An Atmospheric Surface

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Abstract

This thesis considers how to use atmosphere as a driver when designing to strengthen the relationship between the body and architecture. Wigley, following Semper, argues that atmosphere is constructed through the outer surface. Surface is used as a key element in architectural practice to contribute to the overall atmospheric conditions within architecture, to influence the way an occupant experiences space. To strengthen the relationship between the body and the built, this thesis looks at the surface of architecture to explore ‘*how atmosphere can be designed for through a kinetic surface*’. This thesis begins with a theoretical review of atmosphere and surface, along with case study research

that contributes to the thesis exploration through design research. This thesis consists of three design outputs that test the kinetic surface at three increasing scales to engage the body. These design outputs include an installation, a house and a public building with each design increasing in complexity. While primarily focusing on the atmosphere produced through surface, these experiments also deal with site and programmatic constraints. This thesis concludes with an architectural strategy of using a double layered kinetic surface in a public building to create atmosphere that forms a strong relationship with the body, through light, movement and materiality.

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Chapter One: Introduction

Stage One: *Installation*

Stage Two: *House*

Stage Three: *Public Building*

Fig. 1 Three stage design process.

Chapter One: Introduction

This thesis considers how to design for affect and use atmosphere to strengthen the relationship between the body and architecture. This means using atmosphere as a driver to design, rather than atmosphere being a by-product of the design process, or only used as a tool for the analysis or interpretation of architecture. Mark Wigley argues “architecture is but a stage set that produces a sensuous atmosphere” (20). However in architectural discourse, atmosphere is still considered as indeterminate with an “ontological status” (G. Bohme 114). This thesis argues that architecture can be designed to invoke atmospheric effects in order to convey a meaning or create a particular experience.

Mark Wigley, following from the work of Gottfried Semper, argues that atmosphere is constructed through its outer surface, a decorative layer which atmosphere seemingly percolates (20). Through the manipulation of surface, this research explores whether architecture can create serene and emotive spaces that can enhance personal experiences. Traditionally surface has been used to mediate transparency between the interior and exterior, but architects now look to interactive and dynamic surfaces to express buildings, such as kinetic facades.

Kinetic facades enable architects to reengage the occupant with architecture. The intention of this research is to use kinetic surface as the primary element to create an atmospheric experience for occupants, strengthening the relationship between architecture and the body through atmosphere. To direct and focus this thesis towards the relationship between the body and space, the research question for this thesis is: “*how can atmosphere be designed for through the use of a kinetic surface?*” This research will test how atmosphere can be designed for at three different scales which are, an Installation, a House and a Public Building. This will result in three experimental design outputs that will, through design research, give different ways to consider this thesis proposition.

Fig. 2 Thesis Structure Diagram

Thesis Structure

This thesis follows a ‘design through research’ approach, where the design decisions made in this research investigation are guided by supporting theory to help the design. This approach intends to develop better ways of approaching design in future work, by reflecting on each design iteration to add to the body of knowledge developed through this design research (Downton 18-19). Drawing, modelling and digital techniques are employed in this thesis, with each technique having its own ability to uncover and represent architectural relationships. Drawing techniques are used at the start of each design investigation due to the potential of underlying atmospheric qualities they project. Each stage attempts to extract immaterial qualities from the initial drawings and sketches, developing a consistency throughout the design process. Digital modelling gives this thesis the opportunity to generate a series of iterative design tests, while also allowing an understanding of spatial qualities and environmental conditions within a three dimensional realm.

The structure of this thesis is divided into six chapters. *Chapter two: Theoretical Context*, sets up the context to situate this thesis within a contemporary understanding of atmosphere, which leads to a brief discussion on the notion of surface. This chapter includes writing from Gernot Bohme, Mark Wigley, Ben Anderson and Peter Zumthor which is supported and expanded through architectural examples. *Chapter three: Precedents*, investigates three examples of how surface has been used in design to evoke emotional and physical responses from individuals. *Chapter four: Installation*, the first stage of the design process explores how atmosphere can be designed at the scale of the body. *Chapter five: House*, is the second stage of the design process where key ideas are brought through from the installation and translated into a larger scale. The focus here is on how surface can implement atmosphere within a housing scheme. *Chapter six: Public Building*, is the final stage of the design process sited within Civic Square, Wellington City. This tests how an interactive surface can activate space through varying atmospheric conditions while also considering the overall function of the square. *Chapter Seven: Conclusion and critical reflection*, sums up the thesis by looking at what was achieved through the research. This chapter also critically reflects on the design outcome of each stage, specifically on the successes and limitations of the experiments and suggesting strategies for further development.

Chapter Two: Theoretical Context

Chapter Two: Theoretical Context

Introduction

This chapter aims to develop an understanding of how to design for atmosphere primarily through the use of surface. Instead of using atmosphere as a way to describe or interpret architecture, this thesis attempts to understand how to *design for* atmosphere. This chapter has two sections, the first on ‘Atmosphere’ and the second on ‘Surface’.

The chapter begins with a theoretical background of how atmosphere is understood across different disciplines. Historical and contemporary writers such as Gernot Bohme, Mark Wigley, Ben Anderson and Transsolar and Tetsuo Kondo all discuss the notion of atmosphere from varied positions, providing a way to understand the relationship between the body and the built environment. The way atmosphere can engage the body and the concept of affect is discussed through the work of Anderson. Peter Zumthors interpretation of how a body perceives space is discussed, where he describes the emotional impact of atmosphere. The link between materiality and atmosphere is then looked at

through the work of Mark Wigley and Gernot Bohme, who talk about how objects emit atmosphere. This extends to Zumthors work, which is used as an example to show how the combination of form, materiality and light interact to create atmospheric architecture. The topic of surface is introduced with Wigley stating that “surfaces are crafted in a way that produces an ideal atmosphere” (20). Wigleys position on surface enables a shift in this thesis to consider how surface can be used as the driving force for the integration of atmospheric qualities in architecture. The notion of movement is also introduced here, where a kinetic surface is suggested as a technique to engage architecture and the occupant. Given the large range of theoretical approaches to atmosphere and surface, and due to the brevity of this thesis, this research will focus on key theorists and ideas that help provide a clear framework for the basis of this design research.

Fig. 3 (Opposite Page) Lillis Hall Installation, UO, by Ned Kahn
<http://publicuseofprivatespace.wordpress.com/methods/>

Fig. 4 'Cloudscapes', Transsolar and Tetsuo Kondo architects installation at the Museum of Contemporary Art Tokyo
<http://www.yellowtrace.com.au/tetsuo-kondo-architects-cloudscape/>

Atmosphere

What is atmosphere?

For Anderson, the word atmosphere is used as a “vague” description to describe a collective of intangible effects such as “mood, feeling, ambience, tone” (78). Although, Anderson does define atmosphere as a primary catalyst for how we feel and experience space, where it is through atmosphere that intense spatial qualities can be created (80). A relationship between the body and the built environment allows occupants to have an emotional connection to architecture. Anderson looks at the concept of ‘affect’, to describe how the body responds to an environment. Anderson describes typical ‘affective qualities’ as “the sublime, tragic, comic or beautiful” (79), where affect is not a personal feeling but a physical response or a gut reaction to spatial conditions. *Affect* is a lived experience that influences change in the individual who occupies an affective atmosphere.

Given that affective atmospheres are *felt* by the occupant, Bohme, Anderson and Wigley, from different backgrounds, consider the spatial dimension of atmosphere in architecture. Bohme describes atmospheres as ambiguous and “spatially discharged” (118). Bohme continues his description by stating atmospheres “seem to fill the space with a certain tone of feeling like a haze” (114), a haze that has “affective powers of feeling” (119). Anderson and Wigley, however, describe atmosphere as interlinked with forms of enclosure. Anderson extends Bohmes ideas and statements stating that “atmosphere ‘surrounds’ a couple or one finds oneself ‘enveloped’ by an atmosphere” (80), implying that atmosphere is felt within an enclosed space. Wigley in a similar manner claims “to enter a project is to enter an atmosphere” (18). These theorists all develop a similar argument, that architecture is the apparatus for atmosphere.

