LIFTING THE GAME.
ACKNOWLEDGEMENTS

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How can the experience of movement drive the design of a vertical sports facility?
Sport has brought unforgettable experiences and excitement to people’s lives, but with the expansion of our cities, land is becoming scarce and the demand for more indoor facilities is growing. A vertical complex could influence the approach of future planning of New Zealand’s’ sports architectural identity, with the designs adaptability to the dense urban environment, designing vertically. This project aims to investigate how the vertically of the project could implement body and space through visually capture motion in an architectural phenomenon. It tries to investigate how the selected sports volumes and spaces can engage the body and space. They are both visually exciting and will be experienced in different and specific ways. The physical movement of the human body could apply to an architecture concept of circulation and/or forms. The research explores how the sport architecture program could drive the experience of the sensory design, through the materials and the complexity of architectural elements. This promotes the occupant’s visual engagement through the building creating an interesting and curious journey. The intricate design process seeks to incorporate these theories in the vertical sporting complex that is one program based on alive architecture, as an expression of motion.
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Introduction.
An increasingly diverse New Zealand population requires new and modern sporting facilities to cater for the growing demand for a healthy lifestyle. Due to the increase in population a lot of land is being used for residential developments, cities are extending beyond their regions elastic limit. Furthermore, with the changing makeup of New Zealand’s CBD urban fabric, including more high density accommodation more forward planning is required to include new recreational centres and sports architecture to cater for this increase.

The physical nature of sport architecture has specific requirements and equipment depicting the sizing of the fields, courts, pools, ice rinks and other sports areas. The design implication of working with an active program and multiple different sports means for more understanding of the volumes of space and the circulations to and from these facilities. With that in mind, the research projects design must fit comfortably into its urban environment. Improving the existing urban fabric, with the induction of the facility, to support the public and the programs surrounding the site.

Background.
Each sport provides their own set of challenges that the design will need to cater for. Specifically, height, length, and the volume of spaces and spans depict the materials for aesthetics, lighting and structure. The design will consist of a mixture of typical high-rise construction with long span structures. The structural element and tectonics, have the ability to expose the occupants to the systems of the architectural body creating a further understanding of the designs mechanics. In relation to the Kinaesthesis, meaning the awareness of movement in the body’s sensory organs, muscles and joints.

The typology of the design proposed has a large influence in the process of analysis. The sports volume vertical format creates certain problems and complexities that can be addressed through design development. The architectural influence is highlighted in the research theories related to the sensory architecture, movement in design and circulation and body space. Described in more detail in Chapter 3. The complexity of design will focus on the detail of the vertical circulation in the ambition to enhance the experience of the journey throughout the design.

PROJECT OUTLINE
**RESEARCH QUESTION**

How can the experience of movement drive the design of a vertical sports facility?

**AIM**

Design a vertical recreational facility that focuses on sensory, and the visual experience of body and space, within an urban environment.

**OBJECTIVES**

- Explore how a building can create a journey through the design circulation.
- Analyse the human body's movements of selected sports.
- Explore different forms that could provide tactonics to enhance sensory and visual movement.
- Question how movement in the design process can influence this journey.
- Select sports according to site context and New Zealand Statistics.
- Investigate the selected sports and concentrate on each sport's different needs from changing rooms, warm-up spaces, equipment, lighting, materials, seating to the specific, layout of the sport, and its volume.
- Research and understand the different sports specific volumes, then analyse the vertical stacking of the sports volumes.

**SCOPE & LIMITATIONS**

In staying in relation with the context of the selected site, the design should stay in high relation to its surrounding buildings. Thus not to tower over the existing programs, determining a set height for the design. The layout of design will not be designed to cater for professional athletes but the general public, as a recreational centre. The program will have an influence on the spaces in levels for example, restrooms, storage, plant room and staff spaces. The size notation will determine specific treatments in the facade according to the sun paths and surrounding buildings. The use of the site limited the sports selected, due to sports specific dimensions and volume.

**SITE SELECTION REQUIREMENTS**

An urban environment with existing high-density residential, mixed-use, retail and offices in the surrounding streets. Street circulation of urban movement that takes into account public transport, private transport, and foot traffic. Close to large or common public transport links for easy access to the site especially in the event of multiple sports events happening at the same time. The site could have connections with green space parks that could be used as seating for spectating exposed sports.

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**METHODOLOGY**

In the understanding of case studies, specific photos and hand drawings were used to analyse and annotate, focal elements and techniques that could be applied to the design. The process consists of modelling parts of the designs to understand the volumes of the spaces that the architects have created. To understand the program, and selected sports specific dimension and volumes. Modelling both physical models and in 3D software. Capturing the volumes can help to understand how the sports could be arranged spatially, horizontally and then vertically. Thus, circulation can later be applied around, through, over and under these volumes. At this point, the technique pattern forms taken from the case studies could be transformed and adaptable and implemented into the sports volumes concept. The sites selected through the requirements list in chapter 1.6 Site Selection Requirements. The site analysis gives a description as to what is essential to the proposed complex. The circulation of the site context/urban movement is explained through the figure-ground and physical model, analysing circulation paths in the approach of the site, and underlining potential entrance points.

Fig. 1. Initial thinking and process diagram.
Key Terms.

Key terms, in their definitions and their relatability to the project.

Kinesthesia: ‘Awareness of the position and movement of the parts of the body by means of sensory organs in the muscles and joints.’ In the understanding of the bodies movement, the motion of the individual can be captured and analyzed.

Kinesthetics: ‘Tactile learning is a learning style in which learning takes place by the students carrying out physical activities, rather than listening to a lecture or watching demonstrations.’ The understanding visually to connect with movement in space.

Proprioception: ‘Proprioception, from Latin proprius, meaning “one’s own”, “individual”, and capio, capere, to take up or grasp, is the sense of the relative position of one’s own parts of the body and strength of effort being employed in movement. It is sometimes described as the “sixth sense”.’ Not to be confused with Kinesthesia, it’s the understanding of the users own movements.

Journey: ‘An act of travelling from one place to another.’ The act of traveling through the building creating a narrative of experiences.

Body: ‘The physical structure, including the bones, flesh, and organs, of humans.’ Connecting this element of body to the building, for example relating the body to structural element.

Perception: ‘The ability to see, hear, or become aware of something through the senses and awareness of something through the senses.’ Perception is the understanding that the individual with experience the space differently.

Sensory: ‘Relating to sensation or the physical senses; transmitted or perceived by the senses.’ Sensory is a related topic to experience in connecting to space for the project.

Sport: ‘An activity involving physical exertion and skill in which an individual or team competes against another or others for entertainment.’ Sport is the program of this project.

Experience: ‘practical contact with and observation of facts or events.’ The experience of the journey within the design and approach.
RESEARCH / SPORT FACILITY PLANNING
At this current time, Sport New Zealand has put in place a movement for the improvement of our indoor sporting facilities. They have identified that there are problems, and a need for improvements to existing indoor facilities or the creation of new recreation centres. Sport New Zealand state that new designs need to take more account of their context and be designed for multi-use, as space is becoming more limited. Future-proofing starts at the planning of the facility, being sustainable and functional. ‘1 To be purposeful. There are 94 indoor sports facilities across the country providing 216 courts between them. The national average equates to one court per 21,000 people. Every day needs can be met and replaced in redeveloping old facilities and introducing this vertical gym model: the vertical stacking of sports. The need for the everyday facility, that’s accessible to the growth of the city has never been more in need. Especially to New Zealanders that have a very high participation and excitement for sport. “Sport and recreation are hugely important in the lives of all Aucklanders,” as a sport provides health, education, and social benefits. “A shortfall in facilities equals a shortfall in the quality of life for Aucklanders.”

Peter Culley and John Pascoe’s, Sports Facilities and Technologies with Allen Konya, Sports Buildings, brings together the basic planning tools such as facilities, from a functional space that sport can be played in, to circulation, service, structural systems, and sizes of areas, covering the planning of arena spaces to optimal structural members. Thus, the relatability and connection of the sports volumes to the structural element so that they do not negate its structural integrity or the specification of the program. The operation of the mechanics of the building and the maintenance of such facilities also need to be addressed but are less critical to this research and design. The mechanical tectonics, however, is of greater importance in the interests of aesthetics and experiences that could enhance the occupants’ movement through the spaces.

In the minimum planning criteria related to the planning of a new sports facility:

• Comparative accessibility of public and private transport to site.
• Car park potential.
• Ground conditions.
• Any problems with utility services supply.
• Permission; capital costs and funding option.

For required equipment can be storage and extra storage. The ancillary consideration:

• Office space/ Administration
• Changing rooms.
• Specialist equipment/ storage space
• Showers/ toilets/ restroom
• First aid room
• Plant rooms
• Closed spaces.

Consider different types of users at peak periods, in different spaces, open-plan, enclosed or the combination of the both. The flexibilities within the space will enhance the complex’s engagement with the program and exercise. Special requirements are needed for team sports levels compared to individual sport programmed levels in a system of interchangeable changing rooms. In addition there are general considerations in the layout and needs of spaces with the circulation for different accessible standards for disabled occupants, mothers with prams, car parking and passage with the correct spacing and dimension of ramps and gradient for the safety of the user. The energy conservation of the building, in solar energy and heat reclaiming, control of infiltrations, insulation of spaces and the use of district heating systems. Circulation of the security setup and accessibility to spaces, the communications and electronic equipment and flexibility in spaces and accessibility to storage and climatic areas requires integrated planning.

SPORT FACILITY STANDARDS.

