introduce a policy allowing for speedy approval if all of the Performance Criteria is met.

**Mid-Rise Interdivisional Team** - A dedicated team within the city’s planning department should be created that understands the specificities of mid-rise building and planning. This team would be able to help speed up approval times.

**Land Use Designation** - Some of the segments along the Avenues have a Neighbourhoods land use designation, and should be rezoned for mixed-use.

**Parking Requirements** - Parking requirements for mid-rise buildings should be less than the requirements for suburban or Neighbourhoods areas. Requirements for visitors, residents, retail or office space within the building should be reduced or eliminated.

Residents along the Avenues are more likely to be within walking distance to amenities and public transit. Accommodating one or more parking spaces per dwelling unit can cripple the financial feasibility of a mid-rise development, or eat up too much of the ground floor with parking, or a parking ramp to the basement. This ground floor would be better used as retail space, both for providing amenity along the Avenues, and for creating more high-value saleable space to the developer. Bicycle parking and car sharing programs can work in lieu of lost parking spaces.

**Amenity Space** - Many Avenues already have a high level of community centres, fitness facilities, parks, religious and cultural centres, etc. The city’s requirement for amenity parks should be re-assigned to a contribution made to the upkeep or upgrade of neighbouring amenity spaces.

Mason White detests the resulting amenity spaces from the city’s requirements. He refers to the condominiums with amenity spaces as buildings attempting to create a “...simulacrum of urban lifestyle. [They offer] Spa, Gym, Housekeeping services. The notion of interior urbanity,

<sup>2</sup> City of Toronto, comp. Avenue and Mid-Rise Buildings Study. Toronto, 2010. Print, p 105.



extreme convenience, homogeneous social programming, and mixed use will need to be central to re-thinking the role of condominiums in our urban age.”<sup>3</sup>

The Avenue and Mid-Rise Building Study suggest developers submit a “Community Services Report” or similar document to illustrate that amenities are already provided by the neighbourhood, and should not need to be included within the mid-rise building.

**OBC Requirements** - The Ontario Building Codes are unfavorably written for mid-rise buildings, as these projects fall above thresholds of size and height, and burden constructions and features that are more necessary for larger buildings. Buildings above 500 m<sup>2</sup> in building area and three storeys in height fall under Part 3 of the code, which is more strict. Under this threshold buildings are governed under part 9, which allows lower-cost combustible construction. There are also 18 and 36 m heights that require additional life and fire safety measures.

Currently part 3 classified buildings require, two fire stairs, non-combustible construction, fire Sprinklers in residential and mixed use buildings (comes into effect in 2010).

British Columbia has recently approved combustible construction on mixed use buildings under six storeys. Ontario should consider revising these requirements, especially for city mid-rise buildings on the Avenues. These buildings are within reach of fire truck arms, and within quick response of city fire-stations.

**Loading & Garbage Pickup** - Standard methods are sometimes not feasible on mid-rise sites, or results in negative impacts on the ground floor or upper floor layouts, and reduces the feasibility of the development. Shared loading between buildings, or permitting laneway loading or garbage pickup is an attractive alternative.

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<sup>3</sup> White, Mason. “Condomanium.” *Ourtopias: Cities and the Role of Design*. [Cambridge, Ont.]: Riverside Architectural, 2008. Print, 27.

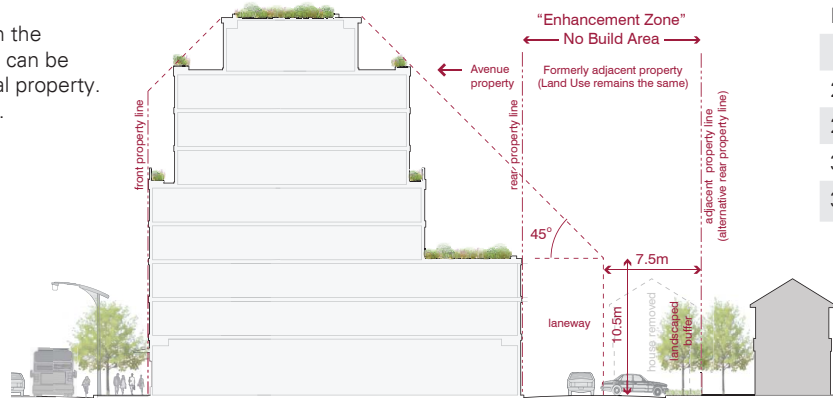
**fig 2.3.5 Shallow Lot Section**

When the lot is not deep enough to contain the buildings shadows, "Enhancement Zones" can be created by acquiring the adjacent residential property. No structures are allowed in this new zone.

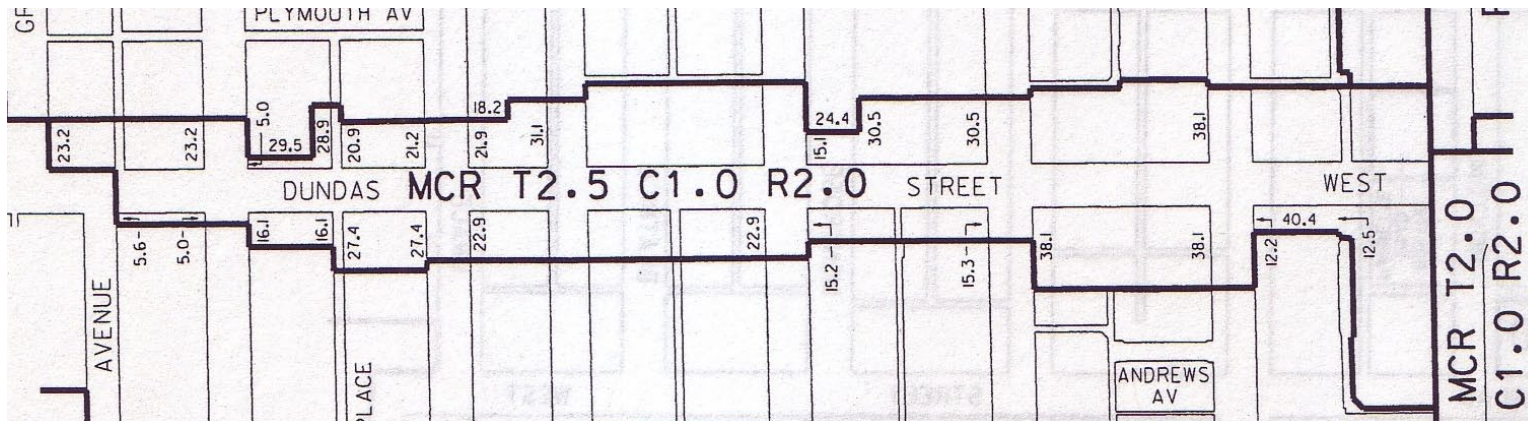
**fig 2.3.6 Satellite Image**

**fig 2.3.7 Non Standardized MCR Lot Depths**

Only a few of the sites along a section of Dundas St. West can be developed to the maximum allowable height as outlined in the Performance Criteria. This is not encouraging to developers who are faced with rezoning battles, amendments, or will settle for undersized developments.



R.O.W.	Lot Depth
	ideal minimum:
20m	32.6 m
27m	41.0 m
30m	44.6 m
36m	51.8 m



## **Obstacles to be Readdressed**

**Shallow Sites** - The study should be credited for acknowledging that certain sections along the Avenues are designated as Neighbourhoods, and recommends that they should re-examined for an official plan amendment for mixed use zoning. And it also begins to address shallow sites (generally under 30 m in depth) by suggesting the creation of “Enhancement Zones” to buffer height difference to the Neighbourhood. This area is created by acquiring one or two residential properties adjacent to the site, demolishing the houses, and creating a laneway, park spaces, or parking spaces.

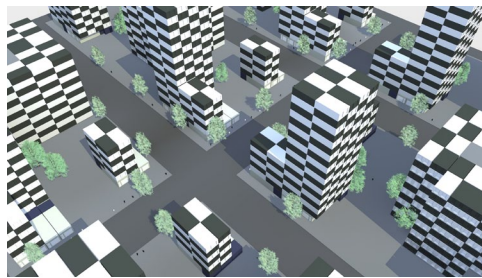
Creating Enhancement Zones is not an ideal solution because it requires an official plan amendment before this the zone can be created, it does not allow for any saleable space to be built within the Enhancement Zone, and it creates questionable public space to the rear of the Mid-Rise building. Instead of the Enhancement Zone solution for shallow sites, the city should redesignate MCR zoning of a standardized depth from the Avenues. This would remove the obstacle of the developer having to rezone this area, which is no small feat, and dramatically increase the value of the properties that were re-zoned.

**Reports** - When requesting to build a mid-rise building with no amenity space, the city still asks for a “Community Services Report”. This is something not required by the smaller single family detached homes, or townhouses. This adds cost and time to a development project, which might be inconsequential the budget of a large development, but a sizable cut to the profits of a mid-rise development. The number of reports or special documents needs to be reduced to a minimum to keep mid-rise buildings as attractive business endeavors to high-rises.

**Building Height** - The 1:1 street width to building height ratio limits the density on 20 m wide streets, which account for more than half of the Avenues in the Avenue and Mid-Rise Building Study. Many successful streets from around the world exceed this ratio. A ratio of 1:1.5 or 1:2 may be more appropriate in some circumstances.

**Building to Property Lines** - Assuming perimeter block planning.

**Social Streets, Quiet Courts** - Perimeter blocks and activity level programming. Great Nightlife & Undisturbed Sleep.



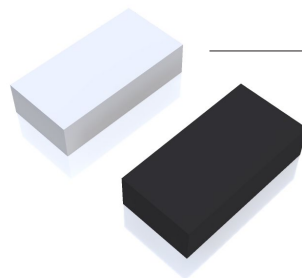
Scheme A

fig 2.3.8



Scheme B

fig 2.3.9



**Social Spaces *in Black***  
for entertaining, dining, cooking, etc.

**Solitary Spaces *in White***  
for sleeping, studying, reading etc.

fig 2.3.10

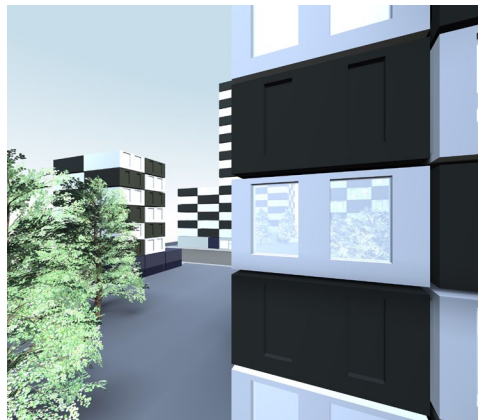
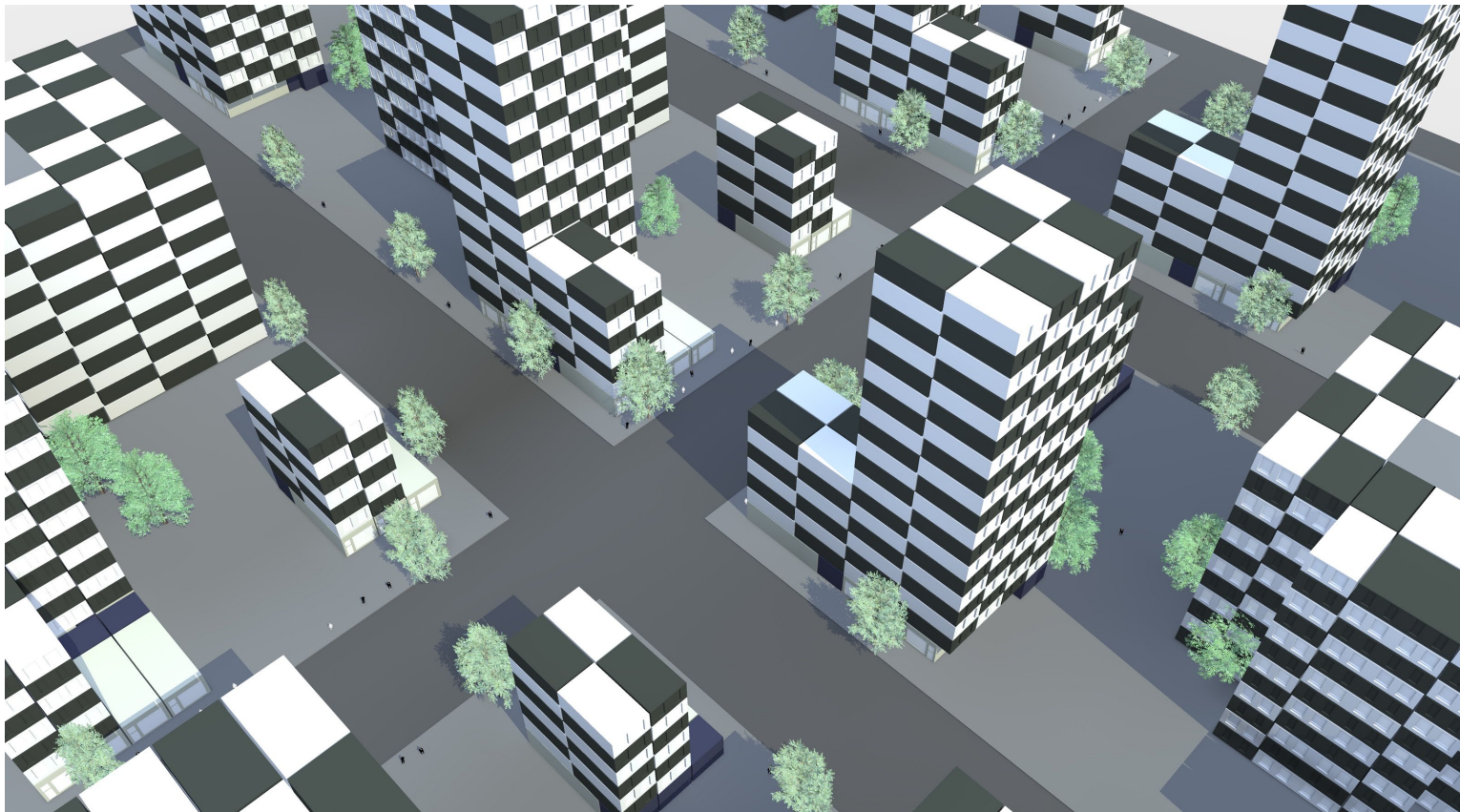
### **Organizing Socializing & Solitary Spaces**

As neighbourhoods increase population density, planning between spaces for socializing and solitude become increasingly important. Low density suburban or rural neighbourhoods do not require the same consideration, as backyard patio gatherings, or band practice in a garage are separated by greater distances. Access and communication between neighbours is relatively easy, allowing for better consideration and negotiation. However, in high density neighbourhoods, neighbours are closer to each other, and noise can be multiplied by many parties. Access and communication to noisy neighbours can be frustrating within or between apartment buildings.

Noisy neighbours can be partially sound insulated from the dwelling unit, however this insulation is ineffective when a window is opened, which is expected during fair weather.

### **Schemes A & B**

Two scenarios are presented; scheme A, a neighbourhood planned with no coordination of socializing and solitary spaces; And scheme B, with strictly regulated socializing and solitary spaces. Both of these schemes below have a density of 192 dwellings and 11 storefronts (6m wide) per hectare. Socializing spaces have been rendered white, and solitary spaces black. The street grid spacing, and street widths are similar to the geometry of the Dundas West neighbourhood – the neighbourhood of Projects Amy, Tim, and Lisa of chapter 4.0.



Site massing is not organized with fragmented park spaces.

Avenues are lined with both solitary and social spaces, and some social spaces have views onto the street life.

Bedrooms are organized around quieter park spaces of the inner block. Sleeping is less frequently interrupted.

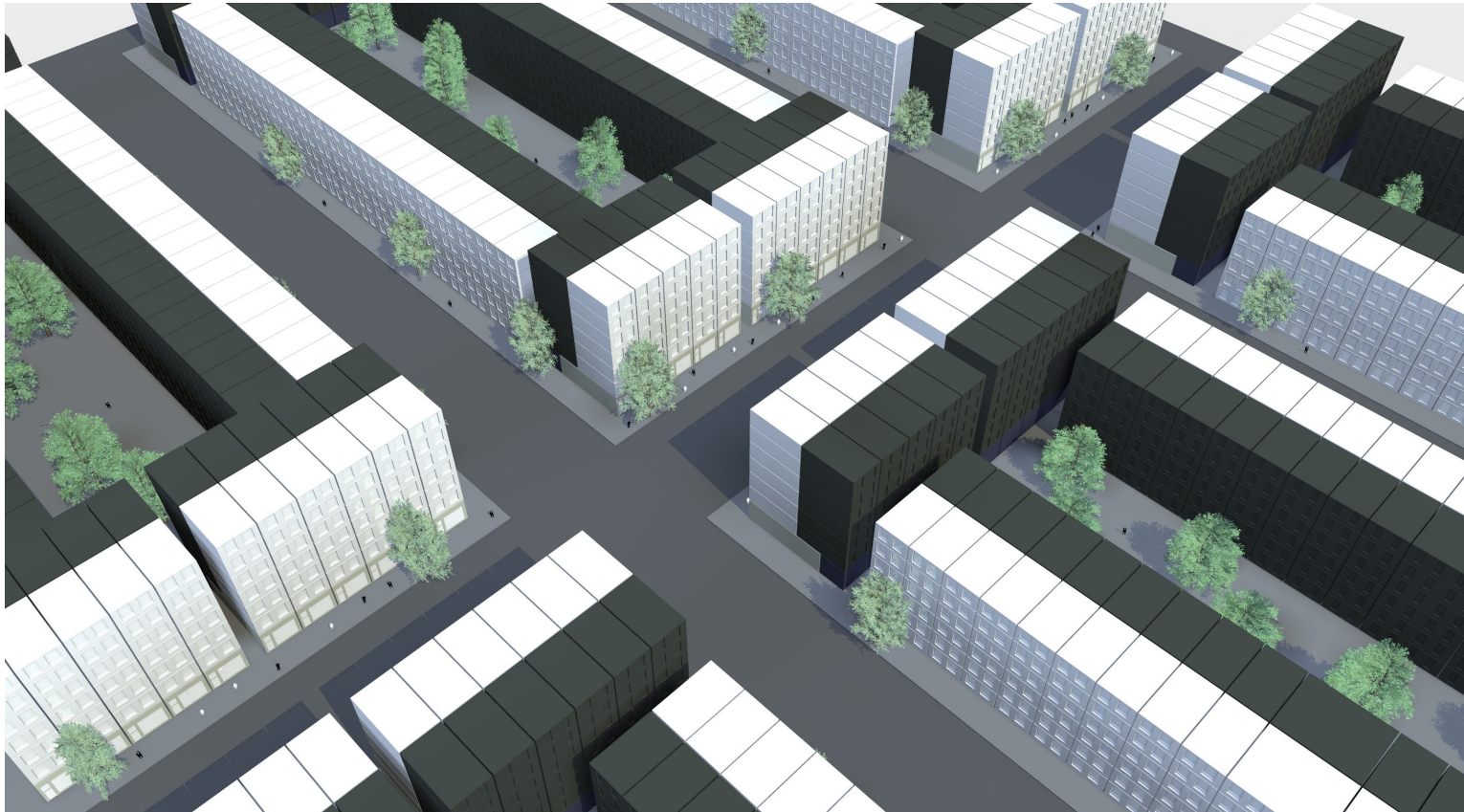
fig 2.3.8 (above)

fig 2.3.11 2.3.12 (below)



**Scheme A**

This scheme has made no consideration to the placement of social and solitary spaces. Each building is a different height, and it is unclear what is private or public exterior space. This configuration can create conflicts between social and solitary spaces. Parties, street life, parades, balcony barbecues, are more likely to conflict with a resident studying, sleeping, or meditating. These conflicts increase the negative aspects of high density housing, such as overcrowding.



Site massing is well organized with larger unified inner block park spaces.

Avenues are lined with social spaces, and social spaces have views onto the street life.

Bedrooms are organized around quieter park spaces of the inner block. Sleeping is less frequently interrupted.

fig 2.3.9 (above)

fig 2.3.13 2.3.14 (below)

**Scheme B**

This scheme considers the placement of social and solitary spaces. Social spaces line the Avenues, with views to street life below for residents. Events in the Avenues, such as a parade, a street performance, or a street fair, can be witnessed by both spectators on the street and from balconies and living room windows above. Street life can be enhanced when the social spaces line the Avenues. This configuration greatly reduces conflicts between social and solitary spaces. Residents who are studying, sleeping, or meditating can do so on the quieter inner block. When these conflicts between social and solitary spaces are decreased, the high density housing seems less crowded. This configuration creates streets that are more lively, and residents that are better rested.

**fig 2.4.1 Economic Implications of Scale**



## 2.4 Economics

### Architects & Developers

Real estate developers and architects are two groups that should closely work together, however it is not unusual to hear of developers that fail to see the value architects, or architects that fail to bring value to a real estate project.

Thorboern Mann, Berkeley PHD and professor of architectural studies at Florida A&M University, tells the sad tale of an architect that was not included in an extensive feasibility study for a new downtown office tower. “5 financial feasibility advisors “... gave him [the architect] a program with the complete service core, number of floors, and outside dimensions worked out in considerable detail, leaving the architect essentially to design a skin around the building.”<sup>1</sup>

Feasibility advisors, it should be assumed, do not have the same spatial awareness and understanding of quality of space that an architect is trained to have. The problem with developments that begin as described above, is the experts designing the program are limited to building types and models they are familiar with. An architect valued for an understanding of feasibility issues is much more probable to formulate a program allowing for more vision and architectural merit than a team of feasibility experts.

### Development Scale

Mid-rise buildings have many economic advantages over high-rise buildings such as:

- \* Smaller land parcels which are less likely to require costly land assemblies.
- \* Lower per square foot construction costs.
- \* Shorter construction times resulting in: shorter loan times, less interest paid, less risk for investors.
- \* Financing for smaller budgets is easier.

Despite the above advantages of mid-rise buildings, municipal and provincial regulations work against mid-rise solutions. The Avenue and Mid-rise Building Study by the City of Toronto, a report in favor of mid-rise development, summarized many of the obstacles developers are faced

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<sup>1</sup> Mann, Thorboern. Building Economics for Architects. New York: Van Nostrand Reinhold, 1992. Print, p 3.



**fig 2.4.2 The Modernization of Main Street**

A Hudson's Bay Company store, originally built in 1900, in Nelson, British Columbia. Updated in 1935 with fresh paint, lowered ceilings, and maintenance-free shop-front materials; and modernized in the 1960's with an automobile city scale facade.



when proposing this building scale. It states, "...The development community has recently focused its attention on either low-rise townhouse projects which may fall within the existing zoning permissions or high-rise projects which involve the same costly approvals process as mid-rise projects - but costs can be better absorbed within these larger projects. ...Mid-rise developments on the Avenues are considered a high risk - low return proposition."<sup>2</sup> If the City of Toronto wants to encourage mid-rise development, it's going to have to work with it's planning department and the Ontario Building Code to revise or make special provisions for this scale of development.

### **Reviving Main Streets**

Dalibard and Holdsworth, authors of *Reviving Main Street*, tackle the problem of declining Canadian main streets. They summarize the history of these streets, their growth during pre-war times, their decline post war, and their various rehabilitation projects afterwards. The study of the economic decline and (not often) regrowth of main streets reveals urban economic lessons that can be applied to Toronto's Avenues.

Rehabilitation projects that restore facades and try to recreate, purely aesthetically, main streets to pre-war conditions merely turns them "... into museums and sucks the life out of main streets."<sup>3</sup> The problem runs much deeper than looks. These main streets are shopping centers, competing with suburban and regional shopping malls. These retailers have ample free parking, and are conveniently located near major local arteries or highways. Main streets were never designed for heavy parking demands, with curb side parking allowing only one or two spaces for every shop, and main street is now inconveniently located for suburbanites. New town growth, designed around car-dependant mobility does not necessarily contribute to an increased customer base for main street retailers.

These retailers retaliate with misguided and desperate attempts to reclaim their lost customers. Facades are remodeled to mimic their suburban competition, often at the expense of the building's original architectural integrity, and some buildings are torn down to create more parking, but both of these strategies only drive out office and residential tenants above the stores. New buildings in erected during this time were usually one storey tall, and were not permitted to be mixed use, and they offer no home for new tenants. These tenants were part of the main street's captive market, and only add to the exodus to the suburbs.<sup>4</sup> Main Streets require pedestrian shoppers and cannot compete with car dependant shoppers. The suburbanites prefer shopping malls, located adjacent or within suburban neighbourhoods, on wider and faster thoroughfares, and have ample free parking.

Retrofitting main streets to accommodate parking and wider traffic corridors, decreases the intimacy and quiet pleasure of walking the main street. These renovations deteriorate their appeal to the car non-dependant market and customers seeking locally owned business. "For Main Street has one advantage: it belongs to the community in a way that the shopping centre, with its franchised outlets, can never belong. The businesses are local ones; the merchants, often are the

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2 City of Toronto, comp. *Avenue and Mid-Rise Buildings Study*. Toronto, 2010. Print, p 105.

3 Dalibard, Jacques, and Deryck Holdsworth. *Reviving Main Street: Articles*. Toronto: Published in Association with the Heritage Canada Foundation by University of Toronto, 1985. Print, p 7.

4 Dalibard, Jacques, and Deryck Holdsworth. *Reviving Main Street: Articles*. Toronto: Published in Association with the Heritage Canada Foundation by University of Toronto, 1985. Print, p. 31

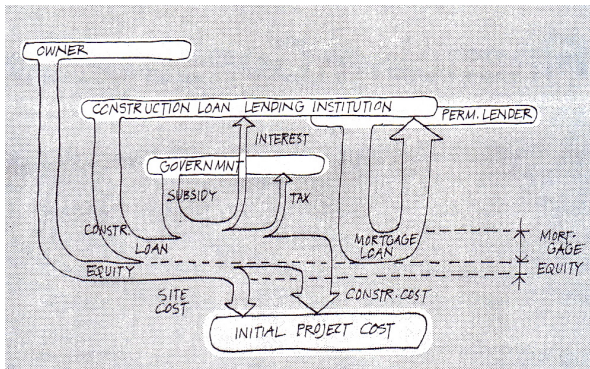


fig 2.4.3 Development Financing - A diagram of capital flow

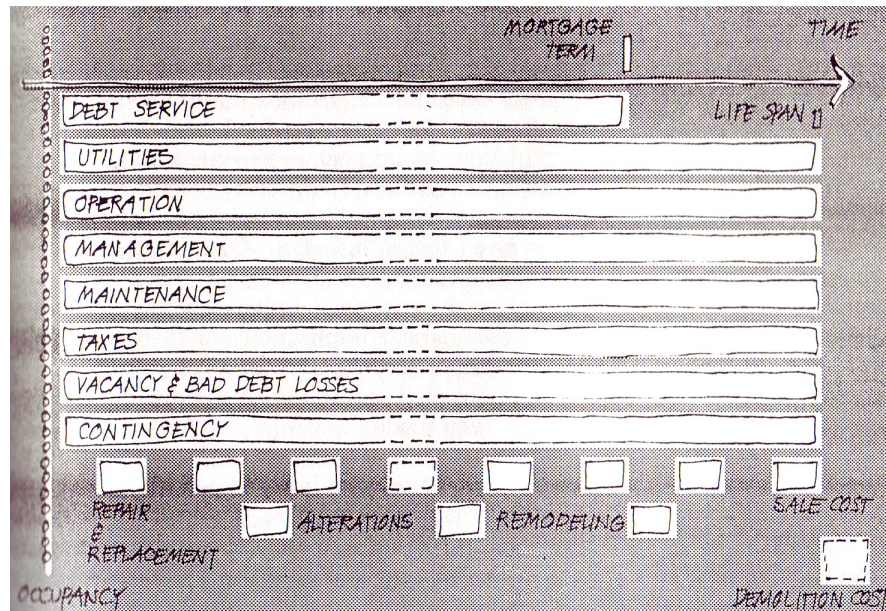
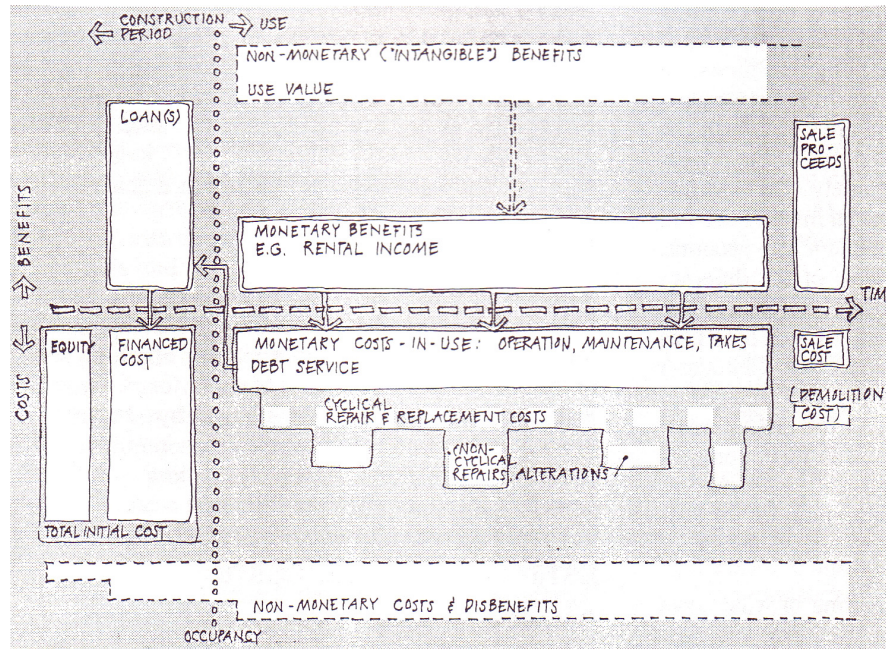


fig 2.4.4 Costs and Benefits - The costs and benefits of a building over it's lifetime.

fig 2.4.5 Costs Breakdown - The costs of running a building over it's lifetime.



sons of those who came before.”

Main street retailers best serve a demographic that is largely car non-dependant. Their financial success is proportional to the amount of captive market, or local residents and workers, that are located within walking distance.

### **Financing Construction Projects**

The costs of borrowing funds to finance a project are often quite substantial. For the owners, the people requesting the finance, their interest in the financing package is often greater than the architects efforts to control construction costs. Unfortunately because of this, the owners are often more concerned with the architect controlling the time, rather than the quality of the architectural work.

The three main phases of construction costs are, (A) site acquisitions, (B) Planning, and (C) Construction.

The three main sources of financing for these costs are: (A) by the owner’s own funds, (B) money from on or many lending institutions, and (C) subsidies from government agencies, either in loans or loan guarantees, usually in the form of tax advantages, or (more rarely) in outright funds.

The loan for a project is often broken into two loans: one for the construction loan, and one for the long-term or “permanent financing” loan or mortgage. Separating these loans into a short term arrangement for the construction, and “permanent financing”, usually in the form of a mortgage, simplifies the accounting, and the latter can achieve better interest rates when refinanced as a mortgage on the constructed building.<sup>5</sup>

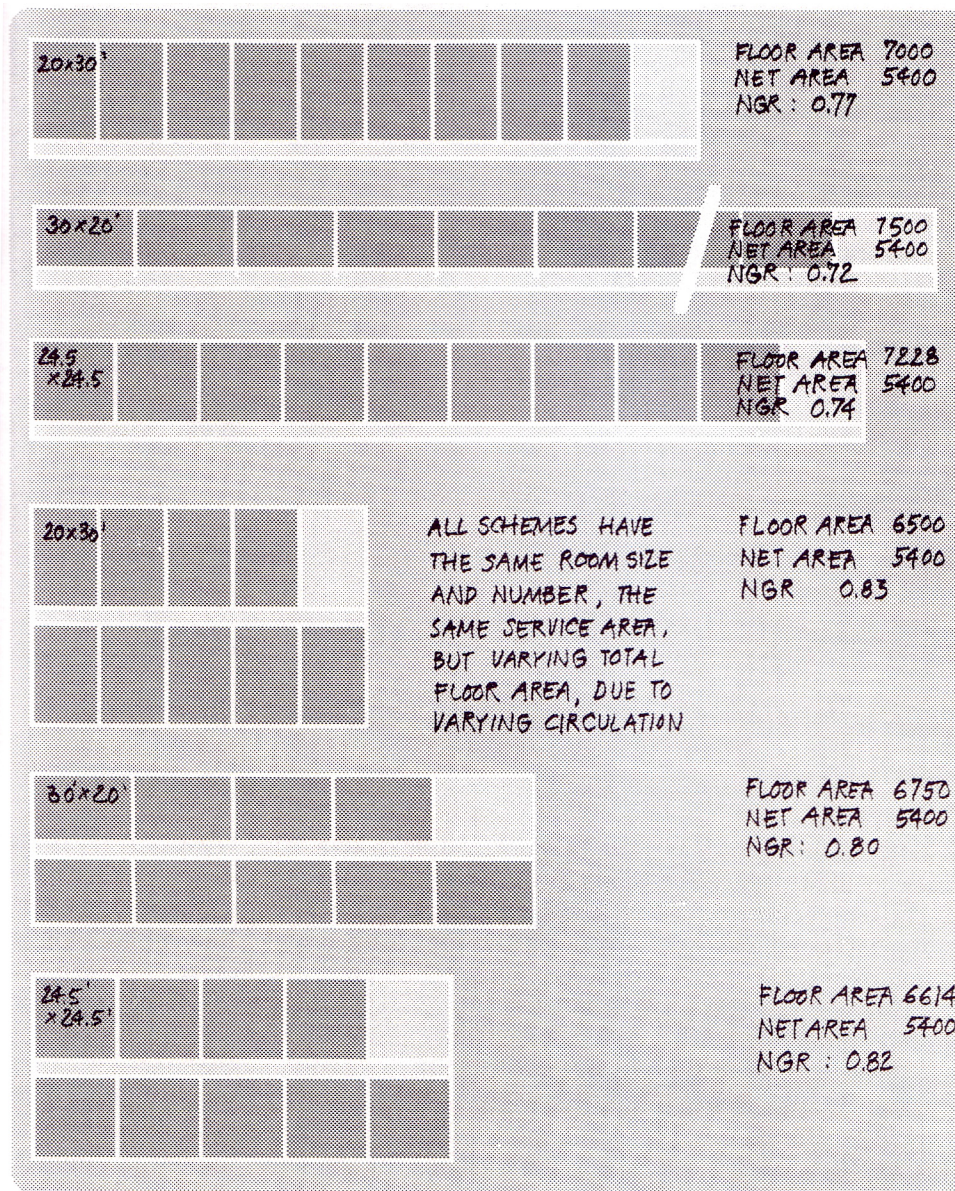
### **The Construction Loan**

Today it is rare for the owner of a building to pay out-right for an entire project. The construction loan is often in the form of a credit line, and provides financing for typically 0.8 or 80% of the total project cost. 0.8 is the typical loan-to-value ratio, which require the owner to contribute the remainder—20% in this example. The amount required by the owner can include the amount spent on acquiring the land, and the site development costs, usually leaving the lender almost all of the construction costs. 100% financing is no longer uncommon.

