ADORATION OF THE JOINT

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Look round the world: contemplate the whole and every part of it: you will find it to be nothing but one great machine, subdivided into an infinite number of lesser machines, which again admit of subdivisions to a degree beyond what human senses and faculties can trace and explain. All these various machines, and even their most minute parts, are adjusted to each other with an accuracy which ravishes into admiration all men who have ever contemplated them.

– David Hume, *Dialogues Concerning Natural Religion* (1779)

ABSTRACT

At many sites across New Zealand, industrial demands and the built environment have taken precedence over considerations for neighbouring natural settings, with a lack of threshold or transitional space between the two often leading to heavy contextual clashes. This is a prominent issue where the Korokoro Recreation Reserve meets the numerous industrial sites at Cornish Street in Lower Hutt, Wellington.

The aim of this research is to address these fragile contextual issues with an architectural intervention that acts like a joint on multiple theoretical levels, furthering our understanding of how architecture can contribute to the landscape, establishing a narrative between two conflicting conditions while establishing a transitional threshold between them.

Marco Frascari and Kenneth Frampton write on the theory of synecdoche in architecture and the capacity of details as generators, evidencing the skilful joining and consideration of parts, defined as 'a process of signification' resulting in synecdochal architecture, in which a part is made to represent the whole and vice versa. When architecture evidences synecdoche, a sensitive viewer can understand an architectural intervention's underlying meaning and understand architecture as a set of dialogues. Through these means of enabling a greater understanding of architecture, the humble joint provides a didactic role, and through this didactic capability people may come to see and understand the important role that architecture can play in the context of its natural environment.

PREFACE

The nature of the joint has been of interest to me as long as I can remember. From a young age I would find myself in the workshop of the family home, piecing together miscellaneous pieces of timber with an endless selection of bolts, nails and fixings that were surplus to the requirements of my fathers latest project.

As time passed, I graduated from off cuts and hand saws to the endless supply of dressed timber and power tools which hung from the workshop walls. One experiment after another I would slowly learn the basics of timber joinery and its close relationship to the working drawing.

This thesis seeks to translate my passion for the joint into architecture, utilizing many of the mediums and design processes I have explored over the years and inspired by some of the most influential theorists I have encountered throughout my studies.

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1.0 INTRODUCTION

Kenneth Frampton and Marco Frascari posit the importance of the architectural joint "as an intersection embodying the whole in the part" and as "the place where both the construction of the construing and the architecture take place". Both theorists allude directly to architectural synecdoche, where a part can convey the story of the whole, and the whole can convey the story of the part – the "construction of the construing".

The joint [can be] treated as a kind of tectonic condensation; as an intersection embodying the whole in the part, irrespective of whether the connection in question is an articulation or a bearing or even an altogether larger linking component such as a stair or a bridge.

– Kenneth Frampton, "Carlo Scarpa and the Adoration of the Joint" in *Studies in tectonic culture; the poetics of construction in nineteenth and twentieth century architecture*

In the details are the possibilities of innovation and invention, and it is through these that architects can give harmony to the most uncommon and difficult or disorderly environment generated by a culture. ... any architectural element defined as detail is always a joint. Details can be "material joints," as in the case of a capital, which is the connection between a column shaft and an architrave, or they can be "formal joints," as in the case of a porch, which is the connection between an interior and an exterior space. Details are then a direct result of the multifold reality of functions in architecture. ... it is useful to restate that architecture is an art as well as a profession. This is because of the understanding generated by the detail as joint. Architecture is an art because it is interested not only in the original need of shelter but also in putting together spaces and materials in a meaningful manner. This occurs through formal and actual joints. The joint that is the fertile detail is the place where both the construction of the construing and the architecture take place.

– Marco Frascari, "The Tell-the-Tale Detail"

This thesis proposes that the architectural joint has opportunities in contemporary architecture to be far more expressive than it is often given the chance to be. The majority of joints are designed by economic necessity – the simpler the better – without realising that the way a joint is designed and made can define the entire identity of an architectural element or space. In the simplest example, two planes coming together at a ninety-degree angle as

a monolithic construct will have a very different story to tell than the same two planes either separated by a shadow joint or passing beyond one another without touching. The 'corner' is still defined, but the identity and dialogues between responding elements are changed.

When an architect does not give serious thought and reflection to the potential of the joint at each and every scale, enormous opportunities are lost. This thesis is about empowering the identity of architectural relationships so that they are meaningful, and so that the entire architectural construct can say what we want it to say by establishing the 'identity' of elements and 'dialogues' between elements.

The ultimate goal of this thesis is to discover how an even greater story can be told through the context of an entire work of architecture. In looking at the joint initially in isolation, the investigation will explore the potential of the solid/static joint as a connector, the kinetic joint as a transformer, and joint as material, reflection and shadow – pushing the boundaries of what it is and how it can be used to define identity.

Research Question

The Research Question for this investigation asks:

If the architectural joint can be conceived as “the intersection embodying the whole in the part” (Kenneth Frampton), can the ‘story of the part’ (i.e. the joint) be challenged to become a generator of the ‘story of the whole’ (i.e. the architectural design)?

Research Aims

The Research Aims (what the investigation seeks to achieve) of this investigation are:

1. to establish a transitional ‘threshold’ condition between industrial and natural settings,
2. to unify architectural components in a way that conveys synecdoche, and
3. to provide a didactic and encompassing link between the natural landscape and the built form.

Research Objectives

The Research Objectives (how the investigation seeks to achieve the aims) are to consider how the following opportunities offered by a well-designed joint as a ‘part’ might be translated into an architectural design:

1. its ability to tell a story (didactic narrative),
2. its ability to represent a greater whole (synecdoche),
3. its ability to be read as an intermediate element connecting two distinct parts (thresholds), and
4. its ability to imply movement, even if it does not actually move (implied dynamics / kinetics).

Literature Review and Project Review

To investigate ways in which the Research Objectives can be translated into an architectural design that generates the 'story of the whole', the thesis critically reflected on the following theorists and related case studies:

Didactic Narrative

Principal Theorist: Cathy Ganoë, "Design as Narrative: A Theory of Inhabiting Interior Space"

Case Studies:

1. Igualada Cemetery in Barcelona, Spain by Enric Miralles and Carme Pinós
2. Tudela Culip restoration project in Cap de Creus, Spain by J/T Ardèvol S.L. Ton Ardèvol

Synecdoche

Principal Theorist: Peter Zumthor, "Thinking Architecture"

Case Study:

1. Duisburg Nord Landscape Park in Duisburg, Germany by Latz + Partner

Thresholds

Principal Theorist: Marco Frascari, "The Tell-the-Tale Detail"

Case Study:

1. IBN Institute for Forestry and Nature Research in Wageningen, The Netherlands by Stefan Behnisch

Implied Dynamics / Kinetics

Principal Theorist: Kenneth Frampton, "Carlo Scarpa and the Adoration of the Joint"