A. Konya, Sport Buildings, 55.
Ibid, 57.
Ibid, 59-60.
The Millennium is an explanation of the existing model in New Zealand. The Sport Institutes has a range of different sports and recreational facilities doubling as a research and educational campus. AUT uses the campus as a resource to connect their AUT Sport Performance Research Institute students who can work high-performance athletes and resources like SPRINZ, that have clinics, physical conditioning, performance analysis, biomechanics, and injury prevention.

These rooms are a health program addition to the sports program that can be included in this project. The AUT facility is spread out over the entire site. The typology of the landscape and large site, with its suburban and industrial context, the architects have been able to use a typical sports facility layout spreading across more land that programs needs. The use of multi-level for the education and health side are common in New Zealand base complexes. The layout of the sports is spread-out along the ground floor. Car parks placed all around the unused space not used for program purposes.

The design is well developed, and fit to the purpose to the different sports specifications but yet lacks the vertical element of this project and future insight that this project is focusing on implementing.
The Vertical Gym was built in the rundown dense urban fabric of Caracas barrios, with most of the land surrounding the site being claimed by dense housing leaving little to no space for a community facility. The Gymnasium was completed in 2004 at a low-cost prefabricated kit part that was assembled in three months and then fitted to the programmatic need of the facility. It was a flexible modular design that had to be adaptable in the needs of the diverse client. The multi-levelled recreational complex has three internal levels and a fourth roof field. The complex is separated between the prefabricated structure and the consumption of its client. The floors layered by a multi-court on the ground floor catering for basketball/ badminton/ netball in this space. The first floor consists of equipment based exercise and squash courts, the second floor has a mini athletics track, and the roof level has a football/ futsal field on top, with football being such an inspirational game in the poverty-stricken country. All circulation expressed in figure 8 in white. Ramps and stairs are used to access all the levels.

This design has a strong connection to the research program and layout of the stacking of the sports but lacks in the approach to how the design could have exposed different elements to the public. The purpose of the design circulation is that of the act of accessing the internal spaces and transport occupants vertically, with no intention to create social interaction and sense of movement separate to the movement of the players.


Architect/ Company: Alfredo Brillembourg & Hubert Klumpner
Location: Caracas, Venezuela

Fig 9. Sketch of the structural elements, highlighting peoples movement in the levels.
power and strength than they hold visually: they merely stitch the two blocks together.

The larger of the two masses houses competition spaces within four different floors, all slightly different for one another. The multiple sports were laid out as follows; on the ground floor, there is a swimming pool, services changing rooms, medical rooms, gym and fitness training. The other floors consist of different courts and fitness levels. The vertical circulation lifts up through the floors as a spiral staircase that acts as a service tower also. Bardi expresses many interior elements, in the tectonics and random vibrant spots of colours to dramatically surprise the occupants. Thus, creating movement through the different masses and experiences within these brutalised concrete boxes.

The literature covers three relatable topics that look to inspire the design of the research project and inform the reader of the process leading to the developing design.
In order to understand human experience, the human mind and senses need to be defined. The mind is the tools or organs that enables us to be aware of experiences that our bodies sense, for example, emotions related to touch, vision or hearing; weather, art, or seeing different environments, and buildings. Thus, in creating different experiences, through a journey, the architecture becomes more complex, interesting and exciting to the inhabitants - this being the phenomenon. So, does one create an architectural space that influences the mental perception of motion?2

Steven Pinker’s book, How the Mind Works, explains that as far as biology is concerned, sense do not care on the environment.3 Compared to Donald Berlynes’ terminology, that in the design of this project, Architect, John Parkes explains another biology study that explores how an aesthetic model is a perception of the mind. In fact, the dynamic of delight, as Peter Smith, The Dynamic of Delight: Architecture and Aesthetics, explains, as the space, or have feeling towards the design or space, and scale are measured equally by the eye, ear, nose, tongue, skin and muscle.4 However, architecture is a sensory experience, enjoyed through multiple senses. Sight and hearing being more conclusive to the mental processes in a sensory response, and more than touch, even though touch is considered as a fundamental sense.5 The sense of touch and skin is relatable to the experience of materiality and tongue and nose to taste and smell of food, but skin is relatable to the experience of materiality and tongue and nose to taste and smell of food.

In that, the mind can find new things interesting, as the mind develops and changes, such as, in a complex sports program that is an, ever-changing matrix of space.

So, is aesthetics alone enough to produce a memorable experience, in the design of this project? Architect, John Parkes explains another biology study that in the design of this project, Architect, John Parkes explains another biology study that explains how an aesthetic model is a perception of the mind. In fact, the dynamic of delight, as Peter Smith, The Dynamic of Delight: Architecture and Aesthetics, explains, as the space, or have feeling towards the design or space, and scale are measured equally by the eye, ear, nose, tongue, skin and muscle.4 However, architecture is a sensory experience, enjoyed through multiple senses. Sight and hearing being more conclusive to the mental processes in a sensory response, and more than touch, even though touch is considered as a fundamental sense.5 The sense of touch and skin is relatable to the experience of materiality and tongue and nose to taste and smell of food, but skin is relatable to the experience of materiality and tongue and nose to taste and smell of food. Thus, in creating different experiences, through a journey, the architecture becomes more complex, interesting and exciting to the inhabitants - this being the phenomenon. So, does one create an architectural space that influences the mental perception of motion?2

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Erich Mendelson suggests that ‘architecture is only the spatial expression for the game of forces that annul the effects of one another.’ For in-space preconceptions of the mind predetermine our process through space. So, what is the force that affects the body to move? In that, the spatial or form is the phenomenon, thus being the product of itself as the senses process motion in the ambiguous term of dynamics that is simulating the experience. How then, does the architecture make a connection with the idea of movement, when the body experiences the phenomenon itself without the influence of the architecture. This uncontrollable impulse originates in the mind and the eye. The optics of perception of images framed picture and motion picture delivers visually principals that can be relatable to architecture space and aesthetics. Alfred L. Yarbus’s explained in the Eye Movements and Vision, that talks about the importance of the curious nature of humans and the human perception much like Pallasmaa. Yarbus speaks of how the eye is always fixated on points and views. Points of fixation translates into architecture as most significant or curious parts from joins, lighting, structural members, pattern walls, to materiality. These fixation points if understood correctly could create a perception of movement the design, such as the Maxxi museum by Zaha Hadid that influences the visitors to flow through the building (refer to 4 Design references). Le Corbusier also discusses a direct relationship between the eye and body establishing a link between the bodies sensations with his visual perception on the walk through of urban spaces. In this sense of moving in space that is actually having an influence in your motion. Walking the path layout, because the body is respective to the narrative of the architectural influence of movement. The complexity of the design is a measurement of the mind’s perception associated with architectural space and is defined as ‘entropic.’ Achieving an unrelieved complexity, that will deliver a shock to the occupant, in the prevailing order of things, such as the experiencing the unorthodox on the journey. Transferring ourselves to a terminal point of the experience been investigated in the application of movement.
Could the notion of ‘Eppur si muove,’ – and yet it moves - be the origin of human fascination with Movement? The theory of movement, through circulation paths and space that could enhance the design decisions within an identified space or program. The motion of circulation with the understanding of spatial experience transforms the standard program circulation into a journey exposing the user to the kinaesthetic empathy of sport.

Circulation is more than the paths that transport people up and down stairs, ramps, lifts, and through spaces. The text ‘Designing Circulation Areas: Staged paths and innovative floorplan concepts’ (Designing Circulation Areas: Staged paths and innovative floorplan concepts), analyses planning principles of circulation that Christian Schitich explains through existing models. Rem Koolhaas’ design of Netherlands Embassy in Berlin cuts through the red tape, creating pathway systems, mixing between stairs, ramps and corridors change in widths and routes, zigzagging through the levels of the design, constantly changing the spaces from narrow to wide openings leaving occupants exposed to views. This formulates connections to the city and urban movement and switches between exposure to the city and program. Koolhaas believes in doing this, Koolhaas brings the public circulations of the streets inside his design, straying away from the customary diplomatic convention of embassy design.13

In fact, the associated rules, regulations and standards have little influence on the circulations ability to be an influential component to design, and the project. Similarly in the introduction to the Flying Dutchmen, Motion in Architecture by Aari Jormakka, Jormakka quotes Père Prosper Enfantin declaring (in 1832) that architecture as a ‘theory of construction is an incomplete art: the notion of mobility, of movement, is lacking in it.’ This is still evident as the experience of motion is represented as immobile. People travel through space and time in a sequence,14 of phenomenon that lead to entropy, ‘a gradual decline into disorder,’ such as the chaos theory. The story of the strange attractor talks about the flying movement through a loop in space that explores Chaos.

Edward N Lorenz explains, ‘whichever direction you have come from you still have a choice, based on the theories of kinaesthetic. Moreover, points that start close together get stretched apart as they circulate around the attractor, so they lose contact, and can follow independent trajectories. This makes the sequence of lefts and rights unpredictable in the long term. This combination of factors stretching points apart and re-injecting them back into small regions is typical of all strange attractor.’15


15 Steven Holl, Parallax (Basel: Birkhäuser, 2001), 272.
Space is a body, a volume, and an area that has been enclosed. Space is studied to understand the fundamentals of being an inhabitant, to have experiences, to fixate on elements, and to follow the natural curiosities of humans. In this book, Spaces of Engagement, Architect, Himanshu Burte explains the experience matrix of the body, metal and social nodes that interact with the environment to implicit expectations of the atmosphere. Burte states that the human body, processes, capacities and limits the significant nature that influences the subject matter. That’s concerning the peoples’ engagement in the space. The design can drive people to connect and visualise the presence of another. The interpretation is that the architecture is ignoring the body in the process of inhabitation, but focusing on the mental experience of the space. This disregard of the body stated goes unnoticed in the modern environment, as the architects neglect to respond to the body into their design methodology. This will not be the case in this research project as the foundering theory that drive the design’s connection to the bodies movement, and experience of the mind, linking together to generate a new experience.

