I would like to thank my supervisor Sam Kebbell for his guidance and his “gentle” encouragement which has led me through the ups and downs of a challenging year (and a bit).

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Lastly thanks to my friends and fellow students, especially those from the “Kebbell Crew” for keeping me sane with coffees, beers and laughs.
Christchurch was struck by a 6.3 magnitude earthquake on the 22 February 2011. The quake devastated the city, taking lives and causing widespread damage to the inner city and suburban homes. The central city lost over half its buildings and over 7000 homes were condemned throughout Christchurch. The loss of such a great number of homes has created the requirement for new housing to replace those that were lost. Many of which were located in the eastern, less affluent, suburbs.

The response to the housing shortage is the planned creation of large scale subdivisions on the outskirts of the city. Whilst this provides the required housing it creates additional sprawl to a city that does not need it. The extension of Christchurch’s existing suburban sprawl puts pressure on roading and pushes residents further out of the city, creating a disconnection between them.

Christchurch’s central city had a very small residential population prior to the earthquakes with very few options for dense inner city living. The proposed rebuild of the inner city calls for a new ‘dense, vibrant and diverse central hub’. Proposing the introduction of new residential units within the central city. However the placement of the low-rise housing in a key attribute of the rebuild, the eastern green ‘Frame’, diminishes its value as open green space. The proposed housing will also be restrictive in its target market and therefore the idea of a ‘vibrant’ inner city is difficult to achieve.

This thesis acts as response to the planned rebuild of inner Christchurch. Proposing the creation of a model for inner city housing which provides an alternative option to the proposed housing and existing and ongoing suburban sprawl. The design options were explored through a design-led process were the options were critiqued and developed.

The ‘final’ proposal is comprises of three tall towers, aptly named the Triple Towers, which condense the proposed low-rise housing from an 11000 square metre footprint to combined footprint of 1500 square metres. The result is an expansion of the publicly available green space along the proposed eastern frame of the city.

The height of the project challenges the height restrictions and is provocative in its proposal and placing. The design explores the relationships between the occupants, the building, the ‘Frame’ and the central city.

The project is discussed through an exploration of the architecture of Rem Koolhaas, Renzo Piano and Oscar Niemeyer. Rather than their architecture being taken as a direct influence on which the design is based the discussion revolves around how and why each piece of comparative architecture is relevant to the designs desired outcome.

**ABSTRACT**

Christchurch was struck by a 6.3 magnitude earthquake on the 22 February 2011. The quake devastated the city, taking lives and causing widespread damage to the inner city and suburban homes. The central city lost over half its buildings and over 7000 homes were condemned throughout Christchurch. The loss of such a great number of homes has created the requirement for new housing to replace those that were lost. Many of which were located in the eastern, less affluent, suburbs.

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INTRODUCTION

Christchurch is a sprawling, low-rise city of around 400,000 inhabitants situated at the edge of the Canterbury plains and Banks Peninsula. It is the largest city on the South Island of New Zealand.

On February 22nd 2011 a 6.3 magnitude earthquake struck the city killing 185 people and injuring thousands. There was widespread damage to buildings and infrastructure resulting in the demolition of thousands of homes and other buildings, with many of the damaged homes located in lower-socioeconomic areas.

The city lost its core, more than half of the buildings were severely damaged and were pulled down, leaving large areas of land bare.

Christchurch faced much destruction and tragedy from these devastating events and will take decades to fully recover. Despite this the city also faces a great number of opportunities to recreate a city that becomes a diverse and vibrant place to live.

In 2012 the Earthquake Authority CERA published a framework for the rebuild of Christchurch and a design “Blueprint” for the central city. This detailed plan suggested to establishing a “Green Frame” around the inner core of the city, creating a new restrained and dense city core.

This thesis project deliberates on a model of high-density housing in the inner city. Playing upon the proposed rebuild blueprint that is set to reframe the boundaries of central Christchurch. Creating a monumental building that draws a diverse range of residents to the front seat of the city.

The design project focusses on the design for a high-rise building situated in the Eastern Frame called ‘Triple Towers’. The building is set to challenge and question the design restraints set forth by the blueprint and provide an alternative housing response to the earthquake and subsequent rebuild.

Fig. 2. Triple Towers viewed from Eastern Frame, central Christchurch. Author’s own image.
Fig. 3. Map of greater Christchurch and New Zealand.

LOCATION

Christchurch, South Island, New Zealand
Christchurch is a car-dominated city with a largely suburban residential population. Before the earthquakes, the central city was primarily a retail and commercial hub with very low permanent residential population. In 2009, only two percent of Christchurch residents lived in the inner city (McDonald).

Suburban housing dominates the residential living options in Christchurch, with bungalow style, one-family homes in low-density sprawling suburbs being the typical place of residence for the majority of the city’s populace. However, conditions, quality and location of these houses differ greatly.

Social housing has traditionally been pushed to the margins of cities, aligned to low-cost areas and inhabiting poor-quality housing. Christchurch is no exception to this claim. There is a scattering of social housing across the city, but it is generally concentrated into the low-lying land of the eastern suburbs.

Very few state homes are located within the four avenues of central Christchurch. Those located around the avenues are visually and physically cut off by industrial parks and large roads (Fig. 4). These homes are isolated from the central city with little opportunity for interaction between their inhabitants and the amenities that the central city has to offer.

With recent events, however, new opportunities have arisen that could lead to alternative options for the inner city.
The earthquake which struck Christchurch on the 22nd February 2011 caused city-wide devastation, with the majority of the inner city and large areas of the eastern suburbs sustaining substantial damage.

The central city lost more than 1400 buildings, or half its building stock (McSaveney 13), leaving large tracts of bare land and a city without a core.

Over 7800 residential homes were deemed beyond repair, throughout the city, and are under demolition (Fig. 6). The large majority of these lie in the eastern suburbs of Christchurch, traditionally home to the city’s low-income residents. Consisting largely of areas of social and low-cost housing, these suburbs were built on poor quality land and as a result were the most severely damaged.

Due to the nature of Christchurch’s low-lying topography and the effect of liquefaction, a consequence of the earthquake, large tracts of land in the east are no longer inhabitable and must be abandoned. Inhabitants of these areas have to relocate to more stable ground, where homes can be rebuilt.

The current plan is to rehouse many of the affected people in large new subdivisions on the outskirts of the city, with 35,000 new sections being made available in the next three years, to keep up with the demand and requirement for new housing (Young).

As a consequence of the fact that 1100* of the 7800 homes requiring demolition are state or council owned (Gates) there is a great requirement for new low-income housing. The plan is to rebuild these in the margins of the city.

The likely constant push into the outskirts of the city will intensify the suburban sprawl and its effects, increase traffic in and out of central Christchurch and create a greater isolation for residents.

In contrast, there is huge potential in those vast areas of new open space in the central city, opportunities have arisen now for bringing a portion of residential housing into central Christchurch.

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*1100 number determined from Caroline King’s article in Stuff.co.nz and the CERA and city council run futurechristchurch.co.nz. See bibliography for references.
Fig. 6. Condemned housing in the eastern suburbs. Ross Becker, 2012
In July 2012 the Canterbury Earthquake Recovery Authority’s (CERA), the Christchurch Central Development Unit (CCDU), in conjunction with the Christchurch City Council and Ngai Tahu released the Christchurch Central Recovery Plan to the public, outlining the future development and rebuild of the central city. It incorporates a spatial Blueprint Plan (Fig 7) developed by a professional consortium of planners, consultants and architects led by Boffa Miskell, with personnel from Woods Bagot, Populous, Sheppard and Rout, RCP, and Warren and Mahoney.

In the Blueprint, creating a ‘green, prosperous and vibrant’ inner city encompassing retail, hospitality, business, entertainment and residential ‘precincts’ was devised to be vital for Christchurch’s future.

Prior to the earthquakes and the implementation of the Christchurch Central Recovery Plan, central Christchurch was considered to be the area constrained by the ‘Four Avenues’: Bealey Ave, Fitzgerald Ave, Moorehouse Ave and Deans Avenue (Fig. 9).

The Blueprint Plan reduces the boundaries of the inner city to a dense ‘central core’ bound by an East, South and Northern ‘Frame’ (Fig. 10).

“The Frame will reshape central Christchurch. By defining a central city Core, and providing new green space alongside a range of commercial and residential development opportunities, it brings cutting-edge urban design solutions to issues of land supply and diversification” (CCDU, “The Frame”).

The three sections of the Frame each have their own designated purpose. The East Frame, the largest, is to incorporate open spaces, cycle paths, walkways and landscaped areas amongst residential developments. The South Frame will contain a “Health Precinct” and allow for commercially based developments. The North Frame incorporates the Avon River and Victoria Square to form additional green space as a boarder around the city.

The East Frame reaches from the Avon River in the north to Tuam Street in the south, spanning a city block from Manchester Street to Madras Street and Latimer Square.