Another way to define atmosphere is to look at atmosphere itself for a definition. Transsolar and Tetsuo Kondo architects’ installation design at the Museum of Contemporary Art Tokyo articulates Bohmes definition of the spatiality of atmosphere (see fig. 4). The atmosphere in this design is formed by pumping three layers of air into the transparent container. It is not the physical enclosure that creates this sensuous experience, it is the enveloping nature of atmosphere which submerges the occupant in space. Wigley describes this state as a “climate of ephemeral effects that envelops the inhabitant,” (18) creating an intimate connection with the individual. The Cloudscapes installation “is, in effect, an experiment in creating a new type of architectural space, one that achieves integration in engagement with its environment” (Transsolar and Tetsuo Kondo). The installation allows the public to be totally submerged in a collective of intangible effects that are constantly shifting and transforming. This installation design pushes Wigleys argument of an ‘enveloping atmosphere’ to the extreme, by creating an atmosphere that dominates the entire space. The interior space is intensified through this application of ‘affective atmosphere’, forcing a response from the body.

Atmosphere and the body

A common thread in atmospheric discussions is that it is through ‘perception’ that an individual experiences atmosphere. According to Bohme atmosphere is “the common reality of the perceiver and the perceived”, where atmosphere only exists when a present body is sensing and experiencing these effects (122). Anderson elaborates on this argument and states that, “atmospheres are the shared ground from which subjective states and their attendant feelings and emotions emerge” (78). Affective atmospheres occur during the in-between state of subject/object distinction (Anderson 78). Through the design

Fig. 5 Therme Vals, Switzerland, Peter Zumthor.
http://variousmallfires.co.uk/?attachment_id=775

of architecture that charges space with atmosphere, the potential is that this ‘in-between state’ between subject and object can be reinforced, to create an emotional response from the occupant.

Zumthor, a contemporary architect known for his atmospheric architecture, is an example where atmosphere is understood as the primary object of our perception. Zumthor for example states “[w]e perceive atmosphere through our emotional sensibility – a form of perception that works incredibly quickly, and which we humans evidently need to help us survive” (Zumthor 13). Zumthor discusses how atmosphere triggers an emotional response in humans, not unlike music, but in a less powerful manner. Zumthor also argues that humans are capable of having a spontaneous emotional response to space, instantly being able to appreciate or reject. Atmosphere being the key to create a convincing first impression in architecture (Zumthor 13). In Zumthors work atmosphere is his primary goal, where he focuses on the individuals’ emotional response to space.

Can atmosphere be created?

While it has been discussed that atmosphere exists everywhere, this next section looks at how atmosphere could be emphasized in space in order to engage the occupant with architecture. Bohme and Wigleys ideas are useful to the argument as they talk about how architectural elements project their own atmosphere. Bohme discusses how atmosphere lies in-between the subject and the object, he gives examples on how it’s the atmosphere the objects radiate that affects a person’s emotion, rather than the objects themselves (114). Wigleys ideas are similar to Bohme, stating that the atmosphere of a building seems to be produced by the physical form, to construct a building is to construct an atmosphere (18). Wigley believes that the experience of a building is not the physical form, but it is the atmosphere that these forms emit, describing atmosphere as “some kind of sensuous emission of sound, light, heat, smell, and moisture; a swirling climate of intangible effects” (18). Atmosphere is everywhere, it surrounds architecture, emanating from the forms and the objects within it. Through the combination of materials and their distinctive properties, architectural elements contribute to the creation of atmosphere.

Materiality plays a significant part in designing for affective atmosphere. In the paper *Designing for Affect through Affective Matter*, Akari Kidd and Jan Smitheram quote Karen Barad, who states that “[m]ateriality itself is always already a desiring dynamism ... energized and energizing, enlivened and enlivening”(2). Although this explanation moves away from a literal description of materials, it supports the argument that materials are capable of having their own atmosphere, where the properties and characteristics of specific materials create atmosphere.

Zumthor, in creating his atmospheric architecture, focuses on materiality and light. In his book *Atmospheres*, Zumthor outlines nine factors that should be considered when designing for atmosphere. These nine factors are form, material compatibility, sound, temperature, objects, movement, boundaries, proximity and distance, and light. All of these factors are important when designing for atmosphere, but due to the brevity of this research this chapter will only focus on two key points, material and light. Following on from Barad who emphasises that materials have their own charge, this thesis now looks to Zumthors work to establish some strategies in deploying material and light in architecture to create atmospheric charge.

The *Therme Vals* in Switzerland designed by Peter Zumthor is a hotel and a spa which combines a complete sensory experience using a combination of material and light as the primary mediums of design. These baths are presented through a series of spaces with their own distinct atmosphere, where light, shadow and materiality vary to create different spatial conditions. Material is a critical element in the *Therme Vals*, in order to achieve the desired serenity within the space. The use of horizontally stacked stone along the walls, enhances the way in which light reflects from different angles, while also highlighting the linear elements within the space (see fig. 6). The materiality reflects the light in order to enhance thresholds in the space and activate movement paths. Zumthor describes his design process through his own experiences in the baths stating, “...something would be drawing me round the corner – it was the way the light falls, over here, over there: and so I saunter on...” (43), where his movements paths are directed by this seduction of light. The reflection of light and shadow is used as a technique to create an atmospheric journey for the inhabitant.

Fig. 6 *Therme Vals, Switzerland, Peter Zumthor.*
<http://www.archdaily.com/13358/the-therme-vals/>

Fig. 7 *Therme Vals, Switzerland, Peter Zumthor.*
http://thinkingform.com/wp-content/uploads/2011/04/therme_vals10.jpg

Fig. 8 *Therme Vals, Switzerland, Peter Zumthor.*
<http://en.graubuenden.ch/wellness-and-recreation/wellnesses-spas/hot-springs-spas/therme-vals.html>

Some of the most compelling aspects of Zumthors atmospheric architecture is his careful modulation of light and shadow. With a similar approach to Zumthor, Architect Steven Holl describes, “the astonishing phenomena of light and shadow contain mysterious ambiguities that glow elastically in a dreamlike uncertainty” (111), emphasising the dramatic impression light can have in space. Zumthor uses vast areas of shadow in the *Therme Vals*, to emphasise the natural light which pierces through narrow apertures (see fig. 7). Zumthor has carefully used lighting to create a type of ambience, while highlighting necessary elements and surface qualities throughout the design. For Zumthor, the compatibility of materials and understanding how it can celebrate light and shadow is a key part of designing *for* atmosphere in architecture.

In this section this thesis has discussed materiality and light, two factors that contribute in the creation of atmosphere. Drawing specifically from the work of Zumthor and the ideas from Bohme, Anderson and Wigley who discuss how atmosphere is interlinked with enclosure, this research now leads us to surface. Surface being an architectural element that can be designed in a way that brings together ideas of form, materiality and light.

Fig. 9 Kolumba Museum by Peter Zumthor
<http://www.stylepark.com/es/peter-sen-toj/k51>

Surface

From discussing techniques used in contemporary architecture in the previous section, we can begin to understand the importance of materials and light when developing atmospheric qualities in space. This section focuses on surface and how it can become a primary tool in creating atmospheric moments in architecture.

Wigley asks the question, “how is atmosphere constructed?” and argues that it is constructed through its outer surface (20). Wigley draws from Gottfried Semper, in particular where Semper states that the “full force of architecture is to be found in its outer surface, the decorative layer through which the atmosphere seemingly percolates” (Semper, qtd. in Wigley 20). Semper believes surface to be one of the primary tools that an architect can use to produce atmosphere, with Wigley in a similar way stating “that to construct architecture is simply to prop up a surface that produces an atmosphere” (20). Farshid Moussavi, the author of *The function of the ornament*, makes a similar argument to Wigley where he links atmosphere to surface. In his book Moussavi argues that ornaments or objects are intrinsically tied to architectural affects. Moussavi discusses how specific design decisions, such as using the screen, aren’t necessarily crucial to the operation of the interior, but they are vital to the affects they trigger in certain spaces (9). These ‘affects’ are what establishes a desirable relationship with the occupant.

Zumthor, as already discussed, uses surface in his works where he carefully composes materiality in order to give rise to something unique (Zumthor 25). In his design of the ‘Kolumba Museum’ in Germany (built above the ruins of a late-Gothic church), Zumthor carefully designed the facade out of brick work with perforations, allowing diffused light to fill specific spaces of the museum (see fig. 9). Utilising the natural light in combination with surface creates an

ever-changing environment, where the “mottled light shifts and plays across the ruins” (Cilento). These specific lighting techniques create an environment that glorifies the ruins of the interior, without this perforated surface these spaces would not portray a sense of spirituality, history or memory. The perforated surface is the key part of creating the atmospheric journey and overall experience of this interior.