Costs an owner covers with his own capital for a development project, such as the site purchase and the development costs, are referred to as “sunk costs”. These are costs that cannot be recovered, even if the project should not be realized. To review, the owner contributes his 20% in “sunk costs”, purchasing the site, paying for architectural fees, etc. Construction costs are usually paid in the form of a line of credit, as described above. To pay for materials and completed work money is drawn from the credit line, and interest is charged on the total amount borrowed, month by month. It is important to understand that if two projects both borrowed \$10,000, but project A borrowed more money at the beginning, project A will pay more interest. Project A borrowed more money than Project B at an earlier time and must pay the interest on that difference over a longer period.

Contractors most often have borrowed money to pay for equipment, materials and labour, are interested in getting paid earlier than later, so they will often “front-load” their bids, meaning work

<sup>5</sup> Mann, Thorbjørn. Building Economics for Architects. New York: Van Nostrand Reinhold, 1992. Print, p 27.



**fig 2.4.6 Plan Efficiency Comparison** Double and Single Loaded Corridor Configurations - Different configuration options for a double loaded corridor. Increasing Net-to-Gross Ratios need to be compared against the quality of space, and vice versa.

at the beginning of the project is relatively more expensive than work later in the project. Spending more money at the beginning of a project adds interest charges to the line of credit, so this “front-loading” is not favorable for the owner of the building.<sup>6</sup>

### **Building Value**

The benefits and values of buildings are:

- \* For sale price and profit.
- \* For income producing properties such as leasable and rentable buildings.
- \* Non-monetary benefits, such as having a handsome building to strengthen the brand of a company.

To measure the efficiency of a building, the following concepts and simple formulas are used:

- \* Net-to-Gross Ratio (NGR)
- \* Net Leasable area (NLA)
- \* Total Floor Area (TFA)
- \* Floor Area Ratio (FAR)
- \*  $NGR = NLA/TFA$
- \*  $FAR = TFA/site\ area$

The higher the NGR is (that is, the closer to 1.00), the better, or more efficient, the building.”

Only the Net Leasable Area is the space for which the owner will receive rental income.

The difference between the TFA and the NLA is the “non-rentable” area.

Thorboern Mann suggests checking the NGR throughout the design iterations of preliminary design of buildings. “ If the NGR does not improve, it is not worthwhile to further pursue the scheme.”<sup>7</sup>

### **Standard Efficiency Expectations**

The standard expected levels for the Net-to-Gross Ratio (NGR) for different buildings are:

Office Buildings	0.75 - 0.80
Apartments	0.67 - 0.80
Hotels	0.62 - 0.70
Schools	0.55 - 0.70
Hospitals	0.55 - 0.67

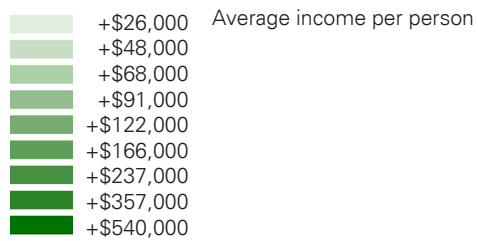
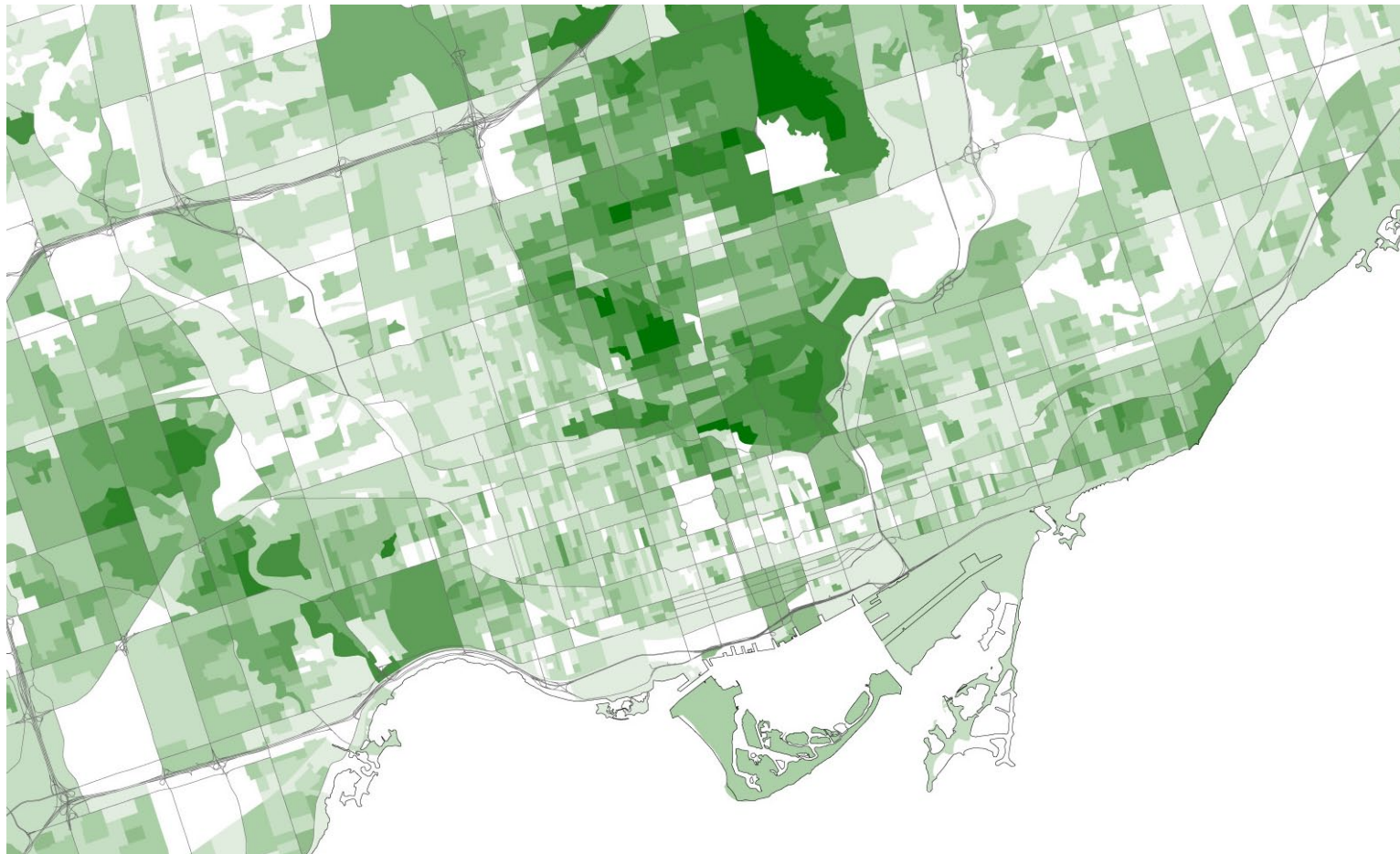
These standards must be used judiciously. The NGR of an office building featuring many small offices will be lower than a building with a large opens office. Using the same standard NGR expectations for both types would be inappropriate.<sup>8</sup>

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6 Mann, Thorboern. Building Economics for Architects. New York: Van Nostrand Reinhold, 1992. Print, p 29.

7 Mann, Thorboern. Building Economics for Architects. New York: Van Nostrand Reinhold, 1992. Print, p 112.

8 Mann, Thorboern. Building Economics for Architects. New York: Van Nostrand Reinhold, 1992. Print, p 112



**fig 2.4.7 Income per Person**

This map reveals what the average income levels are across the city. It is important for a developer to consider what the price of a residential unit will be, and what the average neighbourhood resident can afford, when assembling a proposal.

## Designing for Efficiency

Efficiently planned buildings reduce the amount of non-rentable space within their building. The general goal for space efficiency is to reduce the amount of circulation space within a building, as they are non-rentable or spaces that do not generate income for the owner. Building cores, comprised of elevators, fire escapes stairs, duct space, etc, increase in size as a buildings height increases, reducing the NGR. This runs counter to popular opinion that high rise means high density and high efficiency. “Multiplying the number of floors on which stairs, toilets, duct space, elevator lobbies, and so fourth, must be provided while allocating less net area per floor, clearly does not make a solution more efficient.”

Increasing the depth and narrowing the width of the units also increases the NGR of a building. Imagine a hotel, with a double loaded corridor. The architect can increase the number of rooms by narrowing their width, but maintain the same room size by making them longer. Obviously at a certain point the room becomes unusable, with excess circulation space at the ends, poor furniture layouts, and dark windowless space near the corridor. The NGR may have increased, but the value of the space has been driven down.<sup>9</sup> Multifamily housing, such as condominiums or rental apartments, the pro forma will almost always benefit greatest by using a double loaded corridor. This building type has been optimized around fire egress regulations, accessibility requirements, elevators, structural solutions, to a rectangular floor plate between 8,000 and 12,000 square feet in area, 60 and 75 feet wide, with 6 to 12 units organized along the corridor.<sup>10</sup> Efficient space layout and quality of space are two considerations that need to be balanced, and are ultimately influenced by the owners motivations.

## Car Free Living

There are economic benefits to living in a high density mixed use neighbourhood, one of which is the ability to live independent of an automobile. “Quite a few people have realized that owning a car and living in the heart of downtown doesn’t financially make a lot of sense,” said realtor Al Daimee. Underground parking spaces add \$30,000 to \$40,000 to the price of a condo, and the estimated cost of owning a car is \$10,000 a year.<sup>11</sup>

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9 Mann, Thorbjørn. *Building Economics for Architects*. New York: Van Nostrand Reinhold, 1992. Print, p 112

10 Love, Timothy. “Double-Loaded.” *Harvard Design Magazine* Fall 2004/Winter 2005, Number 21. Web. <<http://www.gsd.harvard.edu/hdm>>.

11 Kalinowski, Tess. “‘Condo Commuters’ Can Ease Gridlock.” *TheStar.com*. 16 Jan. 2010. Web. 8 Mar. 2010. <<http://www.thestar.com/printarticle/751566>>.



## Quality & Innovation

A common complaint, particularly among the design community, is of a lack of architectural innovation in real estate developments. “While futuristic design and the latest technologies are embraced wholeheartedly in other areas, for automobiles and computers, for example, and also for building tasks such as railway stations, museums or fashion boutiques, housing ideas and tastes lean towards proven and traditional values.”<sup>12</sup> Real-estate development is almost always funded by investors, and they, naturally, want to see risks minimized. New building types, new unit configurations, even new aesthetics with unproven sales records are all risks. Real estate development is a designed product that evolves slowly because of the responsibility to be saleable in a conservative market.

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<sup>12</sup> Schittich, Christian. In Detail: High-Density Housing Concepts, Planning, Construction (In Detail (englisch)). Boston: Birkhäuser Basel, 2004. Print, p 9.

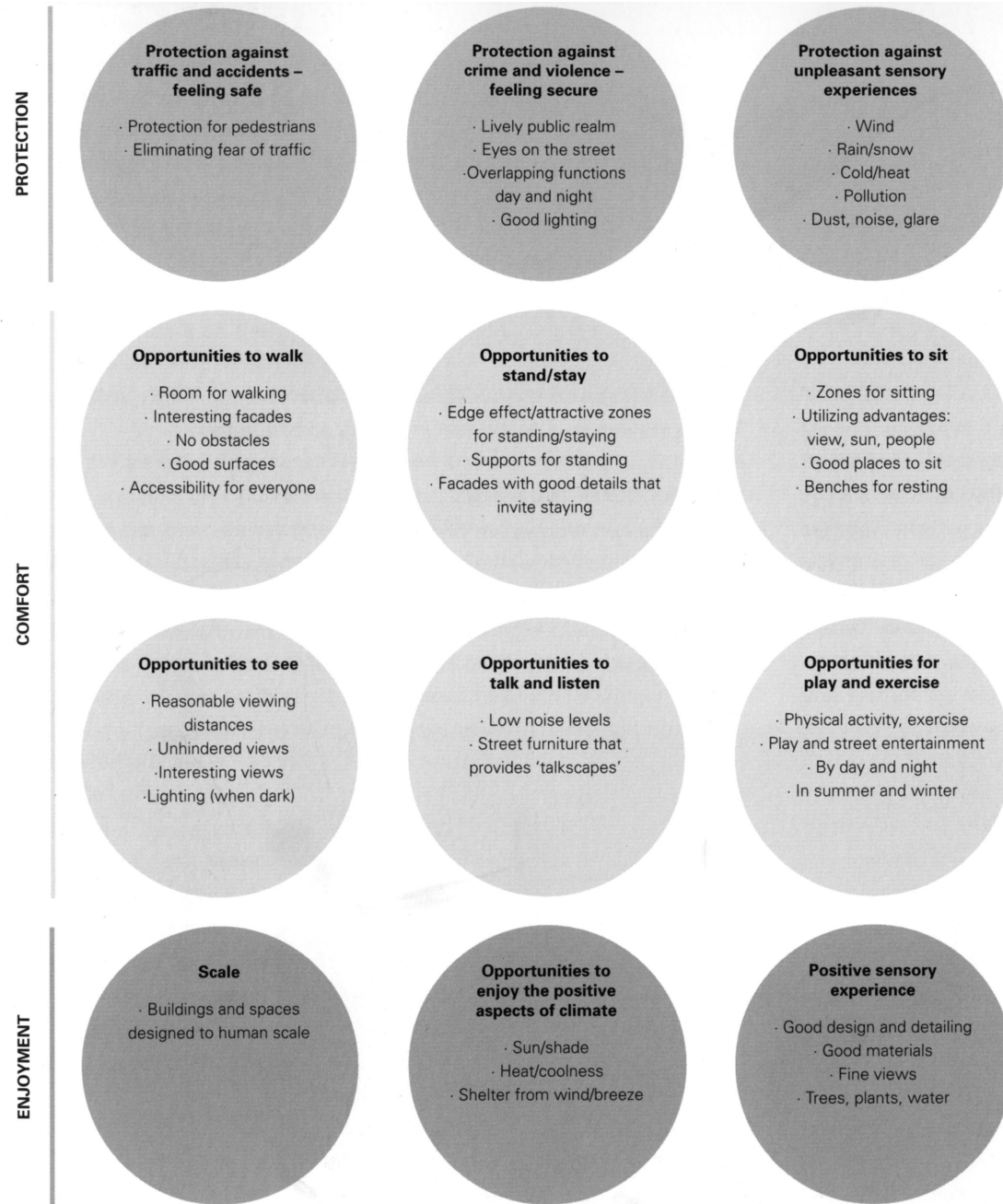


fig 2.5.1 The 12 Key Quality Criteria  
From Jan Gehl's *New City Life*



## 2.5 Avenue Development Criteria Summary

### **The Difficulties of Mid-Rise Development**

Project Lisa (discussed below), a mid-rise building located at 890 Dundas Street West, faces obstacles set by the Ontario Building Code's Part 3 requirements, which demand the same life safety and exiting requirements for both a 4 storey and 100 storey building, as well as amendments and bureaucratic hurdles currently set by the city's planning department. An average of 18 months are needed to be granted an amendment for a building permit. These obstacles make many mid-rise proposals non-feasible.

To make matters more difficult, Avenues are surrounded by designated residential areas of picturesque single family homes with mature tree lined streets. These are referred to as the Neighbourhoods. To protect these Neighborhoods from the impact of Avenue development, the city restricts the height of Avenue developments or requests a building envelope that does not block the sunlight to the Neighbourhoods. Deep lots can angle down gently to the Neighbourhood, but shallow lots are restricted to a maximum height of just a few storeys, as they do not have the room to step down.

British Columbia's building code was recently amended to permit buildings up to six storeys to be built of combustible construction, which if adopted in Ontario, would change the feasibility of shorter (six storey) mid-rise projects. Also, The Avenue and Mid-Rise Building Study discussed the possibility of requiring only one fire exiting stair for mid-rise buildings, which could make the Net-to-Gross ratio more efficient than an efficiently planned double loaded corridor building.

If these planning regulations and some building code requirements were revised, specifically for mid-rise buildings, these buildings could become more profitable and less risky than their larger 30-60 storey cousins. Mid-rise buildings are cheaper to maintain, cheaper to build per square foot, and can be built much quicker than a high-rise building. High-rises are not necessarily more profitable, but under the conditions bound by the city and province, high-rises are the most profitable development today.

The city and province, to a varying degree of consciousness, has designed the way the city is being built through its planning regulations, and building codes. It is not a coincidence that new housing in this city is a drastically different building morphology and typology than the buildings

fig 2.5.2 Avenue Building Criteria



that were being produced 80 years earlier. Granted technology, building practices, transportation, and other factors have all changed too, the Ontario Building Code and City of Toronto's Planning regulations have largely set up the criteria of the "developer game" within the city. Grand mid-rise brick buildings located in the Spadina Avenue and King Street area would not be feasible, or the most profitable building type to develop under today's regulation criteria. Successful mid-rise buildings along Paris' grand boulevards would not be the choice proposal for a Toronto developer, nor would Berlin's brand new mid-rise buildings being erected in place of the fallen wall. The criteria set up by the city and the province have made the high-rise condominium the best, or most profitable, building type to erect today.

Developing properties along the Avenues into mid-rise buildings is a battle most developers would rather not fight. The mid-rise building type simply does not have enough saleable space to offset the costs. High-rise buildings face many of the same rezoning and building code requirements, but can more easily absorb these costs within a larger project budget. Sadly the mid-rise is less attractive to developers and investors, who understandably want to reduce risk with uncertain building types.

### **How Buildings Affect Us**

Chapter 2.0 discussed criteria that affects the morphology of development, or more simply, how regulation affects how tall, how many dwellings, or even how tall the ceiling heights of a development might be. But the other half of the research deals with how morphology and typology affect ones quality of life. How many people will you pass on your commute to work, which could be drastically different depending on how you get there. Will you get there by bicycle, streetcar, your own private automobile, or your own two feet? There is much more opportunity to maintain passive contact, a friendly "Hello", with a few people each day, than the car commuter speeding past others within his metal and glass enclosure. A citizens social life, their sense of community, how safe they feel, how much they're willing to walk, are some of the criteria that determine a citizens quality of life. W. Clement Stone's summarized it best with, "You are a product of your environment."

### **Grading Avenue Buildings**

Both the research regarding development feasibility and the quality of life criteria have been summarized into a grading matrix, the *Avenue Building Criteria*. This is an adaptation from Jan Gehl's *12 Key Quality Criteria*, used in his book *New City Life*, as a tool to grade how design public space. *Avenue Building Criteria* evaluates the case studies in chapter 3.0 to determine both a developments feasibility, and a developments resulting quality of life for inhabitants along the Avenues.

The Matrix is weighted to value, firstly, its viability. It must be a project that could be backed by investors. Innovation balanced with marketability is the target. Secondly, the dwelling units themselves must provide healthy, uplifting living spaces for inhabitants. They should be able to accommodate a range of lifestyles and traditional and non-traditional living arrangements. Thirdly, the building should contribute to the creation of an urban, walkable neighbourhood, balancing retail, office, housing in a considered arrangement. The *Avenue Building Criteria* is organized to grade these three categories, and are labelled dwelling, feasibility, and neighbourhood.



## 3.0 Case Studies

The case studies examine multi-unit residential buildings from around the world. The selection of buildings were chosen for being innovative examples of a certain building types, or for being easily adaptable to Toronto's Avenues. 30 buildings have been evaluated with the criteria from the previous chapter's Avenue Building Criteria, in an attempt to find common characteristics that make up good Avenue architecture. They have been grouped into building types listed below.

### **3.1 The Unit Entry at Grade Type**

- 3.1.1 The Belnord
- 3.1.2 Cour De La Maison Brulée
- 3.1.3 Passage Houses
- 3.1.4 Plex House
- 3.1.5 Seijo Town Houses

### **3.2 The Single Loaded Corridor Type**

- 3.2.1 Oostelijke Handelskade
- 3.2.2 Flats at St. Gall
- 3.2.3 Workmen's Dwellings
- 3.2.4 Social Housing

### **3.3 The Double Loaded Corridor Type**

- 3.3.1 Queen and Portland
- 3.3.2 City Park Apartments
- 3.3.3 The Lock Building
- 3.3.4 QV1 Apartments
- 3.3.5 The Allanel
- 3.3.6 Barclay Hotel
- 3.3.7 Crescent Court
- 3.3.8 Casa de Renta

### **3.4 The Point Tower Type**

- 3.4.1 18 Yorkville

### **3.5 The Direct Core-Access Type**

- 3.5.1 Siemensstadt
- 3.5.2 Deuxfle Yoyogi Park
- 3.5.3 Schlitzbauten
- 3.5.4 Dumbbell Type Tenement
- 3.5.5 Lasanno Court
- 3.5.6 Mietskaserne
- 3.5.7 Housing Complex
- 3.5.8 Apartments for Large Families
- 3.5.9 Edificio De Viviendas
- 3.4.10 Highpoint, Highgate
- 3.5.11 Tower in the Country
- 3.5.12 Mietskaserne

## 3.1 The Unit Entry at Grade Type

### **Type Definition**

*Access to the dwelling unit is through a doorway at or easily within reach of the ground plane.*

#### Positives

- \* having a front door at grade means no elevators
- \* no common corridors
- \* less complex condominium ownership structures
- \* little to no condominium fees

#### Negatives

- \* limited to low heights or the amount of storeys people are willing to climb by stair

### 3.1.2 Cour De La Maison Brulée

Organic Growth  
 1750-1900  
 Faubourg Stain-Antoine, Paris, France

Height: 8 storeys  
 Retail: commercial at grade on street

#### Project Virtues

- \* quiet and intimate public spaces
- \* project can be staged allowing for more financing options
- \* street front continues street wall and provides passage to inner court yard

#### Project Vices

- \* sites such as these are hard to come by in Toronto

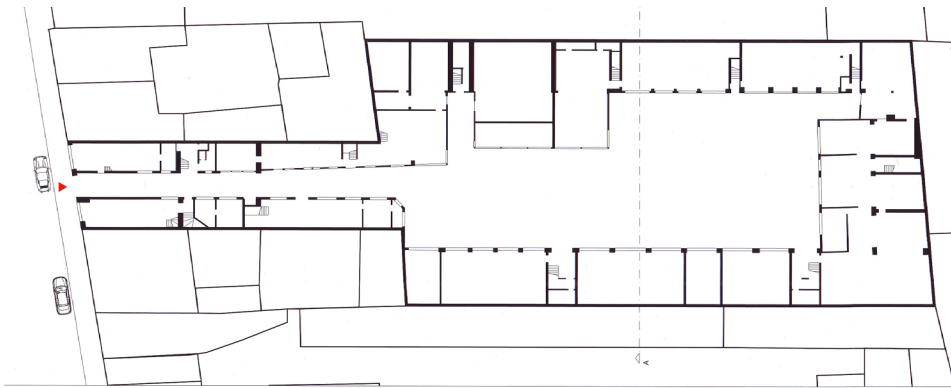
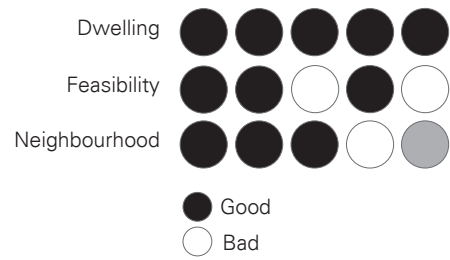


fig 3.1.2



### 3.1.3 Passage Houses

1880  
Reading, Pennsylvania

Height: 2 storeys  
Dwellings: 2-4 residential units

#### Positives

- \* building can easily be reconfigured into many different unit divisions
- \* no land assembly

#### Negatives

- \* low density
- \* not ideal for conversion to retail space at grade

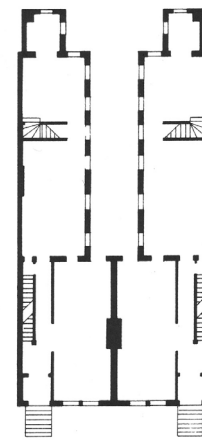
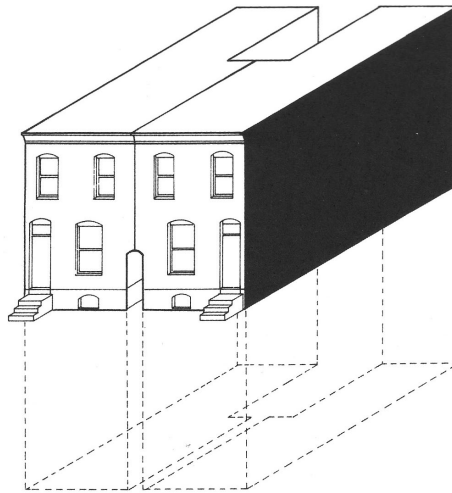


fig 3.1.3



### 3.1.4 Plex House

1880-1930

Plateau Mount-Royal, Montréal, Canada

Height: 3 storeys

Dwellings: 3 residential units

Retail: none, but convertible

#### Positives

- \* reasonable density at 122 dwellings/ha
- \* good access to natural light and ventilation
- \* flexible and subtle friendly construction

#### Negatives

- \* somewhat dependant on setbacks of neighbouring buildings at rear

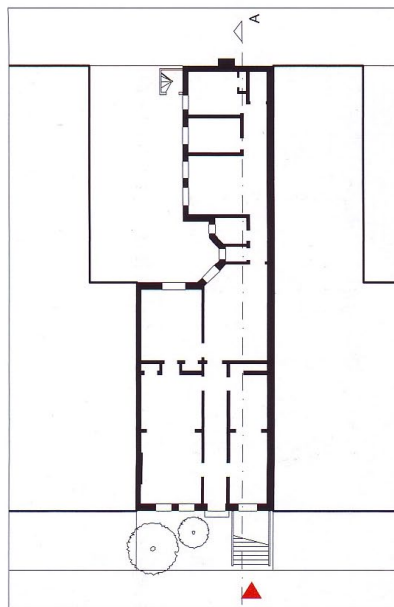
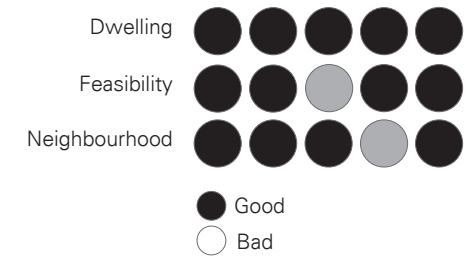
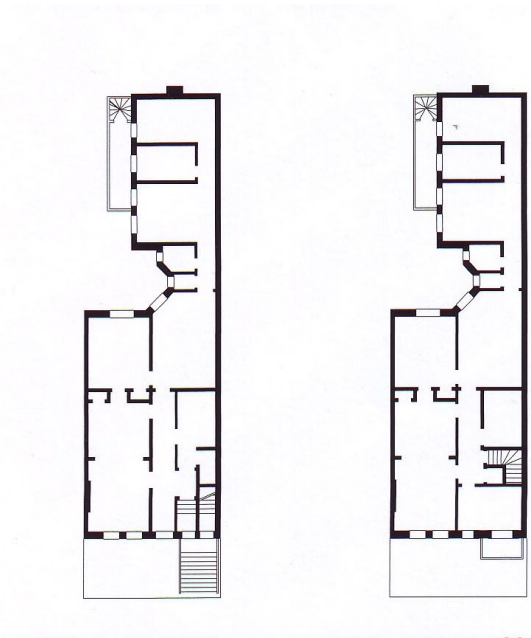
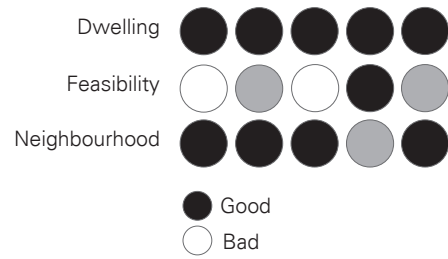


fig 3.1.4





### 3.1.5 Seijo Town Houses

Sanaa

Tokyo, Japan

Height: 2 and 3 storey units

Dwellings: 14 residential units in 20 buildings

#### Positives

- \* intimate outdoor spaces
- \* can easily be developed in phases
- \* flexible ownership arrangements
- \* uncommon living arrangements and room dimensions may sell very well in the Toronto housing market

#### Negatives

- \* massive building envelope
- \* expensive to build
- \* uncommon living arrangements and room dimensions may not do well in the Toronto housing market

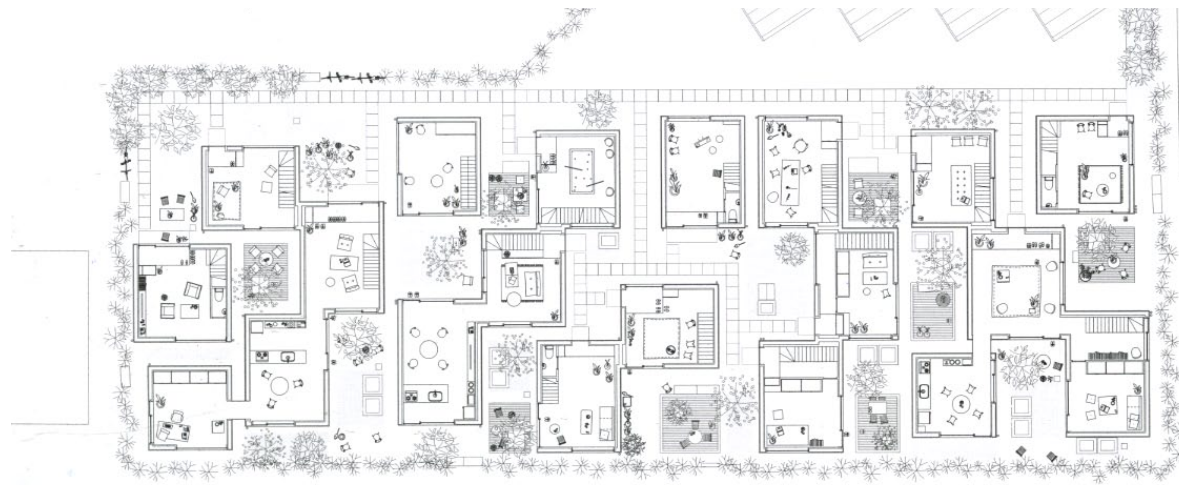
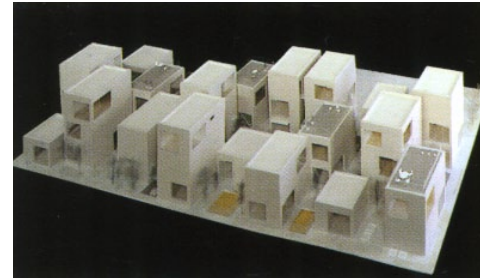


fig 3.1.5

## 3.2 The Single Loaded Corridor Type

### Type Definition

*Residential units are accessed through shared corridors that have units on only one side.*

#### Positives

- \* opportunities for cross ventilation and natural daylight

#### Negatives

- \* shared corridors are noisy and unsuitable adjacent to bedrooms

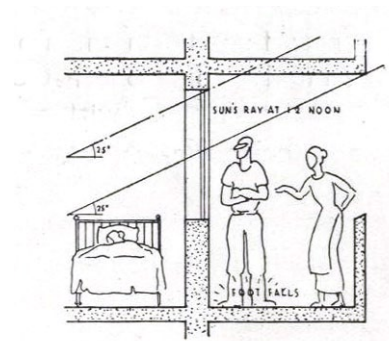
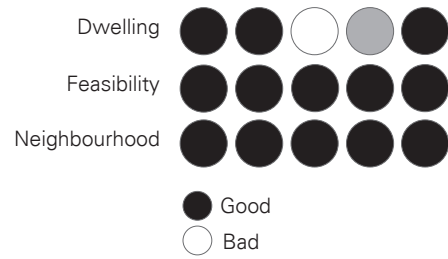


fig 3.2.0 Noise Conflict



### 3.2.1 Oostelijke Handelskade

Claus & Kaan  
 1999-2004  
 Amsterdam, Netherlands

Type: Single Loaded Corridor  
 Height: 11 storeys  
 Dwellings: 60 residential units  
 Retail: ground floor unspecified

#### Positives

- \* Re-use of building.
- \* good access to light and air
- \* balcony space cleverly integrated behind existing facade.
- \* relatively efficient use of space
- \* corner units boast 4 bedrooms

#### Negatives

- \* privacy issues in bedrooms along shared corridor

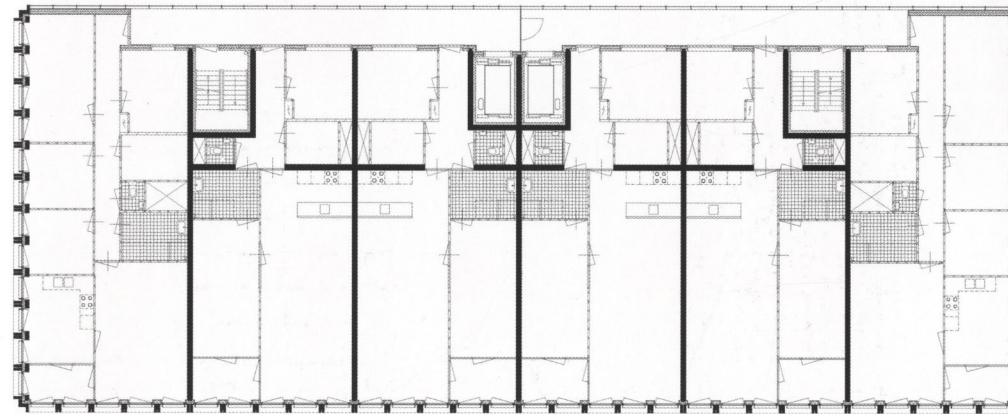
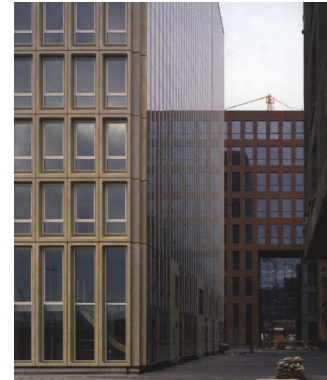
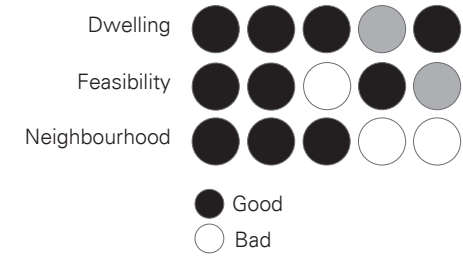
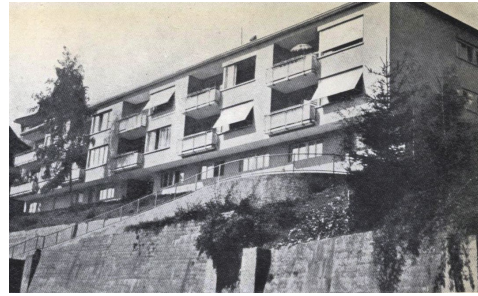


fig 3.2.1

### 3.2.2 Flats at St. Gall

H. Hauser  
St. Gall, Switzerland

Type: Single Loaded Corridor  
Height: 3 storeys  
Dwellings: 90 residential units  
Retail: 101,000 sf of retail



