WATER-SHED

ARCHITECTURAL OPPORTUNITY IN INFRASTRUCTURE

BENJAMIN L. STEVENS

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A Thesis Submitted in fulfillment of the requirements of the Master of Architecture Degree (Professional) Victoria University of Wellington- 2012 Supervisor: Tobias Danielmeier

ABSTRACT

The current systems of infrastructure that comprise water supply are incapable of recognising value in water's urban place in anything other than in empirical terms. The 'Water-Shed' scheme transforms this utility into a rarely considered design opportunity that reinvigorates the relationship between the borough of Petone and its water supply at Waiwhetu aquifer. With a framework compiled from history, art, landscape and architecture practice, it entails the re-appropriation of the systems and technologies of contemporary water extraction. The outcome is an architecture that recovers meaning within this amenity and re-confirms waters central value to life. Light in conjunction with material manipulation are used directly and incidentally to reveal water's character. The scheme also conceives of nature in constructed terms, opening the possibility for infrastructures like Water-Shed to negotiate non-oppositional relationships between city and environment. The result is the maturation of industrial landscape the reinforcement of the hydrological and civic identities of Petone. No longer is water amenity simply reduced to productive issues of cost, efficiency and reliability. Debate regarding the access and availability of drinking water will be one of the defining issues of the 21st century. Water-Shed contributes to this discussion by asking how we can re-think the buildings and sites that form parts of the city's water distribution network.

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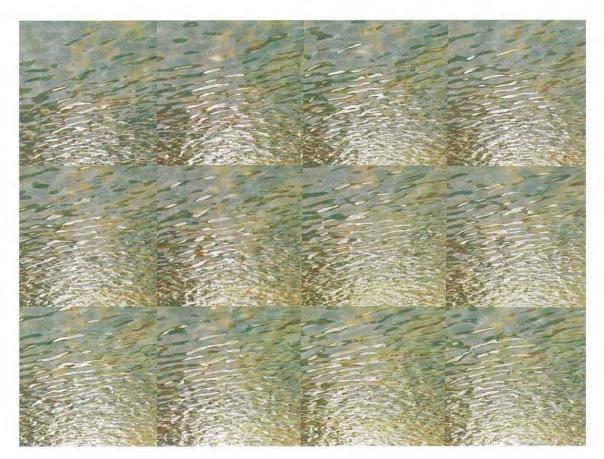


Fig 1 Water Scores series Carolyn Taylor

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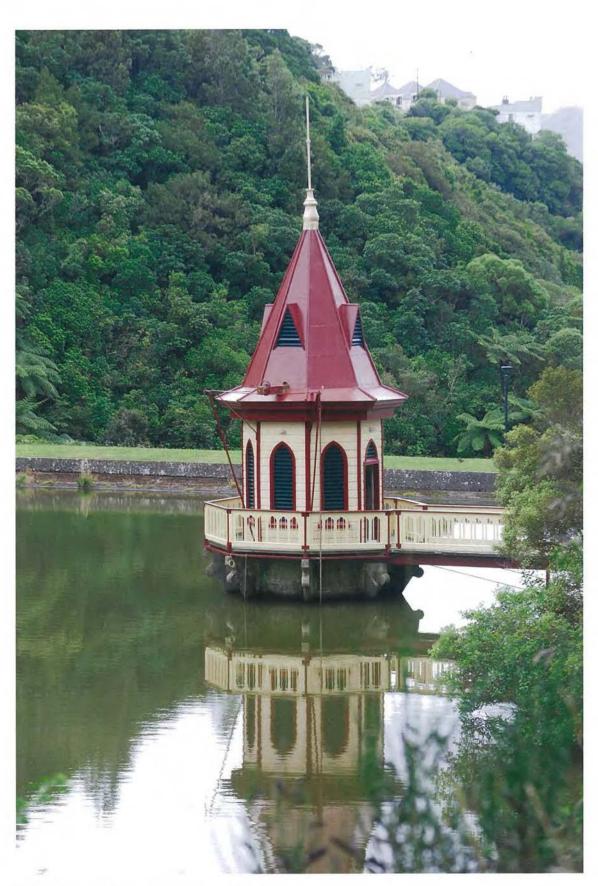


Fig 3 Valve Tower, Karori Reservoir circa 1889

Introduction

The amenity of drinking water is a largely invisible component of the city. However this piece of the built environment need not be reduced to a level of basic infrastructure, instead it can be regarded as an architectural opportunity to reinvigorate the relationship between people and urban water provision.

For all organisms, water provides life and the city's supply operates at the most basic of urban need. The evolution and shape of town growth has often been reflected not only by the shape and nature of surrounding waterways, but also by an accessible supply of water for drinking and for food cultivation. This debt to the provision of water has traditionally been woven into a meaningful architectural dialog that links water amenity with city, environment and citizen.