Case Studies:

1. Bigwood Residence, Sun Valley, Idaho, United States by Olson Kundig
2. Berkshire Residence, Berkshires, Mass, United States by Olson Kundig

Research Methodology

The Research Methodology was design-led and consisted of three iterative Preliminary Design phases followed by the Developed Design phase:

1. Moving back and forth between drawing and modelling, Preliminary Design Phase 1 (initial concept design investigation) explores the translation of drawing to physical realisation, where a drawing represents the perceived reality and the model represents its three-dimensional manifestation.
2. Preliminary Design Phase 2 experiments with the potential relationships of these isolated joints, testing the dialogues between them in an architectural construct and allowing their identities to establish a 'whole' from each of the individual parts. This phase will begin to experiment with architectural synecdoche, challenging these small, isolated joints to become a generator of architectural design where each part is made to represent the whole and vice versa.
3. Preliminary Design Phase 3 explores the joint's capacity for inhabitation with a series of constructs that take on the nature and formal notion of a joint at a large scale, further exploring architecture's kinetic capacity as a means to resolve challenging site conditions and join contexts while beginning to consider access, vertical circulation, spatial volumes etc.

The Developed Design draws from all the previous phases while introducing a specific site, context and program to make even greater demands of the joint as it becomes habitable architecture. The Developed Design Phase aims to address fragile contextual issues with a single piece of architecture that acts like a joint on multiple theoretical levels, joining architecture and landscape while establishing a narrative between two conflicting conditions and enabling them to be connected by a unique transitional threshold condition. Theorist Cathy Ganoë describes this imperative as the ability of two opposing spaces or forms to 'embrace rather than collide' (Ganoë 4).

2.0 SITE / CONTEXT ANALYSIS

FIG 2.01. THE GREATER CONTEXT

At a vital node between Wellington and Lower Hutt sits the Korokoro Recreation Reserve: a scenic recreational area overlooking the north-west corner of Wellington Harbour. The reserve provides a vital means of access to Belmont Regional Park, which covers 3500 hectares of land between Porirua and the Hutt Valley, owned by various councils and the Department of Conservation.

The area also houses a historic waterworks structure established in 1903, consisting of two curved concrete gravity dams at six and eight metres high. These dams tapped into the Korokoro stream to contribute to the water supply of Wellington City until late in the 20th century in an attempt to meet the needs of a growing urban population (Astwood 7). As New Zealand's first mass concrete gravity dams, the pair have a unique significance to the history of dam technology, construction and engineering while providing historic points of interest within the regional park (Astwood 6).

Due to the zoning of land in the neighbouring suburb of Korokoro, numerous commercial warehouses now populate the sites abutting the reserve at the northern end of Cornish Street. The placement and orientation of these warehouses have almost completely stifled any potential for the consideration of access and threshold to the network of walking tracks and streams that weave through the bush clad hills and gullies.

FIG 2.02. KOROKORO WALKWAY

FIG 2.03. KOROKORO DAM

FIG 2.04. KOROKORO WOOD DAM

2.1 SITE / CONTEXT DYNAMICS

In addition to this major contextual clash, the Korokoro region is also prone to severe flooding due to the topography of the surrounding hills and valleys. During a recent flood in May of 2015, 50 millimetres of rain were recorded between 11am - 12pm alone, leading the Korokoro stream to overflow at a level that would occur on average once every 20 years (Flooding Hazard – Hutt Valley).

Despite the capacity of the two contemporary dams, these major floods have often had a devastating impact on the surrounding areas. An extreme 100 year flood, last recorded in Wellington between the 20th and 23rd of December 1976, led the Korokoro stream to flood the road and railway line linking Wellington with Lower Hutt city, eroding land and washing away cars (December 1976 Wellington Flooding).

This site offers the opportunity to explore architecture's potential to act as a joint between two conflicting contexts: the regional park and its neighbouring built environment. In addition, its geographic location demands an architectural response that addresses the area's vulnerability to flooding while facilitating track access and maintenance, ultimately contributing to the landscape and enabling these numerous contextual components to function successfully alongside one another.

The dynamics introduced by the stream and the fluid contours of the surrounding hills are juxtaposed by more resilient and linear forms of the built environment and streetscape, creating a unique set of conditions to be joined mechanically, aesthetically, and conceptually. These contrasting site dynamics will be invited to inform design and influence the form and scale of the intervention in the design chapters to come.

3.0 LITERATURE REVIEW

The purpose of this chapter is to establish the key theoretical principles influencing this thesis. Four key theorists will be investigated. The first theorist, Marco Frascari, explores the fundamental principle of synecdoche which, by definition, is where a part is made to represent the whole or vice versa.

The second reviews Carlo Scarpa's obsession with the joint as perceived by Kenneth Frampton, examining key aspects of his design process and the ideology of craft.

The third further analyses the importance of operating between scales and uniting small fragments as a means to generate the 'whole', strengthening the concepts of synecdoche discussed in the first piece of literature.

Finally, Professor Cathy Ganoes key principles of achieving a spatial narrative as a means to unite space as an intangible element are explored in juxtaposition to the more formal and material considerations of the three prior theorists.

CATHY J. GANOE, DESIGN AS NARRATIVE: A THEORY OF INHABITING INTERIOR SPACE

Cathy Ganoe examines the key principles of establishing spatial narrative in this paper, "Design as Narrative: A Theory of Inhabiting Interior Space", breaking it down to 10 components and focusing primarily on sequences of interior space. She analyzes how the voice of architecture can be articulated through developing and understanding space, describing narrative as a constant development and connection of these spaces, and how sequential spaces such as these can embrace rather than collide. She continues to consider methods of evaluating human interaction with an environment, which becomes an important factor in the design of architectural spaces (Ganoe 3).

The primary mechanisms she discusses – spatial order and transformation; the inhabitant's emotional state and perspective; and subjective experience – will become an important factor in this thesis in aiding the conflicting contextual conditions at the Korokoro Reserve. This will require an intervention that introduces a sense of threshold through which the narrative of the building can be understood by experiencing the series of sequential spaces within.

Ganoe argues that through a considered analysis of a site's inhabitants we can begin to formulate and configure a series of unfolding and dynamic sequential spaces, within which the inhabitant can perceive and interact with various elements (Ganoe 5). This conceptual theory of spatial ordering will begin to influence the layout and formulation of key spaces and levels within the proposed thesis intervention, creating flexible and interlinking spaces that begin to tell a story as the intervention is experienced and allow for inhabitation as the user sees fit, creating a narrative about how each space and material joins the next to create a 'whole'.

Ultimately, this intervention will seek to draw out the transitional space between the two existing industrial and natural environments into a series of smaller, more meaningful threshold moments, integrated both vertically and horizontally. This will allow the user to understand how these two contexts function as individual parts alongside one another, attempting to create what Ganoe describes as "a series of personal mini-narratives" which unravel over time and acknowledge the physical and psychological narratives of the individual (Ganoe 9).