#### Positives

- \* bedrooms oriented away from shared corridor
- \* good cross ventilation and day lighting

#### Negatives

- \* small units

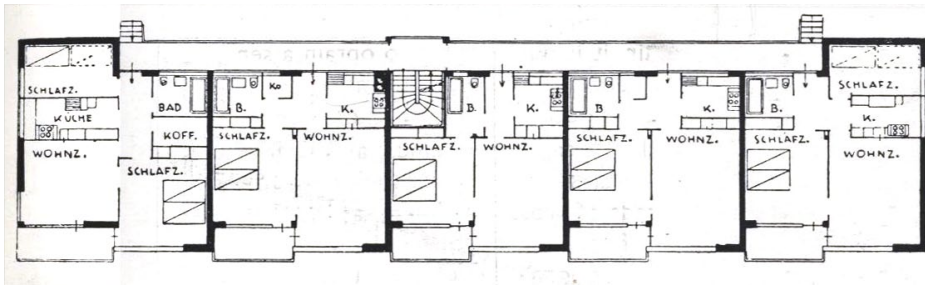
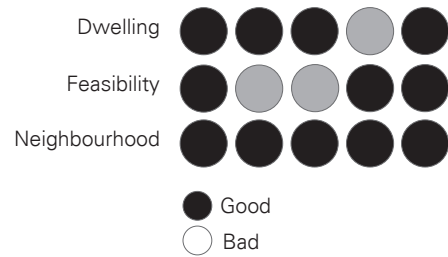


fig 3.2.2



### 3.2.3 Workmen's Dwellings

G.A.E.E.P.A.C.  
 1935  
 Barcelona, Spain

Type: single loaded corridor  
 Height: 7 storeys  
 Dwellings: 69 residential units  
 Retail: open space at grade



#### Positives

- \* bedrooms are placed above shared corridor, eliminating adjacency issues
- \* column structure allows for flexibility of interior partitioning

#### Negatives

- \* building envelope could be simplified (complicated section)
- \* living room space broken up by stair circulation
- \* no variety of unit types to accommodate different living arrangements

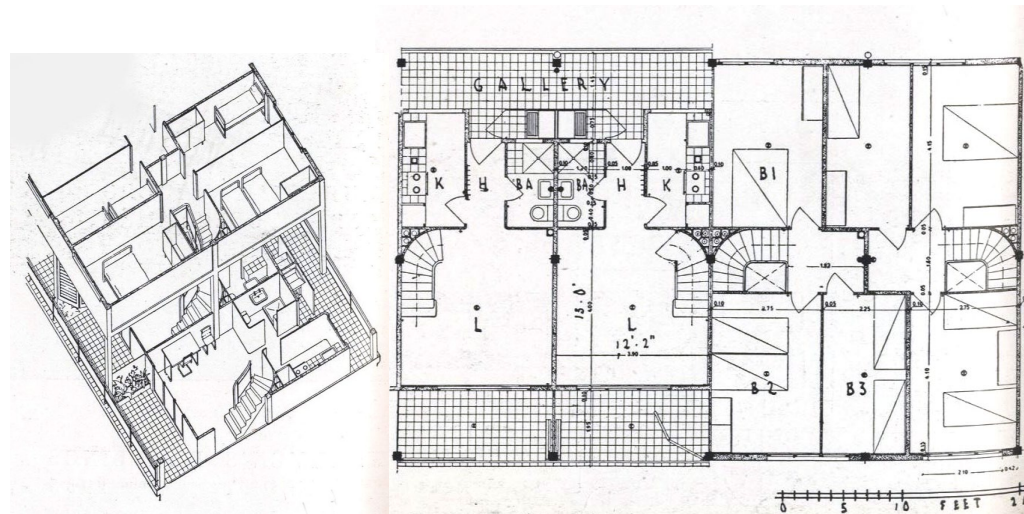


fig 3.2.3

### 3.2.4 Social Housing

Arquitectos López Rivera  
2007  
Barcelona, Spain

Type: single loaded corridor  
Height: 5 storeys  
Dwellings: 27 residential units  
Retail: retail at grade



#### Positives

- \* excellent light and ventilation
- \* ground units have high ceilings to accommodate transition to retail spaces in the future
- \* shared corridor is wide enough to accommodate gatherings and dining
- \* units designed to be highly flexible in accommodating 1-2 or 2-3 person households

#### Negatives

- \* rear patio view is determined by neighbouring properties

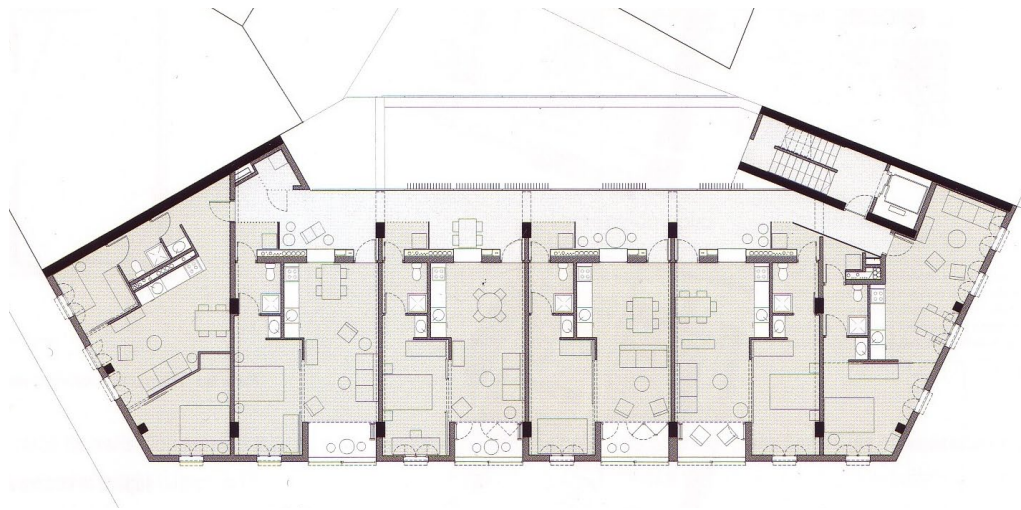
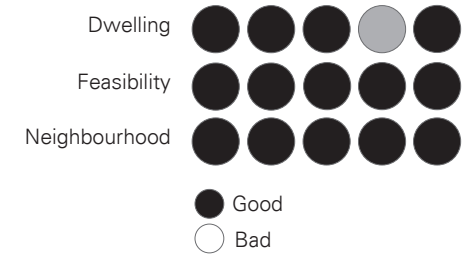


fig 3.2.4

### 3.3 The Double Loaded Corridor Type

#### **Type Definition**

*Residents are connected from the elevator or stair core to their dwelling unit by a shared corridor. This corridor has units on either side.*

#### Positives

- \* economical to build
- \* many units can share the cost of elevators, exit stairs, garbage chutes, etc.
- \* the most economical way to achieve very high densities

#### Negatives

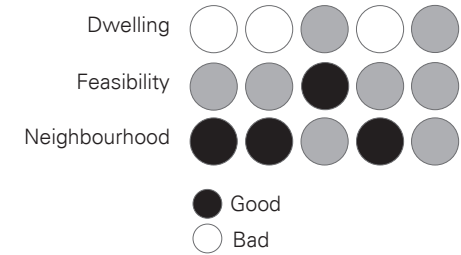
- \* these buildings tend to be large, requiring land assembly and/or zoning height adjustments, which both add time and cost to a project
- \* cross ventilation not possible, except for corner units
- \* typically only one bounding wall of a residential unit has windows
- \* deep units can create dark and unventilated rooms near the core of the building (creating the infamous “den”)



### 3.3.1 Queen and Portland

Turner Fleischer Architects Inc.  
2009  
Toronto, Canada

Type: double loaded corridor  
Height: 7 storeys  
Dwellings: 90 residential units  
Retail: 101,000 sf of retail



#### Positives

- \* high density
- \* intensification on a main street without massive height
- \* value of retail will subsidize residential development
- \* large amount of floor area designated for retail
- \* reasonably efficient
- \* most economically viable

#### Negatives

- \* dwellings too deep with poor light
- \* inflexible construction: units divided by concrete shear walls
- \* interior block units get less light and view
- \* requires very large site and a corner
- \* land assembly required and block zoning adjusting

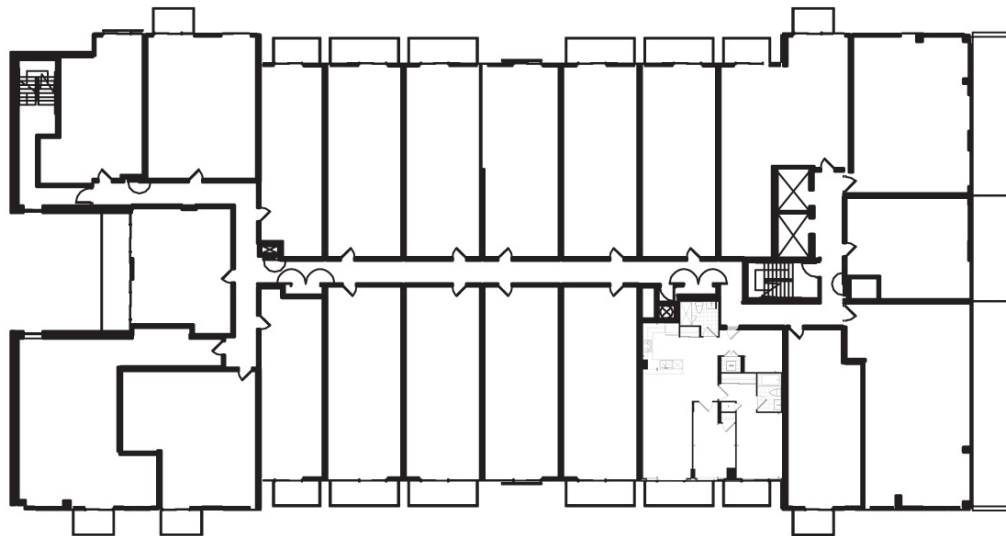
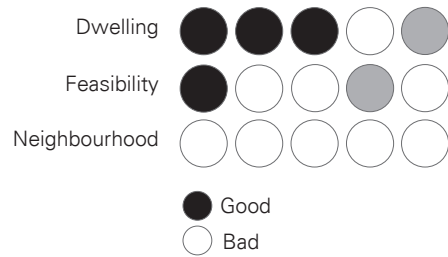


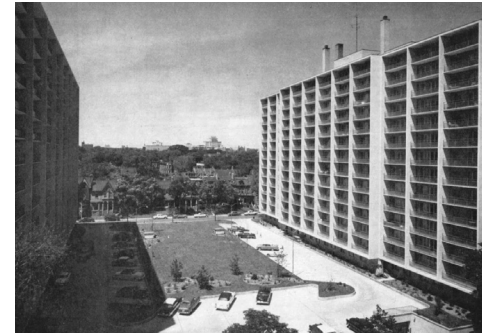
fig 3.3.1



### 3.3.2 City Park Apartments

Peter Caspari Architect  
 1957  
 Toronto, Ontario

Type: "Tower in the Park"  
 double loaded corridor  
 Height: 14 storeys



#### Positives

- \* efficient use of land only when less land is used or more buildings are added to same site
- \* cost efficient construction – many units share elevator core, garbage chute, fire exit stairs, etc.
- \* this floorplate is shallow enough that it ensures all units have good access to natural light

#### Negatives

- \* massive land assembly required , which is particularly difficult on a downtown site
- \* generally too little density (most projects of this type have less than twice the area of land density)
- \* totally inflexible construction
- \* this construction creates many “radiator balconies” that act as thermal bridges, killing the building’s energy performance

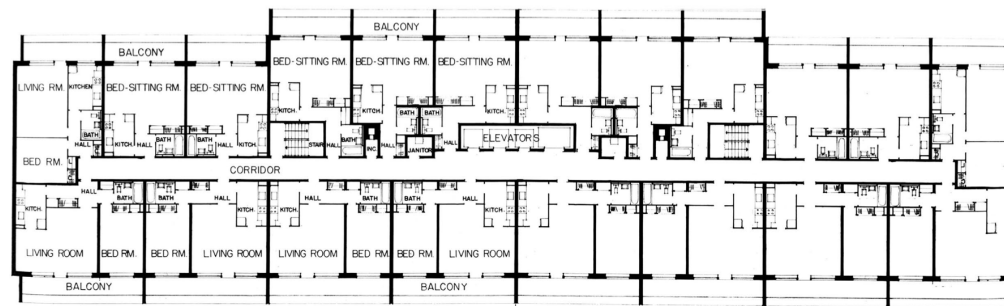


fig 3.3.2

### 3.3.3 The Lock Building

MBLC Architects  
2005  
Manchester, UK

Type: double loaded corridor  
Height: 7 storeys  
Dwellings: 90 residential units  
Retail: 101,000 sf of retail

#### Positives

- \* opportunities for winter airflow strategies
- \* creates spectacular shared corridor spaces

#### Negatives

- \* “spectacular” corridor spaces are not sized for gatherings, and would not be desirable for adjacent bedrooms

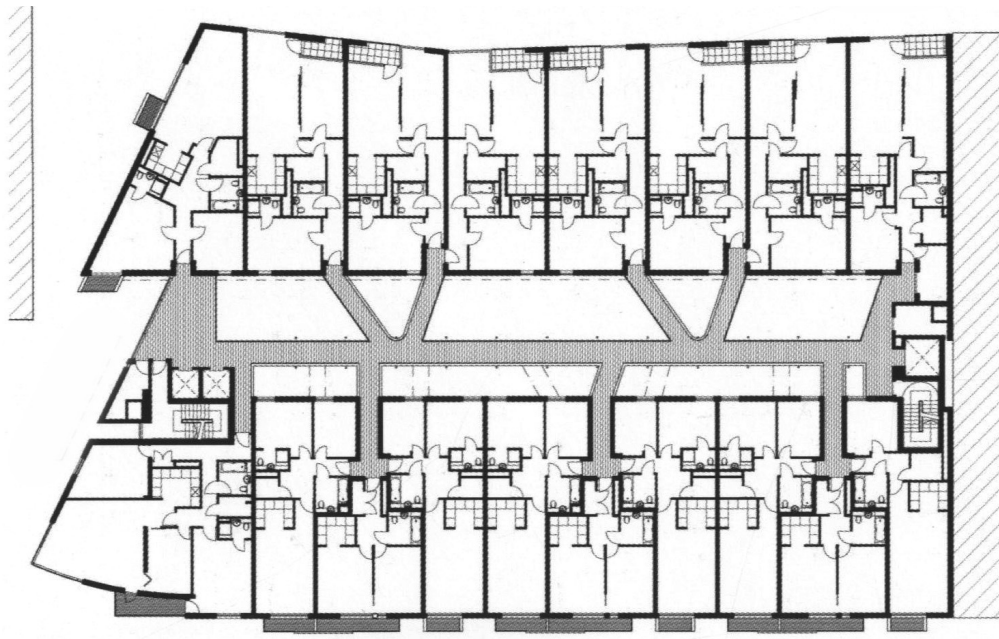
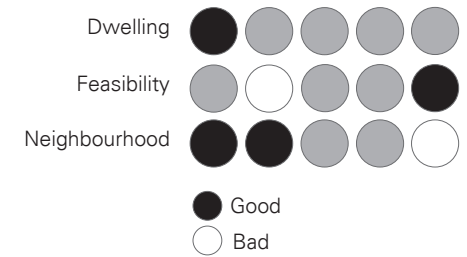
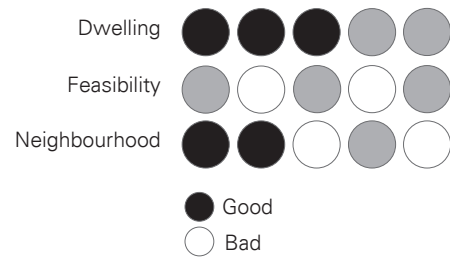


fig 3.3.3



### 3.3.4 QV1 Apartments

John Wardle Architects & NHArchitecture  
 2005  
 Melbourne, Australia

Type: double loaded corridor  
 Height: 44 storeys  
 Dwellings: 458 residential units

#### Positives

- \* distinct exterior presence
- \* hallways with natural daylight and opportunities for natural ventilation

#### Negatives

- \* inefficient example of an efficient building type
- \* elevator core is using up desirable space on the perimeter of the floorplate

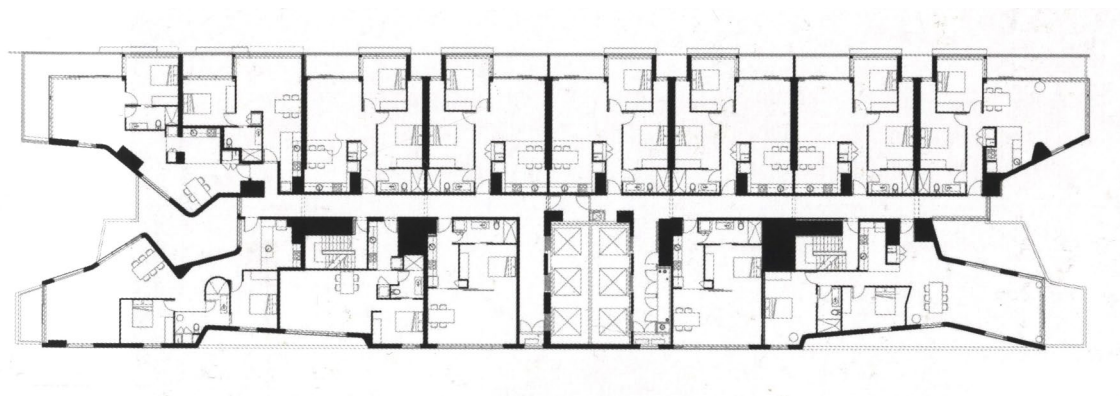


fig 3.3.4

### 3.3.5 The Allene

William L Rouse, Architect  
 1908  
 New York, USA

Type: double loaded corridor  
 Height: 6 storeys  
 Dwellings: 18 residential units

#### Positives

- \* the double loaded corridor building adapted to tight urban neighbourhoods
- \* retail space at grade
- \* units boasting 3 bedrooms
- \* questionable amount of daylight and ventilation at rear lower floors.

#### Negatives

- \* privacy issues with close facing neighbouring buildings

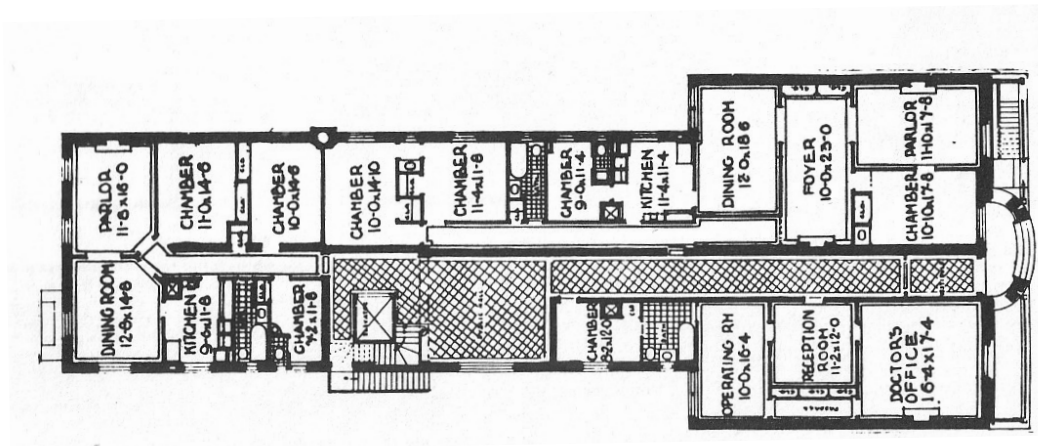
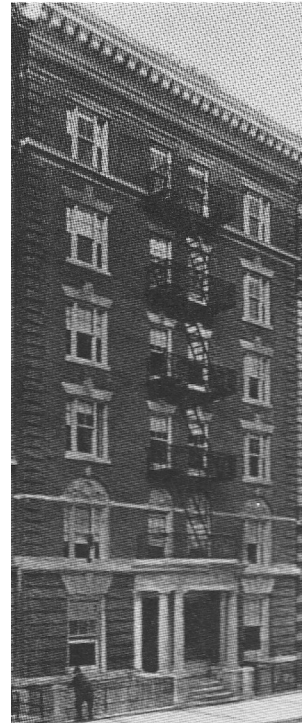
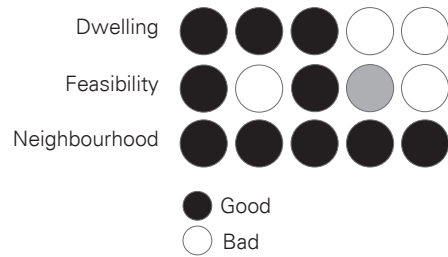


fig 3.3.5



### 3.3.6 Barclay Hotel

Cross & Cross  
 New York, USA

Type: direct stairway access  
 Height: 15 storeys  
 Dwellings: hotel units

#### Positives

- \* the efficiency of the double loaded corridor taken to an extreme
- \* this building has 3 corridors that all share the same core infrastructure as the previous examples which only have 1 corridor.
- \* elevator, stair, garbage-chute costs shared over many units, driving the costs down

#### Negatives

- \* projects of this size often lose the intimacy of smaller buildings

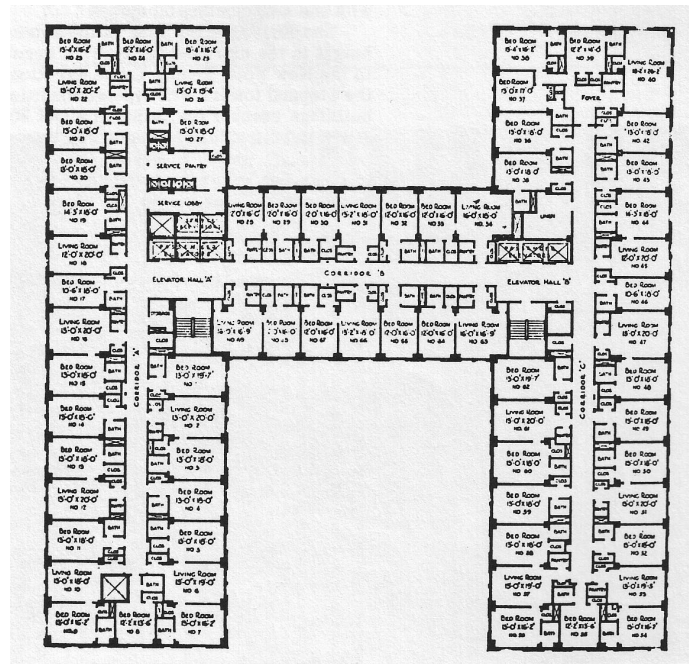


fig 3.3.6

### 3.3.7 Crescent Court

Neville & Bagge Architects  
1905  
New York, USA

Dwellings: 10 residential units per floor

#### Positives

- \* interior corridors have natural daylight and ventilation
- \* bedrooms face onto quiet exterior spaces
- \* bedrooms are isolated from corridor noise
- \* spacious units

#### Negatives

- \* increased building envelope means increased building costs

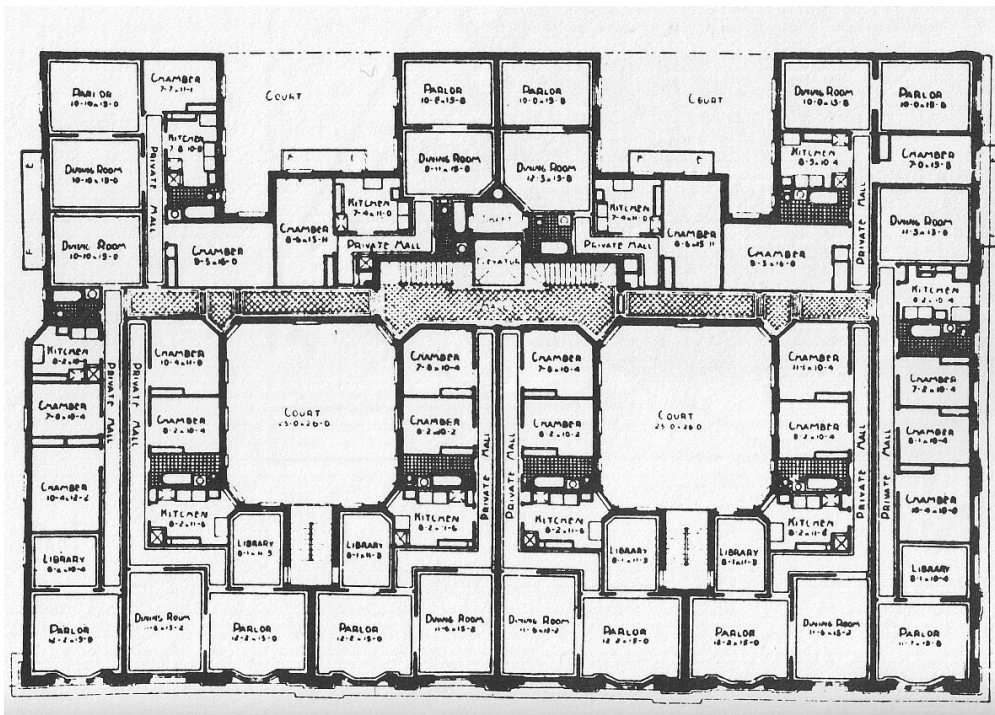
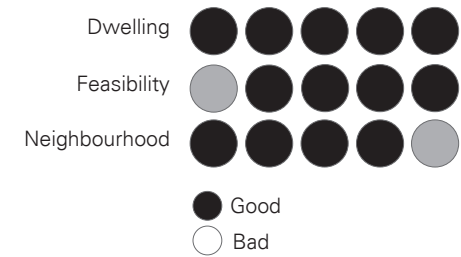
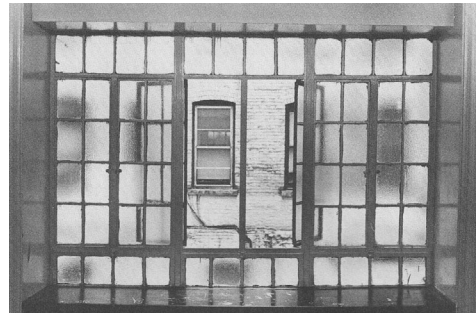
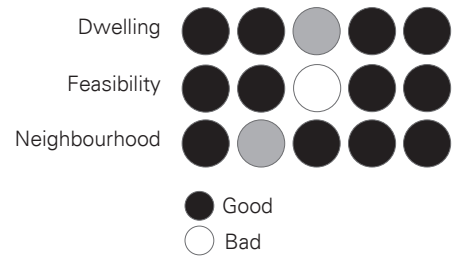


fig 3.3.7



### 3.3.8 Casa de Renta

Canda Gazaneo Ungar  
 Buenos Aires, Argentina

Height: 5 storeys  
 Dwellings: 12 residential units

#### Positives

- \* 2 storey residential units
- \* small intimate building
- \* excellent natural daylight and ventilation

#### Negatives

- \* bedrooms open onto circulation space
- \* circulation outdoors might be a hard sell in the Canadian market

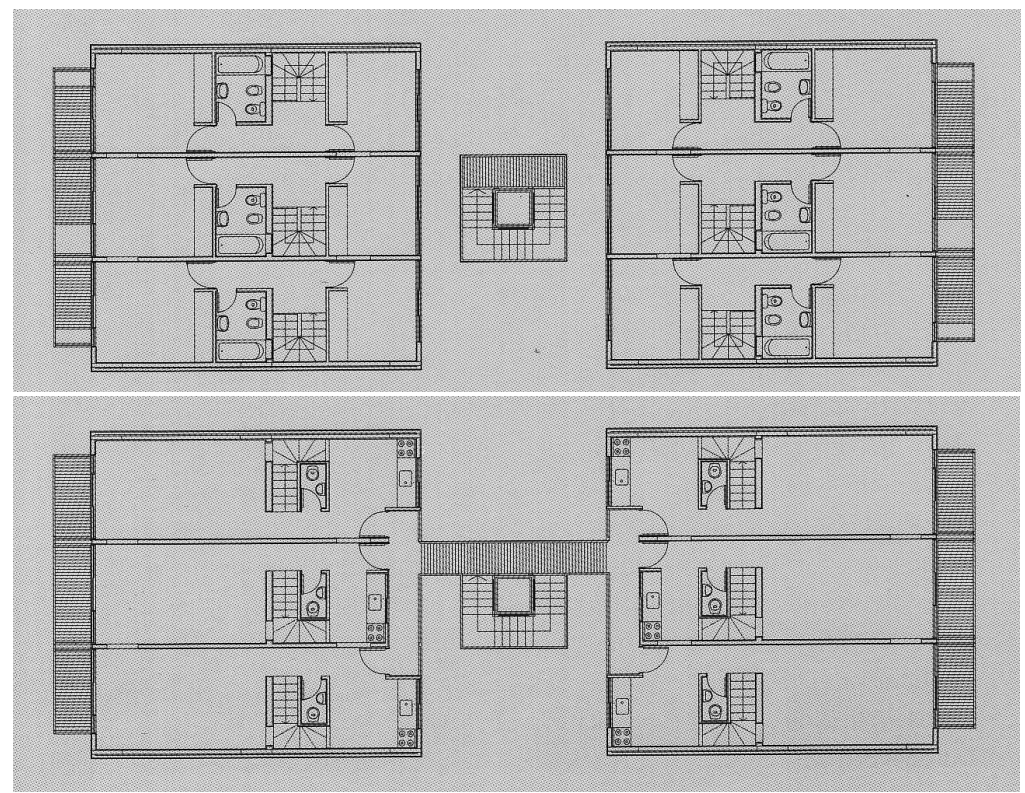


fig 3.3.8





## 3.4 The Point Tower Type

### Type Definition

*Residential units are connected to the buildings core, which contains the elevator and/or stairs, by a corridor that wraps around this core. Typically floor plates are limited in width by daylight access around the perimeter, and usually are constructed as relatively slender and tall buildings.*

#### Positives

- \* high density
- \* these projects are generally large enough to pay for rezoning and life safety requirements of part 9 of the Ontario Building Code
- \* excellent views from the residential units, if unblocked by other high rise neighbours

#### Negatives

- \* not a reasonable way to achieve maximum density in a neighbourhood, as it requires too much space between towers
- \* shadows neighbours to the north, however these shadows do move quickly throughout the day
- \* wind issues
- \* inhuman scale to street
- \* expensive construction
- \* massive financing required
- \* expensive monthly condominium fees

### 3.4.1 18 Yorkville

Architects Alliance  
2005  
Toronto, Canada

Type: point tower  
Height: 43 storeys  
Dwellings: 511 residential units

#### Positives

- \* use of land
- \* reasonably efficient building
- \* good flexibility of dwelling types within envelope

#### Negatives

- \* shadows neighbours to the north
- \* limited private outdoor amenity
- \* requires lots of land

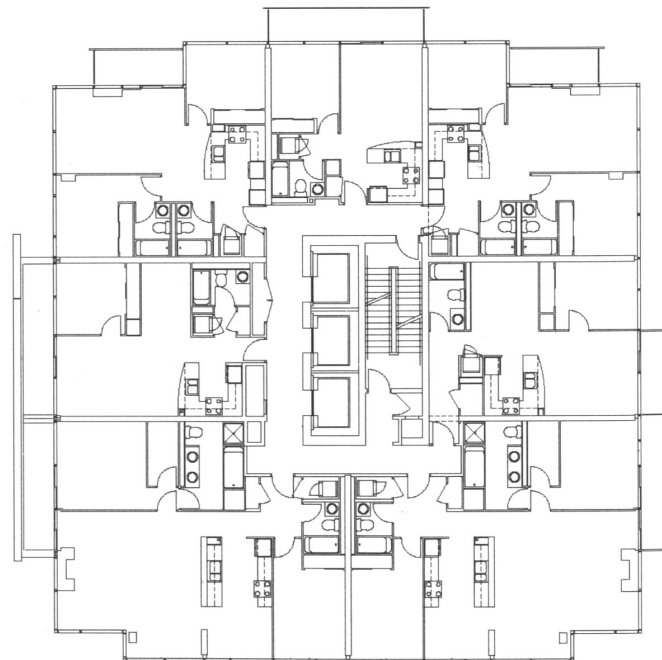
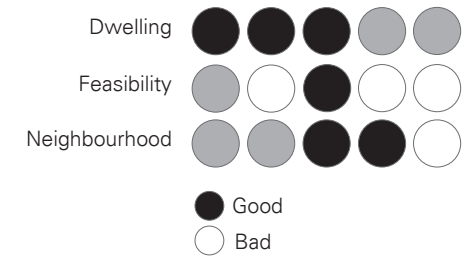
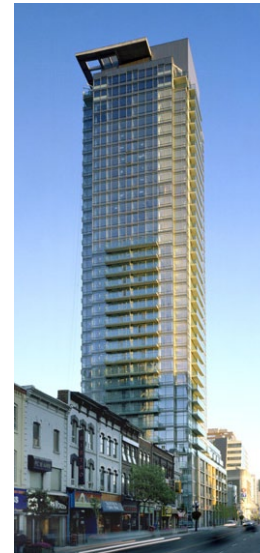


fig 3.4.1

## 3.5 The Direct Core-Access Type

### Type Definition

*These buildings have residential units that directly access the elevator and/or stair core, or have a minimum amount of corridor.*

#### Positives

- \* no common corridors increases net-to-gross efficiency of floor plates
- \* dwelling units often have windows on parallel ends, allowing for excellent natural lighting and ventilation
- \* these buildings are often at a build cost that is easier to finance
- \* this scale has a lower price per sq. ft than larger building types
- \* these buildings are generally built to a more humane scale
- \* smaller apartment buildings can usually find alternate parking arrangements, rather than building costly underground parking garages
- \* these medium sized buildings have much simpler building services (garbage/recycling, little to no lobby & concierge, etc) keeping building and monthly condo costs low
- \* limited building footprint size, helps ensure intimately scaled buildings and neighbourhoods

#### Negatives

- \* limits units per floor, generally to two units, reducing the number of units that can share the cost building core expenses
- \* limited building size has difficulty paying for rezoning and OBC life safety requirements
- \* projects with many units per floor require multiple cores

### 3.5.1 Siemensstadt

Walter Gropius  
1930  
Berlin, Germany

Type: direct stairway access  
Height: 4 storeys

#### Positives

- \* efficient building
- \* low cost construction
- \* reasonable units

#### Negatives

- \* inefficient use of land
- \* requires massive land assembly
- \* not economically viable as land value escalates
- \* disregards public realm/network of streets
- \* no understanding of exterior space ownership
- \* this project is car dependent, but that is the result of the neighbourhood planning. This building type could easily be adapted into a more pedestrian friendly environment.