16 Sport, requires specific actions of the body and muscles of the athletes, that has translated possibilities in space to connect with the human significance, important in the meaning of the reality that draws people in. Philippa Karsten Harries argues, ‘Architecture helps to replace meaningless reality with a theatrically, or rather architecturally, transformed reality, which draws us in, and we surrender to it, grants us an illusion of meaning.’16 Thus, drawing people into the flux of the movement, bodily and space. The factors formulate the design, significance in the individual’s experiences through the journey. Understanding empathetic Kinaesthesia, such as the ability to experience, observe and hear the movements of another’s body and one’s own. Walking ‘requires muscles, balance and rhythm of movement which all senses are engaged with’17 the human body influences the projects design in relation to different motions nature and social. The body’s limitations could translate to how the architectural design has limitations. Charles Moser, author of Body, Memory, and Architecture describes the most essential and memorable senses in three-dimensional originates, in the body’s ability, the body’s experience and bodily understanding the spatial feeling within the architectural space. Memo in Architecture and Landscapes/Backstage, Quest Books (2005), 24.

17 Michael Schumacher, Oliver Schaeffer, and Michael-Marcus Vogt, in their book Move, Architecture in Motion: Dynamic Components and Elements, explains the understanding of the constitution, mechanical and tectonic movement. The tectonics movements the text highlights on are, ‘a swivel, rotate, volumetric.’18 Similar to Charles statement, Francis Chang explains how the body/muscles hold us together, in some way tectonics hold structural elements. Moser suggests that, whether it is conscious or not of the processes, our bodies and our movements are in constant dialogue with our building.19 The expression of motion in the immobility of design looks to concern its processes with movable parts in terms of the composition of the form. The elements have their own function and structural content as well as aesthetic logic. It’s an examination of the movements in the context of aesthetic aspects that contribute to the overall envelope and haptic of experiences.20 The notion of planes and walls, have different axes and shape convey the visual illusion of them being dynamic to the point that the elements are eluding to the motion in space, in the illusion that the plane is floating and hiding. Michael Schumacher, Oliver Schaeffer Michael-Marcus Vogt, in their book Move, Architecture in Motion: Dynamic Components and Elements, explains the understanding of the constitution, mechanical and tectonic movement. The tectonics movements the text highlights on are, ‘a swivel, rotate, volumetric.’18 Similar to Charles statement, Francis Chang explains how the body/muscles hold us together, in some way tectonics hold structural elements. Moser suggests that, whether it is conscious or not of the processes, our bodies and our movements are in constant dialogue with our building.19 The expression of motion in the immobility of design looks to concern its processes with movable parts in terms of the composition of the form. The elements have their own function and structural content as well as aesthetic logic. It’s an examination of the movements in the context of aesthetic aspects that contribute to the overall envelope and haptic of experiences.20 The notion of planes and walls, have different axes and shape convey the visual illusion of them being dynamic to the point that the elements are eluding to the motion in space, in the illusion that the plane is floating and hiding.

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17 Marc Treib, Spatial Recall: Memory in Architecture and Landscape (Routledge, ProQuest Ebook Central, 2009), 24-25.

The spirit builds the body in its own image. The history of architecture is the history of the sense of space.

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flap, slide, fold, expand and contract, gather and roll-up and pneumatic. The text contextualizes the solid tectonic giving the element specific movements the form is able to move in. These connect the architectural element of movable tectonic to the body movements in how the body can rotate, bend, roll-up. The use of these basic tectonic movements could be an element that investigates further in the design process.

The Architects on the Liquid project explain that if the actual architectural space understands the narrative, one could engage with the movement, visually and physically. That has become more accessible in the sense that the visual side of the project could become more or less of a concept with the use of new technologies, computer-aided systems and the abilities to manipulate materials. Space becomes a prosthetic extension of the human body.

Whereas Spuybroek argues that the body’s motion is a mixture of force, direction and actions which are no longer a preface of an enabled object. The perceptions of the style of liquid architecture influenced only by water, being this free-flowing, embodied element held together only by its chemical make-up, Architect Spuybroek developed the idea of the Freshwater Pavilion completed in 1997 that emulates the style in the creation of a skin like sculptural element that encloses a flexible and dynamic space. That flows much like water in motion much how the motion of sports will be investigated to inspire the story of the movement in the design process.

The body is an act of our notions that are controlled motions and that Kari says the embodied movement of the body is not itself a spatial movement but an “indirectly co-localized in that movement.” As Husserl goes on to argue, the body does not entirely conform to the form of the space in the feelings that coincide in the axis of the body. The space does not direct itself but the phenomenal was explained in that his body is wherever there is something to be done, a task or situation the body leads in the direction which is layered in the quality of the mind, leading the movement through the spatial phenomenon.

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Fig. 26. Completed Freshwater Pavilion approach & interior image, express the dark atmosphere and organic form construction of the approach.

"The Freshwater Pavilion sheet physical presence is enough to activate the software, walking back and forth triggers sensors and projections on one’s body."

Spuybroek, Move, 54.

24  Ibid, 74.
26  Ibid, 2.
27  Jormakka, Flying Dutchman, 77-78.

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Spuybroek, Move, 54.
In analysing these architectural designs of the individual buildings, the content of which the project is founded on can be highlighted to adopt similar methods of processes. The approaches to techniques are specific to the underlying style of Kinaesthetics of body and space, the journey and experience. Translating these individual styles in a common theme of design to demonstrate the path in the process of design will take in portraying movement.
The promenade captures the key element of the beach with the recreation of the famous boardwalk filled with the public movement by foot, bicycle and automobile. This famous walk area has been folded and transformed into the vertical circulation. The folding has created some vertical boulevard that then drives the design and connection to the landscape. Having a solid dialogue for the rest of the design to follow. Through the framing strategies, the skin of the MIS captures the view for the visitor moving through the gallery sequence. The vertical circulation designed to interface the street with the building’s entertainment programs. The building is also conceived as an instrument to observe the city in a new way. This dialogue from the public to the occupant expresses a type of movement, could be applied to the project in the exposure of circulation to bypassers.

Fig. 32. Remodeled model of the Competition design, highlighting the different ramps, ramped floors, stairs, for vertical circulation.

Fig. 31. OMA/Rem Koolhaas single line circulation sketch.

Fig. 33. Sketch of the horizontal planes been manipulated.

Fig. 34. OMA, Jussieu Library, section drawing, highlight path.

Lifting the Game // Jussieu - Two Libraries

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Design Reference // Jussieu - Two Libraries

Architect/ Company: OMA
Location: Paris, France
Date of Competition: 1992

OMA’s under Rem Koolhaas, the competition design of Jussieu Bibliothèques uses a series of connected floor plates to link a continuous vertical circulation path. Spatially, within its volumes and pathways creates a vertical journey, from the ground to the roof. The uninterrupted path encourages users to explore the space and its verticality. This representation between the ‘virtual force creating a movement’ within the journey is a key foundation of the design of this project. Koolhaas describes the design as the ‘contour’, or ‘silhouette’ in reference to the path movement follows. The simple warping of lines (figure 33) describes the character of the sweeping movement of the vertical journey.9

This application is a crucial component of how the project could experiment with the visual motion and movement that ‘Not an object-container, but rather a campus for art’, that connects the overlapping pathways to the dynamic space that is interactive in parts. ‘A new fluid kind of spatiality of multiple perspective points’ and Hadid suspended black fragmented geometry, embodied in the chaotic fluidity of the museum design. Hadid uses the natural light to reflect the light grey concrete to achieve lighter space along the circulation and movement but future to light that experiences. The thin concrete beams filter the light in but not enough to affect the works on display, much like how this project looks to manipulate light so that the natural light does not affect the athletes’ ability to play and compete in the sport.

Architect/ Company: Zaha Hadid
Location: Rome, Italy
Date of Completion: 2010

Zaha’s Maxxi Museum in Rome is a mixture of the dynamic forms creating fluidity circulation paths with linear elements on the L shaped site, with three main concepts with the linear circulation paths, lightings and surfaces, that run throughout the building. Each surface emphasises the spatial qualities, with directional changes in the approach being open to funneling the occupants through the journey. Enclosing the visitors, in dark and light places, manipulate materials, colour and reflection levels. Zaha uses similar patterns and dynamic stairways, with navigating light shafts connecting the people to the wall and art gallery to the art, driving their eye to direct occupants through the journey that could be applied to the design of the project. In figures 38 and 37 the show how Zaha uses the stairways as the first element then the transparent linear ceiling light and the third layer being the wall curving and funneling the defining zones and places of views or moments. This journey creating another point of visual interaction in different depths in three layers and elements. The material use and different shading in the materials also adds to the depth of to visual engagement and movement of the journey.

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Architect/Company: Alvaro Siza
Location: Brazil
Date of Completion: 1995

The building for the Iberê Camargo Foundation in Porto Alegre, Brazil was designed by Portugal’s Alvaro Siza, as an exhibition space. With a large central void enclosed by circulation paths linking to the main rectangle exhibition spaces. With some of those circulations paths separated as enclosed arms holding on the body of the building (figure 40).

The connection of the floors is linked together by curvilinear ramps in the interior and rectilinear in the arms both ascending or descending inhabitants travel through the ramps. Visually the circulation is lies to the occupants and people from the exterior with six different ramps with only the ability to see three at one time. Thus, the spatial reality of the building integrates this visual continuous of three flights inside and outside.