PETER ZUMTHOR, THINKING ARCHITECTURE

In his article "Thinking Architecture", Peter Zumthor states that the creation of successful places at large scales can only be achieved with consideration of each and every detail at the opposite end of the scale. This he describes as "the art of making a meaningful whole out of many parts" (Zumthor 11). The whole should not be the primary focus, yet "it is the whole which makes sense of the details" (Zumthor 12). To further acknowledge the importance of a focus on scale, he writes that "To a large degree, the quality of the finished object is determined by the quality of the joins. The details establish the formal rhythm, the building's finely fractionated scale" (Zumthor 16).

I feel respect for the art of joining, the ability of craftsmen and engineers. I am impressed by the knowledge of how to make things, which lies at the bottom of human skill. I try to design buildings that are worthy of this knowledge and merit the challenge to this skill.

– Peter Zumthor

MARCO FRASCARI, THE TELL-THE-TALE DETAIL

Architectural theorist, Marco Frascari, indicates the role of details as generators. He describes architecture as "the skilful joining of parts by a normative by which nothing can be added, subtracted, or altered for the worse. Beauty is the result of the process of signification, while concinnity is the process for achieving it" (Frascari 27).

He analyses the architecture of Carlo Scarpa and the ability of his details to solve not only practical functions, but also historical, social and individual functions (Frascari 29). Scarpa merged organic principles with a learned distilling of Veneto craftsmanship, blending both modern and ancient technologies. His understanding of craftsmanship was active, based on daily working and dealing with the stonecutters, masons, carpenters, glassmakers and smiths of Venice. This constant active formulation aided his ability to express the presence and importance of craft in his details. In the initial concept design phase of this thesis active formulation will be utilized in designing and conceptualizing a detail series evidencing synecdoche and valuing craft.

The relationships between the whole and the parts and the relationships between craftsmanship and draftsmanship allow a direct substantiating (in corpore vili) of the identity of the processes of perception and production, that is, the union of the construction with the construing in the making and use of details.

– Marco Frascari

KENNETH FRAMPTON, CARLO SCARPA AND THE ADORATION OF THE JOINT

In his chapter "Carlo Scarpa and the Adoration of the Joint" in the book *Studies in Tectonic Culture*, Kenneth Frampton reflects on Carlo Scarpa's obsession with the joint and reinforces the importance of active formulation – the only method through which one can truly take possession of and acquire knowledge (Frampton 308).

Scarpa's first stage of design was the delineation of the thing to be constructed, while the second was the on-site process of its realization. He had such respect for craftsmanship that on occasion he would detail in such a way as to suit its procedural needs (Frampton 308). In this thesis investigation, Frampton's reflections on Scarpa's processes will be used to assist in the production of details aiding an understanding of craft and its importance.

"Scarpa offered an architecture of disjunctive narrative in which what is, is always accompanied by what has been and what might have been" (Frampton 332).

While the development of craft was again a key undertaking in achieving this, he also resisted traditional approaches used in generating form. Scarpa disregarded modular production and instead utilized artists and theorists as a primary influence for developing synecdochal constructs and completely innovative and inventive details.

4.0 ARCHITECTURAL CASE STUDIES

The following case studies were selected to investigate how architecture can reflect the work of the four theorists described in the previous chapter. These case studies are organised in relation to the following themes, relating to the four principal Research Objectives: Didactic Narrative, Synecdoche, Thresholds, and Implied Dynamics / Kinetics.

FIG 4.01. IGUALADA CEMETERY IN BARCELONA, SPAIN
ENRIC MIRALLES AND CARMÉ PINÓS

DIDACTIC NARRATIVE

Theorist Cathy Ganoë argues that in architectural design, we can formulate and configure a series of unfolding and dynamic sequential spaces, within which the inhabitant can perceive and interact with various elements. In this way, not only does a narrative unfold, but there is also a capacity for the narrative to provide didactic qualities, enabling the visitor to learn something. Theorist Marco Frascari argues for the ability of details to solve not only practical functions, but also historical, social and individual functions.

The Igualada Cemetery is another example that establishes narrative through points of pause; its carefully choreographed spaces utilise shadow and light to create points of points that change over the course of the day depending on the angle of the sun. Its entrance features a subtly raised concrete platform; the shadow line beneath causes the first moment of pause, appreciating the delicate moment where this architectural form hovers above its context.

FIG 4.02. TUDELA CULIP RESTORATION PROJECT IN CAP DE CREUS, SPAIN
J/T ARDÈVOLS S.L. TON ARDÈVOL

DIDACTIC NARRATIVE

This case study in Girona, Spain offers passage through a natural park rich in geological and botanical value. The restoration project allowed for the revival of its once great ecological dynamic, carefully accommodating the existing site conditions while generating an additive architecture which highlights and unveils some of the site's most unique and vital characteristics.

This trail establishes narrative by employing various points of pause established by variation and hierarchy of materials. Its concrete path is carefully formed around existing rock formations – the first instance of its successful integration with site. Across the length of the park are multiple moments of corten steel; these steel forms identify key natural moments to establish a careful balance between the natural and the man made.

FIG 4.03. DUISBURG NORD LANDSCAPE PARK, DUISBURG, GERMANY
LATZ + PARTNER

SYNECDOCHE

Theorist Peter Zumthor argues the importance of “the art of making a meaningful whole out of many parts” and “it is the whole which makes sense of the details” (Zumthor 11). As such, he proposes that synecdoche can play a vital role in a successful work of architecture. Marco Frascari argues that the relationships between the whole and the parts allows a direct substantiating of the identity of the processes of perception and production of a work of architecture (Frascari 2).

Duisburg Nord Landscape Park was designed by Latz + Partner in an attempt at healing and understanding the industrial history of the site, rather than trying to overwrite, reject or ignore it. Its existing industrial fragments are woven carefully into its new landscape with a new intention, analysing the pre-existing patterns and shapes caused by the previous industrial use, interlinking various systems such as water, fields and vegetation while allowing them to operate independently. Beyond this, the project manages to reconnect previously separated parts of the town both visually and functionally while aiding local vegetation, ultimately attempting to initiate social transformation.

FIG 4.04. IBN INSTITUTE FOR FORESTRY AND NATURE RESEARCH, NETHERLANDS
STEFAN BEHNISCH

THRESHOLDS

Theorist Marco Frascari describes architecture as "the skilful joining of parts" wherein the join plays an independent role, as a type of threshold condition (Frascari 1). Cathy Ganoë argues that such 'thresholds' enable two opposing forms or spaces to embrace rather than collide, and that a successful work of architecture requires an intervention that introduces a sense of threshold through which the narrative of the building can be understood (Ganoë 4).