Considered in their own right, the typologies of water architecture are extensive and varied. Whether it is the sheer scale and ambition of the Roman Aqueduct network, the sophisticated contextualisation in Moorish architecture, or intricate geometries found in ritual Indian step-wells, hydrological architecture has not only been characterised by pragmatic need to provide water, but also celebrations of man's symbolic connection to it.

The technologies of the industrial revolution and subsequent 19th century city reform movements fundamentally altered the spatial dimensions and relationships that connect citizens to water supply. Under the auspices of 'Public Works', water utility buildings assisted with physical definitions of civic identity and social responsibility as the availability of basic amenity extended across the city.

However while the underlying science was lauded for ensuring quality and reliability, its empirical nature progressively undermined any of the architectural or symbolic dimensions previously contained within the hydrologique arts. Water amenity soon transformed into a technocratic challenge of efficiency above all else. A reliable supply also demanded that these city services be shielded from the instability of city hall. Through rationalised science and governance, public works progressed into the realm of infrastructure, away from the view of the electorate. This dramatically altered the original intentions of reformists.

'Nineteenth- century engineers and sanitarians...considered the city as an ecosystem whose perfection and beauty consisted in such a complete and efficient functioning of the parts that nothing could be removed, added or changed without dishevelling the entire system. The problem is that the bureaucrats (with little challenge from designers) have worked diligently to strip such Vitruvian thinking of its mytho-poetic insights, making it completely hygienic not only in terms of health but in terms of meaning' (Poole, 1998, p. 131)



Fig 4 The Water City of Venice

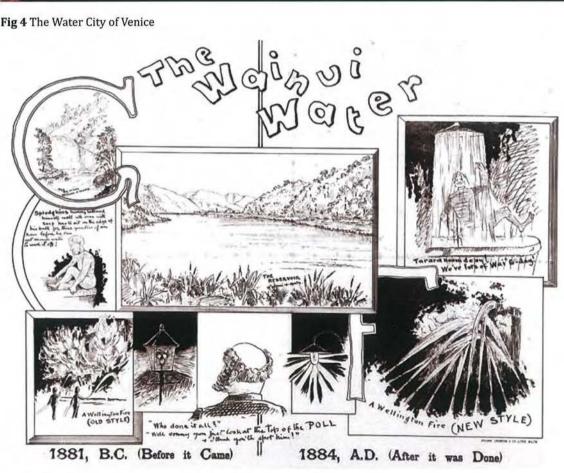


Fig 5 1881 Lithograph on the opening of the Wainuiomata Reservoir

On one level infrastructural solutions were highly successful, extending urban access to water far beyond natural water sheds. However the massive reach of water networks has resulted in de-territorialised and autonomous armatures of the city's functions. With geographical locality removed and supply seemingly inexhaustible, its presence in urban life seems ubiquitous. Combined with infrastructure's inability to absorb any meaningful representation, it has left water to become a placeless product of the city.¹

The transformation of cities during the nineteenth century was neither slow nor partialthey were for the first time systematic and truly comprehensive. The fundamental difference lay in the new possibility of interpreting urban space in terms of self referential structures, ensembles and systems.' (Vesely, 2004, p. 301)

Why is meaning important? Auckland's 1994 water supply crisis and water governance debacles in Canterbury are evidence that community responses to water amenity can quickly become fraught with issues. Fed by misinformation and a sense that something very important is at stake, citizen concern becomes directed towards a resource that seems frustratingly elusive. Whatever the argument, each encounter with a confused or passionate resident indicates that we have a much deeper association to water than its standing simply as an 'out of sight out of mind' line on our rates bills.

In opposition to water infrastructure's reduction to measurable efficiencies and sanitation standards, is the simple fact that our relationship to water is far richer than the city's current systems of supply. Contemporary water infrastructure is:

- Incapable of recognising water's cultural and symbolic role and place in the lived-world
- Denies its wider connections to urban ecologies
- Unable to translate the importance of basic amenity into either place-making or projection of its collective-civic role
- Lacks an ability to be conceived as anything other than rational construction.

The problem lies in the absence of a richer, more informed dialog between people and urban water amenity- why should such a fundamental element of our existence continue to be treated as an anonymous dimension of the city? The suggestion is that we need to extend our vision of the values and purposes water infrastructure at a time when water resource has never been more important.

¹ Or as Adam Smith described ' the diamond-water paradox', where water which is essential to life, is priced far cheaper than diamonds, which are not. (Knechtel, 2009, p. p311)



Fig 6 Water Pressure Group Grey Lynn, Auckland



Fig 7 Water Mains Burst, New York

The program for the 'Water-Shed' scheme calls for an artesian water extraction plant to be located beside Petone train station in Wellington. The aim is for architectural representation to:

- Reconnect the local population to their water supply
- Provide legibility to the processes of water extraction
- Create an identity for the borough's water supply, celebrating the characteristics of Waiwhetu aquifer's pure artesian water
- Re-conceive water infrastructure as a site of public/ civic space
- Offer an alternative proposal to the existing extraction at Waterloo train station.