Due to the influential role of surface in architecture, architects now look for alternative and more interactive methods to express buildings through surface, such as kinetics. Jules Moloney argues that this significant shift towards kinetics has opened up new ways to create movement in space, “there is a poetics of movement emerging at the periphery”(3). Representing movement in architecture is not a new thing, but typically architecture has resisted kinetics (Moloney 3). Employing a sense of ‘movement’ in space acts, however, as a tool to engage the user with architecture as Zumthor considers ‘movement’ as one of his nine factors that create atmosphere, describing architecture as a “temporal art” (41). A kinetic surface drives a literal sense of movement into architectural space creating dynamic transformative atmospheres. There are a few contemporary designers who have experimented with movement and kinetic surface. For example, Ned Kahn who is explored further in the next chapter, is an artist who uses natural phenomena such as wind in conjunction with kinetic surfaces. Kahn attempts to create bodily experiences within space through dynamic movements of material and light (see fig. 10). The kinetic surface creates expressive and animated architecture, reinforcing a relationship between the occupant and architecture through atmosphere.

Conclusion

This chapter looked at what atmosphere is, its relationship to the body, how to create atmosphere and specifically creating atmosphere through surface. Since atmosphere has the capability to engage with an occupant, it forces an immediate response to space by the occupier. This relationship is significant to this research in order to understand how to design for atmospheric architecture. This chapter considers a variety of ideas from across disciplines to help understand atmosphere as a concept and as a material reality. Atmosphere as a material reality is explored further in the following chapter on case studies and also through my own design. The following chapter will introduce and critique three case studies that have induced atmospheric qualities through the use of materiality, light and movement in surface to engage with the body.

Fig. 10 Facade of Brisbane Airport by Ned Kahn
<http://nedkahn.com/portfolio/turbulent-line/>

Chapter Three: Precedents

Chapter Three: Precedents

Introduction

The aim of this chapter is to continue the discussion on atmosphere by looking at examples of contemporary design that explore the relationship between surface, atmosphere and the body. This chapter looks at three architectural precedents which use materiality, light and movement to enhance atmosphere in space. The following precedents; Ned Kahn's *'Microturbines'* and *'Wind house'*, Bing Bu's installation design *'The cloud room'* and Ateliers Jean Nouvel's project *'The Louvre Abu Dhabi Museum'* are examples of how surface can form relationships between atmosphere and the body at different scales. Each example forms a strong relationship between surface and the body, with the key connection being atmosphere. These examples will be analysed in terms of their execution and limitations in relation to light, materiality and kinetics.

Fig. 11 (Opposite Page) *The Cloud Room* by Bing Bu
<http://www.archdaily.com/124110/cloud-room-bing-bu/>

Ned Kahn

The ‘*Microturbines*’ and ‘*Wind House*’ installations are examples of how the integration of movement in surface can create atmosphere. Ned Kahns work uses natural phenomena as his primary medium, such as wind, light, fire and water to bring his installations to life. In describing his work Kahn states, “I strive to create artworks that enable viewers to observe and interact with natural processes. I am less interested in creating an alternative reality than I am in capturing, through my art, the mysteriousness of the world around us” (Kahn). The continual movements and phased patterns within the installation create intimate relationships between the artwork and the individual.

‘*Microturbines*’ is a wind installation consisting of a wall that comprised of small, extruded acrylic turbines that spin in the wind (see fig. 12 & 14). These small plastic turbines, capture the light resulting in interesting shadows as they respond to the passing breeze (Kahn). Khan uses soft and translucent materials in this installation, to generate subtle lighting effects. This softness helps the work engage more freely with the nature of the surroundings. Another design of Khan’s is the ‘*Wind House*’, which is a design that consists of four walls of wind-animated panels that create a gossamer suggestion of a building completely permeated by its surrounding atmosphere (Kahn) (see fig. 12). The panels are lifted and swayed when the wind hits them, creating interesting patterns of movement. These installations engage the viewer through the combined effects of the wind and material to make them aware of the wind patterns in the area. The installation generates immaterial qualities that create an intimate relationship between the surface and the body.

Through the manipulation of materiality, transparency and reflection of light, Kahn dissolves the physicality of the art into immaterial qualities, enveloping the

individual in atmosphere. The connection between materiality and atmosphere is apparent within these installations. As mentioned previously, Bohme argues that materials have a specific atmosphere, where “their properties would be understood as conditions of their atmospheric effect” (125). Kahn has chosen materials whose properties are semi-transparent, reflect light and light enough to respond to wind. When these materials are assembled within a surface, the resulting atmosphere enhances the properties of the materials used as well as the local environment. Both of these installations demonstrate how materiality is a key factor in the creation of atmosphere. Kahns work enhances the existing atmosphere that occurs within everyday contexts, showing how surface can generate affective atmosphere at a human scale. This atmospheric architecture is successful at a small scale, but now this thesis will explore whether a kinetic surface can still project affective atmospheres at a larger scale.

Fig. 12 (Opposite page, Above) *Microturbines* Installation by Ned Kahn
<http://nedkahn.com/portfolio/microturbines/>

Fig. 13 (Opposite page, Below) *Wind House* by Ned Kahn
<http://nedkahn.com/portfolio/windhouse/>

Fig. 14 *Microturbines* Installation by Ned Kahn
<http://nedkahn.com/portfolio/microturbines/>

The Cloud room

The *Cloud Room* designed by architect Bing Bu physically encapsulates the body within a realm of atmosphere, challenging the body's experience in space (see fig. 15). The installation sits on the roof terrace of the National Art Museum of China. The room is an observatory, a place to experience the atmosphere of the surroundings, "the translucent interior screen gives a mix of vague pixel urban image intertwined with wind and sun" (Cloud Room / Bing Bu). The experience of this installation embodies Wigleys idea about how it is the "climate of ephemeral effects that envelops the inhabitant, not the building" (Wigley 18). In The Cloud Room the atmospheric experience is also more important than the form of the building.

The walls of the room are made from translucent polycarbonate, with white polycarbonate panels that protrude out towards the cityscape. Each panel revolves according to the wind, reflecting light and shadow into the interior of the room instilling a calm and serene feeling within the space. The two layers of material work together effectively, where the interior wall softens the look of outer layer. In a similar way, Zumthor talks about how the arrangement of materials can impact the atmosphere in space, stating that "materials react with one another and have their radiance, so that the material composition gives rise to something unique" (25). The layering of the two materials in combination with natural light creates affective atmosphere.

The surface is carefully articulated to enhance the individual's experience of space, by using surface as the tool to produce atmosphere in the interior. The materiality of the spinning panels create a constantly shifting atmosphere within the interior. This installation is a precedent for the house in my design in Chapter five because it provides a design strategy that intends to overemphasise the movements that occur within a typical house such as curtains and doors.

Fig. 15 The Cloud Room by Bing Bu
<http://www.archdaily.com/124110/cloud-room-bing-bu/>

Fig. 16 The Louvre Abu Dhabi Museum, designed by Architect Ateliers Jean Nouvel
<http://www.archdaily.com/298058/the-louvre-abu-dhabi-museum-ateliers-jean-nouvel/>

The Louvre Abu Dhabi Museum

The project *Louvre Abu Dhabi Museum* encapsulates the immaterial relationship between the body and architecture in a large scale building (see fig. 16). Surface is explicitly used to form this relationship through its production of atmospheric effects. The Architect, Ateliers Jean Nouvel, aims to create “a welcoming world which associates lights and shadows as well as shimmers and calm places in a serene atmosphere” (Nouvel, qtd. in Furuto). The interior environment of the dome creates an atmospheric experience for the inhabitant, who shifts from one world to another as they enter the building. The atmospheres within these spaces can be thought of as “singular affective qualities that express a certain world” (Anderson 79), due to the bright light channels contrasting against the shadows. Normally one would expect that because this is a large scale building that it is distant to the body. However, in this case atmosphere still engages with the body because the treatment of surface creates an intimate atmosphere in a large scale space.

The atmospheric qualities of the building are created by a perforated surface that spans 180 metres above the museum, filtering dappled light throughout the interior spaces. The perforated triangles on the surface are mapped out to create a random weaved like pattern (Furuto) (see fig. 17). This parametric surface creates “a shadow punctuated with sun bursts” (Furuto) forming a rain of light that floods the interior (see fig. 19 & 20). These light qualities change due to the moving sun, creating a constantly shifting atmosphere. This transformation in light allows the user to experience the building differently at various times of the day, suggesting a sense of movement within the space without the need for a surface that literally moves.