This facility is designed to enhance the functionality of the surrounding environment, aiding and embracing the landscape without dominating its context. Each internal space is directly linked to both internal and external green spaces, blurring the boundary between the intervention's envelope and its surroundings. Rather than attempting to disappear into the landscape, the design intentionally bears aesthetic imperfections. This prevents the architecture from intervening with the inhabitant's sensory experience of its natural surroundings.

FIG 4.05. BIGWOOD RESIDENCE, IDAHO, UNITED STATES
OLSON KUNDIG

IMPLIED DYNAMICS / KINETICS

Theorist Kenneth Frampton argues that "Scarpa offered an architecture of disjunctive narrative in which what is, is always accompanied by what has been and what might have been", an approach that implies dynamic transformation even when a work of architecture is static (Frampton 333). Cathy Ganoë argues for the importance of the primary mechanisms of spatial order and transformation.

Hinges, pulleys and bearings are just a few of the kinetic motions that allow for the successful transformation of this facade. The integration of these systems creates a responsive space that truly celebrates and values the connection between internal and external space. The cantilevered moments of steel, glass and concrete also contribute to its reading as a single living system, forming 'wings' that introduce an anthropomorphic notion while also minimising its footprint and impact on the site. The entire construct appears perfectly balanced, with careful consideration of the location and massing of its counterweights.

FIG 4.06. BERKSHIRE RESIDENCE, MASSACHUSETTS, UNITED STATES
OLSON KUNDIG

IMPLIED DYNAMICS / KINETICS

Architects Olson Kundig embrace the marriage of architecture and machinery. The integration of mechanical systems on a large scale within many of their works results in architectural interventions that revolve around the notion of the joint. These examples capture the joint's transformative ability, primarily through unique and intricate facade systems.

Whilst this residence once again employs heavy materials and masses of concrete and steel, its design is successfully threaded delicately through the dense forest and meadows of its site. Its highly operable facades ensure features such as light and ventilation are maximised to tie the interior spaces with the exterior environment. The cog and wheel system creates a physical interaction with the intervention, further strengthening the connection between the inhabitants and the space in a tangible and dynamic way, allowing the architecture to be read and experienced as a functioning system.

4.1 VISUAL CASE STUDIES

While investigating architectural case studies relating to narrative, synecdoche, threshold, and implied dynamics, this design research investigation simultaneously looked at examples of 'joints' and related interventions that also engaged these components.

The following section closely examines these visual case studies including physical design works, models, sculptures and drawings. The purpose of this exercise is to analyse various aesthetic techniques which begin to successfully imply one or more of the design components above alongside form and materiality.

FIG 4.07. BEGINNING - CHRISTOPHER WILMARTH

A two way joint uniting the cut and the fold. There appears to be a notion of erosion and weathering across the top half of the installation where the two planes come together. The central vertical line is clearly a fundamental component in tying these two forms and materialities together, also suggesting the theoretical notion of a timeline.

FIG 4.08. VERSIONEN - SINTA WERNER AND MARKUS WUSTE

This work demonstrates how a joint can transform the relationship between two elements, in this instance a door leaf and its frame. The circular cut implies a notion of rotation on the vertical plane, which juxtaposes our preconceived understanding of how the hinge of a door typically operates. This image therefore challenges our awareness and understanding of what the greater piece might actually be about.

FIG 4.09. HUILE SUR TOILE - ANDRE MARFAING

This joint is about light and shadow and shows light itself as a vertical joint between two solids. The light contrasts the shadow to attract our attention to the focal point of the image, accentuating the change in materiality and the small steel crucifix form that appears to be the joint between the two solids. This composition also utilizes direct light and reflected light to achieve two different tones.

FIG 4.10. JANNIS KOUNELLIS

Here, the curved line appears to be an etching that highlights the path that the steel component has travelled. This successfully implies the notion of movement without requiring an actual kinetic component. Because of this arched line we can assume how it moved and transformed over time. This same wire draws our eye through multiple segments of the wall, each with a separate identity. While the joint inhabits one segment, its trace inhabits the two behind.

FIG 4.11. SILENCED SONG - BRIAN DICKERSON

The two sections here are not symmetrical; this joint is not trying to have two perfect halves that come together to create a single line. Instead this joint is celebrating the opening between the two objects and the fact that they never meet; the shadow line becomes fundamental in keeping them apart. One small steel element inhabits the joint, which prevents it from fully closing. The bent steel element is used to contrast its straight and vertical counterpart, drawing our attention to the patina it has created beneath.

FIG 4.12. WINTER SOLSTICE - BRIAN DICKERSON

This piece becomes about the intersection of its vertical and horizontal shadows, forming a cruciform joint between the two. Its vertical form somehow breaks its shadow, allowing light to cross through. This discontinuous shadow becomes the focal point of the joint, highlighting what might be a means of activation.

FIG 4.13. SPRING LINE - BRIAN DICKERSON

This composition utilises a material patina, while formally all of its elements seem to be working in unison to hold the central blocks in place. This compositional joint keeps the pale red block in the centre while the block below looks to have dropped or fallen, providing a sense of gravity. It suggests that if one piece was to be removed the whole form could fall apart.

FIG 4.14. AURORA, ROME - CYTWOMBLY

The elements here appear to be locked in place by the vertical pin, which is expressed rather than hidden. It therefore becomes a fundamental element of the construct and the primary focal device. It has two functions, firstly connecting the three horizontal forms, but also allowing the wire at the top to move while preventing its displacement.

FIG 4.15. SEQUENTIAL MOTION OF A BOW

Drawings have the capacity to tell us something different than physical models. They can depict everything that the joint is capable of doing across each of its different stages. In this instance we are able to see the element move through time as it pivots, rotates, bends and stretches around its various nodes and axes.

FIG 4.16. DIAGRAMMING AXIAL MOVEMENT

This sectional drawing cuts through the more detailed elements of the joint. Each individual moment is ephemeral in composing the larger joint, expressing synecdoche within the joint itself. The aesthetic composition utilizes a dominant axial element to throw the weight of the drawing to the bottom right of the page, indicating the various intensities of movement at different points.

FIG 4.17. COMPOSITIONS IN CONCRETE, STEEL AND WIRE

This is the first of three models that explore the unison of elements and materialities, each with different hierarchical values. Thick and heavy elements are most dominant; the two concrete pieces are connected dynamically by metal components and wires that appear to hold the two together in tension, creating a pivoting motion around the lowest point.

FIG 4.18. COMPOSITIONS IN CONCRETE, STEEL AND WIRE

In this instance the same wire members appear to be at their most tensile point and have forced the two concrete panels to align. The hierarchy of weights is still clearly visible and is strengthened by the strong shadows falling below the bolder members.

FIG 4.19. COMPOSITIONS IN CONCRETE, STEEL AND WIRE

This third image introduces formal symmetry, which is maintained throughout each different phase of movement. The thin wire components now create the focal point of the image and bond the two concrete forms together, becoming increasingly fundamental to the model's kinetic capacity. The composition as a whole becomes the joint.