To recover water's meanings, the separation of 'Instrumental' and 'Symbolic' dimensions of water infrastructure must be understood. These two parts of artistic representation co-existed until Renaissance architecture. However this irrevocably changed with the development of modern sciences during the Enlightenment. The empirical categorisation of everything from light to water undermined the role that the wider arts enjoyed within the sciences. Where for instance cosmology factored in the mythical origins and rotations of the planets, astronomy was interested only in the measurable truth of an orbit.

This logic saw Architecture's role diminish in branches of the building arts that it previously shared with engineering and hydrological disciplines. In conjunction with utilitarian and economic determinism, the design of water infrastructure was transformed into an instrument of exclusively technological character. The calculated production of technology was noted by Heidegger to be 'an act without image' (McCarter, 1987, p. 7) The outcome is that urban water amenity's physical representation has suppressed real meaning.

Therefore the position of technology within water utilities is central to this proposal. The challenge is to offer a contextual reinterpretation of water extraction processes. By engaging and critiquing the functions and meanings of these engineering structures, the intention is to demonstrate that their critical appraisal can transform them into architectural opportunity.

Contemporary studies have argued that technological design is not value neutral and even the most abstract engineering structures depend on a dialogue with initial conditions. The choices made between the many possible alternatives that confront designers still suggest the conscious determination of a set of values. The designers of technological landscapes 'shape an environment in terms of an implicit conception of human life.' (Feenberg, 2010, p. 212)

This suggests the legitimate possibility to alter water amenity construction exists within the scope of design. An investigation into technologies such as hybrid engines for

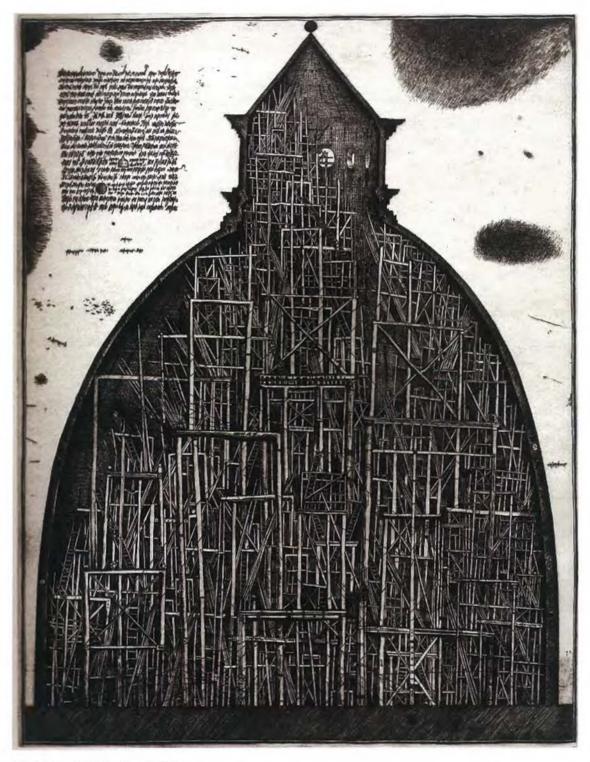


Fig 8 Dome 1989 Brodksy & Utkin

automobiles reveals that 'environmental and other concerns are brought to bear on design by new actors excluded from the original technological regime.' (Feenberg, 2010, p. 215) However contemporary architecture appears to have difficulty reconciling meaning within water infrastructure with anything other than an empirical basis. Subsequently there are few direct precedents available and a composite design approach is taken instead.

The development of the thesis takes a loose chronological line of enquiry with strategies drawn from art, landscape practice and architecture.

Chapter 1 Explores what ideas can be recovered from water's original symbolism, its supply and place-making within in the city using Aqueducts and the City Well as examples.

Chapter 2 Examines the roles that the industrial revolution and an epistemological definition of water have had on water's urban representation. While reform movements improved water's urban availability, creating new civic building typologies, the argument is that this was progressively subjugated by the network's technological basis.

Chapter 3 Considers Dalibor Vesely's argument for architectural praxis; - the mode of conduct that locates the art of building within 'everyday' situation. He argues that 'Lived World' solutions to infrastructure may be found in the wider field of arts that once included architecture. This leads to Olafur Eliasson, whose artistic interpretation of phenomena operate at the juncture of technology and nature.

Chapter 4 Focuses on how water infrastructure can be included in the place making and civic dimensions of the city. Through the lens of landscape practice, techniques of scale are proposed to reconcile the schemes multiple relationships to site. Also examined is how a 'constructed' definition of nature allows water to avoid oppositional relationships with the city. Finally Alexander Chemetoff's Bamboo Garden in Paris, highlights infrastructural representation within landscape design.