The East Frame of the Blueprint is specified to accommodate low-rise, medium density housing that fronts the length of Manchester Street towards the city and Madras Street towards the suburbs. A large green public park is to be accommodated on the land between the residential units.

The Blueprint portrays to accommodate 107 apartment blocks throughout the Eastern Frame. Each of these is considered to be between three to four storeys high, with footprints circumnavigating around 100 square meters per building.*

The intention of housing in proximity to the central city is to encourage permanent residents to move into central Christchurch.

* In February 2013, on commencing this design research, exact figures for the number of residential units and their square metre footprint within the Eastern Frame were unavailable. For the purpose of this design research, numbers are based on what was portrayed in the schematic Blueprint, released in July 2012.
The Blueprint plan seeks to intensify the central city by creating a core that provides amenities for entertainment, work, leisure and living, to bring people back into the heart of Christchurch. The intention, according to the Christchurch Central Recovery Plan, is to create a dense and "vibrant inner city" with a "diverse range of residents" (CERA 36). However, the low-rise, developer-driven housing proposed for the Eastern Frame is in contrast to these ideas.

The mixture of residents required for a "vibrant inner city" can only be achieved by including people from lower socioeconomic backgrounds. Social housing is currently missing from the Blueprint, with the plan to rebuild state houses in the outskirts of Christchurch. The proposed residential buildings in the core will be limited to those on high incomes, compromising the idea of a "diverse range of residents".

The low-rise housing along the East Frame contradicts the idea of the enclosing Frame to define a compact central core. Due to the restrictive height limits set within the Blueprint the housing units are required to spread vertically across the Frame to provide a viable number of homes. This low-rise ‘sprawl’ lacks cohesion and gives a suburban context to an urban environment. The definite line between city and suburb is blurred.

The Frame is meant to provide green space that can be used by the city’s residents. However, with multiple buildings scattered across the East Frame the amenity value of the green belt is severely compromised. A green Frame cannot be described as such if it has buildings mixed throughout. High-density housing is more consistent with the Blueprint objectives of achieving an active central city.

Building a tower, as an alternative solution, within the East Frame in place of the low-rise housing and in defiance of the height restrictions; opens up the Frame to become a green-belt boundary between city and suburb (Fig. 11). The creation of a tower raised questions about height, occupiable space, connection, and form.

Fig. 11. From low-rise to high-rise, Housing compressed. Author’s own image
The location of the design application is within the proposed East Frame, at the apex of Manchester Street and Worcester Street. The East Frame borders the central city, running from the Avon River in the north to Tuam Street in the south. The frame is as wide as one city block, straddling the land between Manchester and Madras Street, bordering Latimer Square.

Worcester Street acts as the central city’s main axis, connecting the city’s key amenities together and forming the central spine; linking Canterbury Museum, Botanical Gardens, Art Gallery, old university (Art Centre), Civic Chambers, Square and Cathedral with one another, through to Latimer Square. This axis also provides the location for the Triple Towers, placing it in the centre of the East Frame.

Worcester Street currently runs as a road from the Canterbury Museum to Latimer Square. The Blueprint proposes that Worcester Street will become a pedestrian and cycle street between the Cathedral and Latimer Square. The Triple Towers straddle the pedestrian and cycleway portion of Worcester as it leaves the city and enters the Frame.

Fig. 12. Worcester Street Axis and site location within proposed Blueprint. Author’s own image.
Fig. 13. Site as of May 2012 Author's own photographs.
METHODOLOGY

This thesis was undertaken as a design-led research. The aim is to create a piece of architecture which is an alternative option or a consideration to a contextual problem and situation through a four-part design discussion.

The iterative design process involved physical modelling, computer modelling and hand drawing. The design research is comprised of process, iterations and the final outcome of the design. At each level of the procedure the underlying complications and developments that sprung from the specific design process were discussed. Following that, the result of the development was questioned, examined and probed for meeting the original objectives before a follow-up design was developed. Ultimately, the process resulted in the final design, the Triple Towers.

Fig. 14. Collection of models from design process. Author’s own photographs.
A BRIEF OVERVIEW

The Triple Towers are comprised of three slender towers, sitting at 71, 74, and 77 floors respectively, coming to an average height of 300 meters. Sitting on the apex of the Frame, on the intersection of Manchester Street and Worcester Street, the towers are to become the draw-line of Christchurch’s major axes. The residential towers project is aimed at housing people who have lost their homes in the earthquake and those who wish to live in a dense urban environment.

Although residential housing existed historically and to a lesser extend in recent times (prior to the events of February 2011), the centre of Christchurch never experienced concentrated inhabitation. The Triple Towers aim to change that.

A diverse range of apartment types are available in this high-rise building; from one-bedroom studios to four-bedroom family apartments. Integrating subsidised low-income housing with high-end luxury apartments. Up to 900 people can be accommodated in the Triple Towers. To avoid the isolation that is attributed with high-rise living, a number of communal spaces are interleaved throughout the buildings. They cater to the residents of the high-rise but also encourage an interaction with the rest of Christchurch’s inhabitants. Instead of restrained private spaces the raised podiums that connect each tower to the other are open to the public. These places of interaction provide public recreational amenities and green space.

Fig. 15. View of Triple Towers from suburbs, Worcester Street. Author’s own image.

Fig. 16. Overpage: View of Triple Towers from Victoria Park, looking towards the central city. Author’s own image.
The vertical extension of green space into the towers is enforced by the building’s form. The narrow entities draw the line of the Worcester Street axis into the form of the Triple Towers. This creates a visual and physical connection between the towers, city and Frame.

The slender dimension of the Triple Towers is permitted through the use of a steel diagrid, a ‘structural exoskeleton’ that is expressed as a vital design element of the project. Clad in a covering of coloured glass, in hues of red, bronze and yellow, the structure is articulated through the diamond shaped panes.

At night the coloured glass is emphasized by the resident’s lights, creating a giant lantern that acts as a beacon for the new central city and Frame.

The base of the building provides an open, covered walkway and cycle way, as an extension of the Worcester Street axis. Splitting the high-rise into three separate towers allows for pedestrian and cycle traffic on the ground level, through the Eastern Frame. The towers are not to act as a barrier in the parkland but as a point of intensive interaction.
Fig. 18. Plans, Level 34 1:500. Author's own image.

Fig. 19. View of Triple Towers from Cathedral Square. Author's own image.
Fig. 20. Plans, Level 63. 1:500. Author’s own image.

Fig. 21. View of Triple Towers from Manchester Street looking south. Author’s own image.
Fig. 22. Plans, Level 72. 1:500
Author's own image.

Fig. 23. View of Triple Towers from Manchester Street looking south at night. Author's own image.
Fig. 24. 3 Bedroom apartment on level 23. Author’s own image.

Fig. 25. Section. Author’s own image.
Fig. 26. Basketball court in main podium on Level 21. Author’s own image.
The Blueprint proposal suggests the implementation of low rise housing in the eastern part of The Frame in the central city. Whilst the overall concept of the Blueprint proposes the creation of a dense and vibrant core the residential addition lacks cohesion and gives a suburban context to an urban environment.

The Frame is to act as a green corridor through the city for pedestrians and cyclists and as a distinct barrier between city and suburb. However, the creation of detached housing units within this green belt diminishes the recreational use of the open space for the public.

The Triple Towers concentrate the number of proposed housing units onto a much smaller plot of land. The towers open up the proposed green Frame, introducing opportunities for a strong connection between the inner city, Frame and residents, making the grassed grounds far more accessible for recreational use by any users.

The towers placement on the axis brings the otherwise marginalised social housing to the forefront of the city. Standing in relation to Christchurch’s core amenities, the Triple Towers become the focal endpoint of the Worcester Street axis.

Before the skyscraper type emerged, the proposed low-rise housing was concentrated into a smaller footprint with a range of types and figures.

![Fig. 27. Previous page: Triple Towers in Eastern Frame. Author’s own image.](image1)

![Fig. 28. Right: Triple Towers in Eastern Frame at night. Author’s own image.](image2)

![Fig. 29. Blueprint housing vs. Triple Towers in the Frame. Author’s own image.](image3)
Formal experimentation with the row house type investigated the continuation of the street, the creation of a tighter community and an active endpoint to the Worcester Street axis. The row house forms were to extend the axis across the green Frame and establish a link between the city, Latimer Square and the historic Christchurch Club building. To prevent a restrictive alleyway the row was split into two low, long, stretched forms.

Two towers, the meeting point of the two building extensions, acted as their central focal point. The extrusion of tower forms created linear, vertical extensions of the Worcester Street axis that is running between the central points of both Cathedral and Latimer Squares (Fig. 32).