While materiality is not a main focus in this design, the materials in the interior are used as a blank canvas for the light to play on. The minimal colour palette

emphasises the lighting qualities that the surface generates, allowing the light to have greater impact in the interior spaces. The interior forms and materials are designed to capture and illustrate this performance of light, while the exchange of light and shadow transform the solidarity of the forms. The Louvre Abu Dhabi project illustrates how the use of surface can successfully create atmospheric architecture at the public building scale. Light is the key ingredient in this project, generating a sense of atmosphere through this outer surface.

Conclusion

These precedents strengthen the relationship between the body, surface and atmosphere. They are designed to create atmospheric conditions in space, using atmosphere as the mediator in the relationship between architecture and the body. Although these designs do not employ every technique mentioned in the Chapter Two, they all use materiality, movement and light to emphasise atmosphere. These precedents give this thesis examples of design strategies to design a surface that creates ‘affective atmosphere’ in architecture.

Fig. 17 The Louvre Abu Dhabi Museum, designed by Architect Ateliers Jean Nouvel
<http://www.archdaily.com/298058/the-louvre-abu-dhabi-museum-ateliers-jean-nouvel/>

Fig. 18 The Louvre Abu Dhabi Museum, designed by Architect Ateliers Jean Nouvel
<http://www.archdaily.com/298058/the-louvre-abu-dhabi-museum-ateliers-jean-nouvel/>

Fig. 19 The Louvre Abu Dhabi Museum, designed by Architect Ateliers Jean Nouvel
<http://www.archdaily.com/298058/the-louvre-abu-dhabi-museum-ateliers-jean-nouvel/>

Fig. 20 The Louvre Abu Dhabi Museum, designed by Architect Ateliers Jean Nouvel
<http://www.e-architect.co.uk/dubai/louvre-abu-dhabi>

Chapter Four: Installation

STAGE 1

Fig. 21 Final Installation Design.

Chapter Three: Installation

Introduction

This thesis seeks to find how atmosphere can be designed for through the intensification of surface through kinetics at different scales; this chapter addresses the installation, the first of the three scales to test the research proposition. The process begun with extracting the key ideas and elements from Chapter Two and Three, that were then tested through drawings and digital techniques. The final design outcome of this experiment is a mobile architecture than can be adaptable to multiple sites, primarily being fixed to park benches. The installation has been designed to generate atmosphere to engage with the individual at a human scale, creating the foundation for an ongoing inquiry throughout the next two scales, the house and the public building.

Aim

The aim for this stage is to test how atmosphere can be produced through surface at the human scale. Designing for atmosphere through the use of a kinetic surface was the focus for this installation experiment. Parameters were set by the supervisors for this experiment so it was achievable within the time frame allocated for this stage of the design research. These constraints meant that the installation was to be speculative, transportable and to have a maximum weight of 23kg. These factors are not intended to limit the potential of a design, but to ensure the installation was easily transportable and constructible.

Method

The installation has been designed through a process of drawing, digital modelling and physical prototypes. It was imperative that the process moved through these realms of representation to test scale, aesthetic and immaterial qualities from the 2-dimensional drawings to an installation which could be physically tested on site.

Fig. 22 Preliminary concept sketches from workbook.

Fig. 23 Microturbines (Above), <http://nedkahn.com/portfolio/microturbines/>.

Fig. 24 The Cloud Room (Middle), <http://www.archdaily.com/124110/cloud-room-bing-bu/>.

Fig. 25 The Louvre Abu Dhabi Museum (Bottom), <http://www.archdaily.com/298058/the-louvre-abu-dhabi-museum-ateliers-jean-nouvel/>.

Fig. 26 Digital modelling of the installation development testing how different configurations of surface could produce atmosphere.

Site

The installation is designed to be located outside, so there is an opportunity for wind and sunlight to have an effect on its kinetic surface. Ned Kahn's work choreographs natural phenomena, so he tends to site his work in the pristine environment of nature (Mather). However, for this installation to be effective in engaging the viewer, I decided that the site had to activate human interest but still be used as an everyday object within an urban context. For this reason, an everyday park bench that can be found at multiple locations was chosen to be used as a base for the installation at various sites.

Process

Drawing from the 'research for design', the design process begun with experimenting through sketches and digital modelling, testing how different configurations of surface could produce atmosphere. The basis for the initial design arose by extracting form, materiality and movement from the design precedents in Chapter Three. Firstly, the design was sketched out to define the form and scale of the installation. Materiality was also a primary consideration at this concept stage. By extracting immaterial qualities from the drawings, such as negative spaces to work as frames and positive spaces to work as light, the atmosphere of the installation became realisable.

The configuration of the installation developed over a series of iterations that tested how it could integrate with a park bench (see fig. 26). The form developed into a 3-panelled design that sits over the top of a bench using it as an 'anchor' on site. Each panel is hinged to the other allowing the panels to be manipulated and arranged by the user. The middle panel is shortened at the bottom to allow for the bench to sit underneath. The following page shows a series of drawings that were carried out to explore the ways in which the installation could be operated (see fig. 27 & 28).

Fig. 27 Exploring the ways the installation can be folded, arranged and experienced by the user through drawing techniques.

Fig. 28 Exploring the ways the installation can be folded, arranged and experienced by the user through drawing techniques.

Fig. 29 Materiality investigation: Testing translucency, exploring conditions of light and analysing material properties and characteristics. Softer materials, such as the plastic sheets of bubble wrap above, were difficult to manipulate and set up in order to effectively respond to wind forces.

Fig. 30 Materiality investigation continued: Testing translucency, exploring conditions of light and analysing material properties and characteristics. The heavier materials proved to be unsuccessful in creating a shifting atmosphere due to their weight and porosity levels.

As the drawing and digital process were testing atmosphere, materiality was explored simultaneously. Materiality is a crucial part of the installation to create atmosphere as established in Chapter two and three. Material was tested for three properties: its ability to reflect light, ability to move in the wind, and to have a simple aesthetic. *The Cloud Room* installation used polycarbonate walls and panels to create the reflections and blurred conditions within the interior. Using a similar material in the installation enabled me to also create a ‘shifting atmosphere’ through the combination of materiality, light and movement. The polypropylene “corflute” that was tested in the prototypes worked well due to its transparency and lightness. The corflute adequately reflects light and creates slight shadows, while still being semi-transparent (see fig. 32).

Fig. 31 Materiality investigation continued: Testing translucency, exploring conditions of light and analysing material properties and characteristics. These materials were more successful in producing atmospheric effects due to their translucency and ability to reflect light.

Fig. 32 Materiality investigation: Taking the exploration of corflute further by testing its movement ability in wind forces while under different lighting conditions. Corflute was chosen as the most appropriate material for the installation.

Fig. 33 Prototypes were made to test scale, materiality and functionality.

Fig. 34 Photographs of installation being constructed.

Fig. 35 Dimensions for final installation design.

In order for the installation to function, the structure needed to be strong enough to hold all the elements together. Fishing wire, plastic 1mm tubes and 2mm steel wire were tested on small scale models to see which one allowed the lengths of corflute to spin appropriately while still holding shape. The 2mm steel wire proved to be most effective for strength and for aesthetic value. The exterior frame is made from Medium-density fibreboard due to it being light in weight and easily painted to meet the functional and aesthetic requirements of the design.

Fig. 36 Explaining the ways the installation can be folded, arranged and experienced by the user.

Fig. 37 Photograph of the final installation on site.

Fig. 38 Photographs of the process of setting up the installation on various sites.

Fig. 39 Photograph of the installation on site.

Final Scheme

The final design is transportable, foldable and prompts occupation when on site. When folded up the installation measures 1.0m x 0.7m x 0.09m, a size that is easy to manoeuvre and transport by one person. The installation is designed so that the middle panel sits at 450mm high, easily hovering over a park bench. It has three hinged frames that hold together the small panels of corflute which all revolve on 2mm thick wire. The hinges on the frames allow the installation to be moved into different configurations, which can be altered dependant on how the user wants to experience the space.

The installation was set up at different locations around wellington for approximately 30 minute periods. This was a sufficient amount of time for a collection of people to experience its spatial effects. The installation drew in spectators who were engaged by the unique effects generated by the moving surface. Each corflute panel revolves according to the wind, casting moving shadows and reflections on the surroundings. Due to the wind and sun affecting the movement and appearance of the corflute, this semi-transparent partition gives the viewer a mix of blurred images of the surrounding context.