Chapter 5 Acknowledges this project requires an architectural basis. If the engineered structures of infrastructure lack meaning, how can poetics within construction be achieved? Kenneth Frampton proposes this occurs through the juncture of 'Topos/ Typos/Tectonic.' (Frampton, 1995, p. 10) The Signal Box projects of Herzog and de Meuron become useful architectural precedent that combine's a utilities program with an alternative language of material manipulation.

Chapter 6 Details information on the Petone site surveying the processes of Waterloo Treatment plant which are appropriated for the Water-Shed scheme.

Chapter 7 Provides an overview of the design outcomes

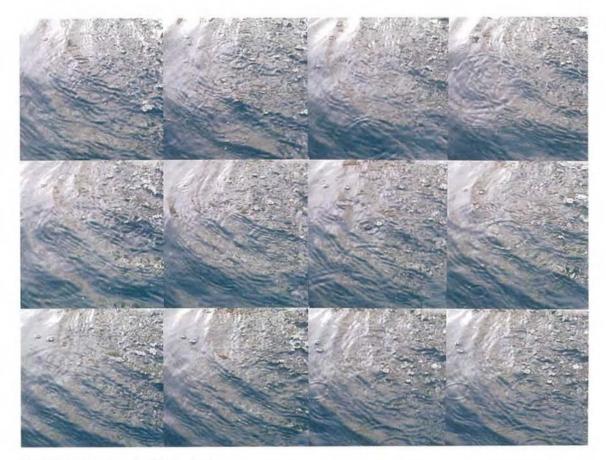


Fig 9 Water Scores series Carolyn Taylor

Why Attempt to Remake Water Infrastructure?

Because man's urban connection to water has for millennia been far richer than the current building typologies offered. Water amenity like so many other instrumentalised dimensions of our lives has resulted in 'a painful weakening and impoverishment of culture...our risk is not the advent of super-intelligent computers, but of sub intelligent human beings.' Could our laissez-faire attitude to this most valuable of resources change if alternatives to current water infrastructure were offered? The design of a new Water Extraction plant in Petone aims to provoke discussion of this. (Vesely, 2004, p. 314)

Debate regarding the access and availability of drinking water will be one of the defining issues of the 21st century. Architecture has the capacity to contribute to these discussions by asking how we can re-think the buildings and sites that form parts of the city's water distribution network. If we cannot establish value in something as basic as water in anything other than extractive terms, how do our other external relationships to the world fare?

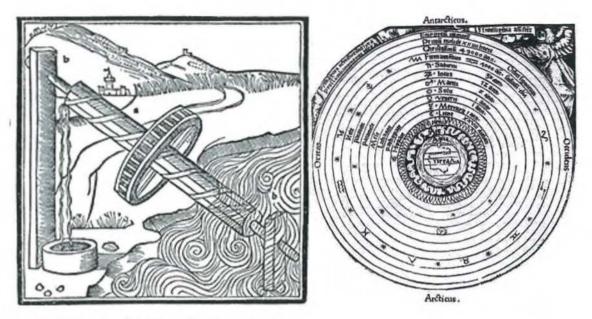


Fig 10/11 Vitruvian Water Screw/ Ptolemaic Sphere



Fig 12 Hindu Disciples at the Ganges

1. Representation of Water Infrastructure in Architecture

Water has always held a significant place in the fabric of the city with spatial implications for its uses, distribution and management. Archaeological evidence indicates ancient cultures such as the Mesopotamians utilised sophisticated methods of water distribution and management, while the VIII book of Vitruvius' treatise on architecture is dedicated solely to the theme. Researching water's characteristics and methods of distribution, the Roman philosopher suggested a typology that lay somewhere between the building and scientific arts. (Gregotti, 1994, p. 5)

Certainly the necessities of water supply have always compelled the use of technologies of the day. However as science was once part of the wider arts these solutions were understood to co-exist with more symbolic mediations on the waters meaning in the city. Unfortunately the hegemony of industrialised solutions has dislodged any dialog with wider architectural or societal issues. Forgotten is the degree of cognitive design processes that traditional water architectures are framed by.

To understand water amenities original place in the city a reading of basic mythology is needed. Secondly in examining premodern examples, the aqueduct systems of ancient Rome stand as perhaps the most significant precedent of water reticulation. Additionally the role of the town well casts light on waters connection to public and collective space. Uncovering the importance of these structure's relationships to water's place within the city can provide clues as to what is missing from contemporary infrastructure design.