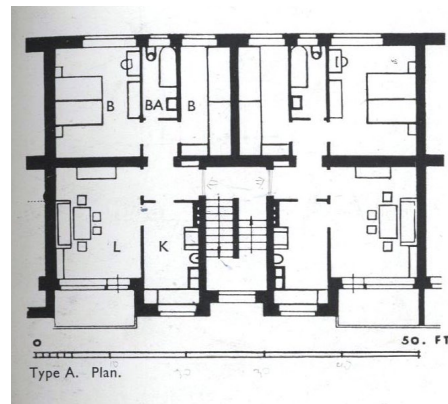
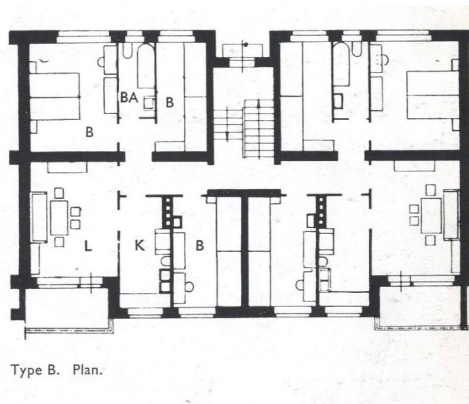
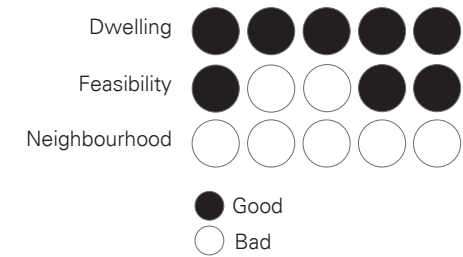
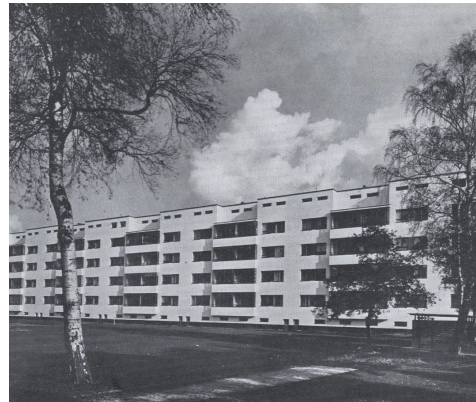
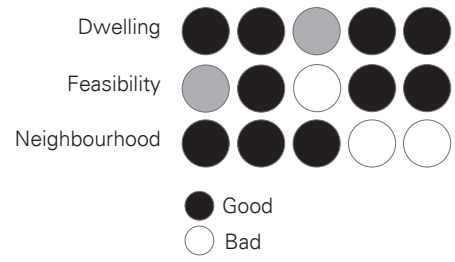


fig 3.5.1



### 3.5.2 Deuxfle Yoyogi Park

Yasui Hideo Atelier  
 2005  
 Shibuya, Tokyo, Japan

Type: direct elevator access  
 Height: 8 storeys  
 Dwellings: 14 residential units

#### Positives

- \* efficient use of land
- \* no major land assembly required
- \* small sites are readily available for development
- \* small buildings are easily manageable
- \* reasonable units

#### Negatives

- \* some issues with light, view and privacy
- \* limitations on dwelling types
- \* generally not flexible

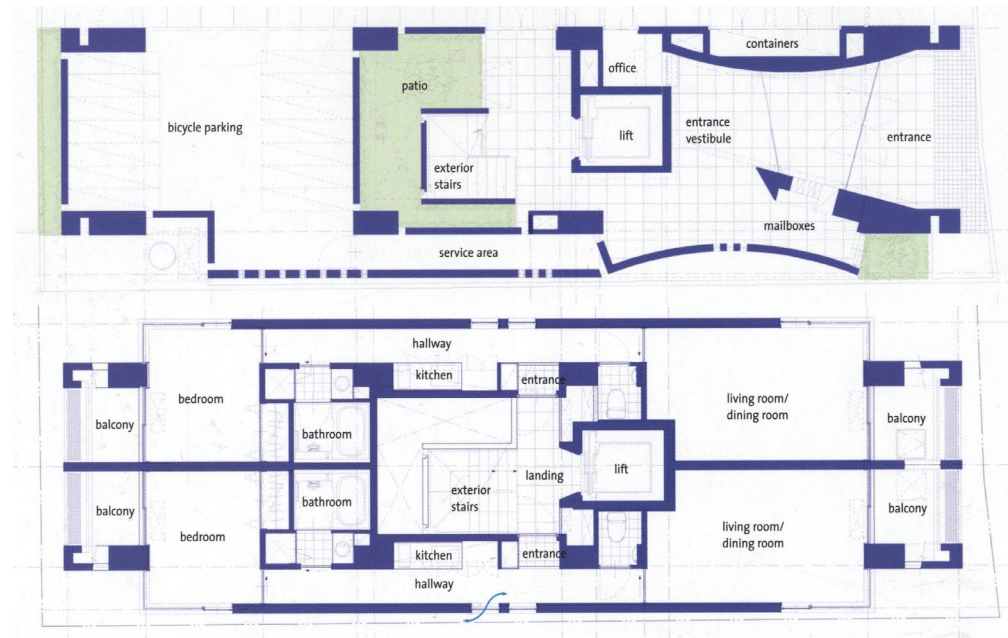


fig 3.5.2

### 3.5.3 Schlitzbauten

Typical Hamburg apartments  
Circa 1900  
Hamburg, Germany

Type: direct stairway access  
Height: 5 storeys  
Dwellings: 16 residential units  
Retail: commercial at grade

#### Positives

- \* efficient use of plot land
- \* flexible construction: masonry exterior walls act as principle structure, leaving the majority of interior partitions for changing interior requirements
- \* good access to natural daylight and ventilation

#### Negatives

- \* rear half of building dependent on the adjoining building's coordinated setbacks for success of daylight and ventilation

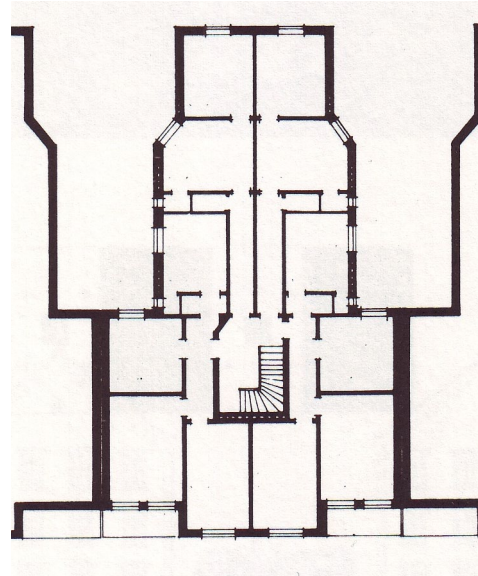
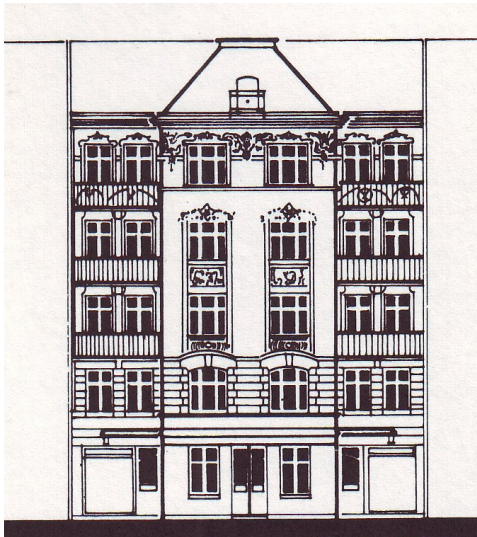
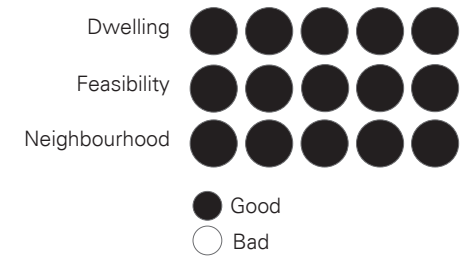
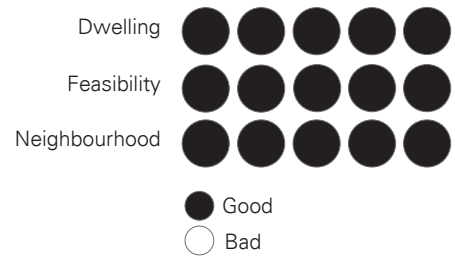


fig 3.5.3



### 3.5.4 Dumbbell Type Tenement

James E. Ware, Architect  
 1879  
 New York, USA

Height: 5 storeys  
 Dwellings: 16 residential units  
 Retail: commercial at grade

#### Positives

- \* core and common circulation spaces have natural light and ventilation
- \* clever layout allows for four units per floor
- \* bedrooms on quiet mid-block air shafts and separated from common corridors
- \* living spaces have views onto street life

#### Negatives

- \* setback co-ordination with neighbours
- \* small residential units

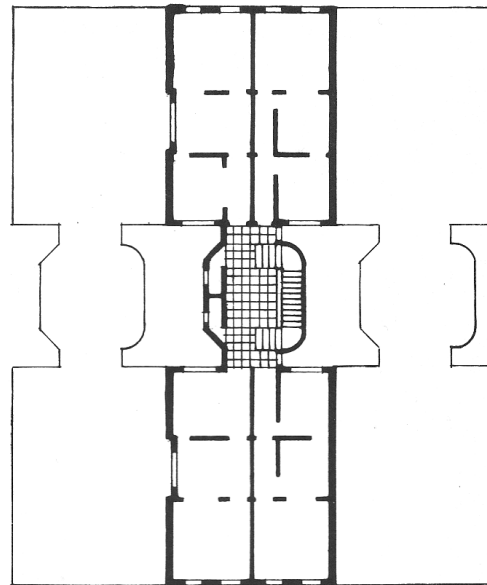


fig 3.5.4



### 3.5.5 Lasanno Court

Schwartz & Gross, Architects  
 1907  
 New York, USA

Height: 10 storeys  
 Dwellings: 4 residential units per floor  
 Retail: unspecified

#### Positives

- \* four units per core share costs of core
- \* spacious units with up to 4 bedrooms
- \* can be used as part of continuous street wall

#### Negatives

- \* apartment entry is adjacent to bedrooms, waking occupants when entering and exiting
- \* units require long corridors for circulation throughout apartment

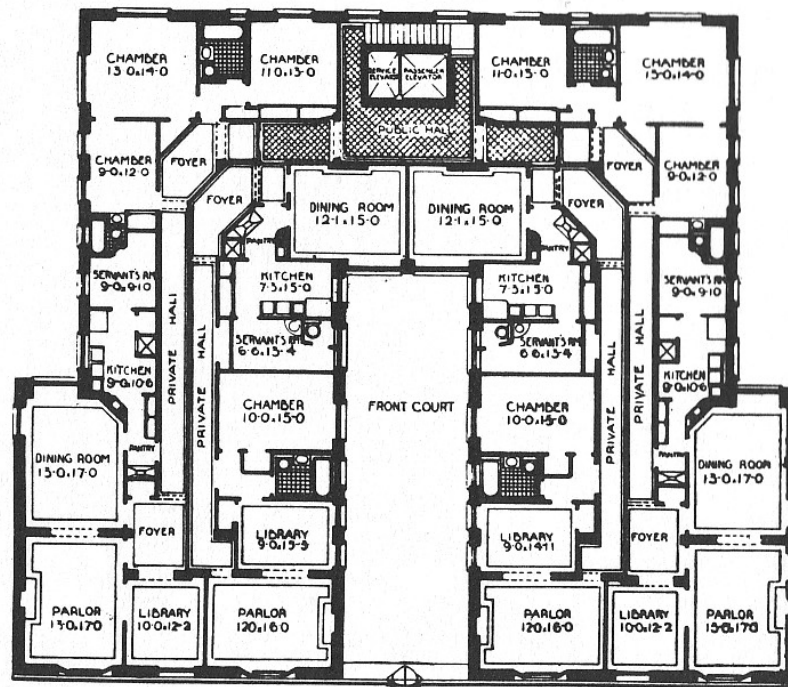
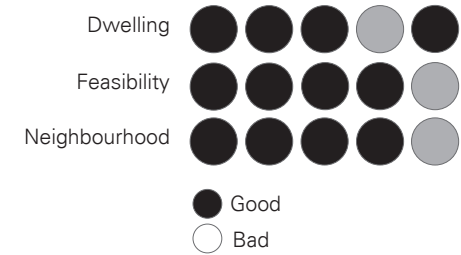
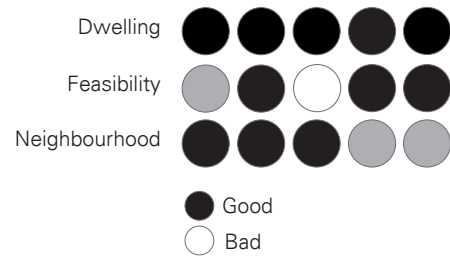


fig 3.5.5



### 3.5.6 Casa de Renta

1889  
Barcelona, Spain

Type: direct stairway access  
 Height: 5 storeys  
 Dwellings: 12 residential units

#### Positives

- \* this building's mid-block courtyards are unaffected by neighbouring buildings
- \* three small light shafts provide natural light and ventilation into many mid-floorplate rooms
- \* these light shafts provide quiet outdoor space to the bedrooms

#### Negatives

- \* light shafts increase the amount of building envelope, adding costs
- \* light shafts lose effectiveness on lower floors when this type of building becomes too tall

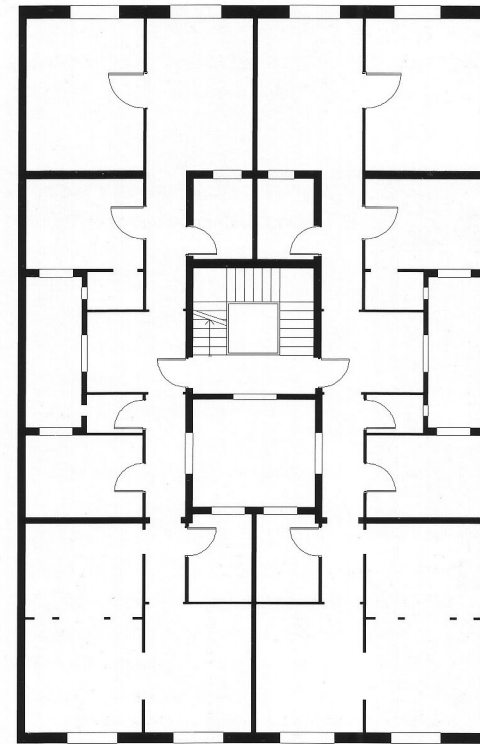
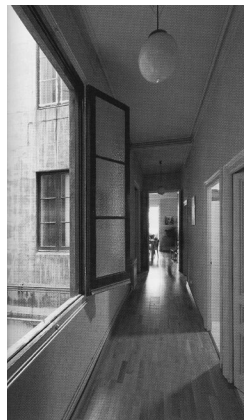


fig 3.5.6

### 3.5.7 Housing Complex

Gigon / Guyer Architekten  
2004-2007  
Neumünsterallee, Zurich, Switzerland

Height: 5 storeys  
Retail: retail at sunken grade

#### Positives

- \* great exterior spaces
- \* three bedroom units
- \* excellent access to light and air in all units

#### Negatives

- \* complex building envelope
- \* spaces required between neighbouring buildings makes it not appropriate for urban sites/main streets

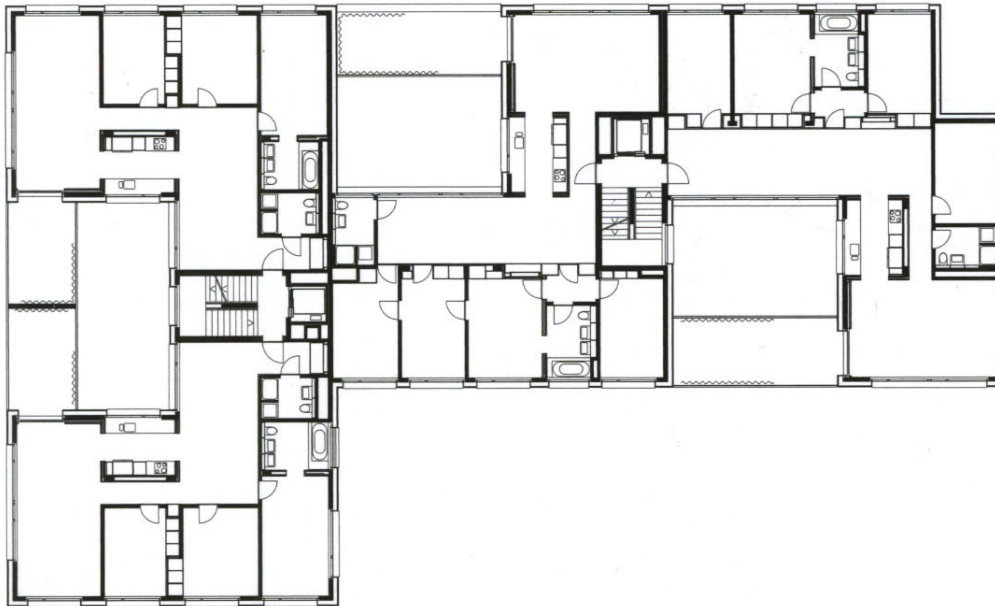
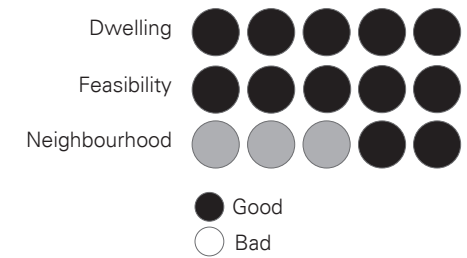
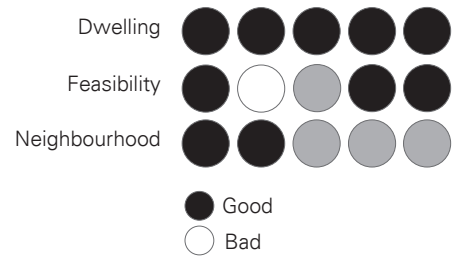


fig 3.5.7



### 3.5.8 Apartments for Large Families

Gigon / Guyer Architekten  
 2004-2007  
 Zurich, Switzerland

Height: 6 storeys  
 Retail: None

#### Positives

- \* residential units suitable for large families
- \* units overlook parks space
- \* separate exterior structure for balconies enables proper detailing for no thermal bridging
- \* an example of a larger project that can be easily staged into phases

#### Negatives

- \* retail or office space at grade would provide work or commercial amenities in the neighbourhood



fig 3.5.8

### 3.5.9 Edifício De Viviendas

Eduardo Souto de Moura  
1992-1995  
Porto, Portugal

Height: 6 storeys  
Dwellings: 8 residential units  
Retail: open space at grade

#### Positives

- \* two storey residential units
- \* excellent access to light and ventilation
- \* efficient use of land and great addition to an urban neighbourhood

#### Negatives

- \* large units such as these are not affordable for the average home buyer
- \* missed opportunity for roof garden

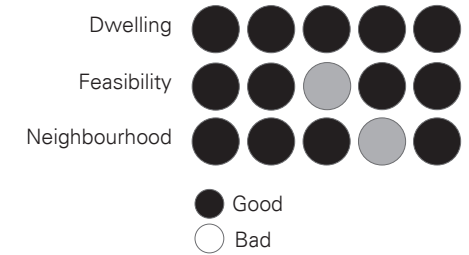
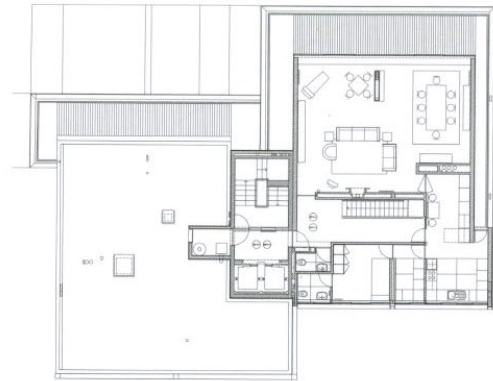
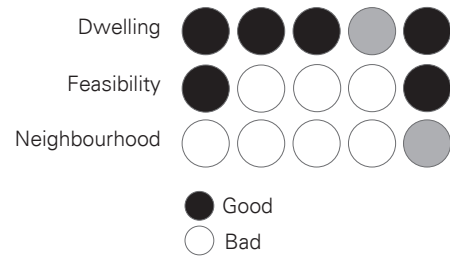


fig 3.5.9



### 3.4.10 Highpoint, Highgate

Lubetkin and Tecton  
 1933-1935  
 North Lndon, England

Type: direct elevator access  
 Height: 9 storeys  
 Dwellings: 68 residential units

#### Positives

- \* Excellent lighting and air circulation
- \* dark rooms and internal angles are avoided
- \* excellent privacy between units
- \* four units to one core

#### Negatives

- \* designed to require setbacks from neighbouring buildings, making it impossible to integrate into street wall
- \* this is a “tower in the park” building
- \* this is the anti-urban version of the direct core access building
- \* this variation of this type cannot easily be reconfigured to form a street wall

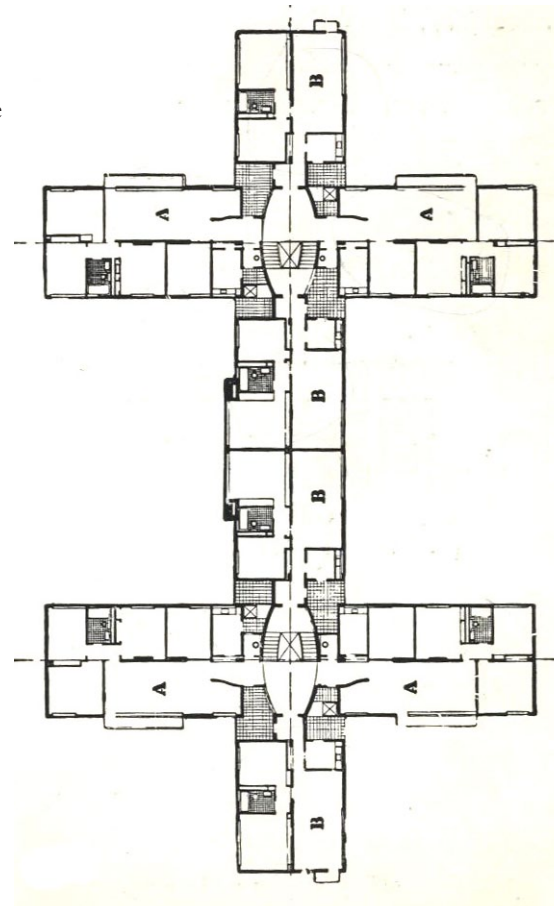


fig 3.4.10

### 3.5.11 Tower in the Country

Raymond Hood  
USA

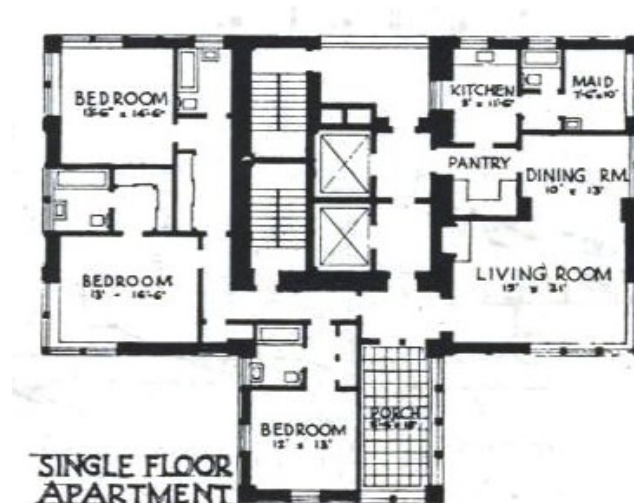
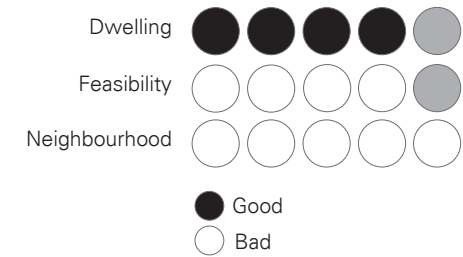
Type: direct elevator access  
Height: 20 storeys  
Dwellings: 20 residential units

#### Project Virtues

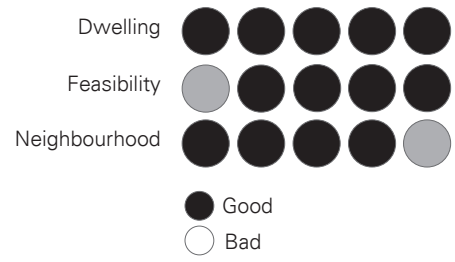
- \* Excellent lighting and air circulation
- \* dark rooms and internal angles are avoided
- \* configuration ensures excellent privacy between units
- \* could easily be adapted to more urban environments

#### Project Vices

- \* extremely expensive, unless the elevator costs can be shared over many units, requiring a tall building.



Yorke, F. R. S., and Frederick Gibberd. The Modern Flat. London: Architectural, 1950. Print.



### 3.5.12 Mietskaserne

A. Weller  
 1896  
 Berlin, Germany

Type: direct stairway access  
 Height: 5 storeys  
 Dwellings: 16 residential units  
 Retail: commercial at grade

#### Project Virtues

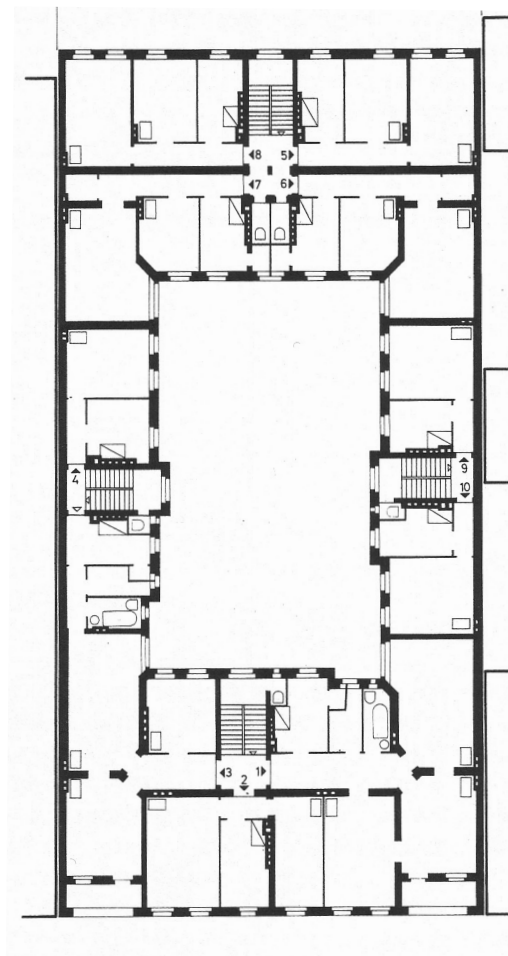
- \* multiple cores allow for added flexibility and sub lease options
- \* humane scale
- \* communal courtyard space

#### Project Vices

- \* less feasible with elevator and fire exiting requirements in Ontario today



fig 3.5.12

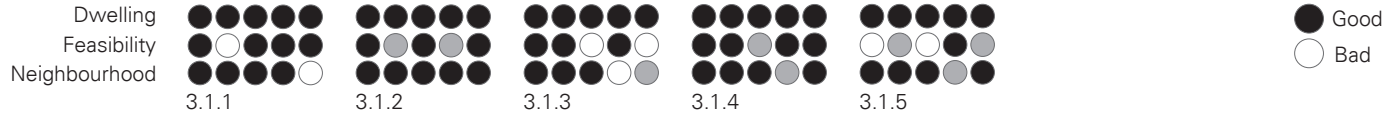




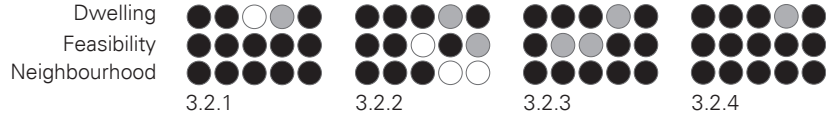


**Avenue Building Criteria Summary**

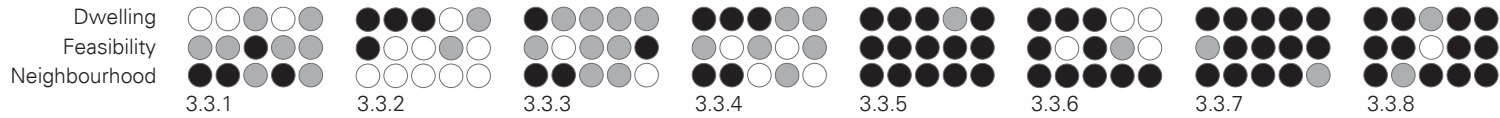
**3.1 The Unit Entry at Grade Type**



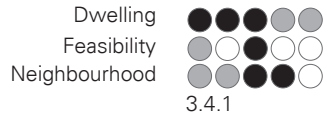
**3.2 The Single Loaded Corridor Type**



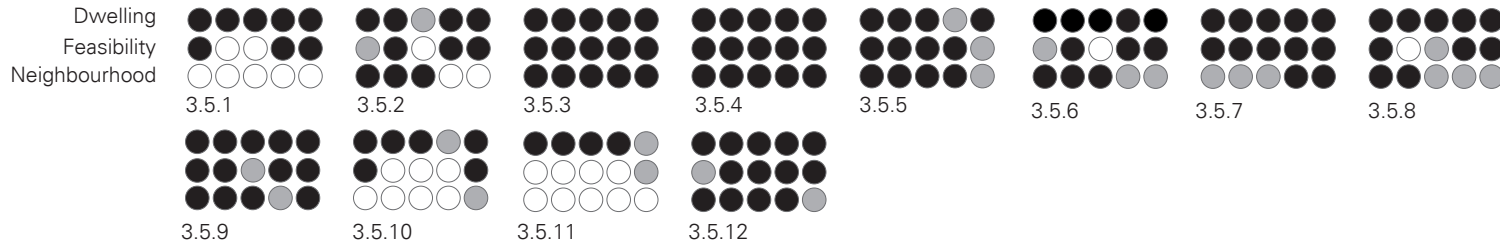
**3.3 The Double Loaded Corridor Type**



**3.4 The Point Tower Type**



**3.5 The Direct Core-Access Type**



## 3.6 Case Studies Summary

### Building Types Summary

The grading matrix used to evaluate the case studies was used to help determine which buildings provided feasible development that offered a higher quality of life standard. Within each of the building type categories, there were winners and losers to this grading system. Of the case study buildings, no building type category was clearly superior. Combinations of certain typological and morphological characteristics consistently scored well. These winning combinations were found in buildings that were, not surprisingly, designed for dense urban areas.

### Best Avenue Building Characteristics

The high scoring buildings of each building type category, 3.1.4 - the triplex from Montréal, 3.2.4 - perimeter block housing from Barcelona, 3.3.7 - Crescent Court of Manhattan, and 3.5.3 - typical Hamburg apartments, share the following characteristics:

1. Heights range from **3 to 10 storeys**.
2. **Retail space at grade** or easily convertible to retail space is provided at grade.
3. **No parking** for automobiles is provided within the building.
4. Approximately **8m to 14m wide floor plates**, rather than wider floor plates with dark building cores, ensure light and natural ventilation is distributed to every room.
5. **Dual aspect dwelling units** (windows at opposing ends of the unit), allowing for better cross ventilation and access to natural light.
6. **No amenity spaces** such as communal gyms, or ‘party’ rooms are provided.
7. Their building **massing does not step down** to lower density neighbourhoods. This point is in direct response to the City of Toronto’s request to have Avenue buildings step down to the Neighbourhoods.
8. **Carefully arranged social and solitary spaces**, within the dwelling unit, consider street activity and quieter inner blocks or courtyards. For example, living rooms face Avenues and bedrooms face the quieter inner block.
9. **Shared spaces are minimized**. Elaborate lobbies with concierges, long windowless corridors



are non-existent or minimized.

- IO. Street facing façade ranges from 8m to 20m.
- II. Exterior space is non-existent, minimized, or grouped with neighbouring exterior spaces to create inner blocks, courtyards, public squares. Exterior space does not occur between the building and the Avenue.

This combination of characteristics creates top grades on the evaluation matrix. There are only 11 building characteristics listed above, but 15 criteria bubbles on the Avenue Building Criteria. A building characteristic encompasses more than one criteria bubble. For example, the characteristic of having reduced or minimized shared spaces within a building, satisfies multiple criteria point. When a building has been planned to have little to no entry lobbies, windowless long corridors, and minimal amenity spaces such as ‘party’ rooms, the feasibility of the project is increased with a greater net-to-gross value. There is now more space being rented or paid for, and less space that is unsalable. Less space needs to be maintained, which reduces the monthly maintenance fees of the building. The shared spaces in a building being the corridors, elevators, lobbies, even ‘party’ rooms, don’t offer the neighbourhood valuable places to interact with the inhabitants of the building. Sidewalks, retail spaces, public squares, public ‘party’ rooms such as bars and cafes are all superior socializing spaces. Accessing one’s unit is more convenient, and finally, efficiently planned space is always valuable in densely populated areas. Under used shared spaces forfeited for retail space at grade or increased dwelling space is win-win for residents and street life. These building characteristics are connected, and sacrificing any one of these characteristics can throw off the delicate balance of the efficiently planned, carefully arranged makeup of an Avenue building.