Ibid.
Kunsthal Museum

Architect/Compan: Rem Koolhaas
citation: Rotterdam, Netherlands
Date Complete: 1992

The Kunsthal is a compilation of several galleries and halls that allow for maximum flexibility, to accommodate for a multitude of exhibitions and activities that can co-exist in these spaces. "How the spaces of the auditorium meet the pedestrian ramp. The structure adds to the enrichment of the spatial dynamism. This passageway displays how the design of this project will investigate connecting the museum’s park to the north extending out to the surrounding city. The wide pedestrian ramp slopes downward from the motorway to the park, separating the volumetric spaces into two sides. The volumetric design strategy has a compositional effect within a series of spaces. The system through the spatial orientation the dynamic qualities provide new spatial conditions for programmatic placement, visual connections, and entry.

The Dancing House in Prague was initially a neo-renaissance style of architecture before being hit by a bomb and destroyed in 1945. Some years later, Architect, Frank Gehry, took up the project to redesign the Dancing House, redesigning it in a deconstructivist style, applying a whimsical image of "Ginger Rogers and Fred Astaire," former iconic dance partners for the early 1940's. Frank Gehry, reflects Ginger and Fred dancing (expressed in figure 49) in the promise of capturing their movement. Thus, enhancing the form of the design to a meaningful design that visually expresses a story of movement, enjoyment and excitement. The understanding of the form and story is at the individual’s visual interpretation.

Architects: Vlado Milunic & Frank Gehry
Location: Prague, Czech Republic
Completion Date: 1996

Fig. 47. Image of the Dancing House
Fig. 48. Sketch understanding Frank Gehry’s technique when handling a corner site and its’ approach.

Fig. 49. Frank Gehry’s initial form sketch, overlayed on Fred & Ginger.

References:
The design of the ‘Bird’s Nest’ has now become a symbol of important cultural monuments, that started as Expressive Rationalism. The creation of space for public and social life in and around the nest, the façade creates different enclosed and voided spaces. Where visitors can pass through and up and around circulation acting as the buff from the action that the nest contains within. The birds nest façade expresses a certain type of movement even without being used for that purpose. The freedom in a design of a Birds Nest is in the sense that it is random but strong and holds itself together acting as its own self-supporting cross bracing structure. And at ground level displayed in figure 52 it shows how the design of the project can applied to the North and South building designs linked together with analysis of motion, creating enclosed cross overs and more exposed action.

Architect: Jacques Herzog & Pierre De Meuron
Location: Beijing, China
Completion Date: 2007

In summary, space and motion is the foundation of this research project. Design references influence the design process in the techniques used by the architects that are relatable to the proposed theory outcomes.

This direct link informs the design process, which must recognise the body’s movement and how the eye and other senses experience space can lead to the creation of architecture and enhance the spatial awareness and overall experience of the user. How the design of the space develops the inhabitants’ perceptions of the space to create multiple sensory experiences within the spatial environment.

How does the user’s experience of movement passing through different volumes manifest itself? This is explained through the visual perception of the space in that with the right balance in the complexity of architectural elements and volumes of space; the design reinforces the idea of motion, to make the user aware of the movement. Displaying the vertical movement between levels, through the exposure in the facade on the approach to the site. The directional experimentation of the body changes with the design’s intention to offer the spectator the view of the program and to journey through the different levels, transporting them through the narrative of the journey.
Chapter 1.5 Site Selection requirements states the initial criteria for the site. To recap, the site would need to be within an urban environment with existing high density residential, mixed use, retail and offices surrounding with some street circulation of public transport, private cars, and foot traffic and close to large or common public transport links for easy access to the site.

Proximity to a park that the design could connect with is also desirable, so that the green space that could flow into the building.

This figure shows basic icons of different sporting background based in the CBD and also other key programs such as major education facilities (Auckland University and AUT), Arts building and major Arena like the Spark Arena. Then choosing a site using this map and local knowledge to pick one of four potential sites that has all the requirements for Chapter 1.5 Site.
Fig. 54. Aerial image representing realatable programs, building heights, and identified possible site locations.

**Purple**
- Location: 5-15 Te Taou Cres/Otara Reserve
- Area: 10,382.54 m²
- Infrastructure: Existing site location is a reserve built off Beach Rd, with Te Taou Cres wrapping around the site.
- Context: Surround buildings are the Spark Arena, Grand Central apartments, Franklin Building, the Landings apartments, with some small offices including Bababbage Consultant Architects and Engineers. There is also a backpackers and garages situated over Beach Road.

**Red**
- Location: 23-31 Hobson St
- Area: 5,646.39 m²
- Infrastructure: The site is surrounded by three main streets in Auckland CBD: Fanshawe, Hobson and Nelson street. Closet to the Viaduct and wharf area.
- Context: The site connects with the Goodman Fielder New Zealand, and surrounded by Hotels and St Patrick and Joseph Cathedral.

**Yellow**
- Location: 69-89 Shortland Street
- Area: 9,217.45 m²
- Infrastructure: Site is situated on existing carparks structures, surround by different streets and lanes. With Albert Park to the south of the site.
- Context: The carpark structures are surrounded by a mixer of apartments and office buildings (AIG, Waldorf), and retail to the west through Chancery Square. The design could connect to the surrounding buildings through realatable heights that wouldn’t look out of place. Connections to the park and surrounding squares and other green spaces can draw people into the approach.

**Pink**
- Location: 42 Mayoral Drive
- Area: 9,837.15 m²
- Infrastructure: Aotea square, with access from Mayoral Drive and Queen Street.
- Context: Situated on the top of the civic carparks and end of Aotea Square with the Auckland town hall, Aotea centre and Queen street entertainment centre, surround the site. It has heavy foot, car traffic and public transport routes with multiple access ways and the area strong entertainment surrounding program could be something the design could drive that connection.
SITE LOCATION.

Location: North building: 69-89 Shortland Street
South Building: 36-71 Chancery Street

Infrastructure: Motorway (state highway 16), Britomart Train & Bus station, Ferry terminal, surrounding streets (shown in figure 56).

Accessibility: The urban environment in Auckland’s CBD provides easy public access through bus transport, Britomart train station network, walkable streets, and car access with carparks situated under the sites and around the CBD.

Context: The site strongly has connections to different approaches from Freyberg and Chancery square, the public known street of Shortland street and key Albert Park on the south of the site connecting the building and design other relating buildings and programs surround like the Art Gallery (south of site), Auckland University (south-west of site), Spark Arena (north-west of site) and Sky Tower (east of site) and other key points the site can draw from.

Size: The site was selected for the dimensions being able to cater for multiple different sports, but doesn’t cater for all sports acting as a limitation to the program in the selection of sports and guidelines that the structural elements will follow.

Form: The topography of the site with the change in 15m slope from Bacon street to Bankside. The multiple accessible points create for interactional designs with surrounding buildings and limit the height of the overall form to about 100m in height from Bacon lane.

Fig. 55: Site images, displaying how the site and area has developed over time, growing vertical.

Fig. 56: Site plan, scale of grid, (50x50m).
The project site splits between the North and South Buildings, as named in Figure 58, and the following analysis breaks the site down into its different approaches and circulation in the surrounding context of the site. Investigation to understand the paths of people around the site before the program and design have been introduced to the site. So, in a breakdown: the site has Chancery Street running through the east-west axis that separates the two sides of the site. The buildings on the left of the north building (legal personnel) have a height of 68 meters from ground level at the base of Fields Lane. So, in respect to the design of the South building and responding to its surrounding building the North buildings height has limited to 70 metres. Where the South building height has been limited to 100 metres, still in context but using that extra 30 meters over the buildings in front to funnel more natural light into its larger site.

There are different opportunities to create different entrances with the approaches to the building. With a lot of foot traffic through the Square on the east side, through Albert Park and Shortland Street. The approach through Albert Park and Bowen Ave runs at a similar angle to the site. The approach through Albert Park and Bowen Ave runs at a similar angle to the site. The top of Albert Park ends with Kitchener Street, that rises around in a broad arc that the site also follows. The difference between the highest and lowest points of the site is 18 meters, producing a street gradient of around 1:2. This gradient gives the approach a unique path and is significant in the travel from the park to Shortland Street and the carry on down to Britomart or Britomart station and the wharf area. Separate from the entrance or approaches paths is the process of how the facade could connect the program visually experiencing the movement from the facade.
These figures show a basic understanding of where natural light can be utilised in the facade and light well, voids in the design process. The figures have taken into account of the surrounding building and showed the shadow paths on the Winter and Summer Solstice. The yellow lines of the figures show how the natural light paths through the site and area the corner that could use the light on an area that needs to enclose to stop that hassle light from entering.
Albert Park: Albert Park is one of Auckland’s most important parks. Its central location in the heart of the CBD, together with its history and distinctive character, have earned it a special place in the hearts of Aucklanders, making it an important destination for visitors. It is surrounded by Wellesley Street East, Princes Street, Bowen Avenue and Kitchener Street. From the entrance at the corner of Bowen Ave and Kitchener St, footpaths climb through native specimen trees dating from the 1880s to the first World War, when the park could overlook the harbor, a view now enjoyed by the towering modern office blocks.

Freyberg: The new form of Freyberg Place was designed by Isthmus Group and Stevens Lawson architects with artist John Reynolds and Graham Tippere. The design of the square is set up as a cascading stream to create a water feature with set plants along the landscaped stream. The area is rich with a mixture of different aged architecture completing the square with both the new and art works being featured with the design.8

URBAN MOVEMENT/ CONTEXT CIRCULATION

Chancery Square design: The design by IGNITE of the Chancery Square focuses on connecting the area’s pedestrian traffic to and through the plaza. IGNITE uses 47 different levels of construction with 40 different façade treatment for the occupants and owners to establish their own identity. The colours of the older urban districts are used in the white, red brick, beige and grey. The complex creates shelter that can allow the sun to penetrate the courtyard within the curved structures. Is has connection to the surrounding building in mixed retail and in the design needed to be flexible for commercial Brand tenants. These two squares give great opportunity with the public interest in this area.
Fig. 64. Cross-section west-facing through Site and Auckland site linking a path from Albert Park through the site to the Hobson.