Water is Life

The contemplation of water's place in the city rarely extends past current infrastructure design processes. However there is much greater scope for design when its wider philosophical meanings are considered. For water offers a means to interpret the nature of all things, including architecture. Bound up in simple movements of water are the complex laws of flow 'that govern the entire cosmos.' (Dreiseitl, 2001, p. 42)

Water is one of the primary elements in life; - it is as fundamental to our existence as earth, fire and air. In fact 'water is everything' remarked the philosopher Thales, he suggested that through its careful contemplation we are able to reflect on 'fundamental questions of metaphysics [and] identity, modality and being (ontology).' (Knechtel, 2009, p. 25)

To observe water is to also observe movement. Water is forever in a state of flux, a state of change. It becomes 'the scene of an inexhaustible process of renewal, with shapes being ceaselessly formed and transformed, coming into being and passing away.' (Dreiseitl, 2001, p. 42) While Hegel described water as 'the element of chaos- of undifferentiated life or of all possible forms of life.' (Didier, 2003, p. 529)

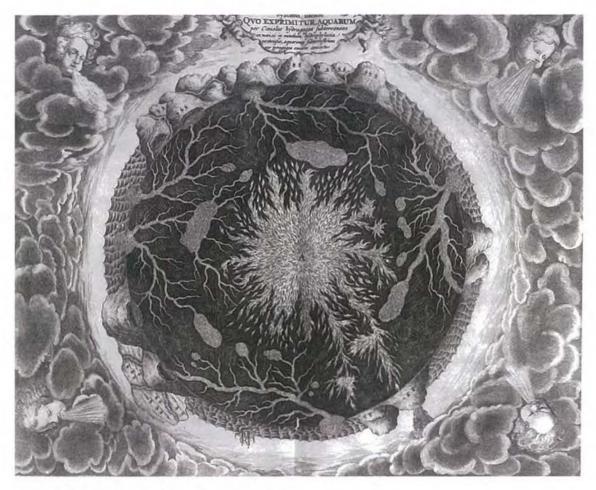


Fig 13 Mundus Subterraneous Atharasius Kircher 1673



Fig 14 Frozen Chicago River

While it may be in flux, water has a constant need to gain equilibrium with the elements it is party to. Water is defined relationships- for it is the 'element of abnegation, the element of perpetual being for others that has no other being than the fact of being for others.' Water's true nature remains elusive 'When trying to describe water using everyday concepts we are immediately confronted with an unexpected problem; - water has no shape of its own, it is formless and unconfined...no colour of its own, no smell, no taste of its own.' Instead it is shaped, forced and influenced by the 'other.' This shows its resilience but also demonstrates its fragility. (Schwenk, 2001, p. 112)

It also operates as a unified whole; - 'Running water is material continuum...not a material made up of individual particles...and so it does not respond to stimuli in isolation, but always as a whole, systematically.' This continuum sees water operating in a cycle of perpetual renewal; - from the sky to mountains, mountains to river, river to sea, from liquid to solid to gas and to liquid again. Water 'behaves like 'being' endlessly changing yet ever the same.' Water then is a constant performer, but it requires other actors to shape its narrative. The role of architecture is that of the 'other', helping to demonstrate water's characteristics and to disseminate its wider meanings. (Geiger, 2001, p. 80)

Symbolism of Artesian Water

Beyond its material qualities, is water's necessity for survival, but drinking water does far more than simply rehydrate our bodies. By 'drinking or immersing ourselves in it, we revitalize ourselves, wash and purify ourselves.' (Didier, 2003, p. 530)

Artesian water types specific to this design scheme retain their own particular meanings, commonly associated with the idea of the 'well'. Rather than receiving rain from the heavens, ground water is delivered from the 'mythical abyss' of the earth. (Massey, 2008, p. 223) The well-spring also has a dual meaning. Firstly it represents darkness, for it describes depth without bottom- it is a deep 'fall into the abyss and nothingness.' However this source of water also offers the possibility of 'drinking deeply of the truth; - [for] the well is a symbol of revelation, knowledge, truth and light.' (Didier, 2003, p. 533)

This offers one of the key considerations of the design thesis; - How could the proposed program be an exercise in revealing this 'knowledge, truth and light' that connects people to their water supply?



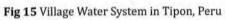




Fig 16 Humpi Stepwell, South India

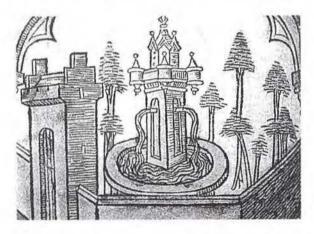


Fig 17 Hortus Conclusus Fons Signatus excerpt 1483

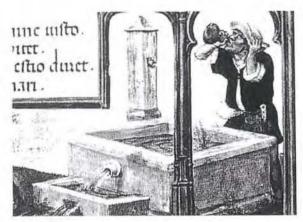


Fig 18 The month of August in the Breviario Grimani

Traditional water storage

Mindful of this symbolism the city's management of water has historically been more than simply about resolving supply. The structures of water management have reflected 'myth and religion and show the spiritual constitution of people living in a water culture.' In surveying traditional water systems of cities, there is clearly a holistic and contextual approach to city water infrastructure that recognises cultural, societal and landscape imperatives as well as rational ones. (Slessor, 2003, p. 23)