Therefore these are the combination of characteristics that inform the design of the following prototype buildings, Amy, Tim, and Lisa.



Project Amy



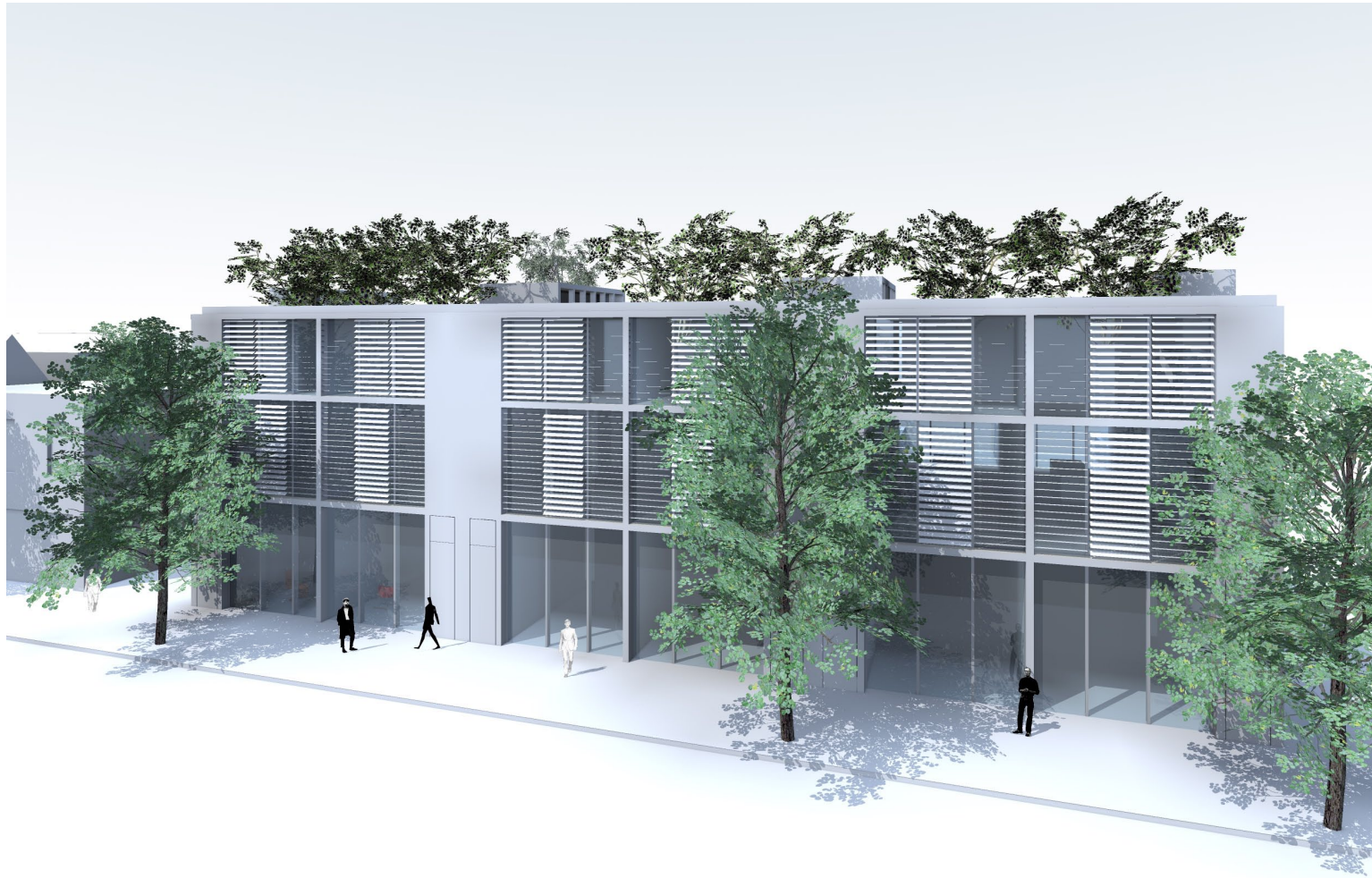
Project Tim



Project Lisa

## 4.0 Proposals

This chapter contains the design proposals: Amy, a low-rise unit entry at grade type, similar to existing century-old Avenue buildings; Tim, the currently popular high-rise point-tower condominium; and Lisa, a mid-rise direct elevator access building type, more commonly found in European cities. Each building contains advantages and disadvantages synonymous with three different building types, affecting the quality of the dwelling, the feasibility of the project, or the benefit of the neighbourhood. Amy and Tim are more commonly built developments, either being a low rise, or high-rise buildings. Lisa is a type under used and under explored in Toronto. The projects below anticipate how building type and scale can affect life on the Avenues, and compare Lisa to the other two more common approaches, Amy and Tim.



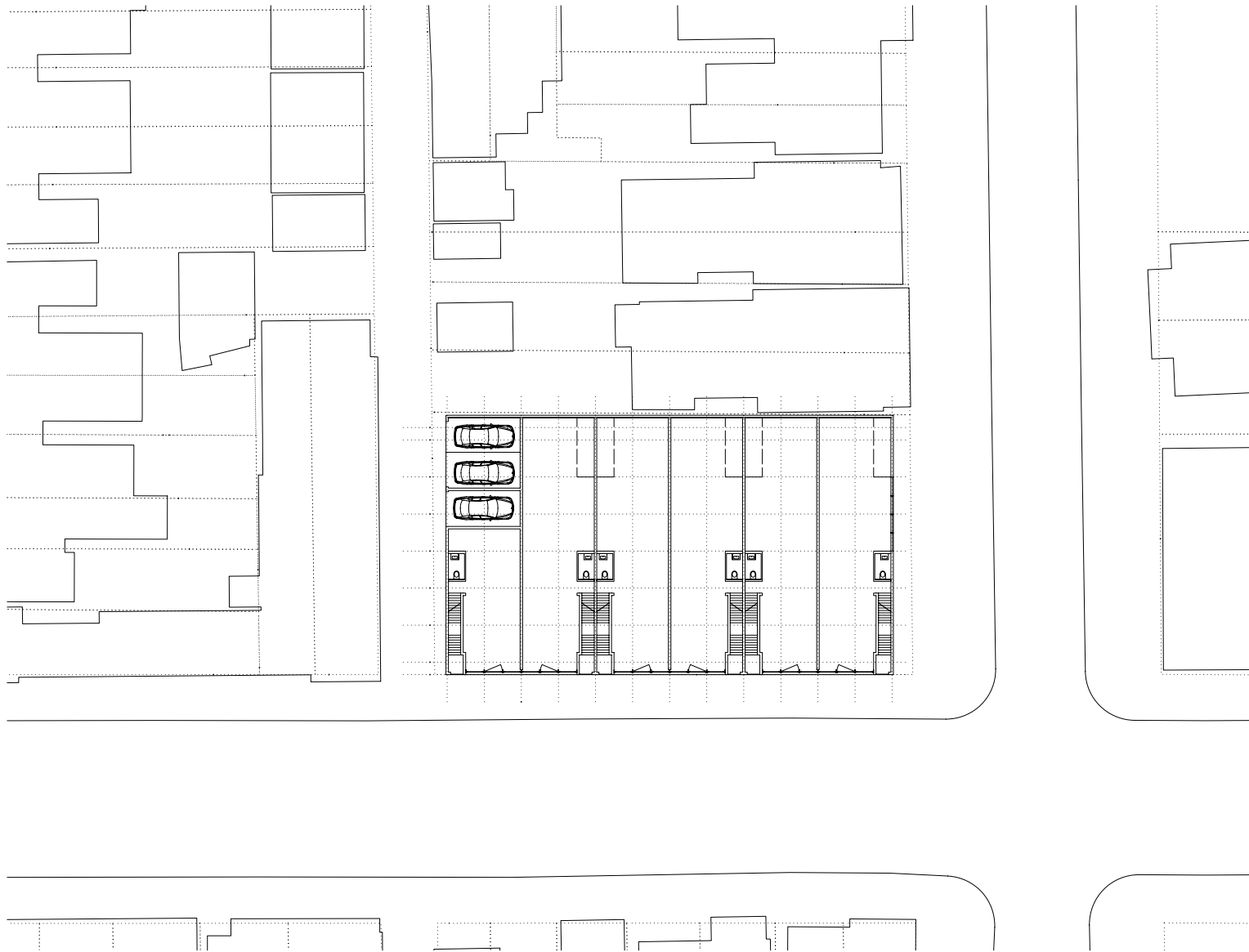
Dundas St. Facade



## 4.1 Amy

### **Low-Rise Development**

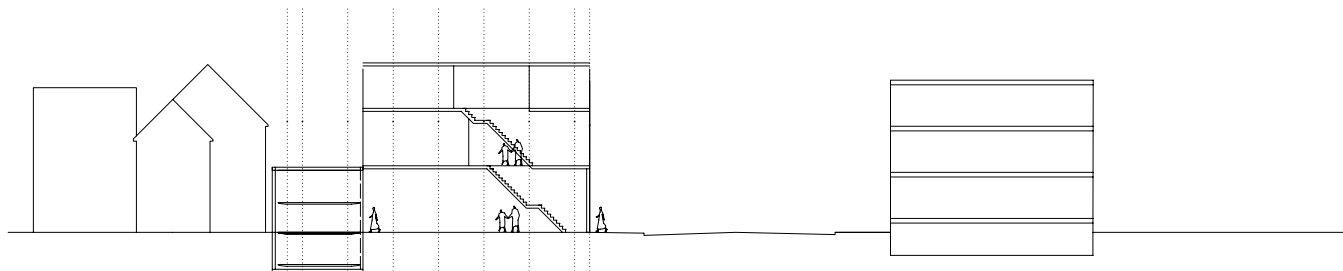
Amy is a development project that could be built under part 9 of the Ontario Building Code, which has less stringent life-safety regulations, and can be built out of combustible material. Amy follows the City's planning regulations, and would quickly and easily get a building permit within roughly 4-6 months. At 12.4m she's also well under the maximum built height of 16m, and fit's within the mixed use land designation. This building type is essentially a replacement of the existing main street buildings, and this is not providing new housing along the Avenues.



Site Plan - 1:500

**Block Massing**

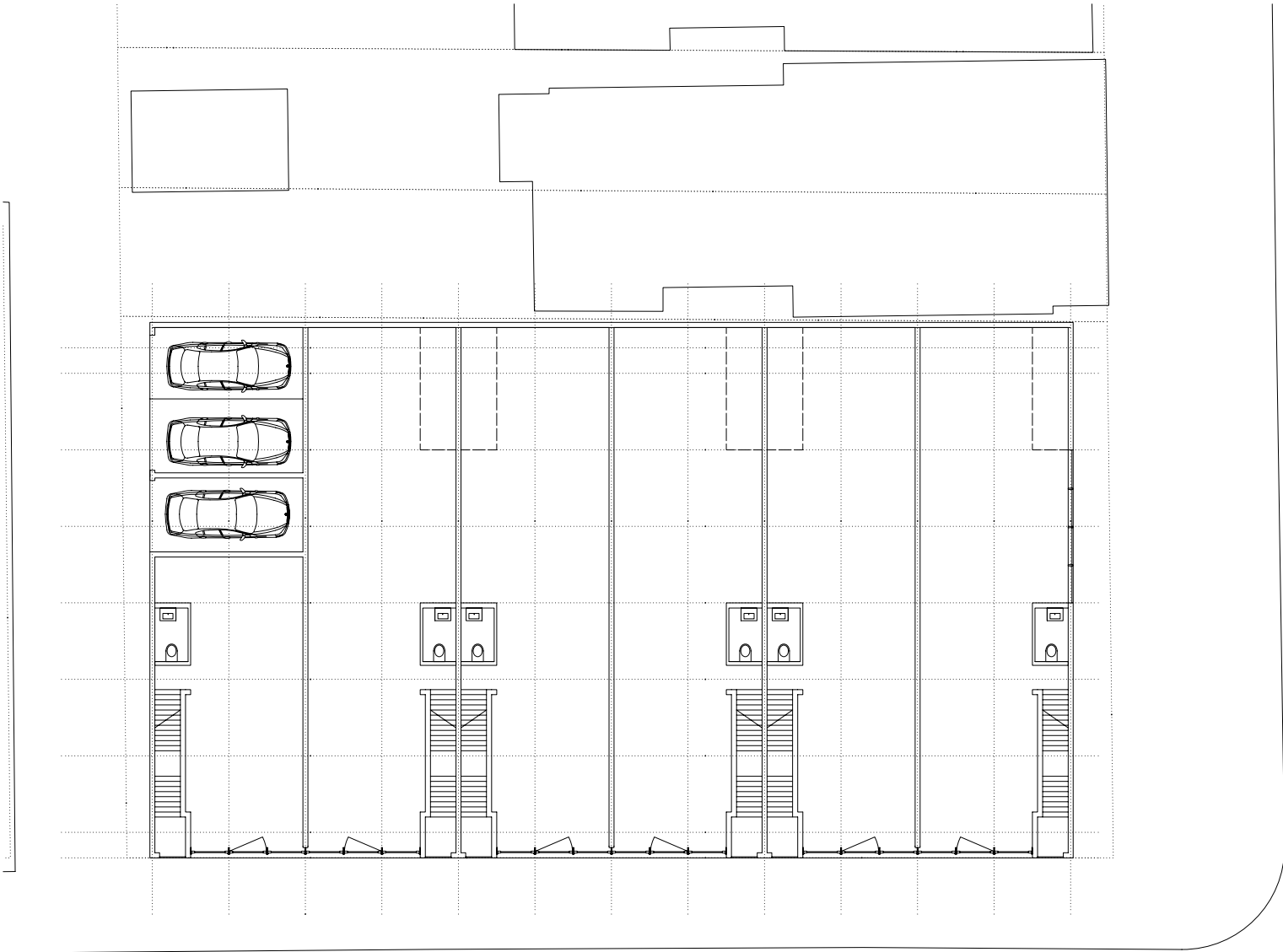
Amy builds right up to the property lines, with parking accessed off the mid-block laneway.  
Note: All drawings have overlaid 3x3m grids on them.



Site Section - 1:500

**Section**

Retail is located at grade, with two storey residential units above. The upper floors are set back from the rear property line, providing northern neighbours better solar exposure, and an opportunity for second floor living spaces to extend outside onto rear terraces.



Ground Floor Plan - 1:250

**Ground Floor**

The priority of the ground floor was to maximize the amount of retail space, and minimize circulation, parking, and other programs. Six retail spaces span the Dundas Street façade, with generous square footage, thanks to the efficiently planned stacking parking spaces. Each stack has two parking plates, making six spaces in total, which is enough parking for each of the six residential units.

**Parking**

One parking space is provided for each residential unit. It is assumed that each household will be able to manage with one car, given the proximity to public transit and car-share programs. Many errands or small trips can also be made on foot or bicycle.



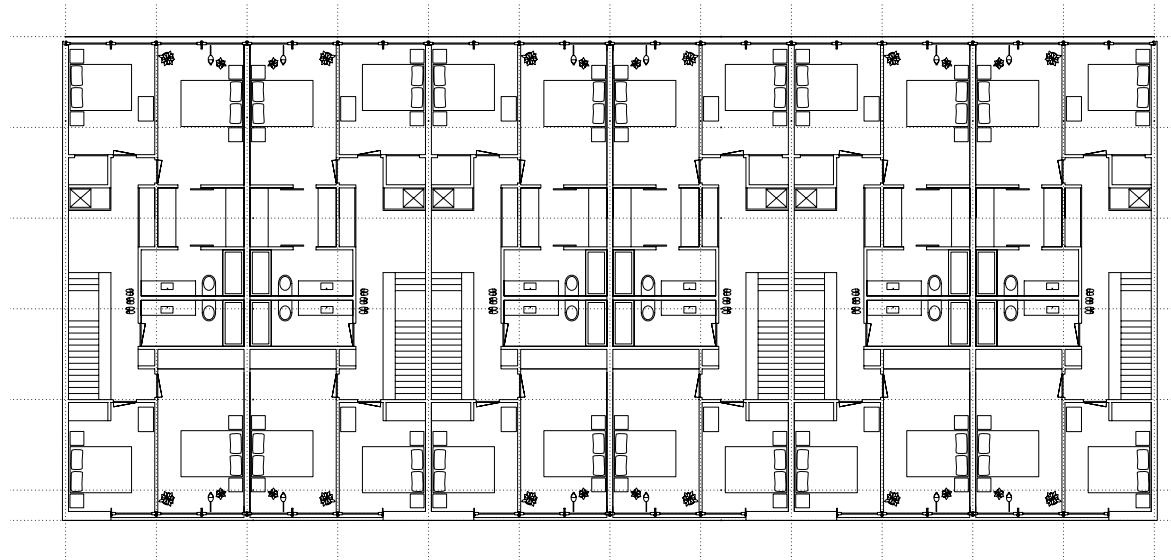
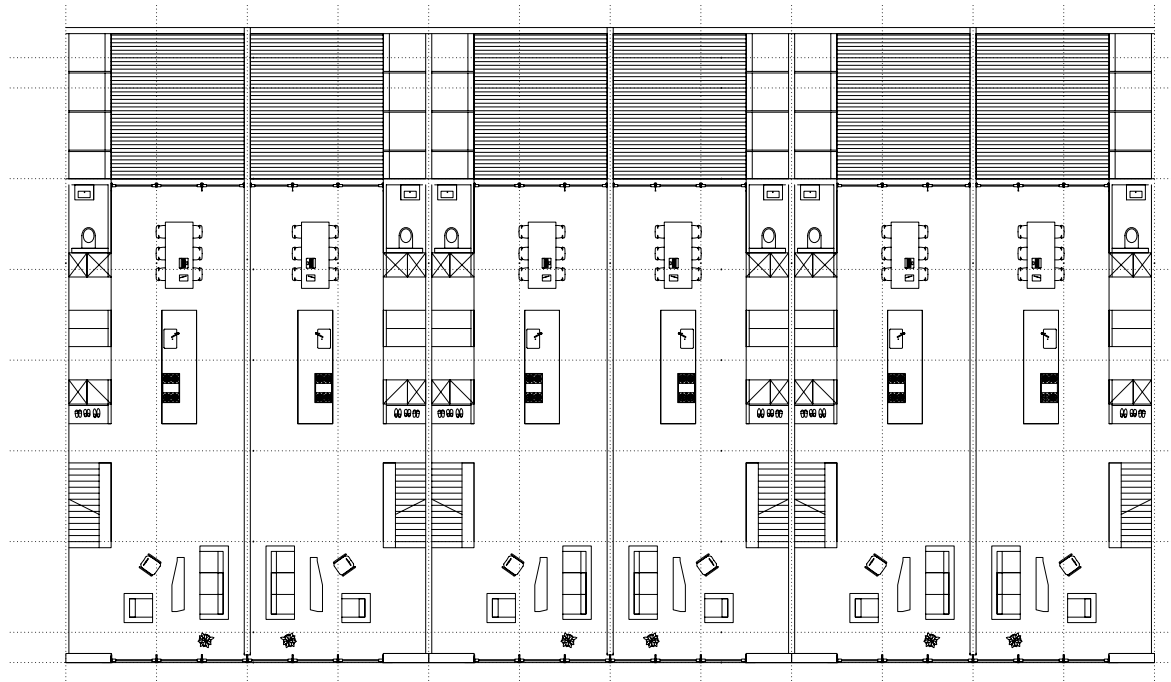


**Storefronts**

Storefronts continuously span the Dundas Street facade at grade. Stairs leading up to the residential units are concealed in the opaque grey masses between retailers.

**Retail Interiors**

Ample south light and 3.4m (14'6") ceiling heights make for attractive retail spaces.



Second Floor Plan - 1:250  
Third Floor Plan - 1:250

### **Residential Floors 2 & 3**

Above the retail spaces, accessible up one flight of stairs, sits six two-storey residential units. These are spacious four bedroom units, with generous living space on the second floor that open out to terraces at the rear.



**Living Room**

**Kitchen & Terrace**



**Exterior Space & Natural Lighting**

Terraces are divided by large skylights that draw sunlight down into the rear of the retail spaces. The third storey roof is broken up by clearstory lighting that draws light down the stairway to the second floor.

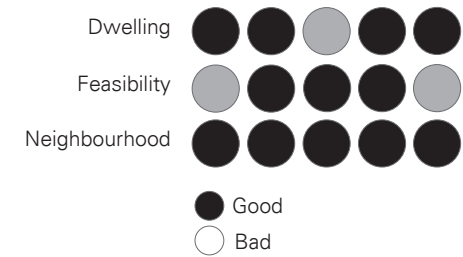
## Expenses

<u>Hard Costs</u>	m <sup>2</sup>	ft <sup>2</sup>	\$ / ft <sup>2</sup>	
Residential Floors	1112	11974	\$180	\$2,155,279
Ground Floor	756	8138	\$220	\$1,790,254
Basement	55.8	601	\$90	\$54,056
Garage Mechanical				\$60,000
Landscaping				\$50,000
Demolition				\$400,000
Total Construction Budget			A	\$4,509,589
<u>Soft Costs</u>	% of A			
Marketing	12%			\$541,151
Architect's Fees	7%			\$315,671
Consultant's Fees	3%			\$135,288
Development Charges				\$200,000
			B	\$1,192,110
<u>Sunk Costs</u>				
Site			C	\$1,500,000
Total Project Costs			A+B+C=D	\$7,201,699
<u>Financing</u>	% / year	years		
Cost of Borrowing	8%	1.5	E	\$864,204
Total Development Costs			D+E=F	\$8,065,903

## Income

<u>Sales</u>	m <sup>2</sup>	ft <sup>2</sup>	\$ / ft <sup>2</sup>	
Residential Units	1112	11974	\$500	\$5,986,887
Commercial Units	648	6975	\$500	\$3,487,507
	\$ / p. space	spaces		
Garage	\$30,000	6		\$180,000
Total Income			G	\$9,654,394
Profit			G-E=H	\$1,588,491
Return On Investment				19.69%





### Pro Forma

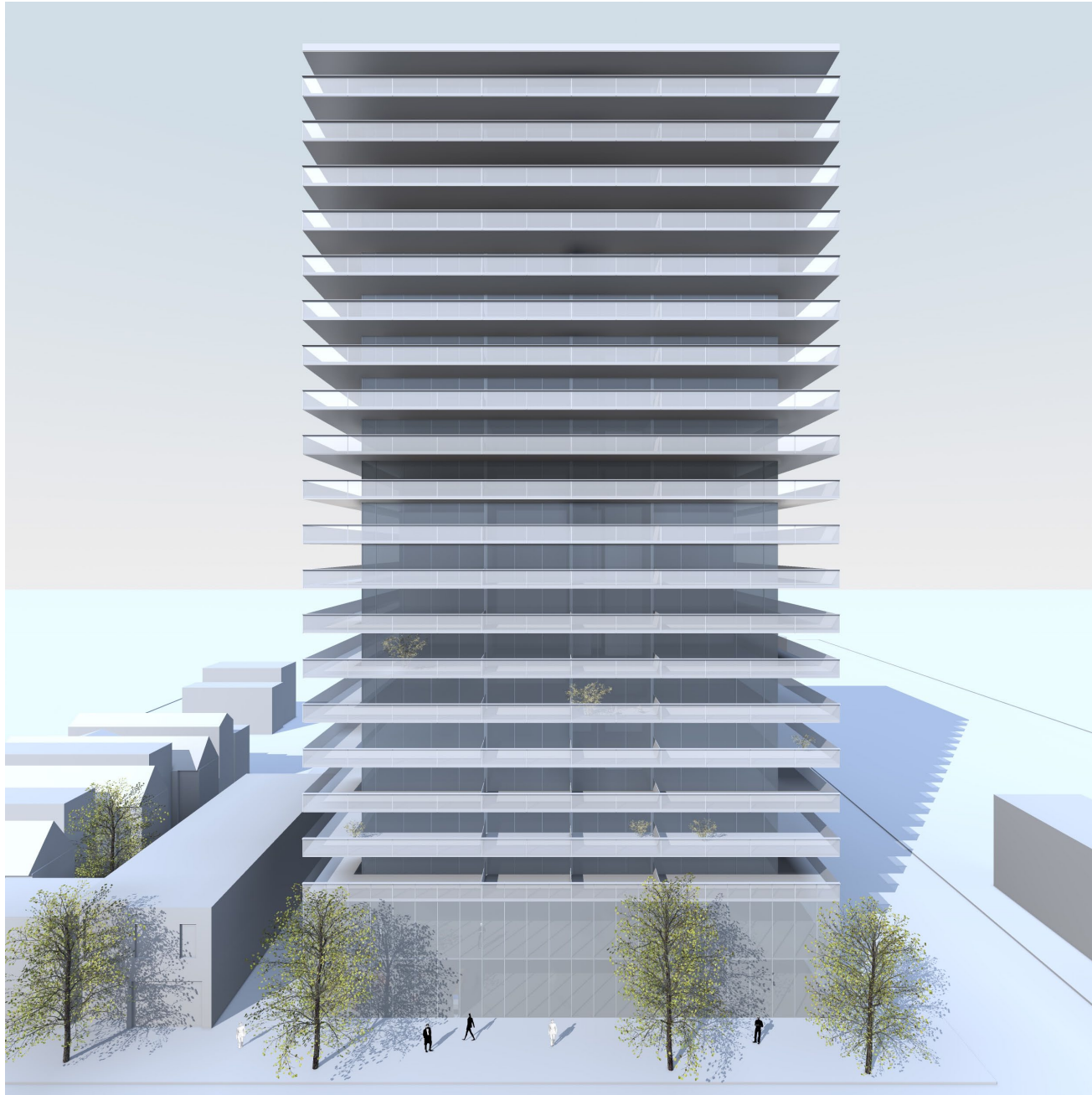
Amy can be built cheaper than the other two prototypes, as it's designated as a part 9 building allowing for combustible construction, and does not require some of the expensive components a larger development would require, such as a underground parking, elevators, or garbage handling facility. Also, development charges are less than the larger prototypes, because it can be built under the as-of-right zoning that currently exists over the site. These cost savings mean Amy can sell space cheaper.

### Avenue Building Criteria Scoring

Amy scores very well on the *Avenue Building Criteria* matrix. This building gets lots of daylight and natural ventilation, and it is the only prototype in this thesis that boasts dwellings with front doors right on the street. Amy offers six very livable dwellings, and very efficiently organizes the ground floor to maximize retail space. Older versions of Amy are what make up Toronto's well loved main streets. Amy is a fresh faced version of the original main street building type, with retail at grade and apartments above. This is a building type that has been proven to work.

### Conclusion

Despite a healthy pro forma, and great report card, Amy only offers six dwelling units, which sadly won't be enough to intensify the Avenues.

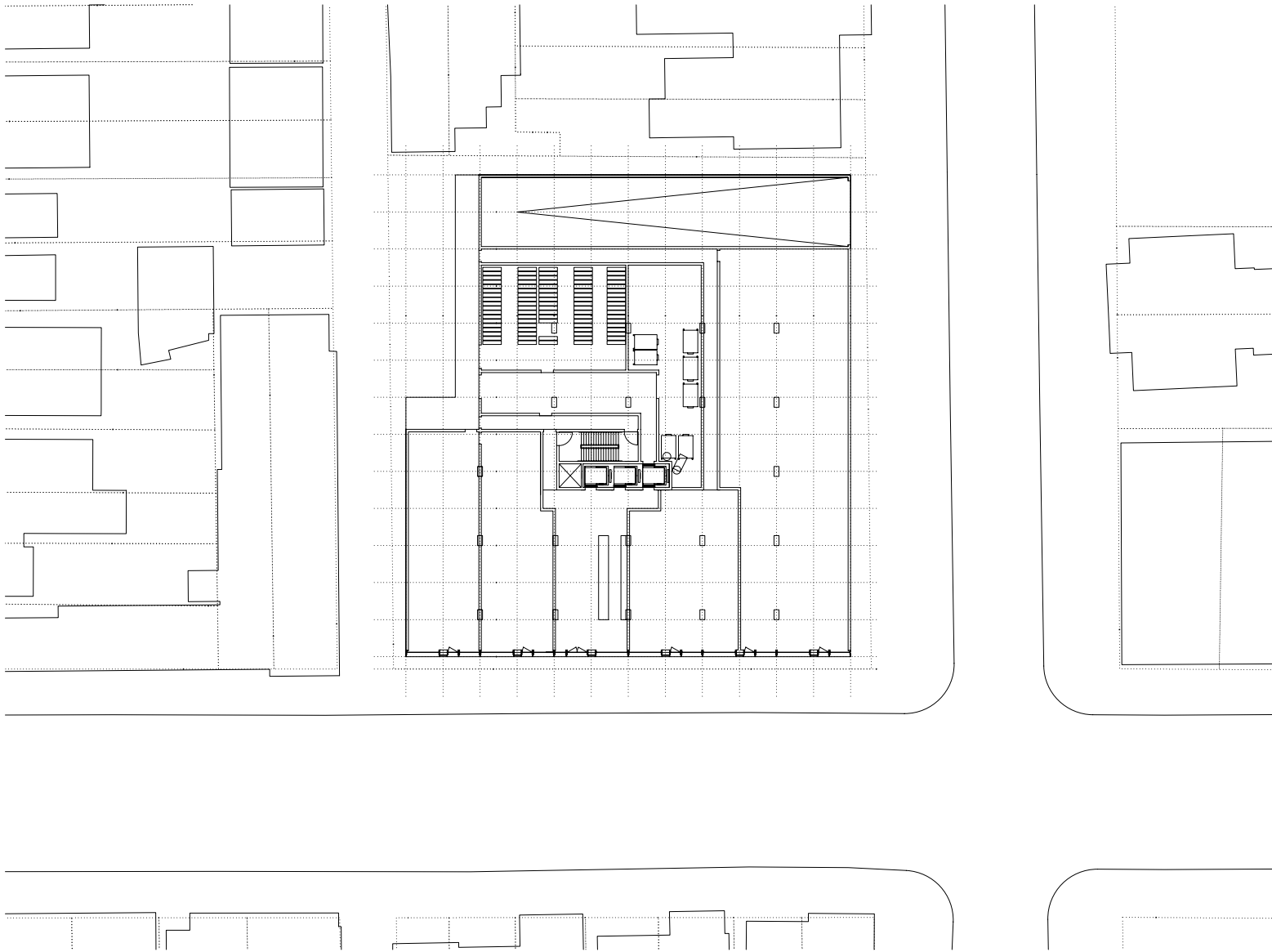


Dundas St. Facade

## 4.2 Project Tim

### **High-Rise Development**

Tim is a development project that must be built under the more stringent part 3 of the Ontario Building Code, requiring noncombustible construction, multiple fire exits, and other life-safety requirements. Tim would have a difficult time obtaining a building permit. It does not comply with the height requirements, and requires rezoning of two residential properties to the rear. These require an average of 18 months of negotiations, which have become fairly routine for condominium developers in Toronto. This building type injects a massive amount of density to this address, offering lots of new housing along the Avenue.