The “in-between status” (Anderson 80) of atmosphere became more apparent through the installation experiments. The effects generated by the installation create an intimate connection between the structure and the body through the play of light on the spinning panels. The intensified space surrounding the installation is due to the effects of the surface but also because the installation disrupts how one would normally occupy a seat, simply through the positioning of the installation. Anderson talks about how the atmosphere of the ‘aesthetic object’ creates a space of intensity, also stating that “it is through an atmosphere that a represented object will be apprehended and will take on a certain meaning” (79). In this case the installation is not complete without the viewers that ‘apprehend’ it, this experiment relies on the relationship between the ‘object’ and the ‘subject’.

The installation also addresses the idea of occupation as it prompts the body into engagement, encouraging the user to manipulate the surface to create varying atmospheric conditions. The angle of the surface to the wind direction dictates how fast the panels will spin, so the user can decide on the intensity of the effects in the space they inhabit. The user can enclose themselves within the panels of the surface, immersing themselves in atmosphere. Anderson addresses this state of ‘enclosure’ in his paper proposing that atmosphere can either occupy a space or permeate it (80), where in this installation atmosphere permeates the space through the surface. Through my experience, immersing yourself within the closed surfaces of the installation intensifies the atmospheric effects of the wind and light, driving atmosphere to be the primary focus of the spectator.

The relationship between public and private space is also brought up during the experimentation process, where the ‘screen’ is a typical element used in separating space. Certain configuration patterns of the installation meant that there was the sense of a private space within the public realm. This questions whether the occupant felt a sense of privacy during their individual experience of space. This idea will be explored further at larger scales where privacy becomes a more important issue in a housing or public building scheme.

Fig. 40 (Left Page) Photographs of the process of setting up the installation on various sites.

Fig. 41 Photograph of the installation attracting observers at one of the various sites on Wellingtons waterfront.

Fig. 42 Photograph of an individual experimenting with the installation.

Fig. 43 Photograph of the installation with the atmosphere produced by the installation enhanced through digital effects.

Fig. 44 Photograph of the installation with the atmosphere produced by the installation enhanced through digital effects.

Reflection / Conclusion

Atmosphere is continually challenged and transformed through the action of natural phenomena, wind and sunlight. Atmosphere is designed for through this intensification of surface, combining the uncontrolled forces of the natural phenomena with the materiality of the surface. This first design inquiry tests the architectural implications of designing for atmosphere at the human scale. This was achieved by designing an interactive, kinetic installation that engaged the body psychologically and physically. The drawings, diagrams and models helped to explore the effect of the installation through different mediums. The installation uses the kinetic surface as a tool to create atmosphere. It constructs a relationship between atmosphere and the spectator through the intensification of surface.

Since the installation is capable of adapting to multiple sites, it showed that surface can implement atmosphere in everyday places without the need for a building. While this process explored one way to design for atmosphere at the human scale, it raised questions about how to design for atmosphere at the second stage, the house, when a specific programme and site is required.

Fig. 45 (Left Page) A close up photograph of the installation during an experiment on Wellingtons waterfront.

Chapter Five: House

STAGE 2

Fig. 46 Exterior view of house design.

Chapter Five: House

Introduction

This thesis seeks to find how atmosphere can be designed for through the intensification of surface through kinetics at different scales; following on from the installation stage, this chapter explores the design proposition at the scale of a house. The transition from the installation to the house proposes certain challenges due to the shift in scale such as programmatic and site constraints. A regular suburban site was allocated by the supervisors in order to let the design operate within an everyday environment. The idea of a ‘private space within a public realm’ was significant in the installation experiment, and was carried through to this house design; where a private residence is cross-programmed with a community garden. This cross-programming was chosen to help this research comprehend how surface might interact within the two different programmes, where it tests porosity levels and layering to enhance atmospheric qualities in space. The final outcome for this stage will be a speculative home.

Aim

The aim of this experiment is to test how surface operates within the ‘housing scale’, and how atmosphere can be *designed for* through surface. Since it is not possible to control someone’s perception of atmosphere this thesis attempts to push for an atmosphere that will affectively engage with people, rather than specifically targeting a type of ambience or tone. Throughout this stage multiple experiments are carried out in order to test surface affect and reflect on these design outcomes to produce a final design.

Method

The experimentation process begins with a series of sketches that extract site conditions and parameters that are overlapped to look at the in-between spaces on site, which are then overemphasised to create atmosphere on the site. This lead into physical and digital modelling to represent these ideas three dimensionally.

Site

The design is sited at 10 Clermont Terrace, Kelburn, a small section that is enveloped by neighbouring houses. A brief site analysis was carried out to understand the parameters of the site such as: size, existing vegetation and trees, sun paths, and views to the city (see fig. 49 & 50). This site information was gathered from the Wellington City Council website. Another analysis was carried out to assess the surrounding houses and how they impact the site, physically and visually (see fig. 51). These neighbouring houses are one of the key parameters considered in this design phase.

Fig. 49 Site with house labels.

Fig. 50 Site analysis showing impacting conditions and potential areas for design.

Fig. 51 Site analysis showing the impact of the surrounding houses.

Fig. 47 (Above) Photographs of the site.

Fig. 48 Diagram showing the design brief for the house design.

Programme

The design is a house that is cross-programmed with a community garden. The brief for the house is an exemplar of a standard three bedroom family home within a suburban environment. The community garden brief reflects the basic needs for a public garden to successfully operate within a suburban context.

Process

The design process began with a series of drawings and sketches that illustrate the way the house could be broken up into layers of surface. Drawing is a crucial step in this process as the line drawing projects intangible characteristics that can flow into the experience of the building (Hill 56). These sketches explore the effect of layering, where the surface may vary in materiality and transparency, resulting in parts that are more public and other parts that are more private (see fig. 52). These drawings test the orientation of surface and give an understanding of where the levels of ambiguity start to develop on site.

The extremes of these ideas are tested by pushing past the boundary of the site, forcing the connection between the house and its context (see fig. 56). The next step involved the transferral of the two-dimensional drawings into a three dimensional reality. When the shift from paper to three dimensional modelling occurred, key elements were extracted from the preliminary drawings in order to derive the main spaces in the design. These elements were then assembled within the three-dimensional realm to create an expression of a built reality (see fig. 57).

Fig. 52 (Including opposite page) These sketches look at scale within the site and map out varying types of surfaces. There are three layers in the sketch, revealing 'in-between' spaces. This ambiguous layering intends to blur the boundaries of the house, to create an atmospheric experience on the interior, exterior and the 'in-between' spaces.

Concept one

Fig. 53 Initial design concepts exploring ways of integrating the kinetic facade into a housing scheme.

Concept Two

Concept Three

Fig. 54 Concept development

Figures 53, 54 and 55 show some of the initial designs that were conceived through digital modelling to test how form may work on site. The use of a kinetic surface is designed to weave in and around the site, establishing the interior and exterior spaces of a house.

Design iteration three was designed with the kinetic surface on the façade of the building (see fig. 55). The surface from the installation was scaled up to act as the façade of the house. This concept was effective in terms of engaging the user from the initial approach to the entrance area, but it did not contribute to the creation of atmosphere throughout all the spaces, only impacting the spaces directly adjacent to the facade.

Fig. 55 Design iteration three was designed with a kinetic surface that was limited to the facade of the house.

Fig. 56 The previous design explorations are reflected on and taken to the next stage of design, where the surrounding buildings, roads and empty lots are used as part of the building scheme. These drawings shown above focus on the outer layer of the design and looked to push the idea of public and private space and testing how the surface can be folded into the interior. These ideas are taken to the extreme by creating an outer layer that attaches itself to the surrounding elements in order to give it form and stability.

Fig. 57 These digital models shown above explore different configurations of surface, derived from the neighbouring elements that have an impact on the site, shown in the site analysis that could be drawn into the design.

Fig. 58 Physical modelling testing the form and layering of surface while wrapping the kinetic surface through the building.

Fig. 59 Sketch iterations of the plan exploring the overall layout for the house and community garden through the combination of programmatic requirements and surface.

Fig. 60 (Above) Section explores how surface intersects with the existing houses.
 Fig. 61 (Below) Diagrams identifying top floor and ground floor zones within the scheme.

Fig. 62 Sketch exploring how this form might interact with the neighbouring houses.