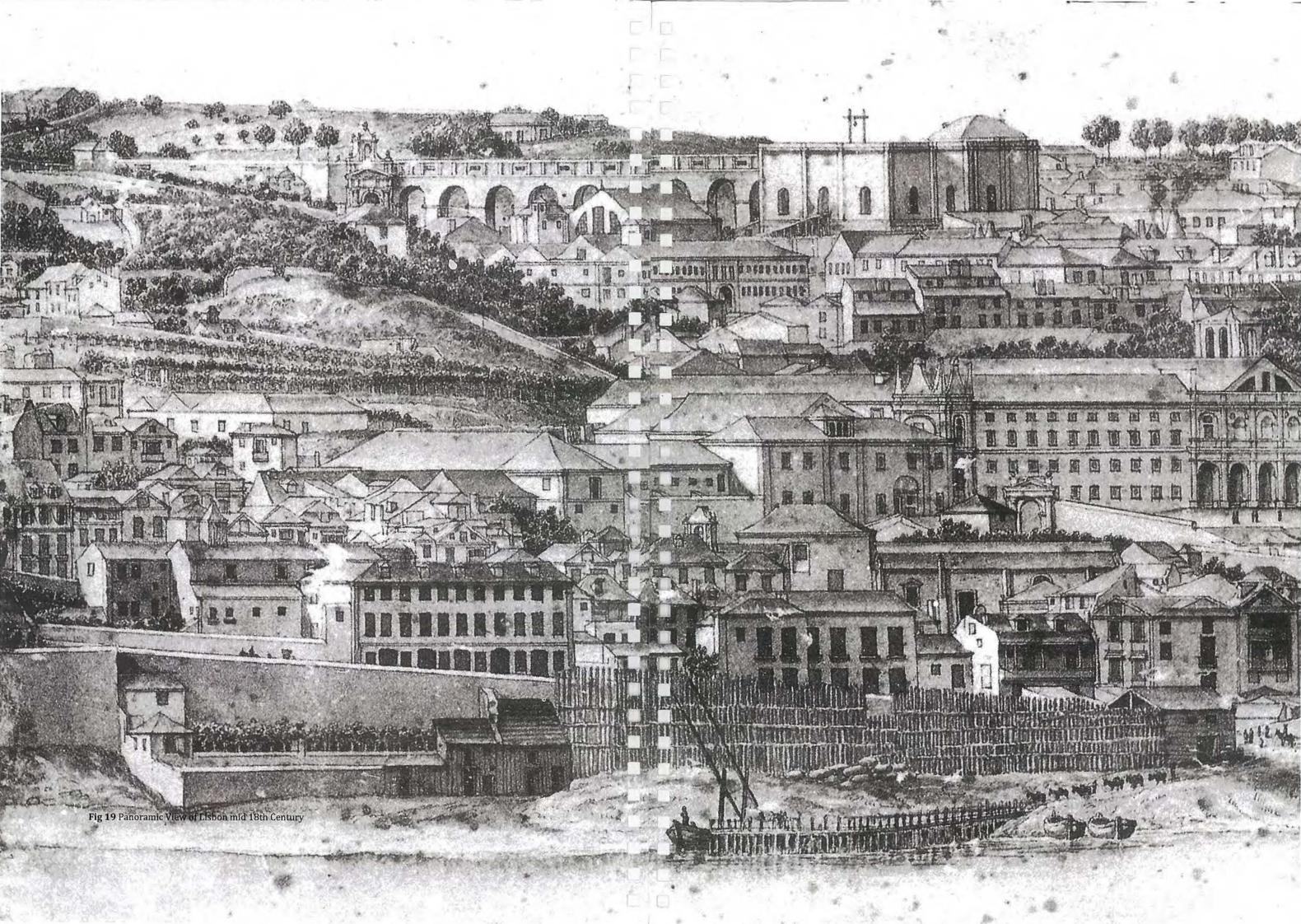
Within the traditional design of Peruvian hillside towns, water's importance is signified by the settlements orientation around a central fountain. Terraced agricultural land located at the top arced around the village with a bowl like topography. The fountain and local temple were located toward the top with housing tightly clustered below and stepped water basins throughout. Depending on the seasons these basins collected water, registering its varying volumes over the course of the year and subsequently providing a legible indication of the town's fluctuating watershed. (Strang, 2002, p. 223)

Like the basin networks of Peru, the ghats of India and Nepal are essentially just simple embankments or retained basements that collect rainwater. These stepped geometric structures measure the success of the last rainy season and then foretell the speed with which remaining supply may last. However as gathering points these structures also help clarify the Hindu peoples' relationships with rivers and water bodies. For these ghats also serve to connect with the divine, binding earthly existence with the cosmos through ritual bathing, and meditation.

Water's role shaping the city

Aside from the actual buildings, water planning is also one of the 'oldest driving forces in urban development' Catherine Slessor argues 'an accessible supply of water, waterways for goods transport and efficient sewage removal were all crucial factors that shaped the ground plan and evolution of settlements' A towns' relationship to water was also about its negotiating its elemental nature. In observing the incessant battle the Netherlands has always had against water we see that 'as much as we may have a physical, cultural and spiritual affinity with water, it is also a powerful enemy of the built environment.'