However, this row housing proposal spanned the width of the Frame and in doing so created a ‘barrier effect’, an obstruction across the green belt that prevented thoroughfare through the Frame (Fig. 31). Whilst lifting and breaking the form created more permeability, the form still retained its obstructive nature.
To mitigate this issue, the east-west extensions of the building were bent to create a quadrilateral perimeter block, situated in the Frame at the end point of the Worcester Street axis, encompassing a public square within it. The quadrangle and its inner courtyard were aligned as an endpoint to the axis, with the central tower extrusions visually drawing the axis up from the horizontal into the vertical. Parts of the central courtyard were raised as split ramps leading into the towers, emphasising the axes’ visual move into the vertical (Fig. 34).

Whilst the perimeter block created a new public square, it also closed off part of the green Frame with the potential of the enclosed area becoming restrictive and isolated. This form was cutting the Worcester Street axis and turning its back to Latimer Square and the suburbs (Fig. 33).
The emphasis on the tower as the focal and physical endpoint to the axis raised questions about monumentality. Using Oscar Niemeyer’s National Congress Building in Brasilia as a case study (Fig. 36), the ‘monumental tower’ was investigated as a means of condensing the low-rise housing into a tighter figure.

The National Congress Building acts as the dominant focus along the Monumental Axis in Brasilia, the large esplanade which runs through the Brazilian capital’s centre (Fig. 37). Running across the esplanade is the slightly raised horizontal plane of the complex’s podium. Two cupolas, housing the chambers of the senate and deputies, sit juxtaposed on top. Rising slightly off axis behind the podium are two towers. The space between them is aligned with a ramp that allows public access to the roof of the podium. The cupolas, the two towers and the podium are arranged into a balanced composition without compromising the visual openness of the axis on which it sits (Philippou 276-278).

Positioned at the apex of the “Esplanada dos Ministérios” in Brasilia, the parliament building marks out a long horizontal line visually broken by the two tower blocks. From a distance, the complex appears to be a continuation of the square on which the building seems to rest (Botey 132).

The building’s composition, site positioning and modernist form generate a building that is a monumental landmark within its city environment, communicating its force over a considerable distance (Botey 132).
Drawing inspiration from Niemeyer’s National Congress, the form experiments investigated translating the monumental qualities of the parliament building in Brasilia into a residential tower that would suitably occupy the Worcester axis.

Eliminating the low-rise part of the perimeter block removed the constraints and the ‘barrier effect’ of this iteration, leaving the towers aligned with the axis as the central focal point from both directions. The raised square of the quadrilateral block explorations were reconfigured to act as the podium on which the towers sit.

The iterations played with the size of podium, the division and size of the tower forms and the method of access. Throughout the iterations the podium was reduced with the intention of reducing the greater footprint of the building, experimenting with how the ‘monument’ touches the ground. (Fig. 38)

**Fig. 38.** Reduction of the pediment and perimeter arms. Author’s own image.

**Fig. 39.** Pediment form models. Author’s own photographs.
The experiments concerning the ‘monumental’ tower forms remained relatively small and because of this the occupancy requirements for nine hundred residents were not met. The ‘monumental’ iterations created a building that would be the focal centre of the Worcester axis. A short tower within the low-rise environment of Christchurch would fail to be perceived outside of the proximity of the axis.

Pushing the elevation of the tower forms to new heights provided the required occupancy levels and created a prominent form within the city that is recognisable from greater distances. The result was the creation of the skyscraper figure (Fig. 40).

The Triple Towers grew from a series of experiments that looked at the form and height of the skyscraper type; playing with division, weight and connectivity. The individual iterations of each are discussed in ‘Contact’.

Fig. 40. 3 Bedroom apartment on level 23. Author’s own image.

Fig. 41. Right: Triple Towers, viewed from Hereford Street. Author’s own image.
The skyscraper type experiments raised the question of height. What is too high and what is a suitable height for the fabric of Christchurch?

This question was addressed through the placement of form masses, of renowned tall buildings, on site. These towers constituted of: 'The Shard' by Renzo Piano Building Workshop, the CCTV Headquarters by OMA and the Eiffel Tower by Gustav Eiffel. Ranging in size, the forms communicated the visual effect of a tall structure within a low-rise environment (Fig. 43).

The Shard and Eiffel tower structures are both placed in 'low-rise' cities and appear to 'slot' into the context of Christchurch, whilst the CCTV building appears too heavy and domineering for the site. From the perspective of the Worcester Axis, all three precedents provide an aspect that carries the axis into the vertical (Fig. 42). These findings led to the development of the Triple Towers concept.

**Fig. 42.** Comparative diagrams of exemplar buildings in site and acting on the axis. Author's own images.

**Fig. 43.** Right: Height comparison of exemplar buildings in site. Author's own images.
The Triple Towers compress the previously suggested low-rise sprawl into three towers sitting between two hundred and ninety and three hundred and eight metres tall.

Opening up the frame through the compression of the built footprint, frees up the eastern Frame to be reutilised as green space (Fig. 45), creating a distinctly recreational zone between city and suburbs. The additional parkland created provides space for leisure and communicative interaction between the residents of the Triple Towers and greater Christchurch.

The Triple Towers’ placement on the axis brings the otherwise marginalised social housing to the forefront of the city. The towers sit in conjunction with the core civic amenities of Christchurch; the cathedral, museum, art gallery and council chambers (Fig. 44). The central focal point created through the towers’ form and placement forces an association between the city, landscape, high rise building and occupants. The axis connects the cultural and spiritual to the social.

A comparison between the Triple Towers, Blueprint and a number of alternative solutions shows the relationships between the occupancy, footprints and floor areas (see overpage). The Triple Towers’ footprint is significantly smaller than the low-rise alternatives and provides an occupancy that is equal or greater than the proposed Blueprint number. Whilst a higher occupancy can be gained from low-rise alternatives, they reduced the amount of open land and resulted in a greater number of separated buildings and contradicted the intent of the Frame.
A COMPARISON


Fig. 47. Left: Schematic diagrams of case studies in site. Author's own image. Fig. 48. Above: Comparison graphs. Author's own image.
The ‘monumentality’ explored in the earlier iterations was not lost in the implementation of the Triple Towers. Through sheer scale the skyscraper becomes a monument itself. Consequences of this are discussed by Rem Koolhaas, in regards to the traditional Manhattan skyscraper, in his book “Delirious New York.”

“Beyond a certain critical mass each structure becomes a monument, or at least raises expectations through its size alone, even if the sum or the nature of the individual activities it accommodates does not deserve a monumental expression. This category of monument… merely is itself and through sheer volume cannot avoid being a symbol – an empty one, available for meaning as a billboard is for advertisement... This monument of the twentieth century is the Automonument, and its purest manifestation is the skyscraper” (81-82).

The ‘skyscraper as a monument’ resulted in two conflicting demands being imposed on the type, “that of being a monument – a condition that suggests permanence, solidity and serenity – and at the same time, that of accommodating, with maximum efficiency, the ‘change which is life,’ which is, by definition anti-monumental” (Koolhaas, “Delirious New York” 81-82).

The architects of the Manhattan skyscraper responded to these conflicting demands through the execution of an ‘architectural lobotomy’. They explored separating a building’s interior from the envelope, as opposed to the notion of a visual and physical relationship between them (Ibidem).

The separation of the interior and exterior is witnessed in the execution of the Triple Towers form and its encapsulating glass façade. The triangular breakup of the façade is not related to the positioning of interior partitions or programs. Whilst the traditional residential high-rise floors are identifiable through the location of generic openings and balconies, the Triple Towers’ floors are ‘disguised’ behind coloured glass (Fig. 49). It is not immediately evident that the towers are occupied by residential apartments.

Fig. 49. Typical apartment block exterior/interior relationship compared to Triple Towers exterior/interior relationship Author’s own image.
The sheer size of the Triple Tower fits into the portrayal of the ‘skyscraper as monument’. This is enforced by the project’s figure, skin and placement on the axis. The occupation of the building by social housing, however, is in contradiction to this idea.

The ‘traditional’ skyscraper is in contrast to the concept of the Triple Towers. The ‘father of the skyscraper’ Louis Sullivan placed the skyscraper alongside the architectural types of the ‘Greek temple, the Gothic cathedral and the medieval fortress (Sullivan 208). The late architectural critic Ada Louise Huxtable defined the skyscraper as a ‘landmark of our age, synonymous with the twentieth century’ (7). Traditionally skyscrapers are aligned to grandeur, wealth and prestige.

The Australian architect Lawrence Nield writes:

“Architecture has always dealt with prestige and pretention. The palaces of the rich have always been larger and more elaborate than the houses of the bourgeois: cathedrals have always been bigger than parish churches. Most prestigious buildings were bigger than the operational demands of the activities they housed. Most tower buildings are about prestige and pretension” (12)

The skyscraper is home to the corporations, the banks and the wealthy. It is the landmark that towers over the city representing commerce and capitalism. The Triple Towers defy this through its occupants (Fig. 50).

Whilst the occupation of the skyscrapers by residents is nothing new, those that are inhabited by social housing are relegated to the edges of cities. Those that are positioned within the prime real estate of cities are occupied by the wealthy. The placement of the Triple Towers on the axis, its height, colour and form force it into prominence.