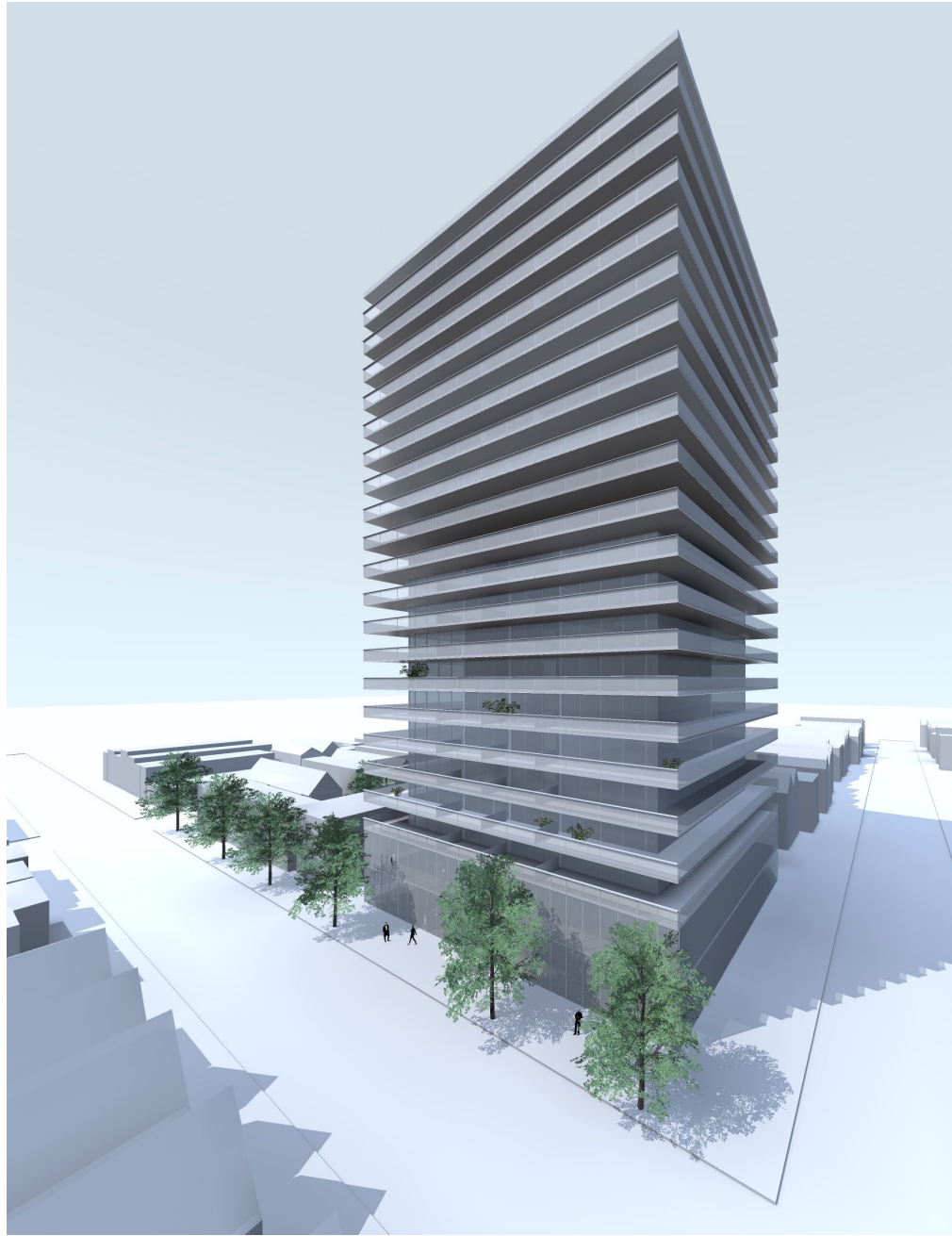


Site Plan - 1:500

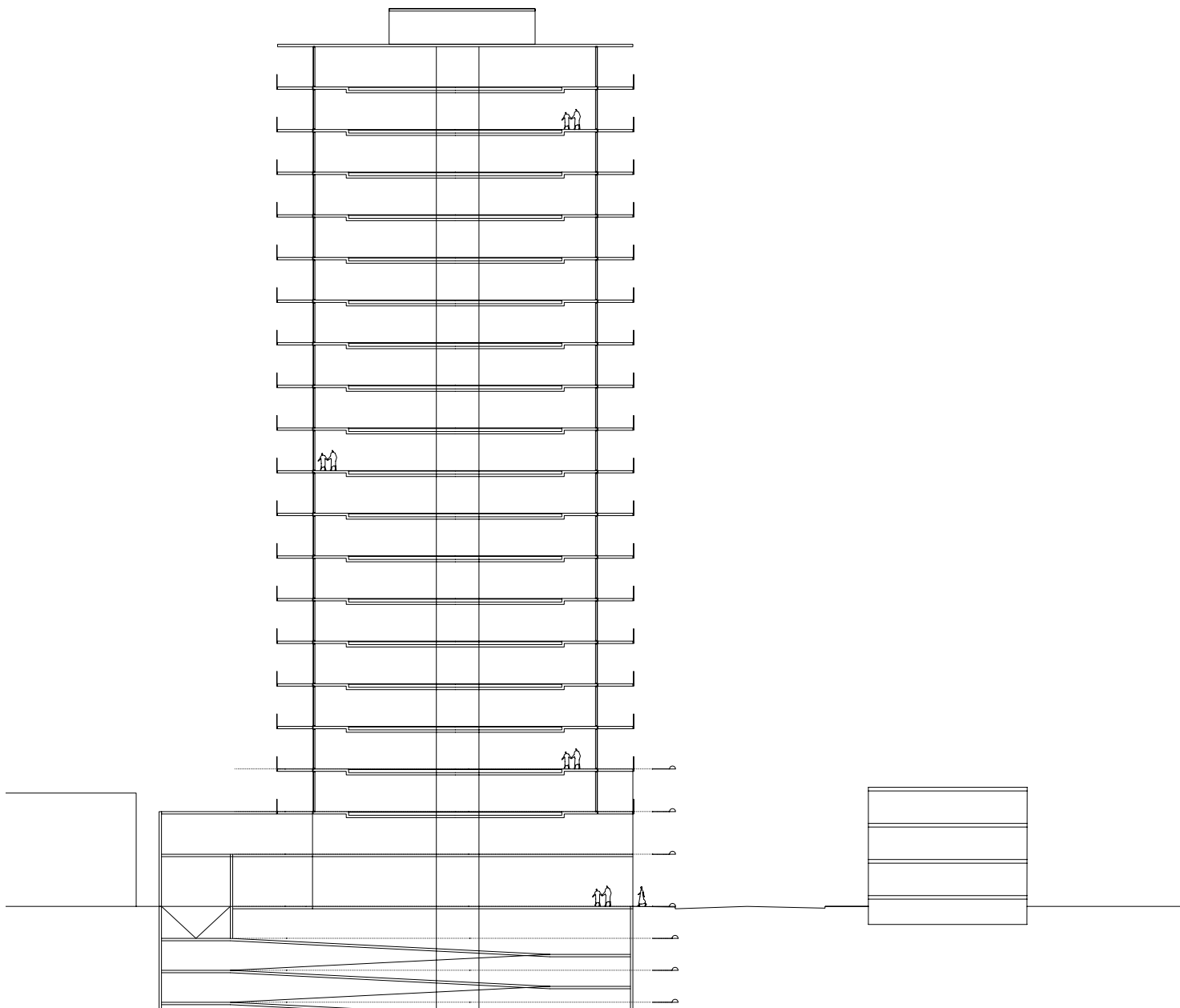
### **Block Massing**

Tim's first two floors build right up to the property lines, while the tower steps in from the north 10 meters. Basement parking is accessed via a ramp off of Claremont Street, which marks the east border of the site. The five properties directly north of the site need to be purchased, two of those for demolition, engulfed within the footprint of Tim, and the remaining three as rental properties. The three homes left standing are most affected by the shadows cast by Tim, and the developer must fairly compensate the owners for the resulting land value depreciation. These properties, with less sunlight, would make suitable rental properties.

Note: All drawings have overlaid 3x3m grids on them.



Dundas St. and Claremont Ave façades

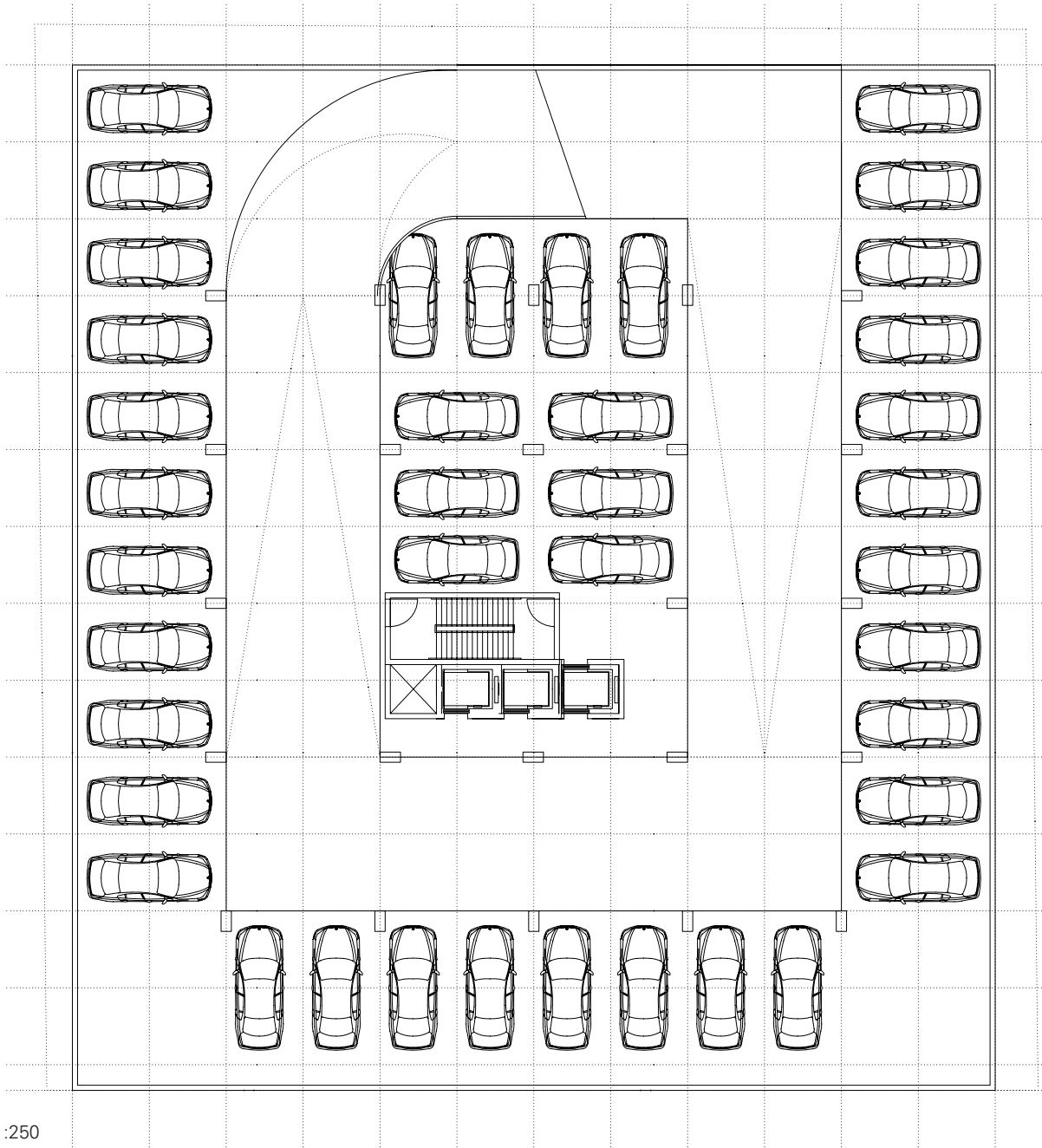


Section A - 1:500



**Section**

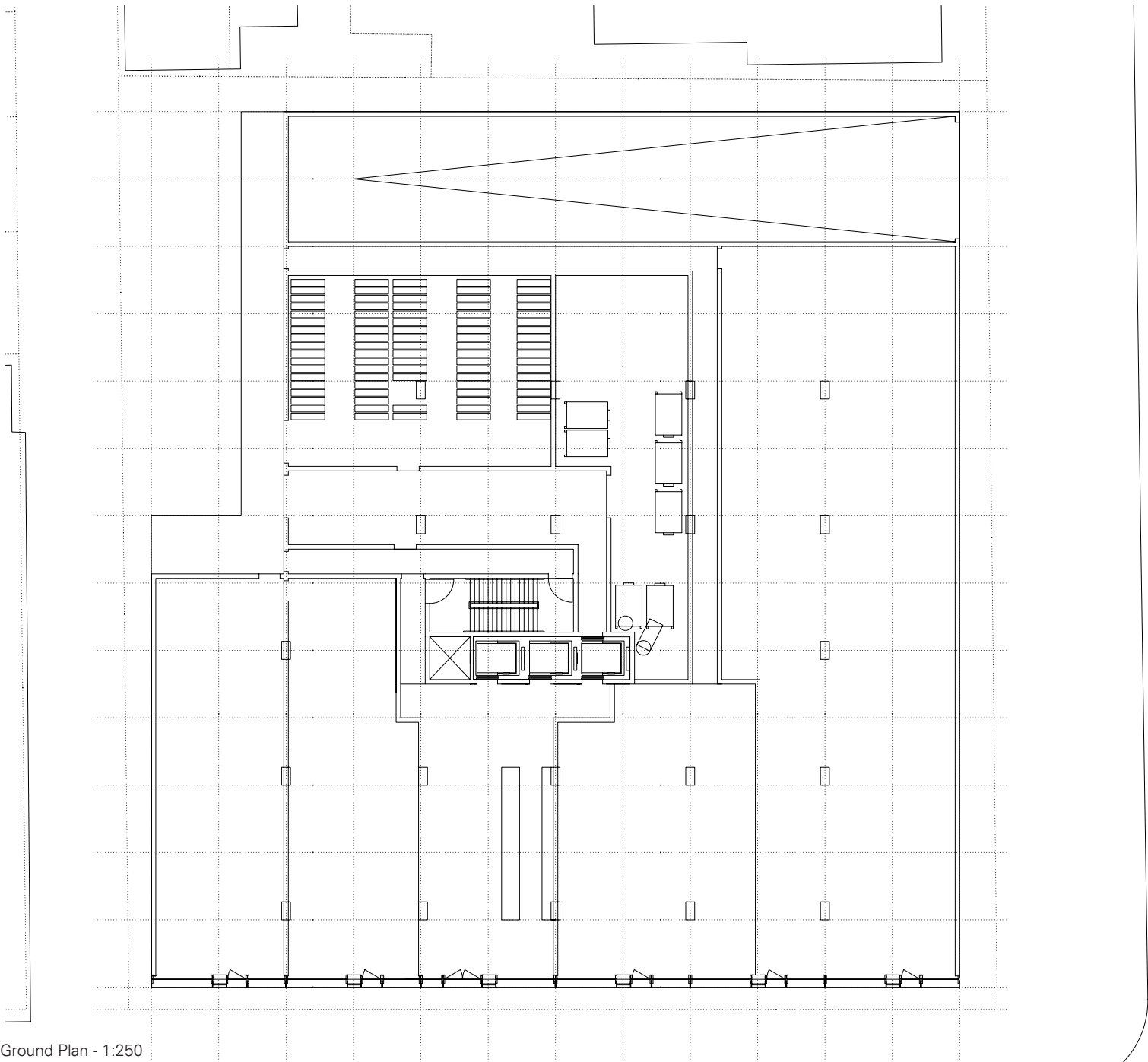
Retail is located at grade, with office space on the second floor, and twenty stories of residential units from floor 3 to 22. The upper floors are set back from the rear property line, but with 22 storeys this hardly helps improve solar access for neighbours to the north. Parking is hidden within the basement levels of this building.



Basement Plan - 1:250

### **Basement Parking**

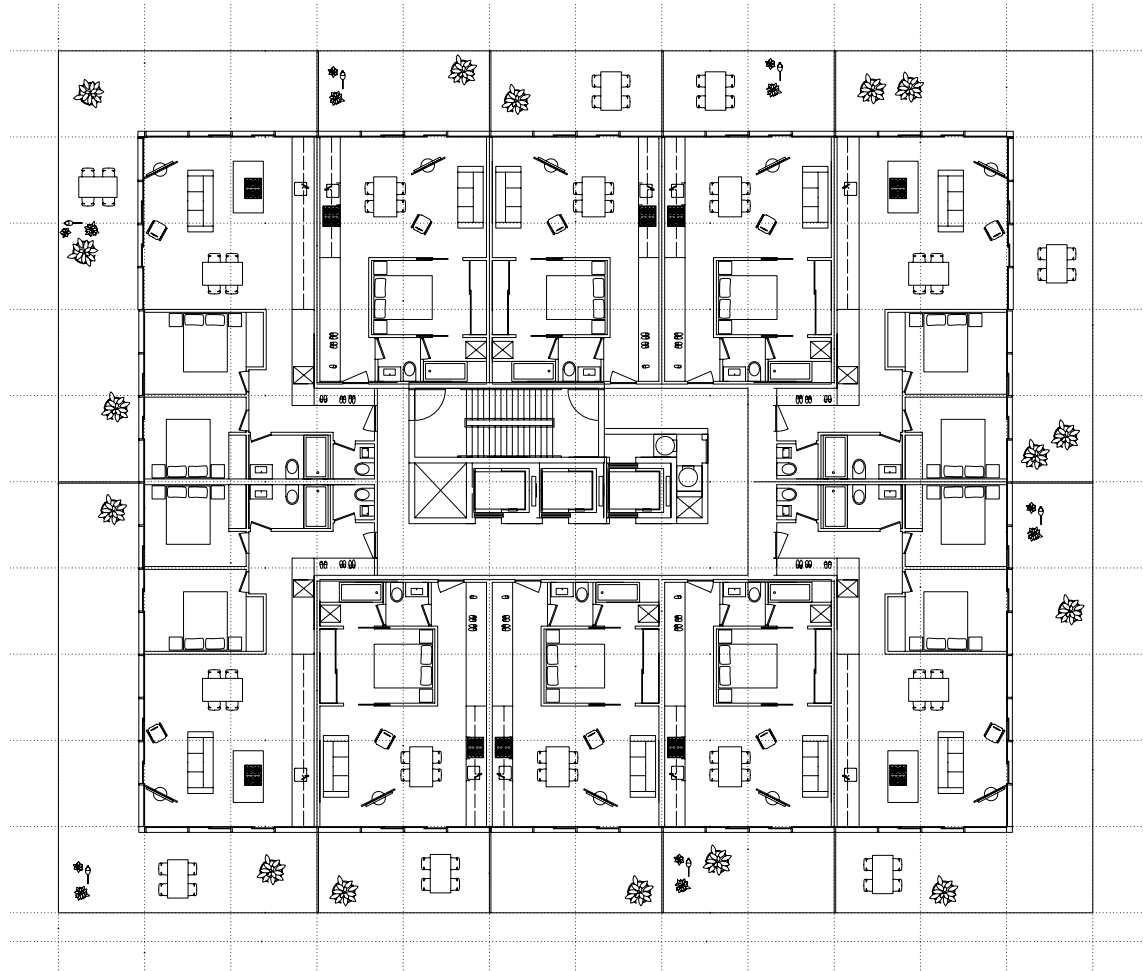
123 parking spaces are provided, which does not provide all of the 200 dwellings above their own parking space. Limited by turning car turning radii, maximum car ramp slopes, minimum parking space and throughway dimensions, this basement floorplate offers only 41 parking spaces per floor. The dimensions of the site accommodate a floorplate 36x39m, however if this was increased to 42x42m, 72 parking spaces could be accommodated. The current floorplate does not allow parking on both sides of a drive aisle, but 42x42m are the minimum dimensions that ensure parking spaces line both sides of all drive aisles. That would be 75% more parking with 25% more space. This site is too small to efficiently use ramped underground parking.



Ground Plan - 1:250

### **Ground Floor**

The priority of the ground floor was to maximize the amount of retail space, and minimize circulation, parking, and other programs. However this building type requires garbage handling and loading facilities, a parking ramp, and lobby with concierge. This program eats up the amount of retail space that can be offered at grade. Less space for stores, restaurants, cafes, offices, and more space for garbage, recycling, and driving up a car ramp. Retail amenity that contributes to the streetscape of the Avenues, where the other programs for utilities and parking detract from them.



Typical Tower Plan - 1:250

**Typical Residential Floor**

Above retail and office spaces, accessible by a choice of three elevators, 200 dwelling units over 20 storeys reside in within Tim. Four corner unit two-bedroom units and six one-bedroom units fit onto one floorplate, and all units have generous three meter deep balconies.

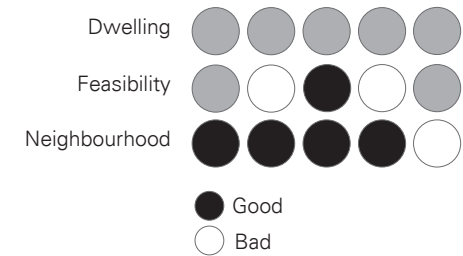
## Expenses

<u>Hard Costs</u>	m <sup>2</sup>	ft <sup>2</sup>	\$ / ft <sup>2</sup>		
Penthouse Mechanical	200	2153	\$180	\$387,501	
Residential Floors	14400	155000	\$240	\$37,200,073	
Second Floor	1188	12788	\$240	\$3,069,006	
Ground Floor	1404	15113	\$240	\$3,627,007	
Basement	4212	45338	\$180	\$8,160,766	
Garage Mechanical				\$0	
Landscaping				\$50,000	
Demolition				\$400,000	
Total Construction Budget				A	\$52,894,353
<u>Soft Costs</u>					
	% of A				
Marketing	12%			\$6,347,322	
Architect's Fees	4%			\$2,115,774	
Consultant's Fees	3%			\$1,586,831	
Development Charges				\$500,000	
				B	\$10,549,927
<u>Sunk Costs</u>					
Site				C	\$4,000,000
Total Project Costs				A+B+C=D	\$67,444,280
<u>Financing</u>					
	% / year	years			
Cost of Borrowing	8%	3	E	\$16,186,627	
Total Development Costs				D+E=F	\$83,630,907

## Income

<u>Sales</u>	m <sup>2</sup>	ft <sup>2</sup>	\$ / ft <sup>2</sup>		
Residential Units	12600	135625	\$550	\$74,593,896	
Commercial Units	1845	19859	\$500	\$9,929,707	
	\$ / p. space	spaces			
Garage	\$30,000	123		\$3,690,000	
Total Income				G	\$88,213,603
Profit				G-E=H	\$4,582,696
Return On Investment					5.48%





### Pro Forma

Tim is a building that is more expensive to build (per ft<sup>2</sup>) and more expensive to maintain. Tim falls under part 3 of the Ontario Building code, which dictates more stringent life-safety requirements which add to the cost of the building. More expensive non-combustible construction and fire exiting spaces that decrease the net-to-gross of the building drive down Tim's profits. On top of these costly building practices, Rezoning costs drive up price of development. An average of 18 months of negotiations are needed with the city to get a project like Tim, which is much larger and out of scale with the current as-of-right zoning. The city also requires amenity spaces, loading and parking within the building, which also add costs and decrease net-to-gross efficiency. Tim also requires more land, both for building on, and because it assumes the responsibility of some homes it blocks light from to the north. Tim also requires a longer construction time than Amy and Lisa. Longer construction means higher cost of financing, and more risk for investors, as over time the housing market can change and demand or average prices can drop. These expenses translate into higher priced units (per ft<sup>2</sup>), and higher monthly maintenance costs, when compared to cheaper to build and run buildings such as Amy and Lisa.

### Avenue Building Criteria Scoring

Tim scores with only passing marks on the *Avenue Building Criteria* matrix. The dwelling units offer great views on higher floors, but only if another building like Tim is not built nearby. Inside these architecturally insignificant units, daylight penetration depends on unit orientation, and will not reach the spaces adjacent to the building's core. The corner units have two perpendicular aspects, allowing for cross ventilation. However the one bedroom units only have one aspect, so cross ventilation is not possible. Tim's ground floor offers decent retail spaces, but nearly 40% of this prime at grade space is eaten up by program that does not contribute to Avenue street life.

Tim is built in typical Toronto condominium construction, casting plumbing within the concrete floors, and concrete shear walls divide the units. These units are not flexible or easily reconfigured into three bedroom units, housing that is more appropriate for raising children.

### Conclusion

Tim offers a huge increase in density, offering satisfactory housing at a premium price, and retail spaces that are compromised by condominium parking ramps and garbage rooms.

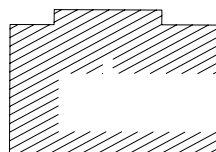
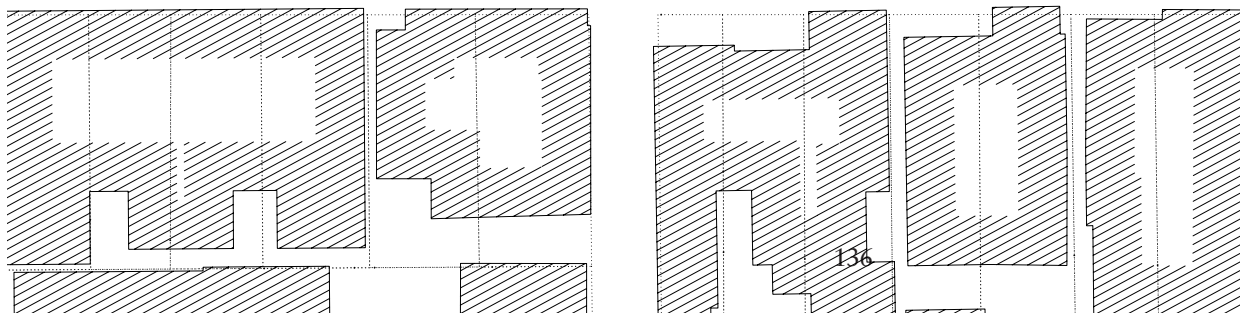
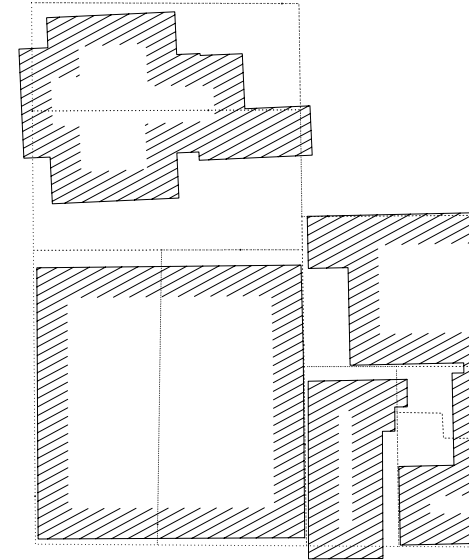
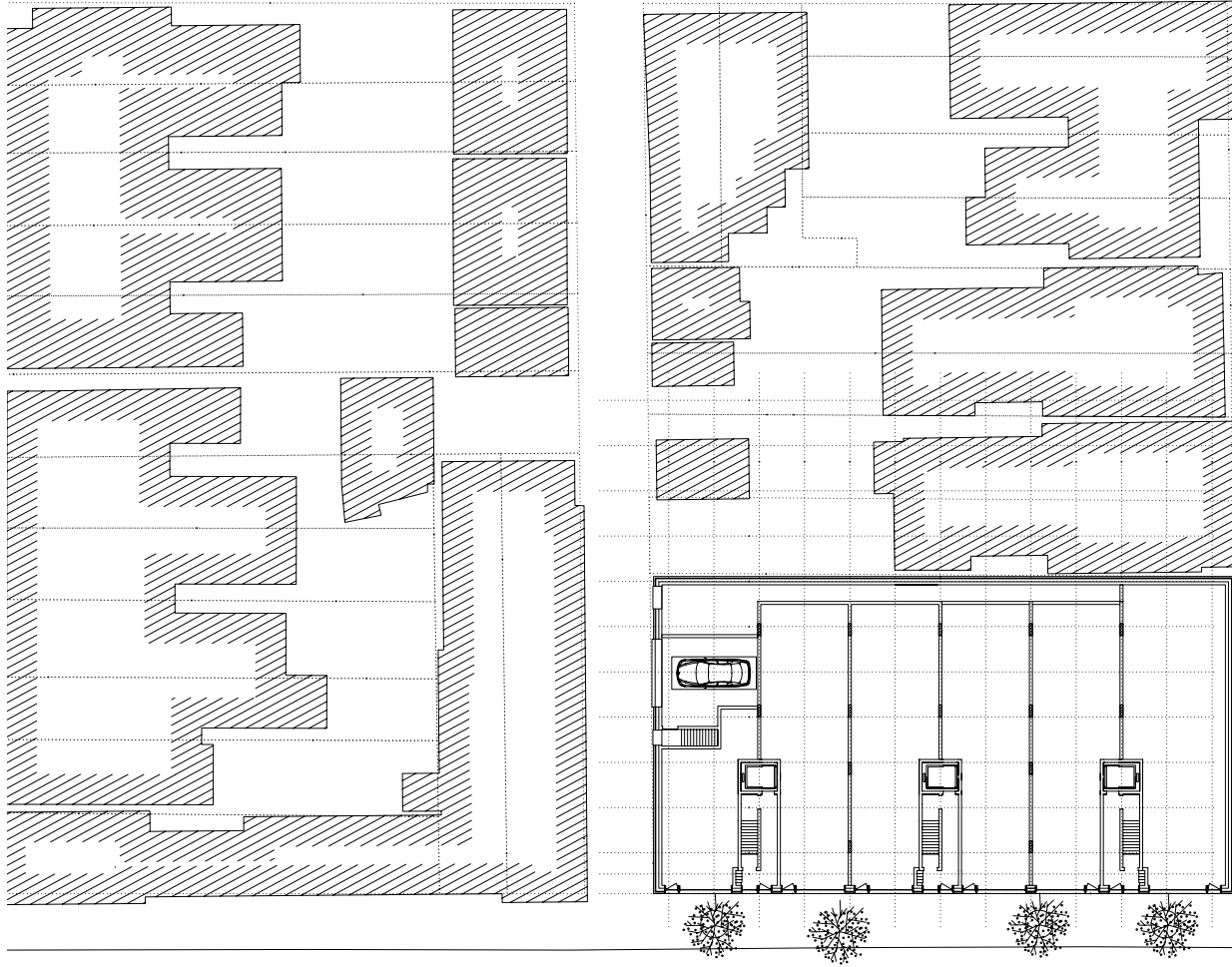


Dundas Street Façade

## 4.3 Project Lisa

### **Mid-Rise Development**

Lisa is a prototype building type for Toronto's Avenues, adapted from the Avenue buildings commonly found in Berlin, Rome, or Paris. Lisa is built around the principles of the zwiespanner building type, which translates to the two-big-spanner, which is typical of European housing. This typology is configured with two apartment units sharing one elevator and/or stairway spanning the entire width of the building (hence the name two-big-spanner). In North American our apartment building standard, the double loaded corridor, bundles units along a hallway to share two fire exit stairs and an elevator. European building codes allow these mid-rise buildings to be built with only one fire exit stair. North American building codes require two. Lisa offers the better housing quality of the zwiespanner, while still complying with the North American building codes, and increased retail amenity for street life.



### **Block Massing**

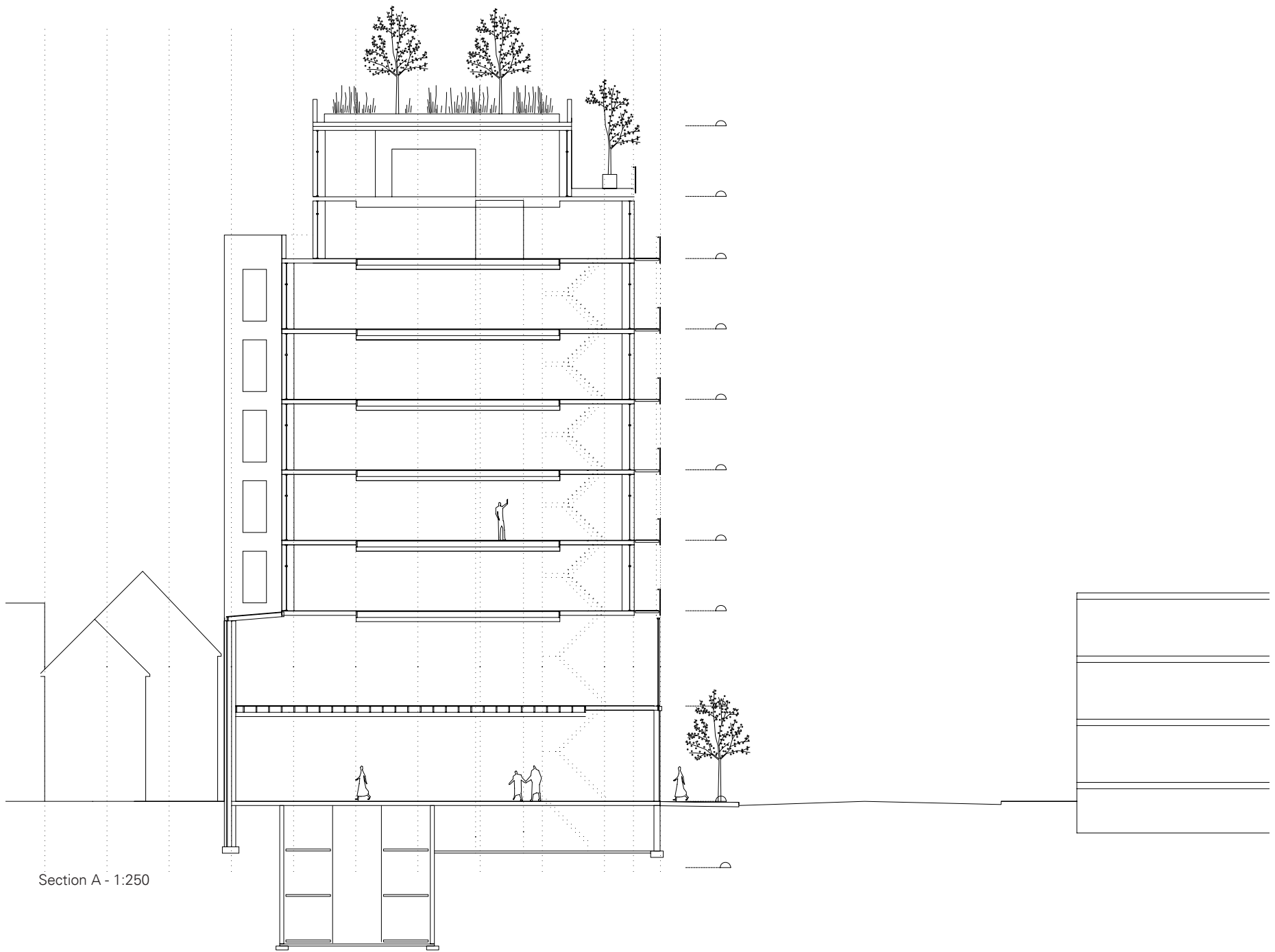
Lisa's builds right up to the property lines. The Avenue and Mid-rise building study suggests stepping Avenue buildings down to integrate into the Neighbourhoods, but Lisa breaks from this recommendation. Stepped buildings are difficult to plan, making deep light restricted floor plates on lower floors, and narrow floor plates at the top. It is more efficient to repeat the same floor plan up multiple storeys, than configuring new plans for every storey. They also have a much more expensive building envelope than a more conventional cube massing. Furthermore, the stepped massing, built for light access to low-rise buildings, assumes only low-rise buildings will ever be there. It is foreseeable that a mid-rise building could be built behind Lisa in the future. Lisa is massed with notches (from the third storey and above) that make up one half of a light well, the other half to be built into another mid-rise building, if one were to be built to the north.

The two houses directly behind Lisa will be most affected by the impact of a nine storey building directly beside their backyard. The pro forma was written to have the developer purchase these properties and reconfigure these homes as rental units.

Note: All drawings have overlaid 3x3m grids on them.