FIG 4.20. COMPOSITIONS IN CONCRETE, STEEL AND WIRE

Every joint experiences constant change as it is closed, open and in-between. This composition is based on a pivot and counterweight; the anchoring creates a static opportunity, while its movement through the vertical plane creates a more dynamic motion. The bold concrete plane thus balances the two.

FIG 4.21. MAPPING PIVOTS

This model and its corresponding drawing similarly explore static versus dynamic elements. The darker lines highlight static members within the joint, while the intermediate, light and dotted lines are about the dynamic. In the top, the shadow of the object is used as a method of drawing to reveal the path of movement that these dynamic elements follow.

FIG 4.22. COUNTERWEIGHT IN MOTION

This series of images explores open, intermediate and closed positions of the kinetic joint. This is a combination where minor and light elements become the most important and dominant, contrasting the heavy counterweight and linear steel member. The semicircular wires are a physical manifestation of the trace of this joint, its path and movement.

FIG 4.23. SHADOW LINE

Here the author is showing how media, in this case ink on paper, can evidence and further challenge a joint's intention. This shadow joint might become a single thin line when closed by compressing either side together. Drawings can evidence and convey certain things that a model cannot: for example motion through blur, rigidity through strong crisp lines and openings through shadow.

FIG 4.24. VERTICAL INTERVENTION

Here there are two different identities on either side of the wall, the wall itself could be seen as a joint between the two. We realise that on one side we interact with the object or architecture in one way, while on the other side its notion of interaction and appearance is completely different. We could not interact with one side if it was not for the other. Further demands could be made for a joint to have a greater purpose or function, how a room might act as a joint within a house, or a whole house might act as a joint in a city. A new building could make sense of an entire city by acting as a pivot joint or a joint that connects two otherwise divided parts. It has the ability to speak to various dynamic interactions that might already be happening and make sense of them.

FIG 4.25. HORIZONTAL PIVOTS

This system appears to present an object or offering to its user. It appears that as the horizontal element is pushed or pulled the object comes towards or moves away from the point of operation. Four different joint functionalities come together to act as one. It is dependant on the horizontal slider, two hinges, a vertical slider and its pivoting connection.

FIG 4.26. THE WHOLE

The materials of the joint are just as important as the two materials being connected; when well executed the parts should become a single, non-subtractable whole. Here we cannot distinguish between what is the joint and what is not; the boundary between the joiner and the joined is blurred. Each of these models becomes a whole object/composition, through which we can begin to understand the concept of synecdoche.

FIG 4.27. ORDERING IN TENSION

The focal point here is the strong knot of thin wire tied in tension. The thicker wires are anchored in the heavy materiality on the left, while somewhat more ordered to the right. We see contrast between permanence and impermanence, compression and tension alongside a strong sense of constriction and restriction. The constriction largely contributes to the radial ordering of the wires on the right and at the same time it returns a non-ordered set of elements to the left. We start to see how a joint as intervention might function in context to establish a sense of architectural order.

FIG 4.28. PATH OF MOVEMENT

This drawing evidences kinetic capabilities in both plan and elevation simultaneously, again something that a physical model is less capable of doing. In this case the contours and natural fluidity of the site contrast yet weave through the perfect sunken circle, again introducing site specific conditions to be resolved by the joint.

FIG 4.29. ARCHITECTURE AS JOINT

This work represents the site itself as a material of heavy stone and the architecture as another, exploring how the two are joined. The joint becomes the third intangible consideration, which acts in unison between the two.

FIG 4.30. JAPANESE BUTTERFLY JOIN

Butterfly joints are commonly used in Japanese furniture and joinery, enabling decay or separation to be celebrated and stopped at a certain point in time to preserve the stability of the fragile.

5.0 PRELIMINARY DESIGN

PHASE ONE

The initial design phase, exploring Didactic Narrative and Synecdoche, was particularly inspired by Marco Frascari's "The Tell the Tale Detail". This article contextualised the importance of the joint and led to a keen interest in synecdoche. The article explores the potential of the expressive joint to empower the identity of architectural relationships so that they are meaningful, and so that the entire architectural construct can say what we want it to say through the nature of how joints are used – especially by establishing the 'identity' of elements and 'dialogues' between elements. In looking at the joint initially at an isolated level, the ultimate goal of this thesis is to discover how an even greater story can be told through the context of an entire work of architecture. The series of models in Phase 1 represent some of the discoveries I have made of the joint in isolation, considering the solid/static joint as a connector, the kinetic joint as a transformer, joint as material, as well as reflection and shadow, pushing the boundaries of what it is and how it can be used to define identity.

The initial drawings that follow experiment with the potential relationships of the joint and materiality. Pairing this with Juhani Pallasmaa's theory of the thinking hand, these drawings began with the isolation of the joint, exploring its static and dynamic capacity and asking simply what it might have to offer contemporary architecture: "Coupling; the initial step that unites research and design interests" (Basballe 65). The drawings aim to test the dialogues between joints in an architectural construct and their capacity to act as a formal design generator. Each of these drawings was then translated into a three dimensional physical scale model, using a consistent material palette of timber, steel and concrete.

Through rapid and iterative physical modelling, this phase of design-led research occurred almost at a subconscious level without strict relevance to a single, specific problem. As Wilkie writes, a successful design-led research process maintains "the two underlying dimensions of 'looseness' and 'openness'" (Wilkie 99). Through the iterative process of translating initial ideas to sketches, sketches to layered drawings, and layered drawings to physical models, my design work began to show a certain consistency – not just in terms of materiality but in scale, and formal relation. The idea of establishing a dialogue between each of these fragments remained at the forefront of my design intentions. Synecdoche was still a primary consideration, the scale of 'the whole' remained to be addressed in a latter phase of the design process.

FIG 5.01. OVERLAY DRAWING - JOIST AND STUD DETAIL

Exploring how a Joist, Stud and Window might come together, influenced by early industrial machinery, which was one of the traditional craftsman's earliest threats.

FIG 5.02. OVERLAY DRAWING - STUD AND RAFTER DETAIL

Another drawing where the form and joinery of a column and beam has been influenced by an underlay of industrial machinery. The angular forms are a result of the industrial structure supporting this machine.

FIG 5.03. SHADOW DRAWING MATRIX

The purpose of this matrix is to identify different opportunities the joint may offer in different scenarios. The use of matrices ensures it is not overlooked as the most important element of the architectural construct.

FIG 5.04. SHOULDER AND ARM

An arm protrudes from its shoulder toward the height of the drawing. It extends downward, experiencing bending movements until finally coming to rest upon the face of the body. This second connection with arm and body prohibits any further expressions of movement.

FIG 5.05. THREAD AND WEAVE

Two circular extensions experience a controlled fall from beneath a heavy shadow at the top of the drawing. These two elements weave around each other without ever crossing paths, continuing on to pass through a second shadow in unison until breaching the plane beneath.