The compression of the low-rise housing proposed for the Christchurch Blueprint led to the formation of the Triple Towers skyscrapers. This freed up the frame and provides an alternative housing option on the prominence of Christchurch’s central axis.

The height of the Triple Towers was partly a result of the requirement for compressing low-rise into high-rise housing, yet this was not the only driving force. The aesthetic lightness, the ‘breakup’ of tower, how it is occupied, and the connection between city, axis and high-rise resulted in the slender forms of the towers. It is this slender nature of the Triple Towers that drove the skyscraper’s heights beyond a simple condensed, medium to high-rise housing block.
SLENDER
The slender forms of the Triple Towers generate a vertical extension of the Worcester Street axis, with which it is aligned. This creates a connection between the towers, city and occupants.

By dividing the proposal into the three towers it avoids the implementation of a condensed tower block; which, as a result, would create a barrier effect between the central city, frame and suburbs (Fig. 54).

The compression of the required floor area into the form of the Triple Towers results in a taller building. The effect of this, however, is directly counterbalanced by the narrow nature of the proposals arrangement.

The slender form and the division of the Triple Towers create opportunities for the residents and the overall composition of the tower.

The vertical extension of the axis and the requirement for the breakup of the form was developed, as before, through the implementation of formal experiments.

Fig. 53. Previous page: View from Cathedral Square. Author’s own image.

Fig. 54. Above: Division of the block. Author’s own image.

Fig. 55. Right: View down Manchester Street looking north. Author’s own image.
The tower as the vertical focal point of the axis was carried through from the ‘monumental’ form iterations. These were beautiful as forms but were impractical for occupation because no provision had been made for light coming into the building.

The ‘vertical break-up’ form explorations sought to make the towers’ envelope more permeable. The aim of this was to create visible or suggestive occupiable space within the form.

The vertical breakup of the envelope suggested where circulation and where potential communal meeting points could occur. Disbanding the outer envelope of the building by fragmenting the previously solid casing into rectangular pieces and weaving those into a discernible pattern created a lighter appearance and would allow openings for windows and balconies (Fig. 56).

Variations to the explorations sought to play with the idea of an optical illusion: the creation of a tower where the location and number of storeys become less defined (see Fig. 58 overpage).

Whilst the tower continued to be the central focus point of the Worcester Street axis, the aesthetic form of the building made little allowance for visually drawing the axis or street into the form itself. Access was permitted through the base of the tower but there was little physical connection between those on the ground and tower itself.

**Fig. 56.** Creation of the ‘vertical’ break-up. Author’s own images.

**Fig. 57.** Models of ‘vertical’ forms. Author’s own photographs.
Fig. 58. Creation of fragmented envelope. Author’s own images.

Fig. 59. Models of ‘vertical’ forms. Author’s own photographs.
To amend these issues, emphasis was placed on the vertical extension and focal draw line of the axis. Further form experiments tried to change the appearance of the building’s envelope by creating symmetrically reflecting patterns along a vertical ‘hinge’. This created the desired effect of a vertical continuation of the axis.

These experiments further reduced the width and weight appearance of the tower by crafting a taller and slimmer form, broken up by regular configurations; therefore moderating the ‘wall’ effect that is generated by flat vertical surfaces (Fig. 61).

The variable dimensions of the envelope’s projections could be interpreted to represent individual floors or give the illusion that each of them would represent an individual floor.

The form created was elaborate in modular scale but when translated into a CAD model the replication along the ‘hinge’ line became ‘too predictable and rigid’ (Fig. 60). Whilst using the ‘hinge’ line was effective at visually drawing the Worcester Street axis into the tower, the form experiment ignored the Manchester Street line.

*response from May review

Fig. 60. Render of Hinge model on site. Presented in May review. Author’s own image.

Fig. 61. Block vs. Triangle vs. hinged. Author’s own images.

Fig. 62. Models of ‘hinged’ forms. Author’s own photographs.
Fig. 63. Creation of the Hinge. Author’s own images.

Fig. 64. The Hinged model. Author’s own photograph.
The ‘split’ investigated reducing the mass of the singular form by breaking it into multiple towers; therefore developing it into less repetitive and rigid forms.

Breaking up the tower resulted in the creation of the tower tripod; three slender towers connected into one structural element. Experiments began with three lower towers that were later heightened to allow for the full occupational requirements. (Fig. 65).

The extended towers, at two hundred meters tall, were kept as slender as possible to permit transparency, in terms of views from the city and from within the tower itself. Remaining connected structurally, the number of towers was increased to five.

Openings were cut into the forms at irregular intervals to avoid the rigidity and predictability of the previous model’s design (Fig. 66).

In additional experiments the number of towers was reduced to three but the slim form of the towers was retained and developed further, creating the Triple Towers.

**Fig. 65.** Split, reconnected and stretched. Author’s own images.

**Fig. 66.** ‘Split’ form models. Author’s own photographs.
The slender forms of the Triple Towers are a refined continuance of the axis. The narrow silhouette of the Triple Towers, when viewed from Worcester Street, (Fig. 68) draws the axis up into the form of the towers and connects the towers to the street and city (Fig. 67). Whilst appearing wider from the Manchester Street perspective, the height, cladding and dimensions of the Triple Towers ensure the structure’s slimness and lightness is maintained.

Fig. 67. Axis acting on the towers, connecting them together and connecting them to the city. Author’s own image.

Fig. 68. View from suburbs on Worcester street. Author’s own image.
The Triple Towers are comparable to Renzo Piano’s ‘Shard’ in London, with both projects rising to a similar height of just over three hundred meters.

Like the Triple Towers, the Shard is situated within a low-rise context making it a prominent landmark within the city of London. Appearing like an elongated pyramid, the seventy-two story Shard sits atop London Bridge Station, housing offices, apartments, a hotel and a public observation deck on the highest occupiable floor. The architect Renzo Piano’s intention was to create a mixed use tower that became a ‘vertical city’, operating twenty-four hours a day and “intensifying the city” (Wright 53).

In relation, the Triple Towers are solely private residential apartments that provide public space to a much greater extent than that of the Shard (Fig. 69). The floating podiums that span between the towers arrange for communal space in three positions, encouraging the interaction between residents of the tower and greater Christchurch.

According to Charles Holland, director and architect of the London based firm FAT, the Shard only adds to what “London already provides in abundance: luxury apartments, expensive restaurants and oodles of office space. It is a building that only caters to the world’s ‘super-rich’” (Holland 57).

Triple Towers creates a mixed model of social housing and market value housing, bringing traditionally separated communities together. The public spaces provide areas where the occupants can socialise and interact.

Fig. 69. Location of public space in the Shard and Triple Towers. Author’s own image.

Fig. 70. The Shard. John Safa. 2012.
TRANSLUCENT

The Shard is clad in an ‘especially’ clear glass permitting a translucency that is unusual in such tall buildings. Piano says: “Too often tall buildings are opaque and mysterious. We wanted this one to be transparent, so everyone could see all the activity inside” (qtd. in Pearson 65).

Although providing transparency, on certain days the eight off-vertical facades of the Shard reflect the sky, causing the building to “almost vanish” (Fig. 71). Piano refers to the Shard as a “kaleidoscope that reflects the sky. You can spend the day in front of it and it will never be the same” (qtd. in Wright 46).

The architect states that in the absence of any other tall buildings nearby, the Shard’s only context is the sky. The shape and cladding address the appearance of the building against the city skyline (Holland 55).

Transparency is something shared by both the Triple Towers and the Shard, each executing it in their own way. Whilst the Shard creates transparency through its clear glass façade, the Triple Towers’ transparency is mainly ensured by its slender dimensions (Fig. 72) (and, to a lesser degree, also by large glass panels in its envelope).

Each tower is twenty three meters long while eighty percent of the Triple Towers’ widths measure just ten meters. From the eastern and western perspectives the towers appear as two ten meter wide forms, with one tower hidden by another. The slenderness of the two visible forms is accentuated by the void between them, again illustrating the vertical extension of the Worcester axis.

With all three towers visible from the northern and southern angle, the form of the building appears drastically different. Although the Triple Towers seem wider from this perspective, their slender character is maintained from all viewpoints.

Fig. 71. The Shard, reflection and transparency. Author’s own image.

Fig. 72. Deep plans = no transparency. Triple Towers = transparency. Author’s own image.
The tall, slim shape of the individual forms, the narrow dimension of the floor plates and the cladding of these buildings ensure transparency, making it possible to see directly through the towers and therefore applying ‘lightness’ to the entity.

This building is creating spaces that are naturally lit from wall to wall, producing warm and sunny and high-quality living areas.