Water in the Dutch case compelled the country's collective social awareness with a 'tradition of localised cooperation and entrepreneurship' that developed to reclaim and irrigate land from the ocean. It is a reminder of how dependency on water provokes a variety of societal responses. (Slessor, 2003, p. 24)



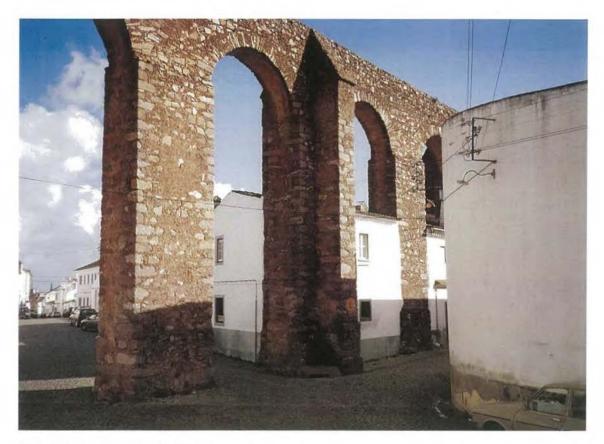


Fig 20 The Aqueduct of rua do Cano Aqueducts

Roman Aqueducts

The desire and importance of mastering water in the city is so compelling that water amenity development may be used as a window to general technological and social progress of the city. Arguably the most significant example of ancient infrastructure was the creation of the Roman Aqueducts. These massive networks of water bridges formed the urban spines that allowed Roman cities to grow and expand. The aqueducts maintained a distribution system for water that connected outlying source to its final use in the city and provided a kind of 'geographically articulated townscape.' Although their significant scale was imposing, the aqueducts were not monumental. Instead their relationship to the city was more textural, and represented 'a vehicle, agent and reference with respect to the surrounding land' (Gregotti, 1994, p. 5)

Gregotti's observations of aqueducts highlights the notion of shared responsibility. A precious resource like water compels 'collective service and thereby the unity...of *Civitas*.' The aqueducts also become a display of how a city's water supply imposes 'it's necessary geometry and reconnects the city and territory, geography and settlement, it reminds of their interdependence through building genius' (Gregotti, 1994, p. 5)

Whilst the construction of the aqueduct networks was architecture of un-garnished necessity, it was nonetheless, exemplary. 'The ability to underscore characteristic aspects of the building technique, of the use of materials, of the identity of places...achieved with a sparing use of the available means...necessity, ingenuity and civic virtue seem to be represented in the aqueduct by an organic synthesis.' (Gregotti, 1994, p. 5)

While the aqueducts supplied drinking fountains at their bases, they also provided water to another key meeting point in the city- the Roman bathhouses. If townspeople gathered at fountains in city squares, the pleasure rooms of water were where the political elite gathered. Depending on need, Rome's aqueducts were a catalyst in the creation of public spaces that allowed classes of society to congregate according to need.

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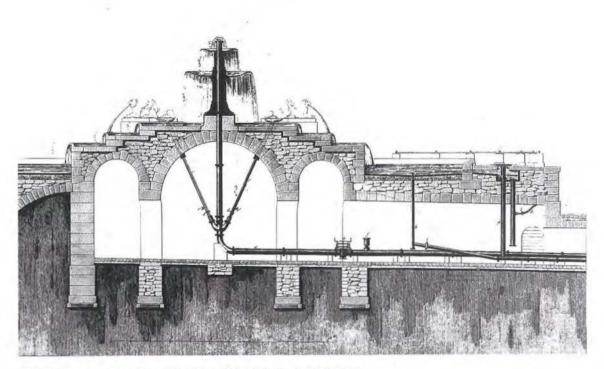


Fig 21 Water tower section of Boulevard Bondy in Paris M. Genieys

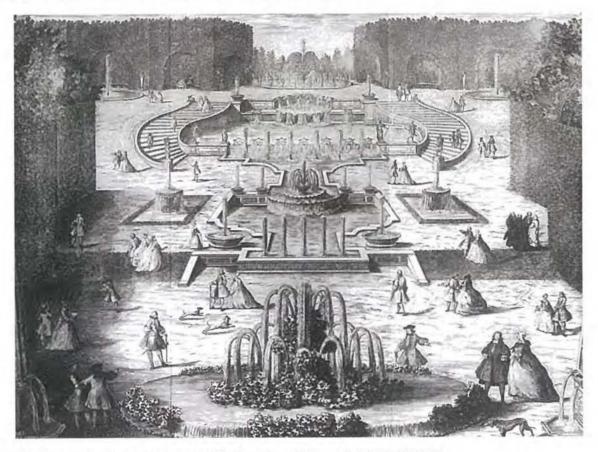


Fig 22 Engraving from Architecture Hydraulique Bernard Forest de Belidar 1737-53

The City Well

The decline of the empire and rising influence of the church prompted water's retreat to more domestic settings marking the fall of the aqueducts into disuse in the 5th century. Underground pipelines survived to supply water to monasteries and feudal lords only and throughout smaller towns, public wells grew to become the main source of water. Like the fountain, the well operated as a focal point for townsfolk to meet on street corner and in city squares. Normally of simple design, the civic character of the well was nonetheless noted with its embossment of the city's municipal shields and emblems.