FIG 5.06. UNDER THE ARCH

The semi-circular arch of one extension is read only through the shadow it casts on the face of the drawing. The second extension bends beneath it to pass through the arch it has created.

FIG 5.07. IMITATIONS

A pair of identical members imitate one another through mirrored movement. The arm of each extrudes and bends across the back of the other, an idea that can also be read through shadow.

FIG 5.08. SHADOW LINE

Two components are joined by a vertical shadow that falls perfectly between them. Their adjacent folds extrude out of the page toward us; then are pierced by two steel pins that cross paths in the light before breaching the central shadow.

FIG 5.09. ADJACENT SHELTER

The shadow cast at the top of this drawing suggests the presence of a heavy horizontal plane. Beneath this element, a vertical plane bends strongly toward us to utilize this new found shelter. Their shadows meet to the east, falling adjacently on the face of the page.

FIG 5.10. OVERLAID COMPANIONS

The smaller of two horizontal planes sits above its counterpart. Through the reading of shadows we understand that they are oriented to face opposite directions, east and west.

FIG 5.11. DIVIDING LINE

Adjacent elements separate two segments through the use of shadow and negative space. A thin divider cuts across the width of the drawing while its shadow informs us of its height and relationship with the rectangular member beneath.

FIG 5.12. INTERLOCKING ARC

Two vertical planes protrude outward from the page intersecting with an interlocking action. As a result, we read a slight bending motion experienced by each, separated again by shadow.

FIG 5.13. CRUCIAL DIVIDER

A cruciform divides an open plane into four separate spaces controlling light and shadow within each. An aperture is seen to the east, joining two otherwise separated spaces through the use of light.

FIG 5.14. SHADOWED MEZZANINE

This shadow drawing reads as a simple monolithic stair leading to a mezzanine space. The stair becomes the joint between two spaces. The resulting shadows allow us to read the construct as a dialogue of two L's. The heavy, bold L to the west becomes broken into a series of smaller L's to the east as it becomes a series of descending stairs.

FIG 5.15. IMPLICATION OF SHADOW

Two adjacent planes are spaced apart to allow a shadow to fall between them. The shadows tell us one lies flat while the other stands upright with implied height. The 'corner' is still defined, but the identity and dialogue between these two elements is changed by this simple alteration.

FIG 5.16. UNITING THE FRAGMENTS

Through joining a selection of individual drawings we begin to read this series as a whole. The larger architectural construct here becomes a sum of the previously isolated parts. We can also begin to read and understand relationships between each.

FIG 5.17. PHYSICAL MODEL ITERATIONS:
SERIES 1

Construction lines from drawing and sketching begin to manifest in physical modelling through the use of thin wire extrusions. As a result, flat and angular planes are able to be joined and suspended in space with their own isolated identity. The models in black and white card begin to reflect the forms to which they are bound.

FIG 5.18. PHYSICAL MODEL ITERATIONS:
SERIES 2

This series of experiments is an array of bent and twisted steel tubes modelled in a responsive dialogue with one another. Triangular timber forms become the heavier elements in this physical hierarchy enabling static, sliding and twisting moments to be realised.

FIG 5.19. BODY AND SHOULDER

The first model in this series features a steel tube extruding from the side of an angular timber form, experiencing bending moments in order to meet its angled horizontal face. The contrast between steel and timber is aesthetically successful, while working closely with the materials begins to introduce an understanding of their abilities for further design experimentation.

FIG 5.20. TWIST AND SLIDE

Two steel tubes are bent at different angles allowing them to cross over and connect to a triangular timber end. The tubes pass through a second timber piece that can slide freely up and down their length. The threaded ends of each steel member allow a firm connection into the timber.

FIG 5.21. ACCOMMODATING THE BEND

Here the bending movements of each steel tube keeps them physically separated ensuring they do not touch while still allowing them to adjacently overlap. The steel elements are embedded into the timber base using two different methods.

FIG 5.22. PAIR IN MOTION

Two identical models where the threaded connection to timber is angled to allow a 180 degree twisting motion for each steel arm. This pair establishes a dialogue where one shields the other, and could begin to represent a kinetic winding mechanism.

FIG 5.23. PHYSICAL MODEL ITERATIONS:
SERIES 3

This series of experiments represents two materials, steel and timber, and their resulting capacities as static and kinetic joints. These joints are designed in isolation without yet considering a greater programmatic function.

The subtle cruciform element is repeated in a different manner throughout each model. It begins as a static manifestation in the farthest model, develops through the series in folding and pivoting movements to become static once again as an aperture.

FIG 5.24. STATIC IDENTITY

This model represents a steel connection between a timber column and rafter. The shadows and reflections generated by the steel begin to separate the two structural elements to establish an individual identity.

FIG 5.25. EXPLODED CONNECTION DRAWING

FIG 5.26. KINETIC FOLDING MECHANISM

Steel pins hold timber segments in place between a pair of identical steel cruciforms. Here, the pins are a physical manifestation of construction lines from the original drawing. Two cruciform elements establish a kinetic dialogue as they fold through space in relation to one another.

FIG 5.27. KINETIC DRAWING FUNCTIONALITY

FIG 5.28. PIVOT AND SHADOW

Three steel planes sit vertically, embedded in a horizontal timber base. The largest plane experiences a pivoting movement at it bends, assuming the programmatic function of a door. Shadows between vertical planes separate the two spaces to either side. As the large steel vertical moves, the joint and adjacent spatial identities change.

FIG 5.29. PIVOT CONCEPTUALISATION DRAWING

FIG 5.30. FUNCTIONAL APERTURE

This aperture is created by the intersection of two steel plates bent to 90 degrees. The cruciform appears again at these functional intersections to ensure the steel composition doesn't slide through its timber housing.

FIG 5.31. PHYSICAL MODEL - MEZZANINE STAIR

A simple mezzanine stair structure derived through drawings in shadow (Fig 5.14). This model operates at two different scales. The larger of the two, 1:100, is the mezzanine stair, which joins two spaces at different levels. The steel wall of this architectural construct is in dialogue with the stair nosings we see at scale 1:10 at the opposite end of the model. The two steel pieces can be removed and exchanged, functioning at both scales to evidence dialogue, synecdoche and the capacity of the joint as an architectural generator.

FIG 5.32. INTERVENTION - UNITING THE FRAGMENTS

This intervention begins to unite a selection of the prior fragments designed in isolation. It operates through a hierarchy of elements in both tension and compression.

We begin to see a relationship through shadow between the two series of joints at each end of the intervention. Vertical elements from the series to the west cast five shadows across the construct that are received by the mirrored duplicates to the east.

Similarly, the cables in tension cast a shadow upward in reference to their counterparts. These shadows begin to introduce a relationship of their own between each series of joints.

AERIAL

FIG 5.33. INTERVENTION - UNITING THE FRAGMENTS

A linear spatial narrative is established here as the user moves up the mezzanine stair and through the intervention. The joints begin to define spaces within, compartmentalizing a larger identity into a series of smaller spaces.