The ‘Equitable Savings and Loan Building’, built in Portland in 1948, became the first environmentally-sealed building (Fig. 75). Since then deep-panned skyscrapers, with fifty foot window to core distances, have become commonplace. (Jencks, “Skycities” 9). Prior to this, skyscrapers would be limited to the distance that natural light could penetrate. Even with high windows, natural light was reduced to fifteen feet (4.6m) from the external wall (Nield 10). The Dutch architect Rem Koolhaas comments:

“There has been no real ‘invention’ in the skyscraper since the ’70s. Their structural principals have remained stagnant – the Tower as Tube: the taller, the deeper its plan, the further removed its floor space is from daylight and Tower as Pyramid: the taller, the broader its base, the vast majority of its accommodation in its dark tower half, an elitist fraction at the top” (“Content” 443)

The design of the Triple Towers counters this criticism. The tall, slim shape of the towers, their narrow footprint, the glass panels of the outer shells and the way the towers are arranged on the available section ensure daylight streaming into the building at all levels and from all sides (Fig. 73). Unlike the storeys in the pyramidal form, of which the Shard is an example, the majority of the occupied floors in the Triple Towers would ensure ‘elite’, i.e. highest quality living (Fig. 74).

The slender towers are possible through the breakup of the deep-plan skyscraper.

Fig. 73. Depth of natural light in pre-modern office building, deep plan office buildings and the Triple Towers. Author’s own image.

Fig. 74. Natural light in pyramidal form in contrast to Triple Towers form. Author’s own image.

Fig. 75. Equitable Savings and Loan Building. Abenj, 2008
The bases of the ‘Tower as a Tube’ and ‘Tower as Pyramid’, mentioned by Koolhaas above, have to be large. The result is the loss of natural light in large areas of the lower part of the building. To avoid this problem, Koolhaas used an alternative model of an apparent “unstable cluster” of slender forms that provide the same floor area. The unbuilt proposal ‘Togok Towers’ (Fig. 77) in Seoul divided the floor plans into smaller but better lit areas, with the individual forms also playing a structural role (Cortés 25). Koolhaas reflects, in “Content”, on the Togok Towers.

“Instead of the obvious stability of a narrow top and wide base, a composite stability of slender members that combines accommodation with structure. Instead of the blatantly bloated, the mutual support of the slender. In such configurations, the self-evidence of the single core could be replaced by the distributed cores that connect at points where individual towers intersect” (443).

The vertical and inclined forms of the Togok Towers are tied together, connecting each tower to the other, creating a larger whole. According to the architectural critic and author Gevork Hartoonian, the “design employs a structural system that frees the building’s soaring tendency from the vertical projection of its ground-floor plan” (101).

The Triple Towers model employs a similar tactic. In order to reduce the mass of the building, on the ground plane and as a vertical construction, the form is ‘split up’ into three. The resulting slender towers are then structurally reconnected through ‘elevated podiums’.

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**Fig. 76.** Left: Tower as tube, tower as pyramid, broken up to create the Togok Towers and Triple Towers. Each with their own respective forms of connections. Author’s own image.

**Fig. 77.** Above: Images of Togok Towers, OMA, 1996.

**Fig. 78.** Togok Tower: Author’s own image.
The separated cores of the Triple Towers do not follow the inclined model of the Togok tower, but remain vertically static while the tower floors are shifted around them (Fig. 79). The first fifteen floor plates gradually reduce in size whilst simultaneously following a 4° angle over the initial sixty vertical meters. From the sixteenth floor onwards, for two hundred and forty vertical meters, the floor dimensions remain steady. Sloping at an angle of 2° in the reverse direction. The reduction of the size of the floor plates and the two opposing angles result in the ‘kinked’ forms of the Triple Towers.

The kink, in cohesion with the conventional vertical elevator shaft, results in the elevator reaching each floor at a different point. The ‘mutual relationship’ between the shaft and the kink leads to apartment configurations that can be vertically repeated, but need to be reconfigured based on the point at which the elevator enters the floor. This means that each apartment is slightly different from the next, resulting in greater variance and individuality (see Figs. in next few pages).

The slender form of the towers means that there are never more than two apartments per floor, with each apartment having views, and daylight, in at least three directions.

The kinks of the opposing slender towers emphasise the void between them, which in turn accentuates the vertical extension of the Worcester Street axis.

The widening and tapering action of the void draws the axis upwards into the Triple Towers with the focus falling on to the main ‘elevated podium’. This lowest podium is situated just above the point of the ‘kink’, appearing to have been slid up from the ground plane. It appears to physically pushing the towers apart and thus becoming a focal point on the axis.
Fig. 81. Plan, level 23. 1:500. Author’s own image.

Fig. 82. Three bedroom apartment on level 23/24. Author’s own image.
Fig. 83. One bedroom apartment on level 23. Author’s own image.
Fig. 84. Plan, level 63. 1:500. Author's own image.

Fig. 85. Three bedroom apartment on level 63/64. Author's own image.
Fig. 86. Previous page: Four bedroom apartment on Level 72/73. Author’s own image.

Fig. 87. Plan, level 72. 1:500 Author’s own image.

Fig. 88. Two bed apartment on Level 72. Author’s own image.
Traditionally the podium is a solid base on the ground plane, a plinth on which a building stands. In contrast to that, the Triple Tower proposal elevates the podium.

Drawn up into the void between the three towers, the podium floats 100m above the ground. Lifting the podium creates new functions and reinterprets the traditional meaning. The podium is no longer the anchor for the building but rather the connector between multiple elements (Fig. 91).

The creation of public space at the ground plane, the shifting of the central focus, the connection between the three towers and the horizontal extension of public space are opportunities generated by elevating the podium. These moves are both functional and formal.

Fig. 89. Previous page: View down Worcester Street. Author's own image.

Fig. 90. Far Left: View from Victoria Street and park. Author's own image.

Fig. 91. Lifting the podium with improved accessibility. Author's own image.
The podium as the traditional base was investigated in early iteration models, discussed previously in terms of ‘monumentality’.

Influenced by Oscar Niemeyer’s National Congress Building in Brasília, the formal experiments explored the monumental building type with the podium as a formal driver.

The Congress building is a focal point at the end of the ‘Monumental Axis’, the large esplanade which runs through the centre of the Brazilian capital (Fig. 94). Raised slightly above the esplanade, the base of the building lies as a long horizontal podium across the ‘Monumental Axis’. Sitting on top of this podium are two juxtaposed cupolas which house the parliamentary chambers, one like a giant bowl facing sky wards, the other a dome, facing the earth. Rising behind the podium are two reflected towers, slightly off axis and aligned with a ramp that allows public access to the roof of the podium (Fig. 93) (Philippou 246).

Fig. 92. Monumental Axis acting on the National Congress of Brazil Building. Author’s own image.

Fig. 93. Top: National Congress of Brazil (Brasília). Marcelo Jorge Vieira, 2006.

Fig. 94. The Monumental Axis. Limongi, 2006.
The design language of the podium, towers and ramp of the Congress building were carried through into the Triple Towers design experiments. The podium was developed in conjunction with the form and division of the tower, with the size of the podium varying through the process.

As with the National Congress building the ‘podium type’ iterations created a termination point for the axis. However, the relationship between the podium and the ground plane was problematic. Whilst providing access through the Worcester Street axis, the iterations ignored the context of the frame. The podium separated the tower from the frame, creating a disassociation between the two (Fig. 95). These issues led to lifting the podium off the ground plane and into the vertical.
The placement of the podium at the ground plane of the National Congress Building is not something that is shared physically by the Triple Towers proposal. However, their respective compositions show similarities in how they relate to the surrounding area. The architect, historian and author Styliane Philippou describes the effect of the horizontal plane of the podium.

"The monumentality of the National Congress Building resides in the proclamation of the horizontal dimension, powerful and effective in a landscape that has no natural vertical elements at all. Superimposing the focal point of the city on the perspectival vanishing point accentuates the limitless flat ground". (246)

As Brasilia, Christchurch city is situated in a flat environment. The placement of the National Congress buildings podium strengthens its focus point along the axis and accentuates the expanse of flat ground that is the ‘Monumental Axis’ (Fig. 97).

By asserting the horizontal element of the podium upwards into the vertical elements of the Triple Towers, the focal point of the city and axis is drawn up into the height of the towers, contrasting vividly with the flat plane of the frame (Fig. 98).

Fig. 97. Far right: The lifting of the National Congress Building’s horizontal plane (podium) and its visual effect. Author’s own image.

Fig. 98. The lifting of the Triple Towers horizontal plane (podium) and its visual effect. Author’s own image.
RISEN

The deviation from the traditional placement of the podium by the Triple Towers is not unique to the design. A similar elevation of the podium is executed in the newly completed Shenzhen Stock Exchange by the Office for Metropolitan Architecture (OMA).

The development consists of a single 246 metre tall tower situated in the centre of a new public square. The generic rectangular form of the development is punctuated by a strict regular pattern of square windows within a façade clad in dark translucent glass. The repetitive face of the building is intersected by a three-storey podium floating 36m above the ground ("Shenzhen Stock Exchange" 78).