Top - Site Massing,  
Bottom - Main Street view & Rear view



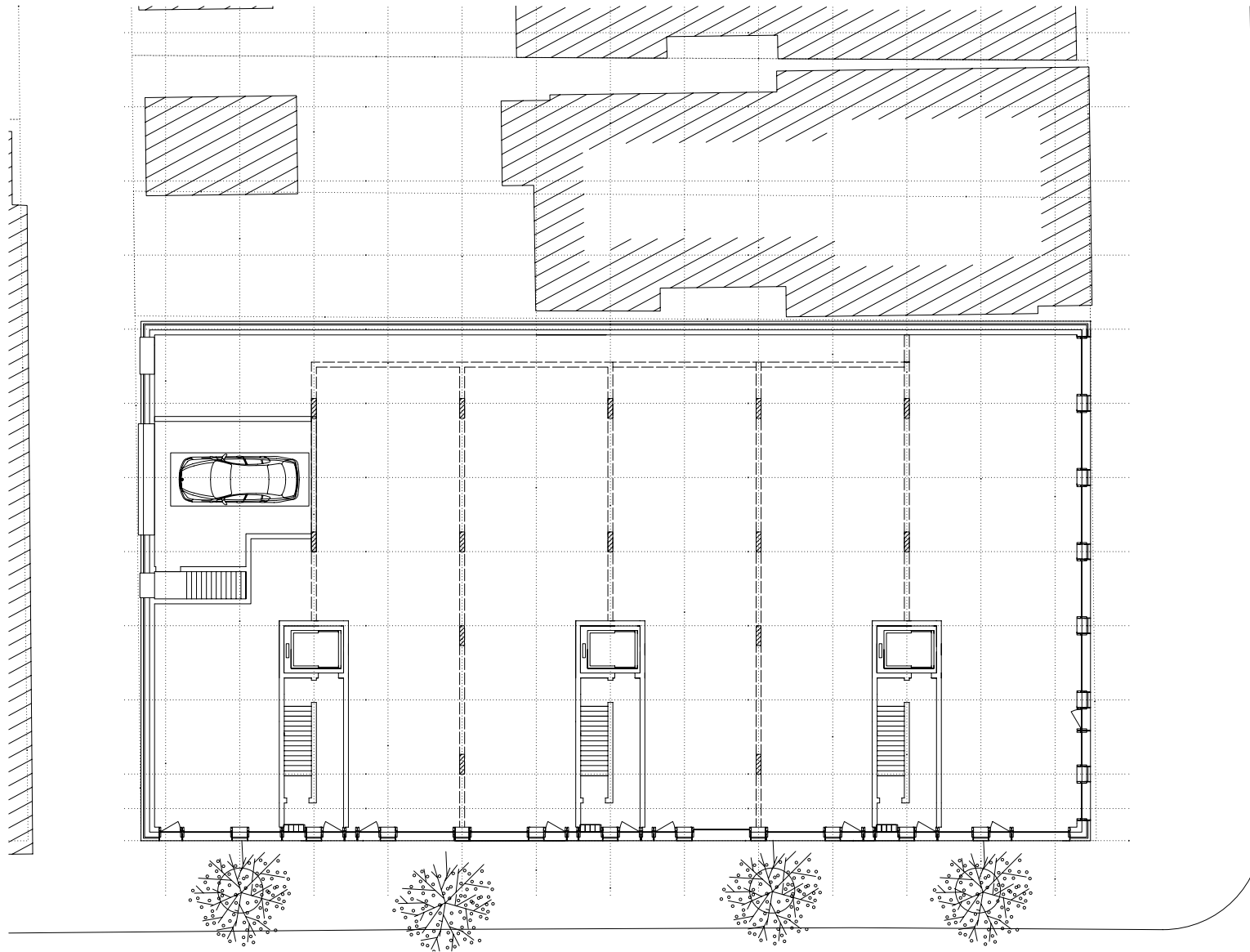
Section A - 1:250



## Section

Lisa offers generous ceiling heights. Retail and Office spaces on the ground and second floor feature 4.4m (14'-8") ceiling heights, and residential floors offer 3.4 (11'-2") ceiling heights. These accommodate the minimum floor-to-floor heights for the ground floor as recommended by the City of Toronto's *Avenue and Mid-Rise Building Study*. Office spaces on the second floor should also be tall enough to attract quality tenants. Taller residential ceiling heights allow for better light penetration deeper into the units, and create architecturally significant space. Standard eight or 9 foot high ceilings are generally less architecturally significant. Lisa aims to offer housing that inhabitants will love, and want to live their whole lives in, something uncommon of many new Toronto condominiums built today.

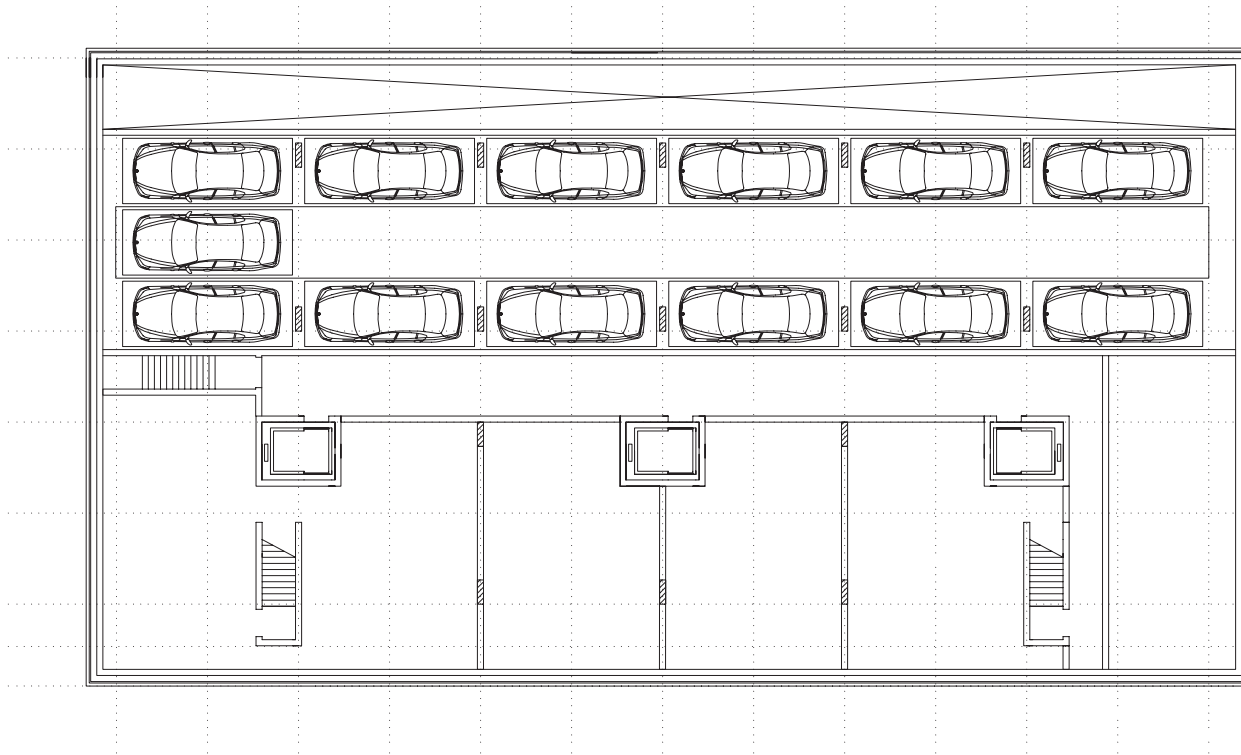
The top floors are reserved for two storey penthouse units. Fire exiting and elevator access is handled on the lower penthouse floor, freeing the top floor for only residential program, and achieves a net-to-gross of 100%. This is made possible, by new mid-rise scaled elevators, which can fit elevator top-of-shaft mechanics in much smaller spaces than previous mid-rise or conventional high-rise elevators. In Lisa, the elevator shaft fits under the top penthouse floor.



Ground Plan Scheme A - 1:250

### **Ground Floor - Scheme A**

The priority of the ground floor was to maximize the amount of retail space, and minimize circulation, parking, and other programs. Lisa features parking in an automated underground parking garage, which frees up a considerable amount of space. Lobbies with concierges replaced with electronically controlled entry areas. A video camera displays visitors on screens within the dwelling units. Garbage and recycling spaces are moved to the basement level, and amenity or party rooms are eliminated. These minimized, moved, or deleted programs free up the ground floor for retail space, which is more profitable for the building owner and healthier for Avenue street life.



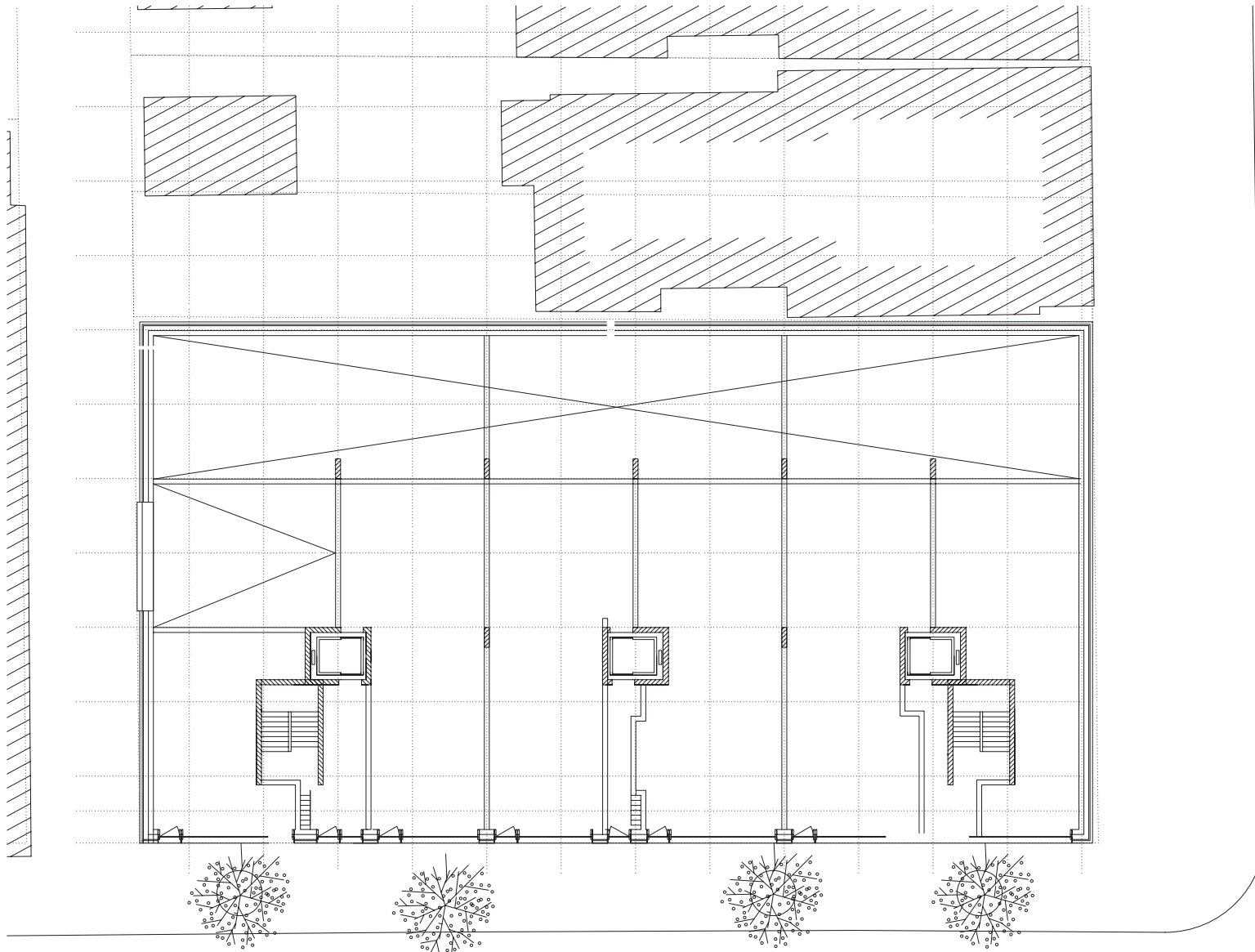
Basement Plan Scheme A - 1:250

### **Basement - Scheme A**

Lisa owes much of the success of the ground floor to the automated parking garage in the basement. Other schemes of the ground floor (see below) used more traditional methods of parking, and push out large portions of the retail space. Automated parking garages are more expensive than traditional garages, but on sites smaller than 42m x 42m (as discussed in Tim's parking strategy - section 5.3) traditionally ramped garages make little economic sense. Automated parking is a profitable solution to small in-fill city sites. Both the market and streetscape favor retail space to garage space, and the pro forma below prove it.

Automated parking can reduce the costs of the basement construction, because automated garage spaces don't have to be built for human inhabitation. Fire exiting and ventilation requirements of the building code do not apply to these spaces. Furthermore, the garage space is much smaller than a conventional garage, reducing the cost of excavation. Other variations of Lisa, as discussed below, house garages requiring deeper and larger excavations right up to the property lines. This is expensive and more risky considering neighbouring buildings are also built up to their property lines.

Automated garages offer the added value of a 24-7 valet service, and eliminate accidents caused by parking in column riddled compact spaces.

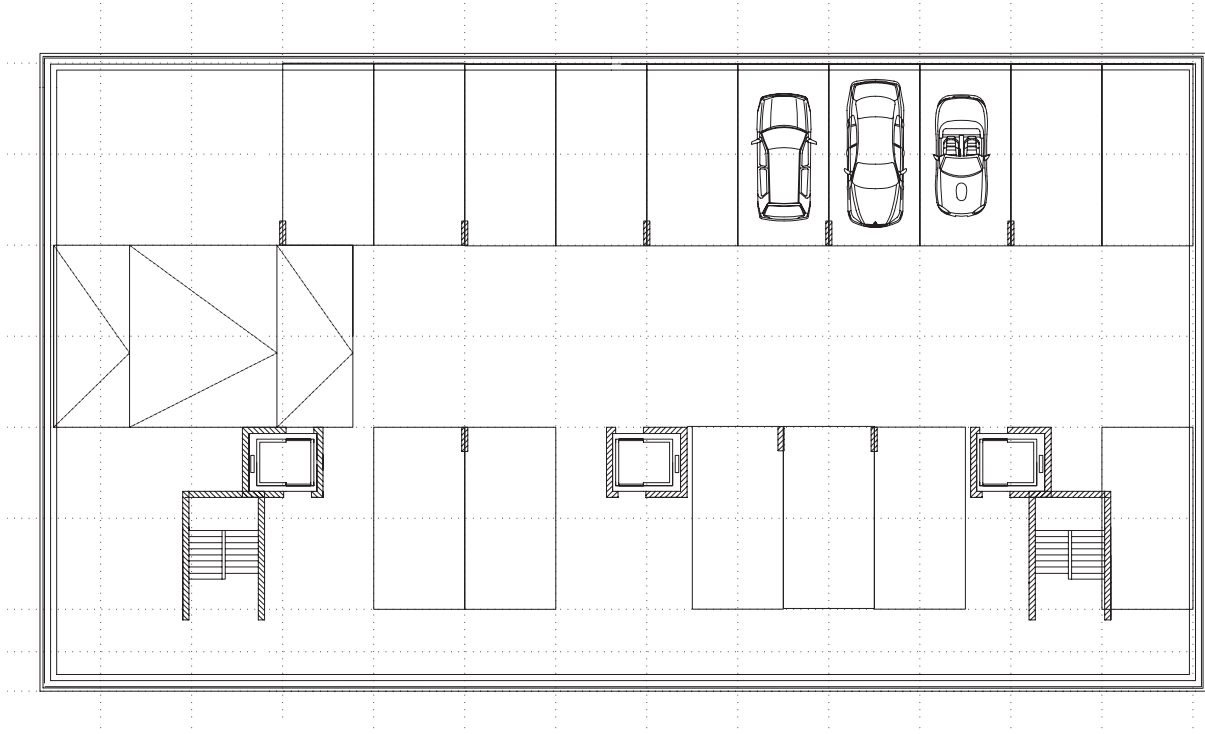


Ground Plan Scheme B - 1:250

### **Ground Floor - Scheme B**

This scheme uses a parking garage ramp and mechanical car stacks. This is a semi-automated system, because a ramped parking solution is not feasible on this small site. This scheme was able to bury the drive aisle and part of the garage ramp into the basement, but the car stacks require ceiling heights that cut up through the ground floor (as seen in the northern space of this plan).

About 2/5 of the ground floor is lost to parking and stores facing the Avenue are compromised.



Basement Plan Scheme B - 1:250



**Basement - Scheme B**

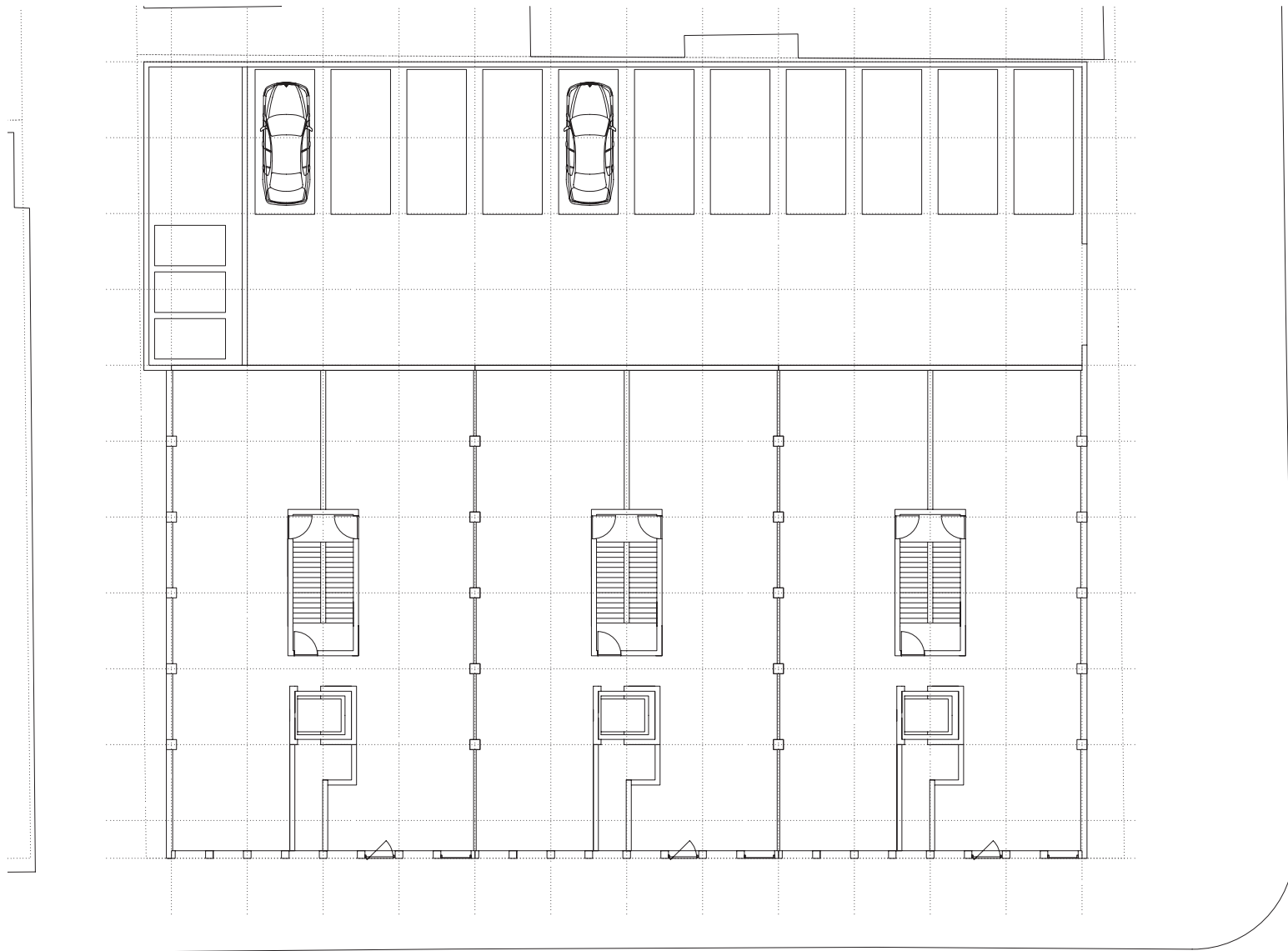
Triple stacking parking spaces and six (regular) parking spaces house 36 vehicles. The excavation of this scheme is more costly, as the stacking space pit is adjacent a house built on the shared property line.

	<u>Scheme A</u> Automated Parking	<u>Scheme B</u> Traditional Ramped Parking
square footage	6394	4384
Parking Spaces	36	36
<u>Construction Cost</u>		
Const. Per P. Space	\$18,000.00	\$30,000.00
Automation cost/ p. space	\$25,000.00	\$5,000.00
Garage Cost	\$1,548,000	\$1,260,000
<u>Lease Difference</u>		
lease rate \$ / ft <sup>2</sup>	\$3	\$3
Monthly income	\$19,181	\$13,152
Construction Difference	\$288,000	
Monthly profit Difference	\$6,029	
Months Until Diff. Paid off	47.8	
<u>Sale Price Difference</u>		
Commercial \$ / ft <sup>2</sup>	\$500.00	\$500.00
Commercial Space Profit	\$3,196,881	\$2,192,000
Commercial Profit - Garage Costs	\$1,648,881	\$932,000

### **A Case for Automated Parking**

Automated parking has a higher initial cost, but proves to be more profitable over the long and short term. Short term benefits include better profits for the developer, if he chooses to sell the building upon completed construction. This is because scheme A, the automated garage scheme, offers more space at grade that is profitable retail space. Scheme B offers more space that is less profitable at grade: garage space.

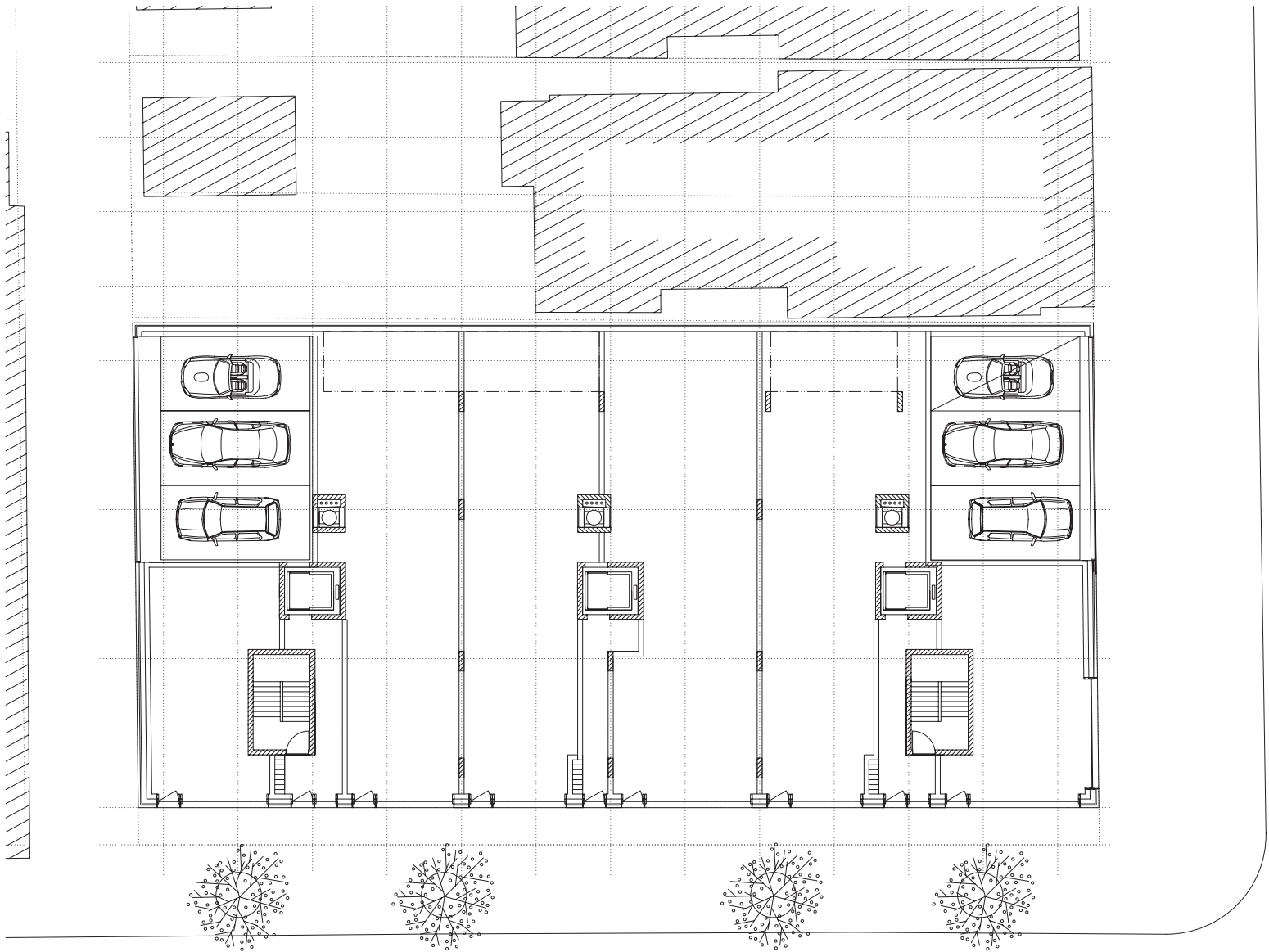
Long term benefits for the building owner include better rent income on the ground floor. In 48 months, the difference of the more costlier automated parking garage can be paid off in increased rental income.



Ground Plan Scheme C - 1:250

### **Ground Floor - Scheme C**

The parking and garbage disposal spaces are located on a property to the rear of the site. This is not advantageous to the neighbourhood because it demolishes a home and replaces it with parking and garbage.



Ground Plan Scheme D - 1:250

**Ground Floor - Scheme D**

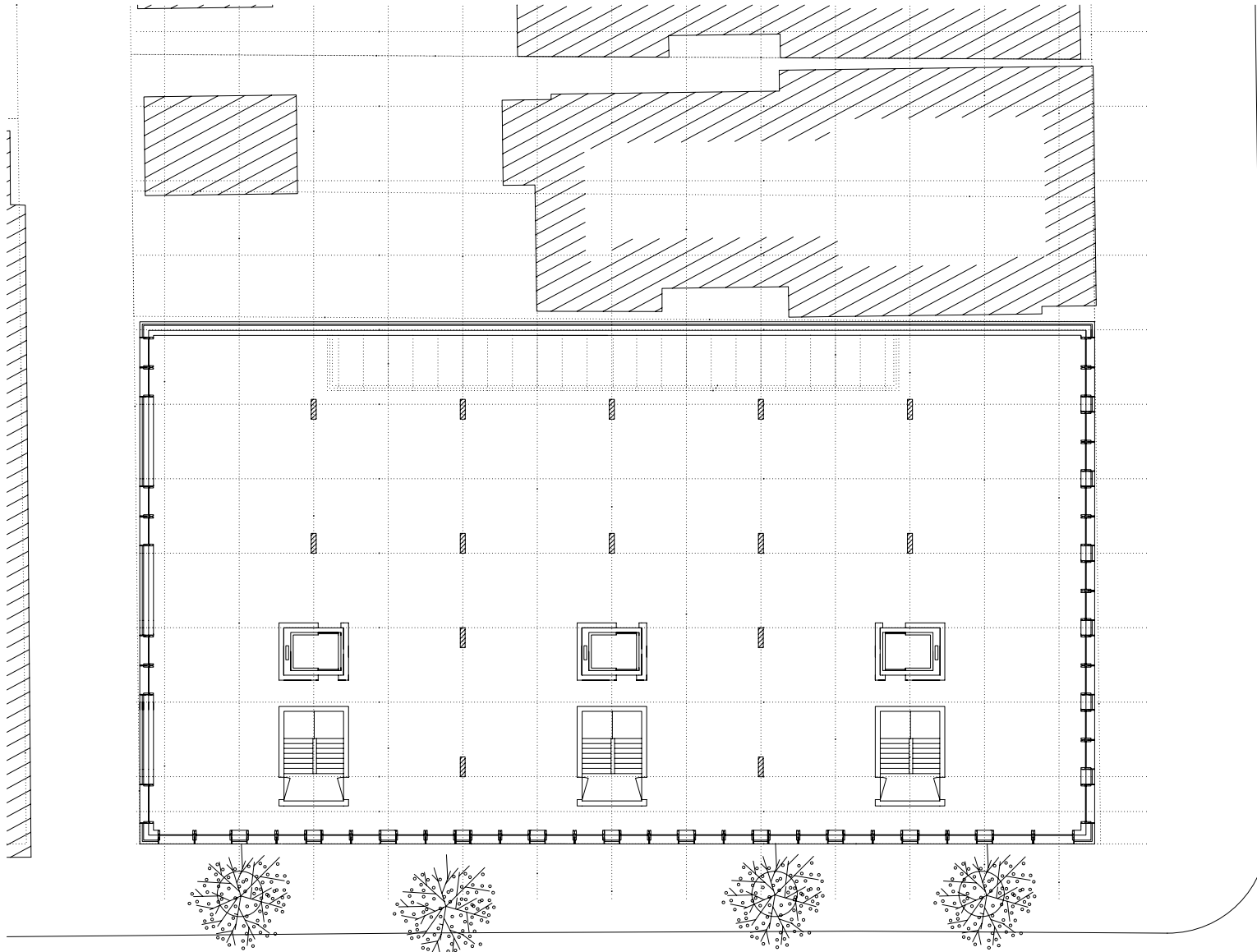
This would be the preferred solution, but only offers 18 parking spaces. One parking space for every unit is generally still a market requirement in this part of Toronto.



**The Storefronts** of scheme A feature deep window sills that provide an “irregular façade” for the public to sit on. Stone, wood, and glass were chosen for their tactile qualities, and should age gracefully. These are pedestrian scaled details that are important for Avenue buildings.



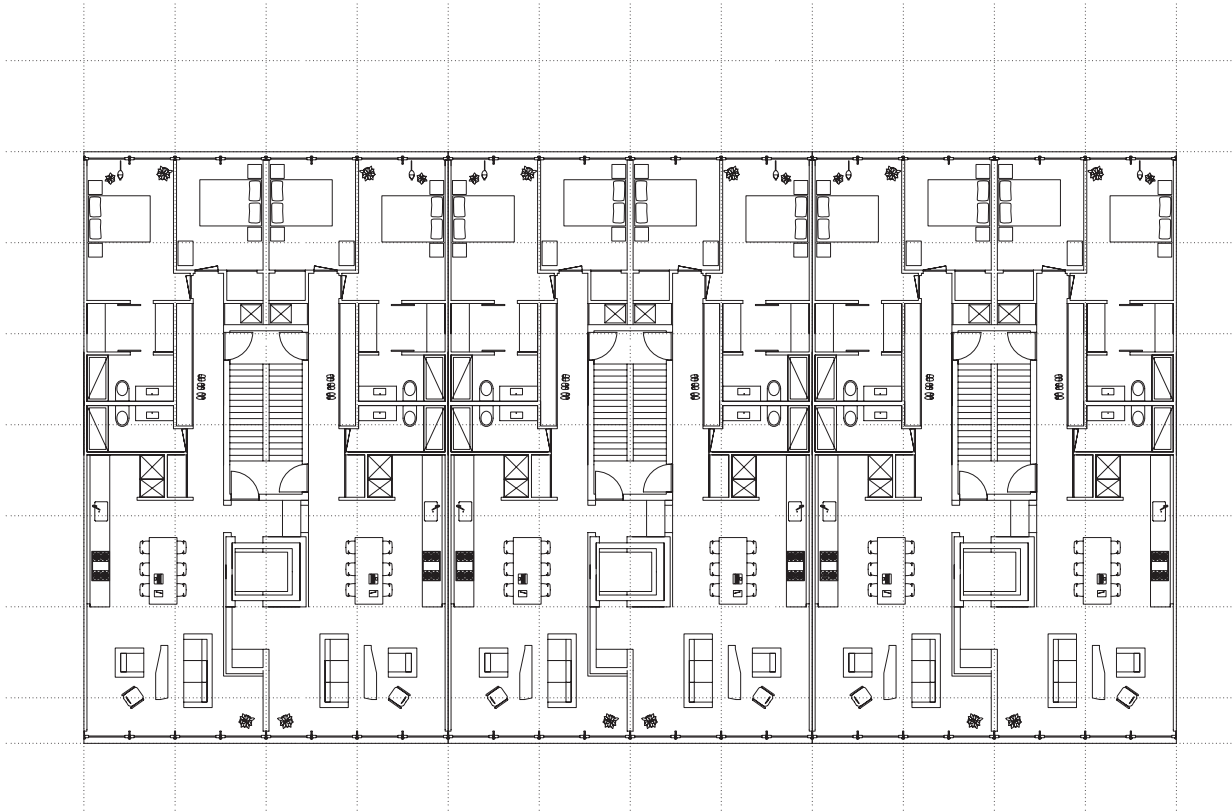




Second Storey Offices - 1:250

### **Second Story Office Space**

Mixed use buildings allows more employment opportunities within the neighbourhood, making more jobs available within the neighbourhood. Separated zoning increases commuting distances and contributes to our dependence on the automobile.



Ground Plan - Scheme A - 1:250

### **Typical Floorplate - Scheme A**

Similar to scheme A, however two fire exits per unit are made possible through scissor stairs. This doubles the amount of staircases required of scheme A.

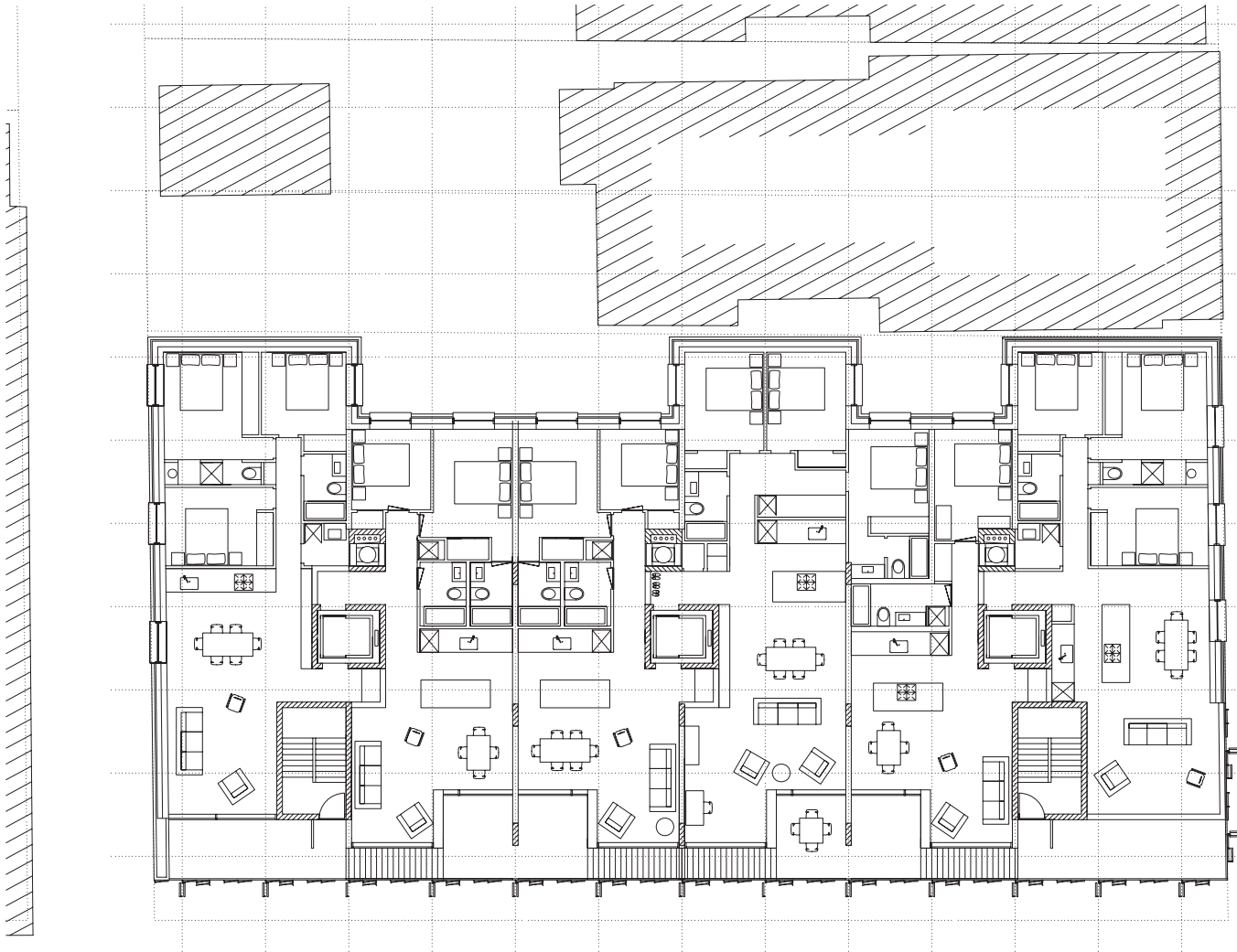
### **Construction Notes - All Schemes**

Lisa uses raised-floor construction, where the floor is spaced 300mm above the concrete floor. Plumbing and HVAC distribution runs in this space, allowing for unit flexibility. Drainpipes are no longer cast into the concrete floor, and showers can be moved over a weekend. Raised-floor construction also eliminates the need for ugly bulkheads. Also, Lisa's structural system is made up of columns and multiple cores, rather than poured in place concrete shear walls that divide units. Columnar structure allows soft boundaries between the units, and flexible raised-floor construction make expansion into one unit, or subleasing space to a neighbour much easier. A growing family can sublet space from a neighbour, possibly elderly widow, supplementing her income and providing space for another child. These types of arrangements are much more difficult to arrange in buildings such as Tim.