The way light and shadow moves through the space is dependent on the position of the manipulable joint elements. Its atmospheric narrative changes with programmatic interaction, while also establishing a narrative of compression and tension.

Many of these initial fragments began to lead to an architectural construct in which each of them had a place as an integral structural component, or a uniting of the fragments as Aldo Rossi would say (Fig. 5.34). This could also be described as tacit knowledge: "Designers are not used to accounting for what they know or do" (Pedgley 466). This type of knowledge is described by Schön as "implicit to our patterns of action and in our feel for the stuff with which we are dealing" (Schön 49)

After translating this construct into a digital model, the next step was reflection. Ultimately, designing the joint in isolation had manifested as a typically recognisable form at the scale of a small house, with some deviations from the norm given the unique design process and approach. Upon reflection, no grand moment had been achieved from the unification of these isolated and original joints. "Research through design's goal should be the knowledge and understanding, but this knowledge and this understanding result from the making of an artefact that, as stated earlier, is embodied in the artefact created or designed." (Godin 10).

Upon reflection, I decided that the most successful aspect of this design experiment had to be the dynamic and kinetic capacity of these joints. This phase had questioned how small kinetic joints such as these could say something about their construct as a whole. What was the dialogue they wanted to create and how could we look at this 'part' and understand something about its 'whole' that we otherwise might not have?

Continuing the design-led approach I began to experiment with how similar kinetic and dynamic movements could be achieved visually, formally and/or structurally at a much larger scale, a scale that had not been considered until now. "Interweaving; At this point, research interests and design interests began to influence each other, and the project as processes, methods and validation are established." (Basballe 65).

FIG 5.34. STRUCTURAL COMPOSITION

FIG 5.35. STRUCTURAL COMPOSITION

PHASE TWO

This phase integrates the Phase 1 experiments with Implied Dynamics / Kinetics. Throughout the next series of design experiments, dynamic interventions were conceived with a strong consideration for their kinetic function. To site them, I asked what sort of contextual issues might they best solve, what sort of difficult terrain could these forms navigate that other more rigid designs could not, at which point I arrived at the conclusion that the capacity for horizontal movement was a key factor in the design of seismically resistant buildings. The work of the Wellington architect/s responsible for base isolators and other seismic engineering feats came to mind, but why should such amazing accomplishments in engineering be hidden away below ground? Architecture has always been about beauty through truth, form as a result of function, and the marriage of beauty and pragmatics.

"Its lines were hard and simple, revealing, emphasizing the harmony of the steel skeleton within, as a body reveals the perfection of its bones"

– Ayn Rand, *The Fountainhead* (2005)

The three interventions that resulted attempted to push the boundaries of current architectural form, attempting to break the norm and find a new language. At this stage I also stopped to ask how a potential programme might act as a joint itself to add another layer between the two scales I was attempting to marry.

FIG 5.36. KINETIC INTERVENTION 1

This intervention implies a strong sense of movement along its tracks on the horizontal plane. One point is anchored in the form of a cog within the large curved shear wall, while the other is placed on roller joints to move with lateral loads.

Ephemeral tension cables in the rear contrast the rigidity of the shear wall and other aspects of the structure. These structural elements enable movement while facilitating identity.

The site condition also begins to introduce an additional sense of dynamics, the movement of water down the river is a challenging site condition which the architecture is attempting to resolve.

FIG 5.37. KINETIC INTERVENTION 2

This intervention combines various types of movement; pivoting, sliding and twisting, to create an intervention that spans between two divided land masses.

The large arch implies a sense of entry and encloses vertical circulation. Structurally, this component supports one end of the suspended passage that leads down to the main spatial body, sheltered by two cantilevered trusses.

At the opposite end, two arms appear to anchor the intervention into the hillside. Up above, three counter weights balance the suspended intervention, allowing it to cantilever across the body of water.

FIG 5.38. KINETIC INTERVENTION 3

By utilizing a series of pivoting moments, this intervention unites multiple platforms with a number of suspended passage ways and box trusses.

The introduction of surrounding context provides an opportunity for a point of reference. By orienting the intervention toward the neighbouring mountain, we begin to introduce a narrative pertaining to the site, allowing it to influence design decisions while the railway lines beneath add to the narrative of movement.

FIG 5.39. PAIRING VERTICAL AND HORIZONTAL MOTION

Stopping to critically reflect on these compositions I tried to identify their weaknesses and what they might be lacking formally. I quickly realised their focus was solely on lateral movement, leaving them prone to vertical movement or subsidence. This fourth intervention and others to follow attempts to join these two paths of movement, both horizontal and vertical, and also begin to consider the language of the joints within, both static and dynamic, that might make up this intervention at a much smaller scale while retaining the theory of synecdoche: how might we now understand the parts from this whole? Frascari's theory on the capacity of 'the detail as a generator' had enabled the investigation to move forward to engage Phase 3.

PHASE THREE

FIG 5.40. JOINTAS PROGRAMME

The aim of this phase is to integrate the Phase 2 experiments with Thresholds to incorporate all four Research Objectives. After studying the capacity of the joint to express synecdoche, I explored pushing the concept of the joint as far as possible, making an entire architectural intervention take on the nature of 'joint' while introducing site, context and program to begin to make even greater demands of the joint to become habitable architecture.

I initially chose the site spanning the Wellington train station and ferry terminal, because both existing buildings have 'industrial/mechanical' qualities, enabling an architectural intervention born of 'a joint' to feel contextually not out of place.

FIG 5.41. JOINTAS PROGRAMME

The site also has a problem in relation to visitors passing easily from one transport hub to another, and so it was proposed that the new intervention can address that issue, while also becoming the new ferry terminal. The ferry terminal is defined by movable parts, as entry and exit ramps shift to different levels of a ferry. The chosen context also represents a site condition that could benefit from a 'joint' in that it is highly susceptible to lateral loading, challenges due to wind load, earthquakes, and differential settling based on proximity to the original shoreline. So a new architectural intervention that is capable of 'acting like a joint' might represent a new approach to such challenging site conditions and programmes.

The programme requires the literal joining of two transport hubs separated by a busy main road. This site has also introduced the issue of reclaimed or 'soft' land mass, and the building's required location crosses a boundary between five and ten metres in soft material depths. By designing the entire architectural construct as a joint it has an increased ability to resist lateral loads caused by earthquake movement, as well as vertical subsidence caused by liquefaction between these two varying depths of soft land mass. The kinetic elements between the two anchors are designed to allow the building to move to prevent structural damage in a location prone to high ground shaking.

I planned to analyse this joint and begin to focus on smaller joints that are created at its major junctions. These became an inspiration for the design and planning of smaller architectural elements, maintaining the concept of synecdoche.

Designing between scales became increasingly important in consideration of the joint not only at a detail scale, but the joint as a whole architectural construct. For example the form of the great arch might in turn inform the shape of internal doorways and handrails, while the central roof structure might inform the shape of a flight of stairs. The kinetic pivoting construct might inform the design and movement of a door.