Fig. 65. Cross-section north-west facing through Auckland CBD and site, highlighting major buildings and the slope through the site (18m slope in site).
Fig. 67. Site Plan diagram, understanding the major paths of approach to selected entry points.

Fig. 68. Axonometric of buildings mass, with Fig. 67 approaches applied and site images expressing existing forms on site and surrounding.

Entrances located in the selected positions after investigation into urban movement in its immediate surrounds. Taking into account walk times, foot traffic, carparks, bus stops, train stations and ferry terminals.

Entrance: Located on the corner of Chancery Street and Bacons Lane.

Entrance: Located on the north end of Albert Park, off Bowen Ave. Construction: Bridge.

Entrance: Located at top end of Chancery Street, on Bankside Street.

Entrance: Located on the corner of Chancery Street and Shortland Street.
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Sport.

Continuing from Chapter 2.1 (Leisure Facility) and the Project background, the Sport and Active Recreation in the lives of New Zealand Adults for ‘2013/14 Active New Zealand survey results’ is the first underlining statistics and text that the sports side of the research project has considered. The text covers who the program is aiming at and what are the activities in recreational facilities that are popular. Understanding what sports and what exercises are growing (these statistics are all taken from 2013/14 survey results and taken from a selected number of adults in New Zealand in that year) has given the research more understanding of what sport and exercise is needed and wanted by the public, and which sports are growing. 74% of adults that took part in the survey take part in recreation activities in any given week. One million adults volunteered in 2013/14; 17% take part in special one-off events in New Zealand in that year. 65.6% are trying new sports, and this number has undoubtedly increased. 91.3% of the survey have taken part in sports in a human-made facility inclusive of parks, cycleways or walkways. 52.1% of participants in New Zealand’s recreational environment are within an urban environment. The journeys then can take the public through the city replicated within a recreational complex.

So why do these people in the survey use the facilities and participate in sports for the benefit of fitness and health? Particularly women say this was the case, as the men mostly enjoy the movement. So why is the reason the participants do not respond to more recreational activities—merely because of the time factor, the accessibility, the cost of the equipment or membership and the payments that come with exercise? Sport had many different reasons to take part in every individual event or team sports to develop skills in community playing and create good environments for social connections with other people.

The survey showed an overall increase in the use of gyms, CrossFit and simple equipment-based exercises in the membership but a decline in the memberships with team club sports. I can say from personal experience that this is still happening with multiple different codes of sport struggling to provide teams week after week. It is because of the cost or convenience of the facilities or if any facilities or the culture within sport in New Zealand. The survey also replicates how the exclusion of walking the proportion of the adults taking part in recreation exercise is lower across all the time frames especially among women, and older ages 50+.

Fig. 70. Statistics comparing Men and Women, most popular of sports and exercise that New Zealand’s participate in.

The 25 most popular sport and exercise activities participated in New Zealand in 2013/14.

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This model has only included and selected indoor sports for this research project. The analysis of the site-unified sports and exercise already within the urban fabric of Auckland's CBD were not analysed, focusing on the context of the site. The sports chosen are based on a mixture of ball sports, racquet, and team and individual sports and exercise, recreational constructs and the ability for the facilities to change, and be adaptable.

The sports and exercise selected were; Walking (Journey), Gym, Basketball, Netball, Futsal, Volleyball, Squash, Badminton, Indoor Athletics, Diving, Swimming, Water polo, Canoe polo, Figure skating, and Ice Hockey.

Gym: This multi-use of the space as it is a sense a room or rooms that hold a space where exercise with equipment based exercise or no equipment-based exercise. That can be used in a class situation or in an individual or group, duo exercise that can be undertaken in occupants/members own time and at their phase. Space does not strictly need to be used as a standard weights gym but flexible for other uses (boot-camp, cross-fit, fitness classes, boxing, cycling). Space can be adaptable to how the staff or the schedule for the facility is set up in more of an administrative capacity. The classic gym is something that is already a part of the urban fabric, with multi different gym facilities located in close proximity to the site (for example the Les Mills and Auckland University Gym facilities).

Basketball/ Netball/ Futsal/ Volleyball/ Squash/ Badminton: These court ball and racquet sports, bear similar materials and requirements in the research. The selection of them was brought about by the specific codes having a court shortage. Thus, with the shortage in courts, there has been a decline in participation in the sport such as volleyball, basketball and badminton, but a need for them is more than ever with the increase in population and residential growth in the city.

Athletics is a growing sport, one which is enjoyed by spectators and athletes alike. New Zealand high-performance program displays how much our athletes are improving the highest level, for example, Eliza McCartney’s results and the recent Olympics, which has influenced a significant increase in the numbers and the program’s standing. The programme’s athletes have developed common different campaigns and management to maximise the performance at major championships. This growth in the sport has pushed the need of a 200 metre indoor track, as New Zealand does not have such a facility.

Swimming has the most significant percentage behind walking in the study, at 30.2%. Displaying how much people enjoy the exercise of swimming because of its benefits, in its ability to take stress off your body, building the bodies endurance, muscle strength providing an all over body workout. Canoeing/kayaking also use both the swimming pool and diving pool that had 8.1% of adults in the study. Ice-Rinks are the least common facilities out of the selected sports with nine Figure-Skating rink and six Ice-Hockey rinks. It counts towards the 6.2% of adults in the study and adds a different complexity in the specification of
the sport, dealing with climate control and advanced mechanical systems.

The sports situated in the North building:

North Building:
- Rock Wall & Cafe: The cafe has been applied to the ground of the North building to connect with the streetscape of Shortland Street. The rock climb wall also states at this level and to create a full length void in through the building to allow natural light to filter through the north facing facade.
- Diving Pool: The dimension, weight and change the volume from the other sport dimensions’ means that the floor to ceiling height had to be increased. This increase meant that for structure reasons was placed at this level.
- Squash Courts: The squash courts have the most defined and smallest area compared with the other court sports. This meaning the spectating the sport is a lot harder the open court sports this floor will need to use different stands and mezzanine level so spectators can watch multiple courts at a time. This with the dimension of the court has been place on side above the diving pool.
- Indoor Athletics: Separates across both building breaking up the events across the floor. Is located at this level so that the track was high enough so the it could penetrate the facade and the runners could have views of the sky tower as the pass around the track, adding to the atmosphere for the athletes.
- Gym: The Gym level has been located on the top floor of the side because of how the program is one which the members are able to connect more with the view out to the wharf and ocean more than a team sport level. For example, been able to sit on a leg press machine and look out over the bay, compared to a normally placed gym situated in an old factory/warehouse looking a white painted tin walls. The experience of the two different situation don’t quite match up.

South Building:
- Ice-Rink: The rinks weight and nature of the material of the rink and the process of structure of the rink it was never ground to be able to be situated any higher than this level.
- Swimming Pool: Similar to the ice-rink and diving the pool the swimming pool has been situated at this level because of the mass and weight of the program space.
- Volleyball Courts: Are located in the same area as the pool above on a mezzanine level.
- Clinic/ Park: This level is where the Albert Park bridge entrance also connects. The bridge acts as pathway through to the North building and out to Shortland street. Its located at this level so the bridge angle is at a able angle and create a strong connection between the park and the internal park/ healing space, with the physio and clinic that can treat any injuring athlete have in the facility.
- Courts sports: The layout of the sports above the park was and random for the dimension of the courts All been able to fit with one other. The placement of naming of the court is simple for the an example of a possible layout, and will be used in this design.
SPORT REQUIREMENTS

Sport requirements will underline all of the programs specification for each sport individual from materials of walls and floors to the construction of these elements, requirements in artificial lighting, daylighting, mechanical systems, extra rooms, dimensions and volumes.

Materials: Colours, tones of the material are important as the material should be in the mid-range letting minimum to middle levels of reflectivity or LRV to help prevent too much shadowing in court area especially in smaller ball sports. Colour or white walls are also important in relation to the sports colour and shapes. Colour or white walls are used in cricket for the batter to be able to see the red ball easier than a patterned or dark coloured screen. ⁵

Artificial Lightening: Considerations of the sports space that is needing to be illuminated, which needs to be a balance of the following issues integrated within the design process in controlling the Glare in certain areas like the swimming pool. Controlling the contrast in dark to light in spaces, the levels of the illuminance and uniformity. The colour rendering created for the lighting and does it comply with the statutory regulation for that sport on the level. ⁶ Shown in figure 72.

Daylighting: The use of natural lighting in indoor facilities and spaces are mostly normal. The sun’s rays can create conflicts in different shadowing paths of the program, meaning less control of the illumination of the actual sporting facility area. The brightness can lead to discomfort and glare when not properly managed, so in any case natural light must be limited considering how the glare on and reflect could be controlled one to benefit and not cause discomforts and danger, and actually enhance spaces that maybe around the playing area that could create extra heat and example 7.

Mechanical: The Building will need mechanical ventilation for heating and cooling throughout the building with different set ups between the level depending on the sports specialized requirements. And separate rooms for example office and staff area with similar systems to the restrooms, changing rooms and showers, with the showers having extra ventilation units, to decrease moisture spreading into other nearby spaces.
Lifting the Game // 88 // Ice-Rink

Ice-Rink:

Units: metres - m
Sports: Ice-Skating & Ice Hockey
Ice Rink Dimension: 61- 26m
Ceiling Height: 7m minimum

Conditions: The thermal condition vary from about -5°C on the ice surface to +10°C in the stand up to +20°C in the outer public areas around the rink. These conditions can create problems like fungi, mould growth and even corrode unprotected materials.