**Scheme A Façade**

Lisa modelled with residential floorplate scheme B which has no balconies.



Ground Plan - Scheme B - 1:250



### **Typical Floorplate - Scheme B**

Similar to scheme A, however “neighbourhood” balconies run undivided along the Avenue facade of the building. This configuration only requires two fire-exit stairways per floor, and achieves the most efficient net-to-gross of all schemes. The third unit from the right has been reconfigured into a three-bedroom unit, acquiring space from the unit to the right, which is now a one-bedroom unit (see *Construction Notes* below).

### **Neighbourhood Balconies - Scheme B**

The typical hallway of apartment buildings has many problems associated with it. These spaces are usually windowless spaces which offer the only communal space, or meeting place with neighbours. These spaces do not encourage ‘staying’ or loitering, which would increase the chances of chance encounters. The hallway also cuts through the floorplate, eliminating the option of cross ventilation or facade appropriate unit programming. These problems are eliminated, in this version of Lisa. Lisa’s corridor runs along the front of the building in the form of a shared balcony. Visiting neighbours on the same floor is possible by walking down this space. No private rooms, such as bedrooms are adjacent to this balcony, only the unit’s living spaces. The façade is recessed, creating nooks that break views between apartments. Privacy and social opportunities are better balanced on this “neighbourhood balcony”.



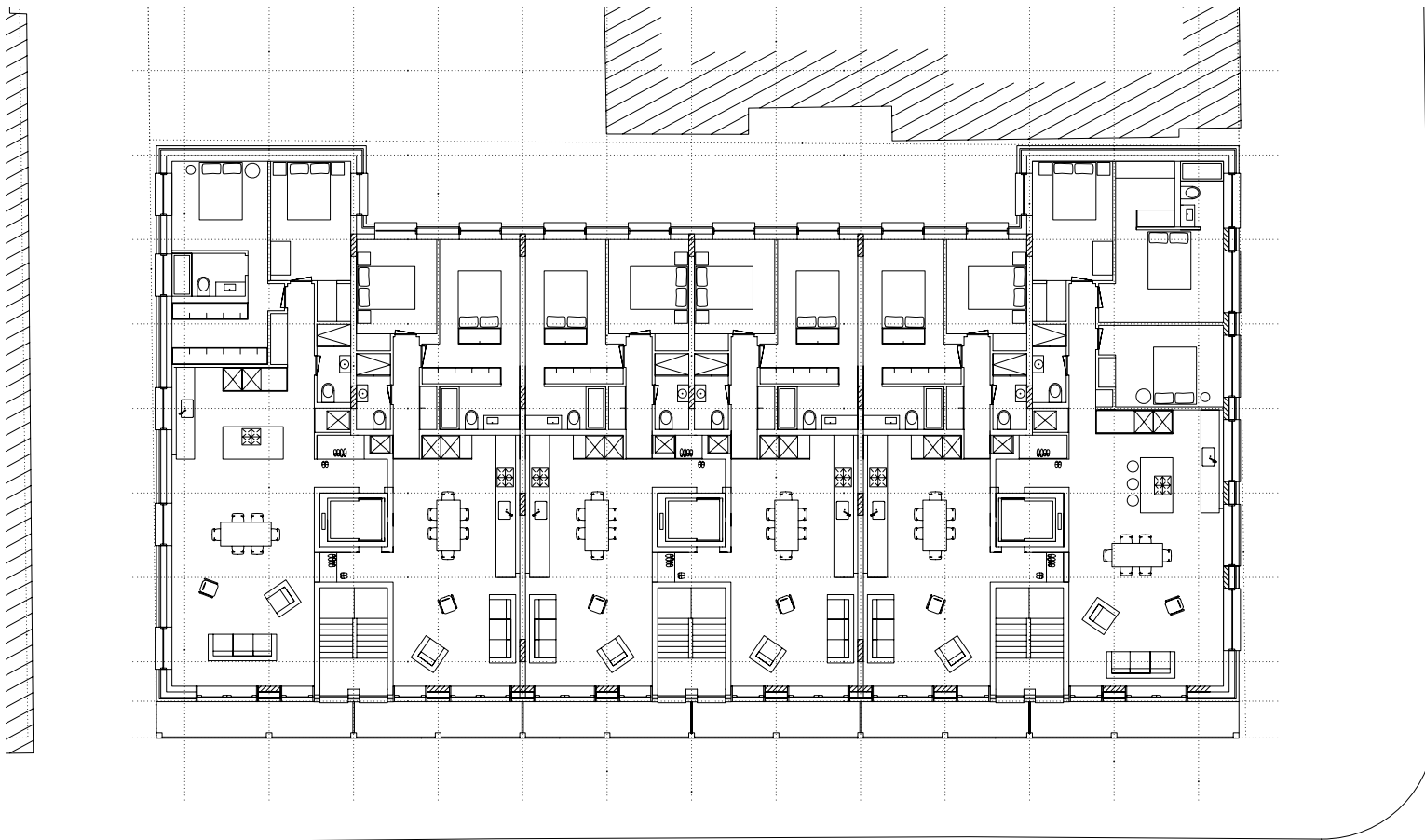
**Scheme B Façade**

Lisa modelled with residential floorplate scheme B which has "neighbourhood balconies".



**Scheme B Neighbourhood Balconies**

Shared balcony spaces with a recessed façade for visual privacy from neighbours.



Typical Tower Plan - Scheme C - 1:250

### **Typical Floorplate - Scheme C**

This is the plan that defines the zwiespanner building typology. Each residential unit has direct access to an elevator and exit stair, as opposed to the double loaded corridor type where units share an elevator core on a shared corridor. Shared corridors are undesirable spaces to socialize with neighbours, and they reduce the net-to-gross efficiency of the floorplate. Lisa's inhabitants access their unit directly by elevator, providing a quicker, more direct route to the Avenue. Alternatively, in the case of the elevators not working, inhabitants can access their unit via fire-escape staircase that enters onto the units balcony. In the case of an emergency, a second fire exit (required by code) is accessible by crossing neighbouring balconies. Balconies are separated by hinged glass partitions which unlock when the fire alarm is activated.

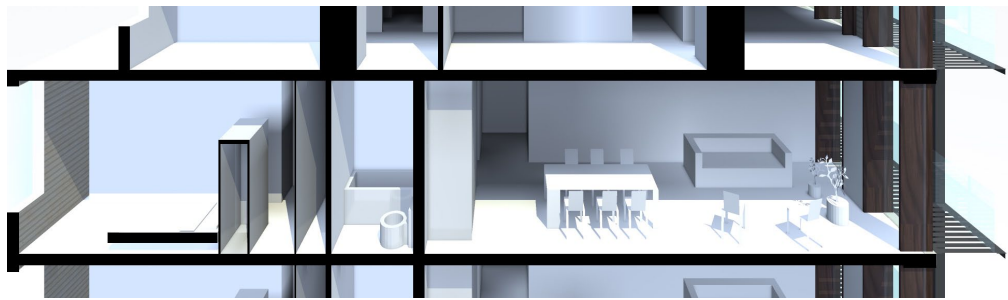
Another advantage to the zwiespanner type, is that dwellings span the full width of the building. These dual aspect dwellings provide cross ventilation and natural light from north and south façades. Dual aspect units along the Avenues can also take advantage of the fact that one side of the dwelling faces the Avenue, while the other side faces the quieter inner block spaces. The residential dwellings in Lisa organize living spaces along the Avenue, offering views onto the streetscape, while the bedrooms rest against quieter light shafts on the inner block. This type of unit programming is described above in scheme A of chapter 2.4, *Organizing Socializing and Solitary Spaces*, and reduces conflicts between socializing and solitary activities, such as parties and sleeping, which are likely to occur in densely populated areas.





**Scheme C Façade**

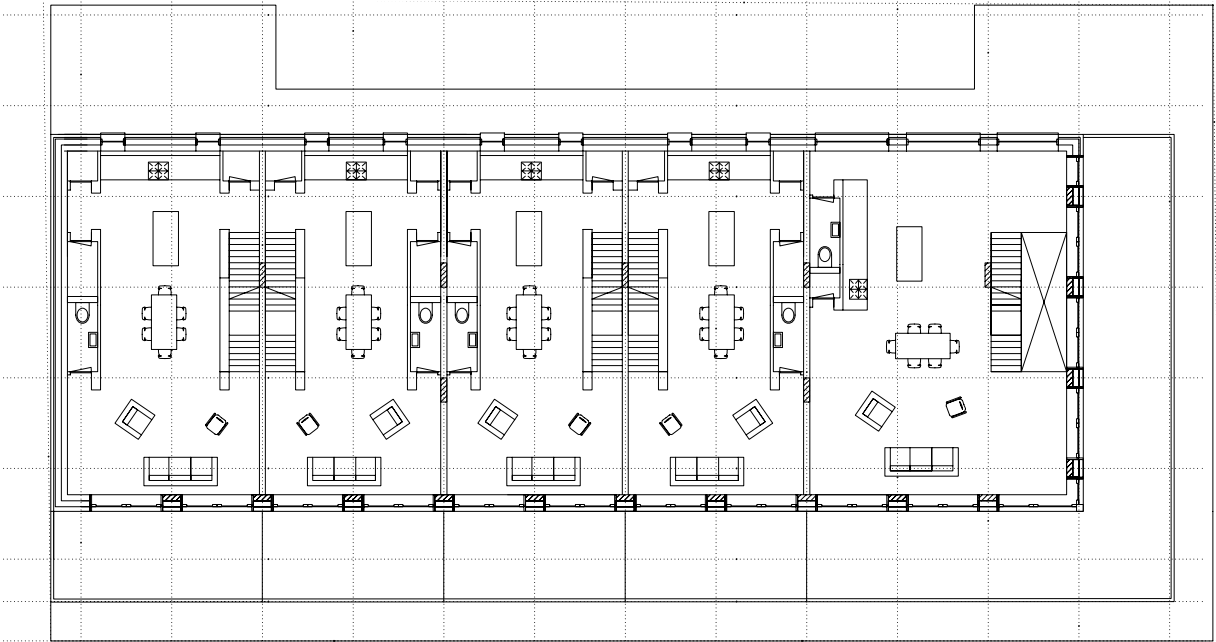
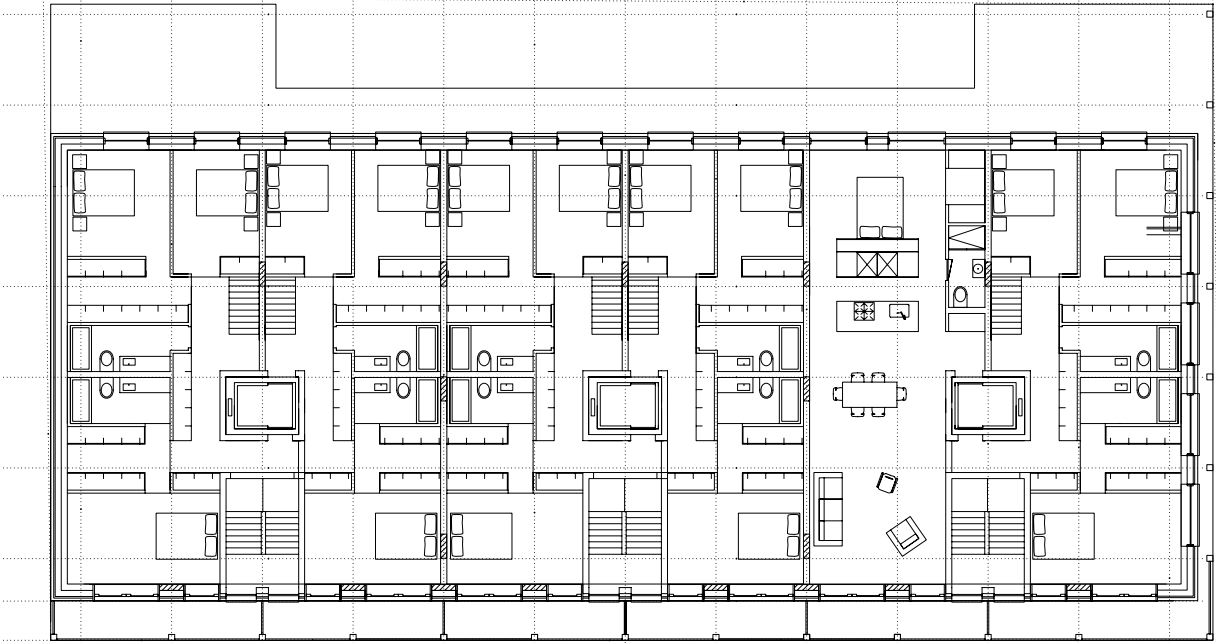
Dundas and Claremont Street façades, shown with operable shutters which help reduce solar heat gain of the building in the summer. The top storeys are stepped back to reduce the visual height of the building.



**Scheme C Interiors**

Above - Typical unit living space.

Below - Cross section of a typical unit, which spans the entire width of the building. This offers cross ventilation and both northern and southern light exposure.



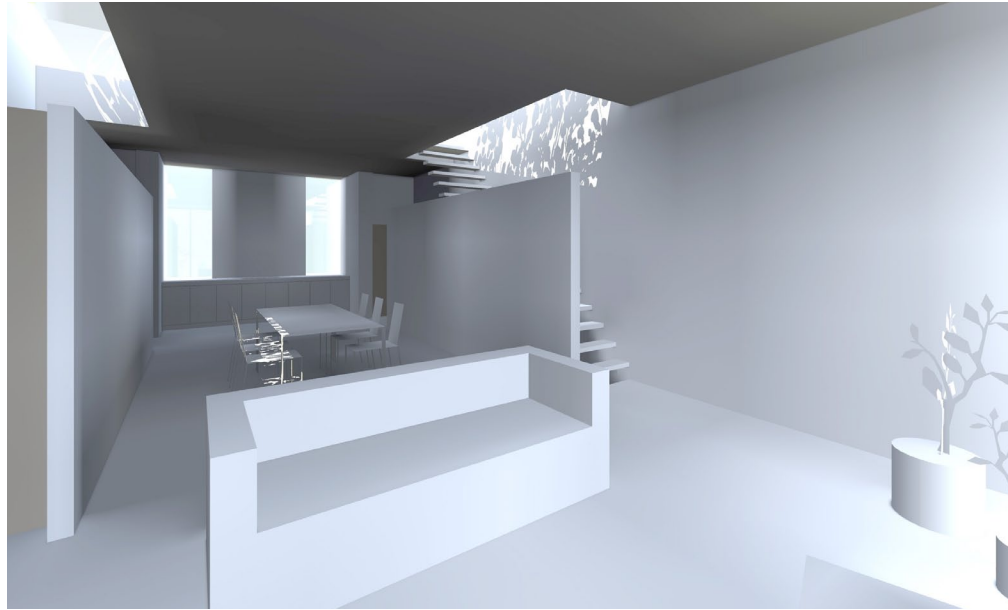
**Penthouse Units**

Two storey units with generous terrace spaces and green roofs.



**Penthouse Section**

Typical units (below) and two storey penthouse units (above)





**Penthouse Living Spaces**

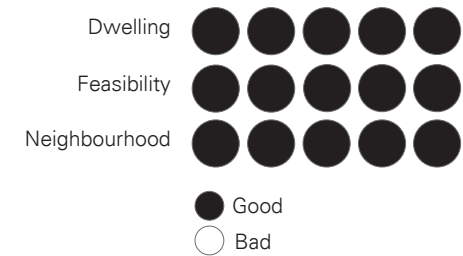
These spaces draw light from clearstory windows in the garden rooftop above.

## Expenses

<u>Hard Costs</u>	m <sup>2</sup>	ft <sup>2</sup>	\$ / ft <sup>2</sup>		
Penthouse Floors	1004.3	10810	\$220	\$2,378,243	
Residential Floors	3375	36328	\$220	\$7,992,203	
Second Floor	756	8138	\$220	\$1,790,254	
Ground Floor	756	8138	\$220	\$1,790,254	
Basement	765	8234	\$180	\$1,482,190	
Garage Mechanical	36 spaces	\$25K/space		\$900,000	
Landscaping				\$50,000	
Demolition				\$400,000	
Total Construction Budget				A	\$16,783,143
<u>Soft Costs</u>					
	% of A				
Marketing	12%			\$2,013,977	
Architect's Fees	7%			\$1,174,820	
Consultant's Fees	3%			\$503,494	
Development Charges				\$500,000	
				B	\$4,192,292
<u>Sunk Costs</u>					
Site				C	\$2,500,000
Total Project Costs				A+B+C=D	\$23,475,435
<u>Financing</u>					
	% / year	years			
Cost of Borrowing	8%	2	E	\$3,756,070	
Total Development Costs				D+E=F	\$27,231,505

## Income

<u>Sales</u>	m <sup>2</sup>	ft <sup>2</sup>	\$ / ft <sup>2</sup>		
Residential Units	3122	33605	\$500	\$16,802,464	
Penthouse Units	956	10287	\$550	\$5,657,888	
Commercial Units	1278	13756	\$500	\$6,878,138	
	\$ / p. space	spaces			
Garage	\$30,000	36		\$1,080,000	
Total Income				G	\$30,418,490
Profit				G-E=H	\$3,186,985
Return On Investment					11.70%



## Pro Forma

Lisa is classified under part 3 of the Ontario Building code, which requires costlier non-combustible construction and fire exiting spaces that decrease the net-to-gross of the building, and obtaining a building permit from the city will require the same 18 months of negotiations that Tim faces.\* However, Lisa is cheaper to develop, per ft<sup>2</sup>, and is cheaper to maintain than Tim.

Lisa can be built much quicker, requires less land, and has a more efficient net-to-gross than Tim. Lisa uses precast concrete floor slabs, and insulated concrete formwork, and can be framed within the year. Shorter construction times drastically reduce financing costs, and less risk to investors, as the market has less time to change. Lisa fits within the existing Avenue site, and does not require rezoning of the two properties it acquires in the Neighbourhood. These two properties are only bought to compensate the owners for their change in property value, but will remain as residential buildings. Tim, requires these two properties to be rezoned mixed-use, which will require difficult and lengthy negotiations (tampering with the Neighbourhoods raises much opposition from residents and the city).

Lisa achieves an efficient net-to-gross ratio. Resident-only 'party rooms' or gym facilities seem redundant when much better facilities are offered within short walking distance in established businesses along the Avenue. Having residents taxed to maintain inferior facilities within the building is absurd, therefore Lisa has omitted resident-only amenity space (Lisa does offer public retail amenity space at grade). Further net-to-gross efficiency is achieved with no shared corridors on typical residential floors, and reduced garage area. Garbage and recycling facilities are still present, but they've been moved to the basement where space is less valuable. Improved net-to-gross ratios equal more square footage bringing in a profit, and less shared space driving up maintenance costs, which is better for the developer and the owners. There is more space for people to live and work in, and less space for cars, empty corridors, and under used amenity spaces.

These cost savings translate to cheaper space (per ft<sup>2</sup>) for residents, and cheaper monthly maintenance fees.

\*Note: The *Avenue and Mid-Rise Building Study* offers a set of performance criteria that developers can follow to speed up approval times. Lisa could benefit from this in the future if the city approves the recommendations in the study, as Lisa follows the majority of this criteria.



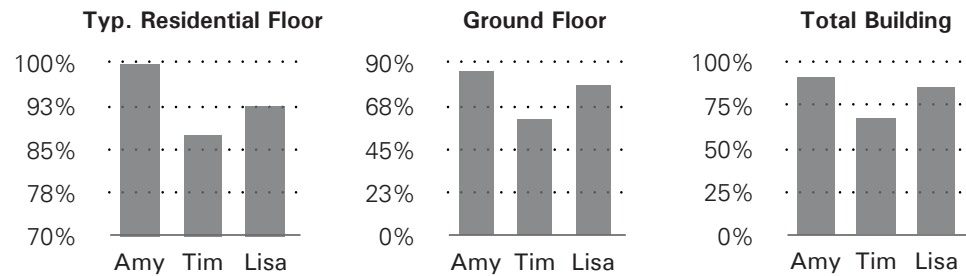
### **Avenue Building Criteria Scoring**

Amy has a perfect score on the *Avenue Building Criteria* matrix. Each dwelling unit has northern and southern light exposure, providing excellent light penetration, cross ventilation. Bedroom and living space planning minimizes noise conflicts within the building, and along the Avenue. Each unit boasts direct-elevator-access, providing direct and uncomplicated paths to and from the dwelling. Six great retail spaces front onto the Avenue, introducing new amenity to the neighbourhood. And dwelling units can be reconfigured into family sized units.

### **Conclusion**

The efficiently planned Lisa is tailored to the conditions of the Avenue, with well ventilated, light filled flexible housing, and six handsome storefronts that contribute to the streetscape.

	Gross m <sup>2</sup>	Gross ft <sup>2</sup>	Net m <sup>2</sup>	Net ft <sup>2</sup>	Net/Gross
<b>Amy</b>					
Basement	0	0	55.8	601	0%
Ground Floor	648	6975	756	8138	86%
Residential Floors	1112.4	11974	1112.4	11974	100%
	1760	18949	1924	20712	91%
<b>Tim</b>					
Basement (3 floors)	0	0	4212	45338	0%
Ground Floor	855	9203	1404	15113	61%
Second Office Floor	990	10656	1188	12788	83%
Typical Residential Floor	630	6781	720	7750	88%
20 Residential Floors	12600	135625	14400	155000	88%
Mechanical Penthouse	0	0	200	2153	0%
	14445	155485	21404	230391	67%
<b>Lisa</b>					
Basement	324	3488	765	8234	42%
Ground Floor	594	6394	756	8138	79%
Second Office Floor	684	7363	756	8138	90%
Typical Residential Floor	624.4	6721	675	7266	93%
5 Typical Residential Floors	3122	33604.93	3375	36328.2	93%
Penthouse floor 8	530	5709	579	6232	92%
Penthouse floor 9	425	4578	425	4578	100%
	5680	61136	6656	71648	85%



**Net-to-Gross Calculations**

The three prototypes are compared for their efficiency, on a per floor and overall basis.

## 5.0 Analysis & Conclusion

### **Comparing Amy, Tim, & Lisa**

Of the three prototypes discussed in this thesis, Lisa receives the highest score in the Avenue Building Criteria matrix, and this thesis recommends that Lisa is the choice building type for development along the Avenues.

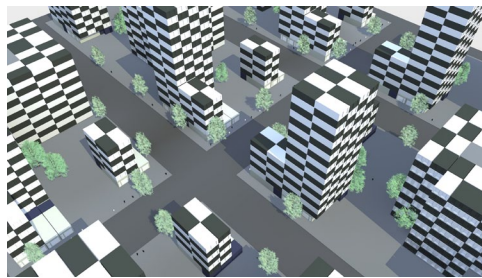
Amy scores very high for its six dwellings, however six dwellings is not achieving a great enough increase in density. Tim offers satisfactory dwellings, but Lisa offers units with better light and air quality, better privacy, and more convenient access, all at a lower price than Tim.

Amy has the lowest price per ft<sup>2</sup>, and quickest construction, due to the less stringent part 9 building regulations she must follow. Tim and Lisa are unfairly grouped together under part 3 of the building code. They both have non-combustible construction and meet more stringent life-safety requirements, but Lisa can be built quicker, construction fits within the boundaries of the existing mixed-use zoning, and has a more efficient net-to-gross ratio. Lisa has a more efficient net-to-gross ratio than Tim, and can operate with reduced monthly maintenance fees, as there are less common spaces to maintain, and provide proportionally more saleable space than Tim.

All three buildings provide retail space at grade, which provides the neighbourhood with amenities within walkable distances. Unfortunately Tim's parking, garbage handling, and lobby spaces drop the ground floor net-to-gross ratio to 61%. The ground floor net-to-gross ratio is a good indicator of how each building contributes to the quality of pedestrian realm. Will citizens be walking around storefronts, parks, cafes, gyms, movie theaters, or parking ramps, and storage rooms with blank walls or lifestyle images pasted over the windows.

These building types create vastly different streetscapes, densities, costs of housing, and quality of living spaces. If we are the product of our environment, we would benefit if our environments were made up of more buildings like Lisa, and less buildings like Tim.

When compared with smaller and larger scaled buildings, with varying typological characteristics, Lisa best increases density while offering a better quality of life for citizens inhabiting Toronto's Avenues, and proves to be an attractive investment alternative to the typical high-rise condominium.



Scheme A

fig 2.3.8



Scheme B

fig 2.3.9

Both schemes achieve a density of 200 dwellings/ hectare, and 24 six meter storefronts per 100 m wide city block.



## Conclusion

Today many are questioning the sustainable and social consequences of suburban, car dependent lifestyles, and consequentially a growing minority of people are choosing to live in the densely populated, pedestrian-centric central neighbourhoods of Toronto. The City is anticipating half a million new residents over the next twenty years, and is encouraging development along the Avenues to accommodate this growth. However exactly what building types and their resulting city block morphology is still up for debate. The city is facing a massive opportunity to rebuild some of the most important Avenues in the city, and the success or failure of these refurbished Avenues is dependent on how we configure the buildings that line them.

From the research, case studies, and ideas generated while drawing the three proposals, it has become clear that not all building types are able to offer the same amount of amenity or quality of living for both residents and Avenue street life. The mid-rise building type used by Lisa, also referred to as the zwiespanner type, offers the best configuration of program for Avenue buildings. Zwiespanner type buildings are best suited for creating world class retail spaces and street life, the best dwelling units, and well formed block morphology.

The block morphology of Toronto's central neighbourhoods is currently an unconsidered mess of building types and scales (fig 2.3.8). Within the city today, many point-tower condominiums are being constructed, providing hundreds of dwellings on a relatively small parcel of land. However these buildings require setbacks that often restrict neighbouring properties from building just over a few storeys. The result is more randomly sized buildings across a city block, making it difficult to form continuous street walls along the Avenues. Mid-rise buildings can be built side by side, without spaces between them, creating continuous street walls (fig 2.3.9). These buildings don't waste any space between themselves, can achieve the same densities as the spaced out high-rise buildings. Mid-rise buildings also make perimeter block planning possible, where all developments group their outdoor spaces towards the inner block, and can create quieter inner court yards. Perimeter block planning is more common in Europe, and provides it's citizens with semi-private park spaces for the residents of the city block. These spaces offer quiet tree filled retreats within busy inner city neighbourhoods. Lisa was planned to grow into this same perimeter block building fabric that makes up many great European cities. The zwiespanner type building can work as an independent building, as Lisa is envisioned to be standing alone when first erected, but also has the potential to link with other zwiespanner type buildings along the Avenues and its side streets, as higher density developments are built. When block morphology has been carefully considered, continuous street walls are formed, and space experienced by the pedestrian on the Avenue is more harmonious.

The enjoyment of walking down an Avenue is only partially influenced by the city's block morphology. The type of people one meets on the sidewalk, the storefronts one passes by, and how safe a pedestrian feels are all determined by the buildings that line the Avenue. A good Avenue building will maximize the amount of relevant program on the floor that is most accessible and viewed by the people on the street: the ground floor. Ground floors cannot be taken over by garbage rooms, private gyms, party rooms, and loading bays. These are not of any interest to the Avenue, and can diminish the street life. Program where pedestrians are able to watch other people is, according to Jan Gehl, one of the highlights of street life. Either sitting at a table, browsing a newsstand, or shopping for clothing offer more people watching for pedestrians. Some less



Present Dundas Street West

interesting program, but just as important for local residents are grocery stores, dry cleaners, day-care centers, or maybe a liquor store. Providing retail amenity within walking distance of residents allows more people to live without depending on a car.

The zwiespanner building type is the best building for Avenue street life. Lisa offers a ground floor almost entirely dedicated to high quality retail spaces, and offers a façade packed with six storefronts for window shopping. This results in a ground floor with a high net-to-gross ratio of leasable space, especially when compared to a point tower building type such as Tim. The things that detract from the Avenue, such as a parking ramp, loading bays, or garbage facilities, are all things these larger buildings must accommodate, and often cut away from program that is more beneficial to the street life.

Street life is a measure of how interesting a street is to the citizens, and as people are deciding between walking or driving, the decision is influenced by not only how far it is to walk, but also and how interesting the journey will be. If we're going to create grand Avenues that citizens love to proudly walk down, they're not going to be sidewalks broken by parking ramps, loading docks, and undersized retail spaces. Suburban streets dominated by cars can afford long stretches of banal program, but along an Avenue every meter of that walk is experienced at a much slower and more intimate scale. The zwiespanner type building offers less banal program, more amenity, and therefore more street life to the Avenue.

Zwiespanner buildings help create neighbourhood communities. Jan Gehl found that residents above five storeys are no longer able to recognize faces, or communicate with people on the ground. Therefore buildings that house the majority of their residents above this threshold lose any significant connection to the Avenue they live on. The connection to the street is an important first step to becoming part of a neighbourhoods community. Being able to recognize, wave, or greet people walking down the street you live on helps create neighbourhood acquaintances. Mid-rise buildings house more people closer to the ground, continuously along the Avenues street walls. High-rise buildings have gaps in their street walls, where residential units are instead piled anonymously in the sky, isolated from the street life.

Smaller scaled buildings and narrower streets offer warmer, more pedestrian friendly Avenues. Expansive six lane roads, dominated by traffic cannot offer the same intimate experience of a tight street with only one lane of traffic. Mid-rise buildings create warmer, more humane dimensions that make up desirable Avenues.

Zwiespanner buildings have a slimmer building profiles, which means more internal space has access to natural light and ventilation. Point tower buildings and most double loaded corridor buildings require a wider floor plates, making for many darker and unventilated spaces. Lisa's apartments have more spaces with natural light and ventilation, boasting a total of 12 linear meters of glazing between north and south façades. Typical two-bedroom or one-bedroom-plus-den apartments in double loaded corridor buildings offer only six meters, along only one façade. Lisa's double aspect units allow for cross ventilation and two contrasting views, either onto the street life of the Avenue, or onto a quieter inner block. This allows units to be configured with living spaces that can observe the street life on the Avenue, and bedrooms that overlook quiet tree filled inner blocks. Double loaded corridor and point tower types have fewer to no dual aspect units, and adjacency issues between bedrooms and living spaces or street life are more likely to happen. Dwelling units within zwiespanner type buildings are more comfortable and provide a better quality of living.



**Proposed Dundas Street West**

An illustration of how Dundas Street West could look if made up of Lisa type buildings.

Accessing a dwelling unit within a zwiespanner building is direct and uncomplicated. Residents living in Lisa access their front door off of the Avenue, enter a code or scan a card and are delivered up an elevator directly into their unit. There are no lobby spaces with concierges, windowless corridors, or other common spaces. Windowless corridors and elevators are not ideal places for meeting and catching up with people. These spaces offer no graceful escape from unwanted social interaction, and are usually out of the eye of others, which can make one feel unsafe or uneasy. Social interaction is better suited just outside the building, on the Avenue. Here residents can encourage or avoid interactions and safely meet and converse among other watching eyes on the sidewalk. Common spaces also add non-saleable space, which is undesirable for the developer, and require supervision and maintenance which translates to higher monthly maintenance fees for residents. Many high-rise condominiums building types require these common spaces, and also add other shared condo amenity spaces. These can include party rooms, resident only gym facilities, theatre rooms, or overflow guest bedrooms. These amenities are often made redundant by businesses within the buildings neighbourhood. Lisa minimizes common spaces to reduce maintenance costs and undesirable social interaction between residents.

Lisa has been designed around a column structure, rather than shear wall structure, allowing for more flexibility for programming. On the ground floor, retailers can expand or contract their space between other retailers, or the office space above. Residents can now sublet or sell square footage between units. This could allow a widow to sell off an extra bedroom to a growing family next door, which could supplement the widow's income. Residents and businesses can share spaces with their neighbours, allowing for them to stay within the building as their needs change over time. This is important because long term tenants care more about their neighbourhood than short term tenants, and this care is reflected in the build quality, and general attitude of conducting business or fighting for social cause within neighbourhoods. Lisa was designed as a flexible column structured building for these reasons.

In conclusion, Lisa can offer a better quality of life, safer more enjoyable streets for people walk on, better spaces for retailers and offices to conduct business in, and more comfortable apartments for residents to live in. These new neighbourhoods offer a lifestyle that is more urban, more pedestrian, bike or transit oriented, and offers residents more opportunities to meet, greet, or keep in contact each other. The growing minority that seek to live in Toronto's central neighbourhoods are seeking a more pedestrian-centric way of life is healthier, reduces our carbon footprint, and helps maintain a better sense of community. Lisa is a building that best contributes to these goals, offering the best configuration of program to maximize the quality of life on the Avenues.

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