Lifting the podium of the Shenzhen Stock Exchange (SZSE) liberates 40,000 square meters of space on the ground plane, where it is reutilised as a public square (Fig. 99). This variation from a ground-based podium is resulting in the increase of the public realm and in the reduction of the overall building footprint. It is a trait that is also implemented in the Triple Towers proposal.

Fig. 99. Lifting the SZSE’s podium with the creation of public space below. Author’s own image.

Fig. 100. Shenzhen Stock Exchange. Philippe Ruault, 2013.
The SZSE and Triple Towers are programmatically very different, housing a stock exchange and housing respectively. This contrast of purpose clearly illustrates the variations between the two projects. However, whilst the respective buildings differ in their programmes, they still share formal similarities.

Both projects lift the podium, reducing their footprints and enabling the expansion of exterior public space (Fig. 101). The projects break the mould of what is expected from the “traditional” podium.

“For millennia, the solid building stands on a solid base; it is an image that has survived modernity. Typically, the base anchors a structure and connects it emphatically to the ground” (OMA)

The floating podium is no longer the heavy mass that anchors the towers to the ground. By shifting the mass of the podium the balance and focus of the towers is changed.

Lifting the Triple Towers’ podium 100m into the air changes the composition of the building. The ‘weight’ of the tower is no longer situated at the expected base of the towers but is suspended high above the city’s streets. Defying gravity, the floating podium introduces horizontality into the vertical forms of the towers (Fig. 102).

The weight and contrast of forms allows the podium to become the focal point of the project, reinforced by its purpose. Occupied by an Indoor sports court, a café and childcare facility it generates a central location where residents and public can interact (Fig. 103).

A similar relationship can also be seen in the SZSE building where the podium harbours virtual trading floors, ceremonial spaces and crucial databases (OMA). The podiums act as the “hearts” of the respective buildings, housing core facilities.
Fig. 104. Basketball court within the elevated podium. Author's own image.
The implication of lifting a large plane into the air means cast shadows and obstructed views. If the Triple Towers podium were to stretch the full length of the project, tower to tower, the result would be a plane over 82 meters long. To mitigate the issues created by the sheer size of such a plane the podium has been adapted (Fig. 107). The ends of podium have been pulled back to be restrained within the tower envelope. A void has been sliced through the podium where it meets the central tower. The shortening and perforation of the podium allows for greater daylight penetration and unobstructed view shafts between the podium, tower and ground (Fig. 106).

In comparison, the podium of SZSE makes a similar move by cutting the podium open above the two atria that flank the base of the tower. These voids expand these already immense spaces and create a visual link between ground and podium (OMA).

Fig. 105. Lifting, reduction and multiplication of the podiums. Author’s own image.

Fig. 106. Top: View from podium through void down to the city. Author’s own image.

Fig. 107. Reduction and cutting of voids in the respective podiums – with view shafts created. Author’s own image.
Green space inhabits the roofs of both projects’ podiums. A ‘Sino-European’ garden on the roof of the SZSE’s podium provides outdoor spaces for staff and clients. The combination of European geometry and Chinese asymmetry generates a variety of strict spaces that can be used for work and recreation (Blaisse 8). Due to the nature of the SZSE’s programme, public interaction with this space is limited.

In contrast, the podium in the Triple Towers is a less-regulated green space, accessible to the public and the towers residents. The horizontal expanse provides spaces for plantings, seating, open ground and a flexible ‘half-court’ for basketball and other activities. The roof of the podium is a vertical extension of the parkland below. The podium as a whole is projecting public space into the traditionally private tower form.

The push of public urban space into the realm of the private tower is discussed by the architect Ken Yeang.

“As an urban design proposition we would need to design skyscraper spaces similar to the urban spaces found at the ground plane but with different types and scales. We need to provide urban precincts and realms within its high rise built form, as well as greater accessibility and better shaping so that its internal spaces become vital settings for a public life-in-the-sky” (“Reinventing the skyscraper” 18).

Due to housing being the main occupation of the Triple Towers it is imperative to offer public space. The podium’s roof and programme provide this. The podium provides points of crossover, a connection point between the towers that allows for social engagements (Fig. 108).

Fig. 108. Green space connections comparison on the SZSE and Triple Towers. Author’s own image.

Fig. 109. Podium, level 22 1:500 Author’s own image.
Fig. 110. Green public space on main elevated podium. Author's own image.
LIFTED GROUND

The lift of the podium reorganizes the Triple Towers’ connection to the ground plane. Instead of a large, heavy base anchoring the towers to the ground, a lighter connection between ground and building is found.

A solid ground based podium would act as a termination point for the Worcester Street axis, a solid barrier that cuts the axis off from the frame. When this mass is lifted it allows for the extension of the axis through the building, permitting a visual connection to the frame and Latimer Square (Fig. 111).

Each tower has its own lobby, circulation, services and bicycle storage. Keeping this required space as small as possible enables the opening up of the remaining ground floor for public engagement. The alignment of the towers creates an open twelve metre high atrium that runs the length of all three. The atrium is an expression of the axis running through the building, an extension of Worcester Street. A canopy forms a visual and physical connection between the towers.

The street acts as a thoroughfare and as a social engager. The spaces between the towers are left open to allow pedestrian and cycle movement through the green frame.

The atrium as a street is a response to the architect and writer Bert de Muynck’s critique of the skyscraper.

“The atrium is the empty heart of the skyscraper that sucks the masses inside and cripples them ideologically, and skyscrapers are placed so far from one another as to render them urbanistically ridiculous and programmatically redundant. They become desolate and impotent phallic icons” (93),

The isolation of the skyscraper is an issue that is sought to be partially resolved through the connections of the atriums, the creation of a perforated public street through the building.

Fig. 111. Podium at ground level vs. Lifted podium. Author’s own image.

Fig. 112. Ground floor plan, 1:500. Author’s own image.
The Triple Towers’ ‘atrium as a street’ sits in contrast to the ground floor of the SZSE. The two atria of the SZSE span upwards to the height of the suspended podium, providing an expansive volume between the exterior and the central core (Williams). The square around the tower is public, but because of security issues associated with the building’s programme, physical interaction between the atrium and the square cannot exist.

The reason for lifting the podium in the Triple Towers proposal is not to serve the “capitalist market”, as in the SZSE (Ibidem), but rather on the improvement of communal interaction. Where the SZSE seeks to express the speculative nature of the stock market (Ibidem), the Triple Towers seeks to express the connection between the tower, city and residents.

Lifting the podium means more than just creating an architectural focal point floating above Christchurch. The elevated podium is tying the towers together, producing a social and formal connection.

Fig. 113. The atrium as a street, looking towards Cathedral Square. Author’s own image.

Fig. 114. Overpage: View down Manchester Street, looking South towards the Port Hills. Author’s own image.
The three towers of the design proposal are linked through an elevated podium. Connecting the towers prevents the creation of isolated skyscrapers lacking any association to one another or the city. The architect Rem Koolhaas reflects on this issue in “Content”.

“...More and more examples of autarkic towers demonstrates how the skyscraper can deny instead of promote interaction and communication” (474-475).

The connections between the towers by the elevated podium and ground are both social and formal. By linking the towers together cohesion is created between them, merging the buildings and their communities together. The created raised podium link allows exchanges and communication between people living in the individual towers.

On an aesthetic level, the connection means the building is perceived as one. The slender forms of the three towers merge from being observed as individual entities into a singular joint form (Fig. 116).

Fig. 115. View from Madras Street, looking southwest towards inner city and Port Hills.

Fig. 116. Connecting the towers, breaks the individual isolation. Author’s own image.
The requirement for a connection between the towers arose in the form, development process. The initial skyscraper forms investigated the break-up of the ‘heavy’ figure (as discussed in Slender). The result of this was the multiple tower form.

Initially the connection between the three towers was purely structural, tying the individual buildings together (Fig. 118). The issues that developed at this point were about the towers’ connection with the ground.

Rather than rising abruptly out of the ground plane, the towers were developed into a double tower form that ‘grew’ out of the ground.

The connection between the ground plane and the vertical form brought the public green space into the towers through ramps rising out of the ground. The towers of this form were linked at the ground level but remained as isolated towers (Fig. 120). Interaction could only occur on the ramps at the ground level.
The developed iteration breaks down the multiple isolated towers into a connected singular form. It explored connecting the two towers together with a horizontal form, creating a point of interaction. A similar concept is executed by OMA’s CCTV Building in Beijing from which this design sought inspiration (Fig. 124).

The CCTV building was designed as an ‘end to the skyscraper’, a building that sought to resolve the isolation of the typical standalone skyscraper. The architect Rem Koolhaas reflects upon it here.

“An explicit ambition of the building (CCTV) was to try to hasten the end of the skyscraper as a typology, to explode its increasingly vacuous nature, loss of program, and refuse the futile competition for height. Instead of the two separate towers of the WTC, there was now a single, integrated loop, where two towers merge” (“Content” 44).