Materials: Ice-Rink insulation. Insulate walls and ceilings. The main arena walls should have a minimum of 300mm insulation in the roof line. E in ceiling with a minimum R1.9 side walls. Ceiling material type is needs to be a polyethylene produce with an ice sheet.

Mechanical: Efficient refrigerant plant. Mechanical ventilation. Efficient heating system. Air dehumidification. Main chiller system. Supplemental heater system for sub-floor heating system. Water heaters. Building alarm systems. Sound systems. Outer Core Room air-conditioning. Any electrical heat employed in building design. Sensors -

electrical Zamboni use. High technology units can reduce the energy consumption by 50%, limits costs.

Lighting: Lighting room. Main area lights- have Standard 110-volt outlets, powering 400-watt metal halide type fixture and type fixtures. All of the lighting fixtures are to be suspended from the same elevation. External lighting, with Emergency lighting systems. Comparison from ice rink facilities running high quality, low energy consuming mechanical system compared with a basic system.

Rooms: Concession equipment. Retail service shop. Skate sharpening machine. Scoreboard. Game room services (shown in figure 74).

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ICE-RINK

Fig. 73. Ice-Rink shape, and lines for Ice Hockey.

Fig. 74. Diagram of program required at the sports level.

Fig. 75. Understanding Ice-Rink mechanics

Fig. 76. Understanding the construction, and weight of the Ice-Rink, for the structure.

Fig. 77. Ice-Rink sport image.

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8 International Ice Hockey Federation, Technical Guidelines
9 Everything Ice, Basic Ice Rink Building Design Scope, Last modified 05/07/18.
10 Ibid 4-5.
11 Ibid 3.

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ICE-RINK
Swimming Pool
Sports: Swimming
Swimming pool Dimension: 50x 25m
Pool depth: 1.5m - 2m
Ceiling height: 7m minimum
Line widths: 2.134m
Water Volume: 2,187.5 m³ = 2,187,500 litres
Water Weight: 2,187.5 tonne
Electricity consumption: 159 MWh/year
Water consumption: 16,000,000 m³/year
Rooms: Shown in figure 79

Fig. 78. Swimming pool, light diagram. Understanding problems with the reflection of light.

Fig. 79. Diagram of program required at the sports level.

Fig. 80. Swimming pool, sport image.


Diving pool Dimension: 25x13m minimum or 20m

Pool Depth: 5m

Ceiling Height: 13m minimum, 15m

Spring board heights: 1m, 3m

Platform Heights: 5m, 7.5m, 10m

Water Polo pool Dimensional: 25m x 20m

Water Volume: 1,875m³ = 1,875,000 litres

Water Weight: 1,875 tonne

Materials: Material within these wet areas and surrounding spaces need to be protected from corrosion that can become a major problem in the damp, humid atmosphere. The structural material are the major concern especially in the design of the project, with a structural failure at these lower levels would cause damage and loss of life. Because of it being a wet area the materials need to have non-slip and texture on the flooring so when wet and damp the surface doesn’t become a hazard to spectators or competitors.13

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Lighting: In lighting areas with water under safety issue for supervision from poolside there is a critical minimum angle at 50° where the water surface avoid glare and reflections the could impair a spectator’s or Lifeguard perception of risk. Screens need prevent bright natural light from entering into these spaces.

Rooms: Shown in figure 82.
Rock Wall
Sport: Rock Climbing
Rock Wall Dimension of space: 25x 13m minimum or 20m
Rock Wall Height: 70m
Materials: The design of the rock wall use the real rock method in hand sculpted look as like of natural rock to keep the natural expression of the building and give the climbs that outdoor experience. The natural features mean a huge variety of climbing moves and hard route variations are possible e.g. instead of bolt-on holds, using only natural features as handholds! The visual factor of the natural look give the wall the x-factor to inspire more people to try climbing.

Lighting: The lighting from the surround sports will also light the rock wall void.

Rooms: Shown in figure 85.

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Fig 85. Diagram of program required at the sports level.
Fig. 88. Diagram of program required at the sports level.

Lifting the Game // 96 // Basketball, Volleyball, Netball, Badminton, Futsal

Basketball
Court Requirements: 4
Court Dimension: 28m x 15m
Runoff Dimension: 34m x 21m
Hoop Height: 3.05m
Ceiling Height: 7m
Number of Courts: 3
Netball
Court Requirements: 4
Court Dimension: 30m x 15m
Runoff Dimension: 36m x 21m
Hoop Height: 3.05m
Ceiling Height: 7m
Number of Courts: 3
Volleyball
Court Requirements: 4
Court Dimension: 18m x 9m
Runoff Dimension: 24m x 17m
Net Height: 2.43m
Ceiling Height: 7.5m
Number of Courts: 3
Futsal
Court Requirements: 1 to 2
Court Dimension: 42m x 25m
Runoff Dimension: 48m x 31m
Hoop Height: 3.05m
Ceiling Height: 7.5m
Number of Courts: 2
Badminton
Court Requirements:
Single Court Dimension: 13.4m x 6.1m
Double Court Dimension: 13.4m x 2.3m
Ceiling Height: 7m

Materials: Flooring: Hardwood (maple standard strips) Grading. Subfloor: Vapor barrier with 9mm polyethylene. Floor joints (over H4), Floor fasteners with cleats and 5mm staples. With wall-based vented cove bases with pre-moulded corners. Used for all the above court sports. Reflectance on walls about 40% and ceiling 80% in the colour control of the material.

Lighting: The courts sport actually have all the same uniformity minimum of 0.7 but the lux average of the levels to vary from Badminton, and Futsal a 550lux, Basketball 750lux, Netball 1500lux, and volleyball similarly 1000 to 1500lux in illumination of the different volumes of space.

Rooms: Shown in figure 88.

Fig. 87. Courts overlay.

Fig. 89. Basketball image.
Squash:
Squash Courts:
Single Court Requirements:
Court Dimension: 9.75m x 6.40m x 5.64m
Ceiling Height: 7m
Number of Courts: 6
Double Court Requirements:
Court Dimension: 9.75m x 7.62m x 5.64m
Ceiling Height: 7m
Number of Courts: 6

Materials: Flooring: Structural stability, enhanced performance hardwood to meet the required floor bounce. Such products like Acer sports floor system. Acer Fit Maple with second layer of 2x12mm Plywood, APA underlay sitting on a Tripower Pad®. For the walls use a low impact e glass or a wall panel system called Fibresin, that comes in panels evolved for performance and durability, with didn’t need moisture control for humid environments to stop swelling of the surface.

Mechanical: Movable door, glass wall to change the court form single to double, explained in figure 91.

Lighting: High powered Metal Halide 400 watt with heat and impact resistant glass enclosing the lamp. Six Lamps setup single pre-court and eight for a double court.

Rooms: Shown in figure 92.
Lifting the Game // 100 // Athletics.

Fig. 94. Indoor track, 200m around, and 60m track through the centre.

Fig. 95. Constructing of special track material (Numbers link to subtile materials).

Fig. 96. Diagram of program required at the sports level.

Athletics:

Indoor Track
- Track Dimension: 95m x 46m
- Ceiling Height: 10m
- Track Length: 200m
- Centre Sprint: 60m

Indoor Track events:
- 60m, 200m, 400m, 800m, 1500m, 3000m, 60m hurdles, 4x400m

Indoor Field events:
- Pole vault, High Jump, Long Jump, Triple Jump, Shot Put, Pentathlon

Materials: Floor B: Non-permeable construction
- 1. Elastomer, 2. Dense grade asphaltic concrete finishing layer, 3. Dense grade asphaltic concrete finishing layer, 4. Base-crushed stone or gravel, 5. Sub-base-crushed gravel, 6. Select fill or subgrade, 200m oval, 40m & sl end straight (52m overall) and 58m runway and pit (sand)

Lighting: ‘For discus, javelin and hammer, special precautions should be taken since the object may travel above the line of light and hence be invisible during part of the flight. The vertical illumination at the finish line should be 1000 lux for photo-finish equipment and officials.’

Rooms: Photo-finish camera room and analysis space (Figure 96).

In internal park with a court place and physio, healthy space that's important to the program. Having a space that can deal with sport-related injuries within the building.

The park has been implemented in the layout of the levels to break up the main court spaces to the heavier weights sports. A quieter level that also the park can connect to.

Related rooms, shown in figures 98 and 99.
This approach to the design, layout of sports and selection of sports based off the Auckland demographic, meaning that the model is one specific to its site and landscape with Auckland urban fabric. This model of staging of sports vertically has the potential for application to other high-density areas around the world in larger or similar scales to this mode. Alternatively, could be applied to schools in New Zealand or the World that have right demographics and boundaries that have stopped the process of development and expansion. Building an envelope to separate public and private areas, the notion of the boundary is critical. More so, that the boundary and threshold of the project start the internal journey of the visitors, players, and staff individually. Thus, the public circulation through the city and approach to the site is separated, but are an influence in the analysis of the entrances.

The envelope is the eye-catching moment that draws people to the facility, and in their approach, they can experience the aesthetic expression and with exposed movement. The envelope idea needs to be carried through the whole design in the dynamic sense to make the design have boundaries in spaces for staff to the public, players athletes and areas for them all together. Areas with ‘moveable partition’ systems in hybrid walls, screens fixed, floating, hinged that can manipulate the volume of space, proportionately has little influence on the overall design. Majorly, focusing on the kinesthetics in the movement of the body in the selected sports motion analysis.