Fig. 63 With the plan and programme set, the investigation returns to exploring how to design for atmosphere through surface. Above are preliminary sketches of the kinetic surface design. Drawing key ideas specifically from the installation design to influence materiality and form.

Fig. 64 Continuing the surface exploration through digital modelling for the final house design. This experiment looks at surface design, scale, light and shadow qualities.

Fig. 65 Sketches of a three-dimensional surface that varies in porosity levels and can be folded and manipulated by the user.

Fig. 66 Continuing the surface exploration through digital modelling. Testing two different types of surface design, the overlapping of surface and the potential for bringing in two types of surface that vary in porosity levels.

Fig. 67 A three-dimensional diagram of how the surface will operate in the spaces around the house and community garden.

Fig. 68 Developing the final surface by testing how it could produce atmosphere through digital modelling techniques that tests the configuration of the surface, controlling the amount of light and wind within the interior.

Fig. 69 Testing the atmospheric qualities produced within the interior spaces of the house at different times of the day, focusing on light, materiality and scale.

Fig. 70 The final programme layout of the design.

Final Scheme

The final scheme is a series of multi-layered surfaces projecting varying levels of light and moving shadows that shift across the interior spaces. The main living spaces are fixed to the neighbouring houses, pushing and collapsing the limits of the site boundaries by intervening on other houses. These spaces are separated through pathways that contain the plant boxes and main areas for the community garden. Both the house and the gardens are accessed from the main street at ground level. When the occupant arrives at the first floor they will be immediately immersed in dapples of shifting light, creating a serene, atmospheric experience generated through these kinetic surfaces.

Fig. 71 Exterior view of house.

Fig. 72 Plan showing areas that are Public (PU) or Private (PR).

Fig. 73 Plan view of house design showing interior views that are shown in the following images.

Fig. 74 Interior view One.
This view shows the surface creating atmosphere within the garden pathways.

The atmosphere in the interior spaces are constantly transforming due to the moving sun and fluctuating wind force, similar to the ones generated in the *Cloud Room*. The effects of the kinetic surface can be controlled through manual screens that can be manipulated by the occupant, influencing the light qualities within a space. The kinetic screens are assigned to particular functions throughout the design, where they are specifically positioned on the pathways that contain the community gardens (see fig. 74). The light qualities generated by these surfaces are similar to the ones produced by the installation, but since there are more of them, the effects create a more overwhelming experience. While the private spaces still receive subtle lighting effects from the surface, the atmosphere in these interiors are much more calm and serene.

These pathways through the gardens are animated through the lighting qualities generated by the uncontrolled wind force on the kinetic surface. The effects from the surface evokes movement and activity throughout these passages reflecting the techniques that Zumthors employed in the *Therme Vals*, where he uses the seduction of light to steer the occupant through his architecture. This design experiments with this type of technique but extends it to use the uncontrollable aspect of natural phenomena to create sequences of flickering light to lure the occupant through space (see fig. 74 & 75).

Fig. 75 Interior view Two.
This view demonstrates how surface creates unique spatial conditions in areas where people are more active.

Fig. 76 Interior view Three.
Showing how the occupant will be immediately immersed in dapples of shifting light when they reach the first floor, created by the kinetic surfaces.

Through materiality, the porosity levels of the surfaces vary to mediate between the two programmes. Privacy is achieved through the layering of materials, influencing the function of a room and also determining the visual and physical connections between spaces. The white polycarbonate panels reflect light while maintaining translucency between spaces. The materials, specifically in the gardening areas, contribute to the overall mood of the design, where the simplistic yet effective polycarbonate panels set the ‘mood’ in each space (see fig. 75). The materials, in combination with light and sound, produce an affective atmosphere throughout the spaces. The design decisions were informed by Bohme, who states that “[a] feeling can be produced through the choice of objects, colours and sounds...” (123), where in this case the materials were chosen to emit a calm and uplifting atmosphere.

Fig. 77 Elevation perspective of exterior.

Reflection / Conclusion

This second design inquiry tests the architectural implications of designing for atmosphere at the house scale. This was carried out through a cross programming scheme that looks at atmosphere, surface and public/private space. This design for a house cross-programmed with a community garden uses a kinetic surface to produce atmosphere, specifically within the garden areas. This positioning of surface heightens the experience for the inhabitant as they undergo a journey that leads them through different intensity levels of atmosphere. The cross between the garden and the house programmes enabled the design research to shift according to the type of occupation or activity in each space. The kinetic façade intensifies the action of gardening through the moving light qualities, reflecting ideas such as activity and movement. Material is used discretely within this design, where the polycarbonate panels allow the light to pass through and reflect off the surfaces. This design also pushes conventional ideas of site boundary and public and private space through the design of the surface and screen. However, pushing the building past the boundary lines meant that the focus shifted from creating atmospheric space to the relationship between public and private. The different ways of implementing movement, materiality and light that were explored in this design research, will be carried through to the next scale, a design for a public building.

Chapter Six: Public Building

STAGE 3

Fig. 78 Facade of Public Building.

Chapter Six: Public Building

Introduction

This chapter introduces the Public Building design, the last of the three scales that tests the research proposition in this thesis. This stage explores how surface could generate atmosphere in a public building. Evident in the installation and the house design were different design strategies, where techniques such as the use of light, materiality and form created atmosphere. These design strategies and techniques are carried through and explored in the Public building. The site analysis, programmatic requirements and design resolution are much more complex, while the overall design still remains experimental. The final outcome for this stage is a speculative public building design located in Wellington's Civic Square.

Aim

The aim of this public building design is to create a metaphorical joint between the surrounding buildings and to help provide a more functional and lively civic square through atmosphere. The proposition, to explore kinetic surface to create atmosphere, is slightly modified due to the needs of the site and public building programme. This project is not looking to solve all the issues that come up in the site analysis, but it will strive to increase the quality and usability of the space in Wellington's Civic Square. The design will be an intervention that will initiate a relationship between the inner area and outer buildings of the square.

Method

The process of design begins through drawings and then develops into three-dimensional inquiry. The initial design experiments were grounded in the initial site exploration, where the site conditions influenced the surface arrangement of the design. Due to this large scaled investigation, surface will be tested through digital modelling techniques, in order to understand its proportion, size and its atmospheric effect within the site context.

Site

Wellington's Civic Square was selected by the supervisors for this project. It is appropriate for this thesis investigation because the current programs, buildings and overall identity aren't successfully working together, creating a non-civic like space. My critical approach to the site comes from Frederick Law Olmsted's idea of the "inner park" and the "outer park", where "[a]n active, welcoming outer square is essential to the well-being of the inner square" (Project for Public Spaces). This is relevant to this site since the buildings that currently surround the square effect its accessibility and use.

The creation of Civic Square was completed in 1992, with the 'outer circle' of buildings consisting of the Central City Library, the town hall, the City Art Gallery, Wellington City Council offices and a small learning centre for children. The 'inner circle' of the civic square consists of vast areas of brick pavement for 'civic-like' activities with a few public seats. This design intends to tie together this 'outer and inner circle' through a designed intervention. The current public attractions in the square are the Public Library, City Art Gallery, and Capital E, which are all vital to the success of Civic Square as they contribute to social events and activity.

A town square is a place for social activities, in the book *Life Between Buildings*, Jan Gehl states that "social activities occur spontaneously, as a direct consequence of people moving about and being in the same spaces" (14). This design project intends to promote 'spontaneous' activity by introducing new programmes that will draw people into the square.

To support this, this project first looked at what was already occurring on the site. The following site analysis was carried out based on Kevin Lynch's theory in the book *Image of the City*. Lynch's methodology for site analysis is to make a visual map that analyses factors such as existing form, public image, access routes etc. to understand critical problems and opportunities within a space (Lynch 116). Following on the next page is a list of site positives and negatives that will influence the design for the Public Building that were developed from Lynch's work.

Fig. 79 Final design is located in the Civic Square, Wellington City, New Zealand.
 Fig. 80 Civic Square is located in central Wellington in a business district near the waterfront.

Fig. 81 A three dimensional digital model showing the current programmes within Civic Square.

Fig. 82 Site analysis: Pedestrian access routes and areas of congregation.

Fig. 83 Site analysis: Evaluation of the relationships between the building edges to Civic Square.