Koolhaas refers to the issues surrounding tall buildings. The lack of a physical and social interaction between skyscrapers makes them isolated from one another. Creating a connection between them provides a point of communication.

The CCTV based design iteration created a physical connection between the towers, but the open form moved the focus away from the mechanisms of the street and axis. The central focal point becomes lost in the expanse between the individual towers (Fig. 122).
The iteration was developed further with the ramps and spacing reduced. Pulled together the towers are aligned to almost touch. The point of connectivity is moved to the middle of the towers. It is this iteration that most closely resembles the final proposition.

At the point of connectivity the ‘elevated podium’ is slid between the tower forms, appearing to push the towers apart, but acting as the entity that joins them together (Fig. 126). This elevated platform is the connection point between the three towers. It is where the community of the towers meet and socialise and where the public can also be engaged. Visually the towers appear to connect at the base, middle and end.

**Fig. 126.** The creation of the ‘kink’. Lifted and pushed together. Author’s own image.
Additional iterations were also carried out, investigating methods of connection. Twisting and bending towers together, to form points of connectivity, were examined (Fig. 128). However the result was never satisfactory without a strong point of connection being developed. Therefore the final design iteration returned to the raised podium form to which an additional tower was added, creating the Triple Towers (Fig. 129).

**Fig. 128.** Top. Creation of the twisted towers form. Author’s own image.

**Fig. 129.** Above. Addition of the third tower to the Kink forms. Author’s own image.

**Fig. 130.** Twisted forms models. Author’s own photographs.
Standing at over three hundred meters tall the Triple Towers dominate the Christchurch skyline. This height makes it possible to condense a large population onto a small footprint and enables the expansion of the green frame. However it also creates social and formal issues.

The skyscraper type has been, according to Koolhaas, corrupted.

“The intensification of density that the skyscraper initially delivered has been replaced by carefully spaced isolation. Skyscrapers deny instead of promote interaction and communication” (Koolhaas “Content” 473).

This ‘corruption’ of the skyscraper is observed by the Malaysian architect Ken Yeang as a key factor in high rise social problems. Yeang states: “The biggest social problems in the case of the skyscraper are the isolation and alienation of the inhabitants” (Ken Yeang 140). Koolhaas expands upon the issue, stating:

“The typical skyscraper, a tall building standing in a degree of isolation, attracts its own inhabitants but limits direct communication with others. Two typologies offer promising alternatives. The first is the hyperbuilding - a building which has such an enormous population that it generates an urban condition within itself. The other is an expanse of disperse cores in a low rise condition that performs as an extended field of interaction” (“Content” 475).

Here Koolhaas offers two alternatives to the isolated skyscraper: the “hyperbuilding” and the “low-rise community”.

The Triple Towers do not directly fit into either alternative type put forward by Rem, but do share some similarities with the hyperbuilding type. The “Hyperbuilding” and the critiques of the isolated skyscraper, play an important role in defining the Triple Towers response.

Fig. 131. View of Triple Towers from Hereford Street, suburban side. Author’s own image.
With OMA’s unbuilt Hyperbuilding proposal, for Bangkok in 1996, the functions of the skyscraper program were broken up in a grouping of slender towers, prismatic blocks, inclined structures and thin platforms (Gargiani 239).

The Hyperbuilding with 120,000 proposed inhabitants is configured as skyscraper-city that acts as a ‘piece of urban fabric that has been raised vertically’. “To achieve urban variety and complexity the building is structured as a metaphor of the city: towers constitute streets, horizontal elements are parks, volumes are districts, and diagonals are boulevards”. (Gargiani 241)

The Triple Tower is compositional similar to the Hyperbuilding. The slender forms of the Triple Towers are intersected by horizontal platforms, these bind the towers together but also act as ‘vertical extensions’ of the street and parkland. Both projects investigate the interaction between the vertical and the horizontal.

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**Fig. 132. Triple Towers. Author’s own image.**

**Fig. 133. Above: OMA’s model of the Hyperbuilding. OMA, 1996.**

**Fig. 134. Hyperbuilding as a form. Author’s own image.**
The CCTV Building, by OMA, can be understood as a development of these ideas. Built as the headquarters for Chinese Central Television, in Beijing the CCTV building was designed as “an alternative to the exhausted typology of the skyscraper” (OMA).

The CCTV building is not organised like a traditional vertical tower but as an integrated loop that chains all the elements of the program together. In reference Rem Koolhaas states: “The essence of the building is to take the height out of the high-rise and to redirect the evolution of the tower to its potential for a social interface” (“State of Architecture” 75).

Standing at 234 meters the CCTV Building is still a tall building, but had the building been composed as a single tower it would have had to be almost three times that height to encompass the required floor area (Fig. 137) (Pearson 94).

Visually, according to Koolhaas, the building appears to consist of ‘rectangular or rhomboidal blocks’ arranged in ‘L-shaped pairs’ (“Content” 490). The building is essentially made up of four main components; the two towers, the podium and the overhang (Fig. 135).

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**Fig. 135.** Creation of the CCTV, two towers bent and merged, creating the podium, towers and the overhang. Author’s own image.

**Fig. 136.** Top: CCTV building, Beijing China. Iwan Baan, 2012.

**Fig. 137.** Height comparison as a loop or as a single tower. Author’s own image.
MULTIPLE LOOPS

The visual contrast between the CCTV building and the Triple Towers is distinctive. One is short and stout, the other tall and skinny. Whilst visually opposite, the buildings are still related through their respective compositions.

The four-part composition of the CCTV building is different to the ‘traditional three-part formula’ which breaks the skyscraper into a beginning, middle and end (Hartoonian 105).

In comparison the Triple Towers retain a beginning and endpoint, but the lines are blurred through the connections provided by the elevated podium and the continuation of the street.

The duplication of the lifted podium offers, through its repetition and connection, multiple routes through the skyscrapers (Fig. 138).

Added at fiftieth and seventieth floors respectively, the additional podiums are not direct replications of the initial floating podium but rather smaller versions of the original. The additional floating podiums maintain their community-focused function and create multiple opportunities for interaction (Fig. 139).

The podium of CCTV building retains its traditional placement on the ground plane completing the distinctive loop. However, as discussed previously, the placement of the podium in this position can create a barrier effect (Fig. 140). The Triple Towers develop on this by lifting the podium. This creates an open connection on the ground plane and generates an additional point of connectivity.

Fig. 138. Top right: Single path, single loop, multiple loops and journeys. Author’s own image.

Fig. 139. Above: Multiplication and shrinking of the podium. Author’s own image.

Fig. 140. Affect of the podium at ground level, diverted paths. Author’s own image.
The horizontal planes of the raised podium are the link between the tower forms, breaking the isolation of the singular tower. The connection created by the Triple Towers’ podium provides a space for the building’s community and the public to socialise and participate in recreational activities (Fig. 141).

The podium’s roof is designed as open green space that can be accessed by all. The interior function of the floating podium provides opportunities for public recreational amenities. This link creates the heart of the towers with a central focus on community interaction.

Fig. 141. Left: Access from private towers to public green spaces. Author’s own image.

Fig. 142. Above: Cafe on podium level 22. Author’s own image.
WOHA CONNECTED

A similar conjoining of the tower form through elevated platforms can be seen in the work of Singapore-based architects WOHA.

WOHA’s 2002 housing competition entry for Duxton Plain in Singapore was not realised but it laid the groundings for their future projects (Busenkell 13).

The scheme is comprised of nine fifty storey tower blocks that are connected by at every fifth level by inter-connected platforms (Fig. 143). These connections, described as “skystreets” and “skyparks”, enabling community interaction at higher levels and reduce the impact of the canyon-like chasms between the massive urban blocks (qtd. In Johnson 34).

The “skyparks” are multiplications of the ground level, permitting horizontal movement in a vertical environment. They provide spaces for the residents to exercise, linger, gossip and enjoy the views; exactly as if they were in the parks and squares on the cities ground plane. WOHA states:

“It was not only to do with organisation of space, but more to do with making room for interaction and possibilities, creating an architecture, which allows, or even provokes, social meetings, connections and communication” (qtd. Busenkell 14).

The compositional ideas developed through the Duxton Plains Housing Competition were applied in The Met high-rise building in Bangkok (Fig. 145).

Six, 66-story, free-standing vertical building blocks are connected on every sixth floor by private and communally used terraces. These “sky-gardens” become communal extensions of the residencies private living areas.

The towers are grouped into three staggered pairs. This allows for solar penetration and wind flow, between the buildings, that creates a natural cross-ventilation in the tropical climate (Busenkell 21).

Fig. 143. Duxton Plains Housing form model. Author’s own image.

Fig. 144. Above left: Image of Duxton Plains skystreets and skyparks. WOHA, 2002

Fig. 145. Above right: The Met, WOHA, Bangkok. Tim Griffith, 2009.