Capturing the motion, experience, directional paths in the different axes and the forces the body applies in the movement, highlighting muscles, and dynamic paths. This investigation will inform the process of the application into design elements in the entrance. Furthermore, inform how the circulating journey will transform between the changing levels of the sports volumetric experience of space. So in the interest of experiencing movement in architecture, the mapping of moving elements (such as air flow or traffic patterns) or in the reference to this project the motion of sport/athlete is not sufficient on its own. Rather, that the individual’s movement through space, as experiential study can be explained through Gordon Cullen’s notion of ‘serial vision’ in the classic Townscape of 1961.

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2. Steven, Parallax, 226.
Fig. 104. Sketch applying a similar style to Zaha Hadid’s Maxxi Museum, different lines representing circulation paths on different levels.

Fig. 105. Initial sketch using the site angles and direction of contours.

Fig. 106. Sketch applying both techniques from figures 103 and 104, with lines representing circulation paths on different levels.

Fig. 107. Sketch now applying Chaos Theory to techniques in figure 106.

Fig. 108. In applying the chaos theory the site plan displays a specific point become a central connection, of the circulation and two buildings.
Fig. 109. Initial North Building section.

Fig. 110. Initial South Building section.

Fig. 111. Initial sections combined (Colour representative of the entrance).

Fig. 112. Initial sketch of SB possible circulation.

Fig. 113. Initial sketch of entrance (Shortland St.) and circulation of NB.

Fig. 114. Initial sketch of entrance (Shortland St.) and circulation of NB.
VOLUME EXPLORATION.

This volumetric study is of the sports volumes, which relate to understanding of the vertical format, the sports volumes are specific to the sports program needs of the sport. In a conceptualised process, that a conceptual vertical circulation can then be applied to the volumes. These circulation paths were generated by the use of the initial sketches (Fig. 102) and then applied to a 3D image. This process allowed the study then to be further analysed in what was sport volume, what was circulation, and what was void. Empty space for pragmatic requirements or voided exploration.
Structural system: Structural systems relative to project, long span structures, large sized trusses, high-rise structures and multilevel recreational facility come to mind when first approaching the structural system for the project's program.

The structure systems for the project are looking at; long span structures, large sized trusses, high-rise structures and multilevel recreational facility come to mind when first approaching the structural system for the project's program. The project structure looks to investigate a long-spanned, high-rise topography. Theorists like Adolf Behne have the idea of 'functionalism,' when the structure becomes an important part, as can influence the aesthetic and effectiveness of the program and envelope. The structural elements in this project are important overall construction.

Rem Koolhaas, Presentation of Très Grande Bibliothèque (OMA, January 16, 1989).
Engineer: Peter Nash
Location: Paris, France
Completion Date: 1977

Engineer, Peter Nash and architect’s, Renzo Piano and Richard Rogers, teamed up for the design and construction of Centre Georges Pompidou in 1977 Paris, France. Creating a long-span, open-plan model, adaptable to any clients needs within the volume of the floors, thus completely free, to be used for all forms of cultural activities. Both known and yet to be discovered. This flexible structure can be processed in the giving this project and program an open space that can be adapted easily for the different sports. The large 3m deep trusses with spans up to 50 metres in this model, anchored by a “gerberette” beam systems, columns, X cross-bracing connection and tension cables that support and counter each force to create a robust and stable design. The complex is situated within the Piazza, one side that the building’s volume occupies and the other an open urban park space. The technical equipment, pipelines have all been colour coded to their function in a dramatic display.

This project was described as an “act of disobedience” at the time in the early 1970’s when the city was at a serious cultural stand point. This high-tech disobedience encloses this flexible space for program, much in the way that this research project has to detail the exposed mechanical systems.

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This project was described as an “act of disobedience” at the time in the early 1970’s when the city was at a serious cultural stand point. This high-tech disobedience encloses this flexible space for program, much in the way that this research project has to detail the exposed mechanical systems.

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Projects structural systems:

The finishing floors of the sports themselves have been specified in the (5) Project- Program, section, (5.4) Sport Requirements under the materials part of each sport requirements.

- Painted Stain steel round hollows
- Gerberette Column
- X-bracing
- Tension cables
- Women masts (1m depth, 4m length SB and 30m NB)

Fire Stairs:
The Clause C4 - Movement to place of safety

Functional requirement

'C 4.2 buildings must be provided with means of escape to ensure that there is a low probability of occupants of those buildings being unreasonably delayed or impeded from moving to a place of safety and that those occupants will not suffer injury or illness as a result.'

The design needs to set fire stairs up with a path of no more than 50 metres in any direction; one in the north building and two for the south building described in figure #.

Lighting: All lighting requirement were specified in the (5) Project- Program, section, (5.4) Sport Requirements under lighting.

Explorational study of skins or screens, to investigate how the inhabitants could experience different levels of movement, through a conceptualised model. Weather been fully enclosed in a space without a visual connection but having the ability to funnel the soundscape of the movement close by to the enclosed space. The soundscape could be the related to the sound of an athletes feet squic on the timber floor or the the bouncing of a netball, or the expression of a passionate Coach. Allowing a different experience to be achieved privately or in pasting another, creating engagement.

The screens allow for different perspectative for the eye to fixate on as you pass through a screened space the occupants visual level is been manipulated and limited. As you carry on through the space the occupants body has been set on a specific path were his eyes on other. In figure 117. within the exploration model, the perspectives blocked the visibility on the right side of the image but opens the other. All related to the individuals perception and positioning in the environment.
Motion within sport: SIM · reality motion systems have been capturing and developing high-end image-based motion to analyse the body kineesthesis. Through the understanding of the analysis and drawing over the top of their research and colours within their website have created these diagrams of motion. The physical motion of the body’s limbs create patterns/paths, such as in the running man diagram the path of the athlete’s hand and elbow are tracked. The figures link together to create the different paths of motion. In the studies pattern and shape created can then later be applied to the level in which that specific sport’s movement actually happens. The patterns and paths could then influence shapes or motion relatable to the design.

Further explanation in images.
Francis Ching explains the sequence of the experience into and through the buildings circulation system. Ching describes the five circulation elements, in the ‘Approach’ to the site, where visually visitors connect to the form building to the entrance. Next comes the ‘Entrance’ with the change in atmosphere from the outside to the interior, then the sequence of spaces that the design creates the ‘Confirmation of the path.’ The fourth comes the ‘Path-space Relationship’ where the paths connect to different nodes and change to the ‘Form of the Circulation Space’ that funnels the occupants through the stairs, ramps, corridors, galleries, rooms and halls changing in volume and materials, light and sound developing the relationship of the people with the design intent experience.

These approaches were applied to the project considering the site from the various entry point provided on the design have been located in specified vital points. Because of the nature of the environment and the site situated within the CBD of Auckland, the urban environment makes the approach similar to what Francis Ching explains in his approach to the Notre Dame Du Haut in France, with the grand path surrounded by open landscape and untouched land and rolling green hills.

1. Chancery: The Approach to the Ice-Rink floor placed on the corner of Bacon Street and Chancery. The people approach from this direction they pass through the Freyberg square and then through Chancery Square. The Oblique style entrance enhances the effect of the perceptive on the form of the building especially in the approach as the views can see the form of the building from multiple points and come from multiple places.

2. Shortland: The Shortland street Entrance has a more frontal approach with the entrance opening out to the street, allowing the people to walk past and people coming into the building to view especially to the movement of the sport.

3. Bankside: The Bankside entrance approach is more confined and has the least traffic passing by in the existing program, but with the injection of the swimming pool at the level, the street facade of people would increase. The approach is darker and narrower with the sensible surrounding building overlooking the site and entrance on the east site of Bankside street.

4. Albert Park: The last approach in the south building is that of the Albert Park one that has a unique oblique approach with a change in approach with the bridge access working as a mini spiral approach emphasizing the form of firstly the entrance and second the form of the south building.
The entrance into the site is defined as the field of exterior space that separates the there and here argument. Travelling from one experience to another, in the passing through of the façade or threshold, much in the way the circulation will present itself later in this process. Once the body finishes its approach, the arc overhead frames the gateway of the recessed doorways. The Arcs encloses the occupant at the end of the approach pathway before passing through the threshold. The notion of the entrance is a visually feature that the motion analyses in figure # have created to the unique style so that the sport been played is influencing the design of the entrances.

1. Chancery: This entrance is located on the corner of Bacon Lane and Chancery Street and Chancery square. The design of the stairs and ramp will replicate a similar style to the Freyberg stairs and the paths through to Chancery Square. This connection is essential to connect with context and to draw people in through this approach. The shape of the arc is taken from a movement analysis, focusing on the Figure skating motion. This movement transfers from horizontal to vertical motion, with elements of spiral and weight transfer. Thus, translated into this curved arched form (figure #), enclosing the stair and ramp entrance.

2. Shortland: The Shortland Street entrance is on the corner and end of Bankside street that connects to Shortland street. Its form is taken from similar forces in the shapes created from the figure skating. The diver image captures the spiraling motion of the diver right into the water creating this dramatic entrance (figure #). The arc form expresses the dramatic nature and elegance of the sport.
3. Bankside: The Bankside entrance in the middle on Bankside and close to the top end of Chancery street. The arcing beam from the Chancery entrance flows up the slope of the road slowly forming the motion inspiration from the motion of the swimmer and the patterns the swimmer forces upon the water. The swimmers' motion was specific to freestyle in the analysis. The arc symbolises both these actions of the movement and the patterns created by this movement (figure #).