Site Positives:

- The rectangular grid of the civic square is defined by the City Gallery, promoting a relationship between the 'inner circle' and 'outer circle'.
- Adequate greenery for people to use for picnics and relaxing.
- The public library and the art gallery are positive attractions.
- Great display of architectural heritage, with the Town Hall being registered as a category one heritage site, and the City Art Gallery listed as a category two.

Site Negatives:

- Lack of coherency in the boundaries and the edges of civic square.
- Weak relationships between the facades of the surrounding buildings and the civic square.
- The majority of programmes in the square do not contribute in activating the square.
- Lack of attractions e.g. fountains, sculptures, entertainment opportunities.

By improving the quality of Civic Square, it will become a destination for people, rather than just being used as a convenient access route. It feels incomplete, partly due to the lack of connection between its 'inner and outer circle' and partly due to its lack of identity.

Fig. 84 Site analysis: Showing main areas considered for the intervention. These areas are located at the main entrances, while being adequately dispersed throughout the square, promoting 'spontaneous' activity that will draw people into the square.

Fig. 85 A mapping exercise exploring the current access routes within Civic Square and how they could be integrated with the new design.

Process

Following the site analysis, the programmatic requirements needed to be established before the design could begin. Particular programmes were chosen for their suitability to draw people into the square such as cafes, restaurants, retail spaces and accommodation. A mapping exercise explored where different programmes could be located within the square while considering circulation and access routes (see fig. 85). The intervention is to be considered as a mediating device between the 'outer square' and the 'inner square', therefore the programming within the square is imperative.

Similar to the home and installation, the form of the overall design was initiated through a series of sketches and drawings. By using overlaying techniques to consider how surface could interact and relate to the existing site. A series of flat surfaces were overlaid on to site images to test how this layering of surface could divide up the square into separate spaces (see fig. 87). These experiments resulted in opportunities for spaces that could allow for the dispersal of activity throughout civic square.

Fig. 86 Mapping out potential layouts for the new programmes. The programmes were tested in different configurations to see how they would function during civic-like events and activate social activity.

Fig. 87 Overlaying a series of surface planes on the site to test how different spaces can be created in the new design. Surface is tested horizontally, vertically and diagonally to understand the existing spatial proportions within Civic Square. These surface planes are also beginning to intimate forms that could be developed for the final design.

These surface planes are then translated into physical paper models where the complexity of form increased by experimenting with folding techniques (see fig. 88). These models explored how surface could fold and turn in order to activate functional requirements for particular programmes. In the installation and the home designs surface was treated as a flat plane, with its defining properties being its materiality and kinetic nature. Whereas due the increase in scale in this third stage, surface becomes more three dimensional and as a result the form of the design takes a more important role.

Through the combination of drawing and modelling the general form was developed into a folding surface that intervenes with the existing buildings in Civic Square. The layering effect evident in the house experiment is brought through to this larger scale, where an outer surface and inner surface operate at different scales. Rotating panels, which were first explored in the installation, are also brought through into the public building, operating on the outer surface but at a much larger scale. The outer and inner surface offer different porosity levels to create unique atmospheric effects that differ throughout each programme. The form configuration alternates depending on the functional requirements of each programme.

Fig. 88 (Opposite Page) Paper model exploring form.

Fig. 89 (Opposite Page) Sketch exploration of possible surface configurations on site.
 Fig. 90 Sketches of potential section cuts on site.

Fig. 91 Form development of the intervention drawing from the previous sketch and paper model experiments, working towards different ways of occupying space within a series of layers.

Fig. 92 The developed form is then tested on the site through digital modelling. The final form integrated with the existing buildings allows for different surface arrangements that create unique atmospheric space.

Fig. 93 The final programme is developed along side the form development.

Final Design

Fig. 94 Exterior view of design from waterfront.

Fig. 95 Image showing the old versus the new.

Fig. 96 Final programme layout.

Final scheme

Programme:

This design spans from Victoria Street to the waterfront where surface evokes movement, dynamism and activity creating an atmosphere that impacts the entire square. The intervention is a mixed use complex where the programmes are dispersed around the square in order to draw people in. Each area is defined by an enveloping surface where the programme impacts the surface arrangement creating different atmospheres.

Fig. 97 Final scheme in Civic Square.

PROGRAMME KEY

- 1 CIVIC SQUARE
- 2 SERVICE AREA
- 3 CAFE
- 4 RESTAURANTS
- 5 RESTAURANTS
- 6 MAIN CONVENTION CENTRE SPACE
- 7 SMALL AUDITORIUM
- 8 EVENT SPACE
- 9 LARGE AUDITORIUM
- 10 SMALL CONFERENCE ROOM
- 11 RECEPTION FOR APARTMENTS
- 12 SERVICED APARTMENTS

The largest programme in the design is a convention centre, which is accompanied by serviced apartments (see fig. 98). The convention centre has small and large conference rooms, two auditorium spaces and a garden bar. The serviced apartments have a reception area at the ground floor which is accessed from Wakefield Street. These apartments are ideal for people who are attending conferences in the convention centre. Below the convention centre, cafés and restaurants open up to the civic square creating that desired connection between the square and its surrounding buildings.

Fig. 98 (Opposite Page) SECTION AA. Section cut showing the interior of the conference centre, the cafe's and restaurants, and the serviced apartments.

Fig. 101 South Elevation of design.

The smaller programmes within the intervention include an extension of the art gallery, retail outlets, an outdoor bar, breakout space for the Michael Fowler Centre, an outdoor art gallery and a picnic area. These are supplementary programmes that contribute towards the new convention centre, as well as the existing programmes. The picnic area is designed to subtly introduce the visitor to the intervention, by providing a folding surface that creates seating and covered areas for picnicking. The retail area begins at Victoria Street and leads people into the main square by offering boutique retail outlets and food stalls. The outdoor bar creates a breakout space for the auditorium in the Michael Fowler Centre while providing a link to the square. These supplementary programmes re-establish the relationship between the 'inner and outer square', by introducing programmes that push past the harsh building edges. This design intends to help Civic Square become an important part of everyday activities of the local residents and visitors alike, re-establishing its identity and significance in Wellington.

- 1 PICNIC AREA
- 2 BAR AND BREAKOUT SPACE
- 3 CAFE / RESTAURANTS
- 4 CONVENTION CENTRE
- 5 ROOFTOP GARDEN BAR
- 6 SEATING AREA
- 7 RETAIL

Surface:

The process of investigation throughout this research has focused on different scales of surface, where the thesis has looked at the micro-scale to the macro-scale. At this stage of the design experiment surface is mainly dealt with at the macro-scale, where the physical interaction with surface will be limited. The primary relationship will be formed through emotional and psychological means, linking back to Andersons and Zumthors discussion on the emotional impact of atmosphere in Chapter Two. As a result, the surface operates in two layers, with the primary surface being the 'outer' layer which is scaled slighter larger than the 'inner' layer (see fig. 103). Both layers are able to respond to programme relationships and lighting requirements. Design tests were undertaken to study geometric shape, kinetic ability, orientation and permeability levels in order to design a composition for the façade. Three main areas were focused on in order to represent how surface operates within this design, these are: the conference centre, the rooftop garden and the art gallery extension.

Fig. 102 (Opposite Page) View of Civic Square showing the atmosphere generated by the kinetic surface.

Final Surface Design

OUTER SURFACE WITH KINETIC LOUVRES

Fig. 104 (Opposite Page) Inner surface.

Fig. 103 Diagrams showing the 'outer' and 'inner' surface layers.

INNER SURFACES WITH VARYING DEGREES OF
POROSITY, MATERIALITY AND FORM

The outer layer of surface is the most prominent in the design. The surface is comprised of diamond shaped louvres that collectively create dynamic lighting effects, conjuring up atmospheric qualities within the square. This folding surface filters sunlight within the interiors of the intervention and throughout the 'inner square' (see fig. 105). Due to the sheer scale of the surface the material options for construction were limited. The surface needed to have reflective and translucent qualities with slender and intricate detailing in order to produce certain atmospheric effects, while acting as a structural element. The diamond shaped louvers are designed to be made out of strong steel elements so the surface as a whole can be structural while still capable of producing atmosphere. The steel is primed so its reflective qualities are enhanced and used to produce vibrant light qualities around the square.

This outer layer explores the kinetic aspect of surface which has been a consistent component in each stage of this research. Specific parts of the surface consist of kinetic louvres that are designed to spin in the prevailing wind. Due to the large scale of these louvres, it is only necessary to have a select few that are kinetic in order to evoke movement and vibrant effects in the square. The kinetic façade has a prominent impact on the interior spaces and the outdoor areas of the square, due to the moving geometry which casts dappled light across surfaces. This light subtly dissolves in and out of intensity levels depending on the weather.