6.0 DEVELOPED DESIGN

Having tested the potential of the joint between two similar but divided contexts, the final design chapter of this thesis sites its intervention between two conflicting contexts, testing the ability of an architectural intervention to unify two directly colliding contexts and introduce an element of threshold.

This final intervention unifies industrial demands such as city water supply pipes and dam walls with the public track and regional park to become a valuable component of a greater system: allowing the industrial and natural systems to join via an architectural threshold condition that provides a didactic notion of joint between the built industrial site and the opposing, pristine environmental site.

FIG 6.02. CONTEXTUAL THRESHOLD

FIG 6.03. KINETIC INTEGRATION

Kinetic pulley systems control the gates of each dam while the entire structure visually implies a strong pivoting motion along their arches. Using this formal notion of the joint as an architectural generator implies dynamics and allows us to read the architecture as a system rather than a static object, thus enabling it to be experienced as a threshold between nature and industrial architecture.

Curved concrete dam walls integrate key architectural and structural elements with nature and the immediately surrounding context and contours. These curved walls create a water catchment opportunity, allowing the stream to expand into a miniature wetland system within their circumference. Synecdochally this environmental system represents the whole, with its fragments scattered up the valley as smaller environmental parts and plants.

FIG 6.04. LEVEL 1: IMPLIED DYNAMICS

FIG 6.05. LEVEL 2: IMPLIED DYNAMICS

FIG 6.06. LEVEL 3: IMPLIED DYNAMICS

FIG 6.07. LEVEL 1: DIDACTIC NARRATIVE

Vertical circulation elevates the inhabitant to fully view and understand all the components of this environmental system as a whole. The architecture becomes didactic, communicating an awareness of the balance that architecture needs in the context of its natural environment while facilitating track access, viewing platforms and spaces for learning, regeneration and track maintenance within the context of the industrial.

Communicating the fragility of this site where a stream and natural reserve meet an industrial context and built environment is vital. The intervention recognizes the vulnerability of this fragile 'joint' context where the entire system could come apart and implements a transition between the two heavily conflicting contexts, engaging with the landscape rather than disappearing into it.

FIG 6.08. LEVEL 2: DIDACTIC NARRATIVE

FIG 6.09. LEVEL 3: DIDACTIC NARRATIVE

Perforated materials, cladding and flooring contribute to a breathable design, ensuring environmental integration and enhancing the inhabitants' engagement with nature. Corten steel is engrained with the patina of the water's movement and oxygenation over time. Similar to the use of corten throughout the Tudela-Culip Restoration Project, it begins to indicate points worthy of pause, utilized as the primary materiality of the balustrades at each of the three platforms.

7.0 CONCLUSIONS

This thesis sought out the potential of the joint as a generator of architectural design in what began at a small and un-sited scale, driven principally by the theories of Frampton and Frascari, which propose that the skilful joining and consideration of parts defined as 'a process of signification' can result in synecdochal architecture through which an entire construct can be understood.

The primary goal of this design-led research investigation has been to investigate architecture's potential to inherit the conceptual notion of the joint, utilizing it as a means to unify multiple contexts, components, scales and materialities. Early studies of visual works, models and compositions examined the visual capacity of the joint, reflecting upon what made it successful, what allowed movement and what implied dynamics. Throughout the subsequent process of design-led research it was soon realised that the potential of this consideration for 'joint' in contemporary architecture far surpassed a mere formal capacity, and that it had the potential to unify more than just physical components.

Architectural case studies and spaces with kinetic capacities were analysed to inform the potential for movement in an architectural intervention, the work of Kundig being a primary influence. In addition to actual kinetic movement, implied movement and implied dynamics also played a fundamental part in establishing a narrative and enabling various components to read as a 'system' through formal notions, rather than simply appearing as a static object. This idea was then explored through numerous design phases, initially working through the larger scales of the joint before testing its ability to address difficult site conditions with kinetic potential; this began to push the boundaries of 'joint' in more theoretical ways.

These concepts were then collectively explored in unison at a chosen site that demanded the resolution of various contextual issues. The natural and built environments would form two primary components of a greater system that would continue to test the capacity of the architectural joint at numerous levels, both physically and theoretically, providing a base to introduce further conceptual theory such as synecdoche and narrative.

The final design phase used the clashing of contexts and dynamics of site to generate an approach for the reconciliation of contextual tension, joining two pre-existing parts. As a key objective, the architecture aimed to engage with the landscape, becoming a didactic component that established a narrative between the settings to either side and between each of the spaces within. The spatial layout within the intervention was driven particularly by Ganoe's fundamental components of achieving sequential spatial narrative. This theory of

subjective narratives informed the sequence of spaces between two contexts, generating a threshold in an attempt to join the two and tell a story.

This formulated a basis upon which the form and symbolic content of the intervention and its components were designed. Sequencing spaces, landings, pathways and circulation allowed the intervention to be experienced in a certain way with a sense of order, allowing the inhabitants to gradually learn more about this 'system' as they are exposed to each component individually, before seeing and understanding the system as a whole from its topmost level. As a result, the joint became a generator for architectural design, influencing a conceptual system within which the intervention acts as a joint, or threshold, between two disparate systems - while teaching visitors about these systems through didactic narrative.

As our built environments encroach further and further upon the natural landscape to pave the way for our industrial needs and growing populations, we are increasingly faced with instances of clashing contexts between the natural and built environments. This is an important issue that architecture has the power to resolve with the introduction of four critical design drivers, allowing an intervention to act as a joint on multiple levels; Synecdoche, Didactic Narrative, Thresholds and Implied Dynamics / Kinetics.

This thesis has explored each of these key principles through a series of design experiments, concluding that when we design architecture to perform as a single system in unison with its setting and context, we can come to understand the 'whole' through its series of meaningful parts. In theory, this same notion has the potential to be applied at any given site where two or more contexts or programmes sit side by side in juxtaposition, ultimately introducing a threshold and beginning to establish a narrative between the two.

The limitations of this research lie within the scope of the various design phases. Given that the theory of synecdoche is successfully represented across a variety of scales, from a small scale joint, to an intervention and then two neighbouring contexts, the framework suggests that these same principles might also apply at a city scale. Where architecture can be successful in joining the built environment with the natural, it might also achieve concinnity between two towns with contrasting functions and operations. While the site was adjacent to a small node between two cities, Wellington City and the Hutt City, this scale of design was not explored.

Beyond this, increasing the scope to also assess the environmental impact of this additional dam and its impact on the wider areas would also be beneficial. Aspects of sustainable design, for example harnessing the movement of water and solar exposure to generate power are further considerations that would enhance its ability to function as an independent stand alone system with additional consideration to setting and environmental impact, beyond its physical footprint. Integrating such aspects would further enhance its didactic capacity.

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FIGURES

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