Fig. 146. Breakup of the solid form. Author’s own image.
The Met and WOHA’s Duxton Plain proposal have shared similarities with the Triple Towers. The multiplication of the ground plane and creation of “skystreets” and “skyparks” are parallel with the implementation of the elevated podiums in the Triple Towers.

The lifting and multiplication of the podium in the Triple Towers acts as the vertical extension of the Worcester Street axis. The elevated podiums project the axis and the green space of the Frame up into the vertical form of the towers (Fig. 148). Introducing public space into a traditionally private realm. The intention is to create multiple levels of connectivity between the towers, ground plane and the city.

The platforms and podiums that provide the connection are imperative to both the Triple Towers and the WOHA projects. However, due to climate, the Triple Towers have less connective links than the WOHA buildings. Sunlight is vital in providing warmth in Christchurch’s temperate climate. Additional connective podiums would reduce the available sunlight for the residents, casting shadows on the apartments and other podiums (Fig. 149).

From left to right.

Fig. 147. Lift of green space and parkland into the forms of WOHA’s The Met. Author’s own image.

Fig. 148. Lift of green space and parkland into the forms of the Triple Towers. Author’s own image.

Fig. 149. Effect of shadows created by elevated podiums and skystreets. Author’s own image.
An alternative to numerous podiums providing communal space is the insertion of open floors in each tower. Located at regular intervals across the towers, the open floors provide a green refuge where tower residents can interact.

Providing small but usable areas where people can have small social events, from BBQs to family gatherings. The open intervals break down the isolation of the ‘typical tower’ even more. Whilst the platforms create connections between the three towers the open floors provide connections within the individual tower (Fig. 151).

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**Fig. 150.** Above: Occupied ‘green-slice’ Author’s own image.

**Fig. 151.** Left: Four locations of interaction with only podiums, multiple opportunities for interaction with open green ‘slices’. Author’s own image.

**Fig. 152.** Overpage: View to central city and Triple Towers from Hagley Park. Author’s own image.
THE STRUCTURE

The structural development for the Triple Towers played an important role in defining the building’s form and height. Whilst the forms of the towers were developed through physical modelling, structure had to be applied to create a feasible project. This structure had to work with the established forms without compromising the slenderness and the vertical extension of the axis.

The small footprints of the towers required a construction that would not compromise the limited floor area. A structural central core was deemed unfeasible due to the required size; therefore an exterior structural solution was sought. A diagrid structure became the ideal solution.

The steel diagrid is an exterior-based braced frame structure that unlike a conventional, braced frame can carry both gravity and lateral loading, eliminating the requirement for vertical structural members (Connor, Fernandez and Moon 206). The diagrid is characterised by a grid of diagonal elements which are made up of triangular modules. The exterior-based diagrid structure eliminates the requirement for interior structural columns.

The diagrid of the Triple Towers is expressed through the glass clad envelope which follows the diagonal lines of the structural grid. Each tower incorporates four essential components; the circulation cores, the concrete floor diaphragms, the steel diagrid, and the coloured glass envelope (Fig. 153).

Fig. 153. Axometric explosion of main components. Author’s own image.
The size of the steel diagrid’s structural members is established by taking the height of the building and the dimensions of the triangular diagrid module into account. In turn, the dimension of the diagrid structure had an influence on the form of the Triple Towers. A series of sketch experiments explored how various diagrid modules would influence the footprint, ‘kink’ and height of the towers (Fig. 155).

The podiums that connect the Triple Towers do more than just provide a location for social interaction. Due to their narrow footprint, the three slender towers cannot stand as individual entities. The podiums hold the towers together and thus provide essential structural support whilst reinforcing visual connectivity: three buildings that work together as one (Fig. 154).

The floating podiums follow the lines of the Warren trusses that bind the three towers together. Connected at 20th, 50th and 70th floors respectively, the structural steel trusses span the heights of the entire podium.

Fig. 154. Towers without connection and towers with. Author’s own image.

Fig. 155. This page and over: Diagrams of diagrid experiments and their effect on forms and structure sizes. Author’s own images.
WHERE TO FROM HERE?

Whilst the Triple Towers achieve the introduction of high density housing to central Christchurch, open-up the East Frame, and create a vertical extension of the axis, other matters would require improvement and further development.

Some issues were left unexplored or under-developed because of the sheer scale of the project. The inhabitation of the open green spaces would only be possible with the inclusion of windbreaks and weather protection. The sliced openings, throughout the towers, could be redesigned to serve as enclosed winter gardens which would greatly enhance their function while their purpose of creating small interactive spaces would remain the same.

The height of the Triple Towers was explored and questioned in the development of the project. The problem arose whether its tallness would be disadvantageous.

The Triple Towers proposal creates a building that soars over central Christchurch and provides a monumental landmark for the city. Its design features commend transformation and diversity. However, whilst the towers are plausible the project would probably not be financially viable due to the combination of the building’s height and restricted small footprint. With a maximum of two apartments per floor, the total cost to build such a tower would exceed its market value.

Realising this impediment, a series of formative mass experiments were undertaken in search of developing the Triple Towers, in case the design investigations would be taken further (Fig. 157).

The experimentations removed the third tower and reduced the height of the towers in a series of increments whilst simultaneously increasing the length (Fig. 156). A positive spin-off would be that the total inhabitable floor area would be increased. However, increasing the length of the building creates a ‘wall’ effect, making the Green Frame less open and accessible. This issue could be resolved, as with the Triple Towers, through the insertion of openings which would very likely become the communal spaces of the building. In this extended experimentation a main characteristic, the elevation of the building as the vertical extension and end point of the Worcester Street axis as well as the feature of the binding podium would be retained. This way, the redeveloped Triple Towers would not lose the majority of the attributes that have been discussed in this thesis.

Fig. 156. Right: Possible future development of Triple Towers. Lowered and stretched. Author’s own image.

Fig. 157. Overpage: Mass experiments exploring possible future development options. Author’s own image.
IN CONCLUSION

Christchurch faced much destruction and tragedy from the devastating events of February 2011 and will take decades to fully recover. Despite this the city also faces a great number of opportunities to recreate a city that becomes a diverse and vibrant place to live.

The Blueprint plan is a start in the right direction; discussing the revitalisation of the city’s long quite CBD and creating a point of ‘vibrant density’ in a sprawling, low-rise city. It does not however directly address Christchurch’s issue with suburban expansion.

The earthquake resulted in the loss of thousands of residential homes, a large number belonging to those who could least afford it. Christchurch’s answer to this is the continuing push into the outer margins of the city.

The city continues to sprawl; more and more land on the outskirts of the city is being developed into vast new subdivisions. The only option for those who lost their homes is to move further out into the outskirts of Christchurch. Affordable housing is being proposed by both the local and national governments but this too is in the outskirts of the city, often in the vicinity of the industrial parks and motorways (“Plans Unveiled”).

The Blueprint for the inner city would require a diverse range of permanent residents to make the plan successful; unfortunately the current proposals make no allowances for this. The suggested housing complex in the Green Frame delivers residential density (in contrast to the suburbs) but compromises a key feature of rebuild – the open and accessible Green Frame.

Fig. 158. Triple Towers within the green Eastern Frame. Author’s own image.
The Triple Towers are a response to these issues, seeking to deliver an alternative to the blandness of the suburban sprawl by providing high density inner city housing that also offers opportunities like diversification and original and inventive features for the city.

The development of the Triple Towers through the design-led research resulted in the creation of multiple options that were critiqued and developed further. This approach allowed for the exploration of variable alternatives to the current selections, with varying degrees of suitability.

The Triple Towers final design proposal, its slender shape, narrow footprint, cladding, and the way the towers are arranged on the available section tries to ensure the accessibility of the publicly available green space in the proposed eastern frame of the city. The positioning of the project on the axis of Worcester Street is intending to bring the tower and its occupants to the forefront of the city.

One of the major drivers in the development of the Triple Towers was the idea of connectivity both between residents and building and also the city; connecting private vertical and public horizontal space. A visual and spatial connection between the axis and the tower was created through the towers’ placement at the apex of the Worcester Street alignment and through the ‘kink’ design feature. Further links between private and public are created by the raised podiums, acting as communal places for both inhabitants and people from the outside as well as the open walk and cycleway underneath the towers. The tinted glass casing with its diamond shaped panes delivers a colourful, transparent and creative feature with special light effects at night, engaging people.

The composition of an informal building in the formal square grid of central Christchurch is intentional, celebrating diversity, variety and difference in its configuration, providing Christchurch with a monumental, ever-changing landmark.

Although the Triple Towers project could benefit from more refinement and detailing and the topics of cost viability as well as stigma and social issues concerning high rise residential towers cannot claimed to be resolved; the envisioned project is intended to consider a plausible and vibrant alternative to unappealing suburban residential housing and the block housing proposed in the Christchurch Blueprint.
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