Fig. 105 (Opposite Page) View of Civic Square immersed in atmosphere.

Rooftop Garden Bar

The 'inner' layer supplements this outer layer in terms of creating functional spaces for the different programmes. This inner layer varies in porosity levels, form, and aesthetics depending on the requirement of the space. For example, the inner surface creates a light filter for the rooftop garden bar, while still reflecting a similar diamond pattern that is on the outer surface (see fig. 106). These diamond shapes are a scaled down version of this 'outer' surface, so the effects don't suppress the functionality of the space (see fig. 107). The diamonds are either solid to provide shelter from the weather and some are fully penetrable to embrace light. The surface crafts unique light conditions within the space depending on the time of day and weather conditions (see fig. 108).

Fig. 106 (Opposite Page) Roof top garden bar.

Rooftop Garden Bar

Fig. 107 Design test testing how the change in surface in the roof top garden bar can produce atmosphere.

Rooftop Garden Bar

Fig. 108 Design test showing the shifting atmosphere during different times of the day in the rooftop garden bar.

Outdoor Art Gallery

The outdoor art gallery space is an extension of the existing art gallery building, where art can be on display at all times. Both the inner and outer surfaces contribute to the activation of this space, through form and atmospheric effects (see fig. 109). The outer surface provides filtered and dappled lighting effects through its louvres and kinetic panels, where the inner surface consists of a folded plane that shades the interior and provides areas for artwork to be displayed (see fig. 110). The materiality of the inner layer is a solid plane that contrasts with the outer layer. The materiality acts as a canvas for the light and shadow to shift across. The small breaks in the inner surface create bursts of light penetrating the darkness at multiple places throughout the gallery. This is designed to continuously affect the individual's response to space and create a sense of awareness of the ever changing atmosphere.

Fig. 109 (Opposite Page) Art Gallery interior view.

Fig. 110 (Above) Diagram testing the relationship between the 'inner' and 'outer' surface in the Art Gallery.

Picnic Area

Fig. 111 Design exploration of the picnic area where the surface operates at a smaller scale.

Main Walkway

Fig. 112 Design exploration of the walkway from Victoria Street where the surface operates at two scales.

Fig. 113 Interior view of the fourth floor of the conference centre.

Fig. 114 Breakout Space from Michael Fowler Centre and boutique bar area.

Reflection / Conclusion

Due to this extreme redesign of Civic Square, this experiment challenges the idea of a typical town 'square' and how it might bring communities together. The threshold between the 'inner and outer circle' is broken up through the use of surface, form and their combined integrative programmes establishing new relationships within the square. Picnic areas and extra seating area are offered to create a community type feel within this design. The design still allows for 'civic-like' events such as protests, concerts and markets while revitalising the space, creating a fresh identity for Civic Square.

The main focus for this final design looked at how surface could generate atmosphere at a public building scale. While acting as its own entity this design tested how surface could create atmospheric effects that engage the inhabitants, reflect programmatic requirements, while providing functional and lively spaces within Wellington's Civic Square. The overall atmosphere within the square is generated by the perforated screens and kinetic louvres that tower over the central square. The large stretch of surface generates an overwhelming experience for the occupant when they move from the outer streets into the inner square. The atmosphere intends to emphasise the social happenings, public events and 'civic-like' activities that will occur within these new-found spaces.

Fig. 115 (Opposite Page) Exterior view of design showing the atmosphere generated from the surface at night.

Chapter Seven: Conclusion & Critical Reflection

Chapter Seven: Conclusion & Critical Reflection

This thesis looked at how atmosphere created by surface can strengthen the relationship between the body and architecture. Throughout this research inquiry the aim was to improve the experience of the occupants by engaging them with the built environment. The design outputs in this thesis benefited from the exchange between theory and practice, where the theoretical ideas defined in Chapter two were tested through a multi-scaled design process. Chapter two also looked at theoretical approaches to atmosphere and also how similar ideas were developed in architectural practice, using Peter Zumthors work as an example. These ideas were explored further through Chapter three where the design strategies of Ned Kahn, Bing Bu and Ateliers Jean Nouvel focused on key elements such as light, materiality and movement to create atmosphere.

The three design experiments in this thesis all tested how atmosphere could be designed for. The installation began as the starting point for the process, which allowed for a more intimate understanding of the body's relationship with the built environment and how atmosphere can be experienced at a bodily scale. The installation came to life when tested on multiple sites, the combination of

materiality, light and movement intensified the spatial qualities around it. Key ideas uncovered in this experiment such as material effects, engagement with the occupant and public and private space were translated into the house stage.

In designing for atmosphere, the house design prompts the body into motion through a series of kinetic surfaces. These surfaces convey a sense of liveliness and energy throughout particular areas where occupants are active. The play between public and private spaces were carried through from the installation where the porosity levels of surface were dependent on the programme requirements. Experimenting with the layering of surface created new ways to deal with transparency, light and public and private space.

For the final stage, the resulting building emerged as a layered surface that integrates with the existing buildings in Civic Square. Materiality and light are the two key interplaying elements that create a shifting atmosphere within the square. Light is filtered through surface in ways that subtly evokes movement and activity within the square. Materiality is used to provide structural support while contributing to atmospheric effects. The material differs between the outer layer and inner layer of surface in order to accommodate different programmes.

The final building tests the ability of surface as a method to design atmospheric architecture at the public building scale.

Some experiments were more successful than others in terms of reflecting on how to design for atmosphere through surface. Testing the research question at three different scales created opportunity for analysis and evaluation to occur throughout the process. The three different scales enables this criticism to feed back into the experimental process at each stage and informing subsequent design iterations. The transition from the theory section to practical design proved to be challenging, so a path was chosen that pulled together a few key design strategies that had the potential to be effective in the design inquiry such as kinetics, light and materiality.

The first experiment (the installation) was successful in designing for atmosphere through a kinetic surface that engaged the body physically and psychologically. It offered the opportunity for people to experience atmosphere while physically engaging with the kinetic surface. Further development of this section would benefit from creating more iterations of the installation design, re-testing and experimenting with materiality and scale to potentially create a surface that was not limited to a flat plane. The combination of material and light was successful in creating dappled lighting effects which was taken forward into the house design.

In the second experiment (the house), surface was designed to produce atmosphere that reflected the movement and activity that occurred within the programmes. The move from the installation to the house proved challenging. The ideas of public and private space that were looked at in the installation were brought through to this experiment which weren't directly significant to the research proposition of exploring kinetic surfaces to create atmosphere. Although somewhat veering from the proposition, the successful aspects from this stage included the use of varying porosity levels, adjustable screens and the overlapping of surface which contributed to the creation of unique spatial conditions and atmosphere.

The third experiment (the public building), developed ideas such as light, materiality and public/private space from the first two experiments. Limitations such as materiality choice and the occupant's opportunity for physical engagement were encountered due to the sheer increase of scale. The overall design intervention was successful in establishing a series of atmospheric spaces creating unique experiences for occupants within the square. Due to the brevity of this thesis it was not possible to resolve this design. Supplementary tests could include, but not limited to, further variances in scale throughout the square, sound effect analysis of the kinetic surface and further materiality tests looking at how its effects operate at such a large scale.

In terms of the design method, manual and digital techniques were used to represent and portray a sense of atmosphere which was essential throughout this research inquiry. Since this thesis is limited by its representation on paper, two dimensional images are carefully manipulated to give the reader a sense of the atmospheric qualities within each design. Testing and experimenting within the digital realm offered a better understanding of the spatial qualities that could be achieved when designing for atmosphere.

In conclusion, both the process and the final outcomes of each stage all contribute to the investigation into how atmosphere can be designed for through a kinetic surface. By filtering through the most successful ideas at each design output, it enabled smooth transitions from one stage to the next. Each design output supported the research showing that sensuous and affective atmosphere can be produced through the manipulation of light, materiality and movement. The result of this thesis consists of three designs that produce atmosphere through surface, engaging the body with architecture at three increasing scales. As previously covered, Wigley states that atmosphere is constructed through the outer surface, yet this thesis shows that atmosphere is constructed through the interplay between the outer and inner surface. This thesis concludes with an architectural strategy of using a double layered kinetic surface in a public building to create atmosphere that forms a strong relationship with the body, through light, movement and materiality.

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