4. Albert Park: The Albert park entrance takes a different approach to design in that the motion of been portrayed is that of the landscape of the slope in the gradient and form of the hill. The bridge brings about an experience of anticipation, fear and excitement upon entering the tunnel section before been squeezed out into an internal park, health/physio floor, opening the inhabitants up to different experiences, individually felt. The bridge acts as a path for the park's green vegetation to flow into the design of the floor, and it can be functionally used as a separate pathway to get through to the North building and Shortland Street.
The design of the bridge had to relate, firstly to the outlining the narrative of movement in the form but also linking to the building and its skeleton. Different structural elements were investigated including the buildings model of Warren trusses. The idea to link the bridges design with the buildings design.
Fig. 151. Sketched initial Ice-Rink floor plan
Fig. 152. Sketched initial Swimming pool floor plan
Fig. 153. Sketched initial Volleyball and Shortland entrance
Fig. 154. Sketched initial internal park floor plan
Fig. 155. Sketched initial Basketball and squash court layout
Fig. 156. Sketched initial Athletics floor layout

Initial Floor sketches.
The following diagrams study how the program spaces could influence the path of the circulation. The first diagram (right diagram) displays the different circulation paths of the public users, the athletes users and the staff paths that are limited as required highlighted in the key.

The second diagram (right diagram) focuses on the main circulation path that the journey looks to follow. The path symbolises the journey that is manipulated in different parts of the levels depending on how much visual engagement can be made with other uses and the sports. The path is broken up in Semi-enclosed that allows users theo visually see the sports in fragments playing with the individual perspective. Enclosed were the sports movement cannot be visually connected but through the use of other sensors, such as hearing the movement is felt through another perception. Viewing is where stand and other viewing platforms are set up for spectators. And lastly, quite areas are spaces that could be enclosed but are more separated from the noise of the sports and circulation that could be used for small groups, stretching or small exercise such as yoga to be performed.

Diagram Keys:
Left Diagram.
Right Diagram.

North Building : NB. South Building: SB
The urban circulation around the sites has depicted the main entrance points. The Café, being an addition to the program, does not influence the design of the main program or circulation paths. The entrance connects on the basement floor under the main North building’s administration area for the diving pool, squash courts, track and gym. The level holds the rock-climbing wall that is situated on the west wall, running the entire length of the building. Visually engaging with the different sports as the climber moves up the wall. The layout of the level has specifically made the entrance to the wall enclosed in the exercises with safety protection of spectators as required. The idea of the sport was to draw the curious eye vertically to the movement, of skill and feeling of the anticipation in the thrill of the sport.

The North building entrance has been explained to the point of the threshold. At this point the control of the transitional pathway is direct and linear entering up a half floor this now having the first visual contact with a sport, the gliding motion along the ice and shape spiral, turning in the network of motion that can be experienced upon travelling along this level generating the narrative of what’s to come. This journey then transfers the body up the direct stairs allowing the spectators to look over the Ice-Rink before being fully enclosed and then funnelled out to the following level.
The entrance to the South building users are met by large steel columns and lifts shifts next to the dramatic curves of the entrance explained as influenced by the dive motions. The narrow space then funnels the user up until the Diving pool. On approach, the pool level the occupant can visually engagement with the rock climbing wall and any movement in the void.

Upon leaving the stairwell, space becomes light, open, clean, and fresh: new elements entering the inhabitant’s space. Another sight of the swimming pool. A flood of sensory phenomenon become engaged in the hearing of the splash in the kicking of water, draw the eye to the motion of the exercise.

Also entrying on this level through the Bankside entrance the users pass through an admiration area that later connects on the circulation path.
Second/ Mezzanine floor: Diving Pool (NB) and Volleyball/ Badminton courts (SB)

Upon travelling up the stair the space narrows and more enclosed before open the user up to a 10m floor to ceiling, in a grand gesture to the sports specified volume. The direct path then connects up on the mezzanine overlooking the diving arena.

The volleyball courts are situated on the mezzanine level to enliven the smallest of spaces boosting the mood of spectators and athletes being able to connect visually overlooking the pool level. The interesting space that the expressive of circulation passes through separating the Volleyball court and the Swimming pool is interesting in how the stairs create a visual block, but upon passing up and along the stairs, the user has the opportunity to experience both sports movement.
This floor circulation becomes of utmost importance to the success of the scheme, acting as the connection piece of all the other floors. The Albert park bridge flows into the south side of SB, enclosing the users fully. The opening the occupant up the significant design of the open indoor park, that allows people to relax and recover, in the experience of freedom and peace.

Also, connects through to the NB. This connect is important to the design creating another journey path for the public to use as they pass from the park through the building and out Shortland street and further down or vice-versa.
The direct pathway allows the user to pass through space quickly or slower to the users need, but the experience will change for both. The squash level has strong ties to the higher seating and semi-enclosed space along the rock wall. This is because of the special lighting requirements for squash so the athletes don’t lose the ball passing through black spots. The circulation for the floor is how simple as this stage.

The Basketball courts as more of the occupants in multi-visual points with different levels to spectate along the circulation route. The open space allows the opportunity to have specialized placement and positioning that the eyes perception of depth in the space could be manipulated to create interest.
Fig. 172: Sketched perspective on track looking over the high jump and other events.

Fig. 173: Circulation Diagram, Fifth level, Floor Plan and Section.

Fig. 174: Main circulation diagram plan, fifth level.
Sixth Floor: Gym (NB) and Netball (SB)
Lifting the Game //150

Diagram seventh level floor plan

Fig. 178. Circulation Diagram, Seventh Level, Floor Plan and Section.

Fig. 179. Sketched perspective of the futsal courts that allows the most daylighting into the space.

Diagram seventh level section

Fig. 180. Main circulation diagram plan, seventh level.
While understanding that the circulation has its challenges, the challenges also present a strong narrative that the design can take influence from.

At the end of the narrative of the journey is at the individual user's discretion, to understand their destination, as could be any floor.

The key difference between this strategy and a normal Multi-sport complex is its vertical and is represented in the diagram section that expresses the different movement of the specific people within the building such as in the diagram of the floors.

Understanding the paths that are taken from space to space, creating a circulation path representation, through the exploded axonometric diagrams highlighted in red. The diagram looks the explain the floor diagrams into a 3D circulation path that deals with the vertical plane, in a direct transition to the pathway of the journey.
RELATIONSHIP & FORM OF CIRCULATION SPACE.
The treatment of the envelope is important to connect with the entrance forms, and to stand out of the classical urban surroundings, so that both can heighten the design appeal. The façade is being treated in a way that the exploration of the program can be experienced from the exterior, creating a visual scene for the urban circulation to connect with. The visual expression of circulation as the direction paths of the spectators inside the building reinforce the approach of experiencing movement throughout the whole design and connecting the building narrative to the public.
EXPLORATION.

These figures investigate the engagement of users spectating the sports, engaging with the people around them. Using levels to create different visual perspectives. Thus, allow human curiosity to draw the individual’s eye around the space, making visual connections that engages with the other users. Engaging with their kinaesthesia.
Competitive and recreational sports bring about unforgettable experiences for both players and spectators alike. This environment of movement has driven the design process of the research element within this project. The goal was to highlight how Auckland’s urban land is becoming both more scarce and more in demand. Therefore, the planning of a new facility must be a compact multi-sport complex that is future-proofed to Auckland’s regional future.

The vertical application of stacking the individual sports facilities gave this project a series of interesting and complex tasks. From implementing a structural system that could maintain the different sport’s specification requirements, to the site’s geographic complexity. The complexity includes dealing with shared facades, integrating with urban circulation and movement, and combating accessibility within a city with public transport issues. Not only this but due to the site’s challenging geography, a new element of design then heightened the scope of the project.

The design first started with the study of combined volumes—exploring how the selected sports facilities’ programmatic’s might work together. Simultaneously, the circulation throughout these volumes was explored. Diagrammatic exploration of both program and circulation gave the planning process an abstract idea of how the proposed floor plans could be laid out. Once there was a clear understanding of these elements, it was important to create an emotional experience through the use of this building, as either spectator or competitor.

Strict regulations in court sizes, pool depths and other facility specifications created rigid rules to abide by while designing. This created clarity in the process of forming both spaces and experiences. Furthermore, it could be further developed in the final design to demonstrate the changing perception of movement through visual nodes. The occupant’s visual engagement to the body and space gives the journey its narrative throughout the entire journey of the design.

The kinesthetic motion analysed meant that from the approach to the design and site, the influence was introducing one step of many, in ways the motion can be translated to architectural elements. That suggested how aspects of the design dynamic had a dramatic impact on the movement results.

In considering how the steps in the research could be taken further to enhance the already complex project. In the possibilities to research, ideas such as, the movable tectonics that was touched on in the literature but never amounted to much substance in the way of design. The potential of that element might link in with the design as it stands, or create comparisons in how the spaces differ from the immobile representation of movement to movable tectonics.

This would result in different styles of architecture but could lead to a similar result of enhancing the experience of movement. Other considerations were related to the process of how spatially the volumes could involve the curious eye phenomenon. That relies on the position of the inhabitants, experimenting with the implication of nodes developing the circulation paths further. That the design at this stage has not yet been taken to the level of detail or exploration.

A final note: this project highlights a very real future possibility in the planning of any sporting complex, for all different scales. The vertical model is being introduced more and more, with four vertical facilities having been replicated from the original Vertcal
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SPORTS VOLUME
STUDY MODELS


Initial Vertical sports layout.
Declaration

Name of candidate: Sean Henley-Smith

This Thesis/Dissertation/Research Project entitled: Lifting the Crane

is submitted in partial fulfillment for the requirements for the Unitec degree of

Principal Supervisor: David Turner
Associate Supervisor/s: Lucia Mitchell Chris Murphy

CANDIDATE'S DECLARATION

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

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Student number: 1434844
Full name of author: Sean Henley Smith

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Full title of thesis/dissertation/research project ('the work'):
................................................................. Lifting the Game .................................................................

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