Through medieval times, increases in city densities and diversity of industry consolidated demands on water. In the middle ages a progresisve emphasis was placed on waters economic and strategic importance to towns; - water works powered mills and provided defensive mechanisms as moats. While its value also translated into an industry of water carriers during this period. The sources of water, from wells to fountains continued to be 'important places of urban aggregation' for a myriad of social, business and economic reasons. (Guillerme, 1994, p. 12)

By the 16th century water was integrated in the city, supplying both business and households with daily needs, while its distribution still reliant on manual labour. It was through interest in its role within the Europe's garden follies that the next stage of waters architectural manipulation developed. Bernard Forest de Belidor's text *Architecture Hydraulics* helped lay the foundations of modern water hydraulics. His work incorporated the new mechanically powered systems that enabled the great fountain elements such as Versailles and others to exist. Crucially with their role as ornament, de Belidor's schemes place great emphasis on the types of water representation that were to be produced by these machines- something that was to be later undermined by technology itself. These early fountains became a means for designers to use machines not to upstage the natural water effects but instead to 'animate and enrich nature by applying the reason and technology they had developed' (Moore, 1994, p. 43)

Conclusion

For thousands of years the role of water in the city held a certain duality. It was about using technology and building technique to harness and control this element of nature, whilst also maintaining a clear need to represent its constituent role in the city. From ancient aqueducts to the gardens of Europe, the development of water amenity has always been about expressing a particular philosophy of water that incorporated myth and religion. During this period the hydrological arts recognised that the provision of urban water amenity was a task for both scientific *and* architectural disciplines.



Fig 23 The City of Glasgow JH Clark ,1821



Fig 24 Newton splitting light

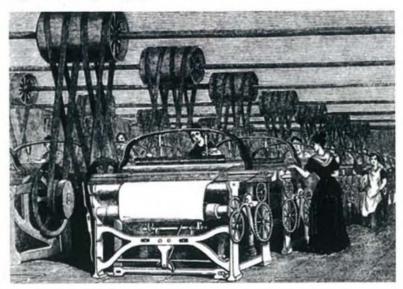


Fig 25 Steam driven Mills in North England, Industrial Revolution

2. Critique Baroque to present

The industrial revolution prompted a fundamental altering of Europe's cities while mechanised modes of production and consumption transformed how people lived. The steady re-organisation of rural-urban populations consolidated the city's role as cultural, economic and social hub for society. As the re-orientation of labour from the countryside to factories and mills occurred, towns struggled to cope with densification and rapid population rise. Dysfunctional urban sewage and water systems prompted the need for radical solutions to public health and basic amenity. In conjunction with post enlightenment thinking, the modernisation of water amenity fundamentally altered how water was to be interpreted and used in the city.

Emergent Newtonian concepts of natural elements, the forces of production, and concepts of sanitation all came to dominate a new formally defined, instrumentalised representation of water. Architecture's role in urban water management was also becoming progressively marginalised as the medieval hydraulic arts become replaced with modern engineering disciplines. Collectively these changes altered how water was to be perceived and represented in the city. Bound to the processes of industrialisation, water was gradually disconnected from modes of representation to become a suppressed 'product' of the city. Examining the loss of meaning through this period could assist in framing the problems of contemporary water supply and offer paths to potential solutions.

The production of H_,0

Made possible through the formation of the modern sciences, water's 18th century recategorisation from *elemental* to *element* was significant. Whilst modern science claimed to reveal water's true nature, in many respects it discarded any interpretation that did not meet these new narrow definitions. The altering of water's representation ultimately changed its' perceived value within society. It was no longer simply drawn from nature but was now an extractable commodity identifiable on the periodic table.

After the Renaissance, Europe departed from established cultural and religious relativisms of the past as universal foundations of faith and truth emerged. Framed by *mathesis universalis*, pre-modern concepts of situating existence in the life-world gave way to Newtonian scientific understanding. Previously defined relationships to water that pondered mythological connections to natural and cultural phenomena were replaced with scientific definitions of hydrology and chemical composition.

Accordingly the discovery of modern steam technology did not herald a new age that celebrated water's role in the revolution. Instead its representation was reduced to a static and uniform status in the pipes and engines of industry. 'On an epistemological level the mechanics of fluids was created, and from then on it served all devices for the control of

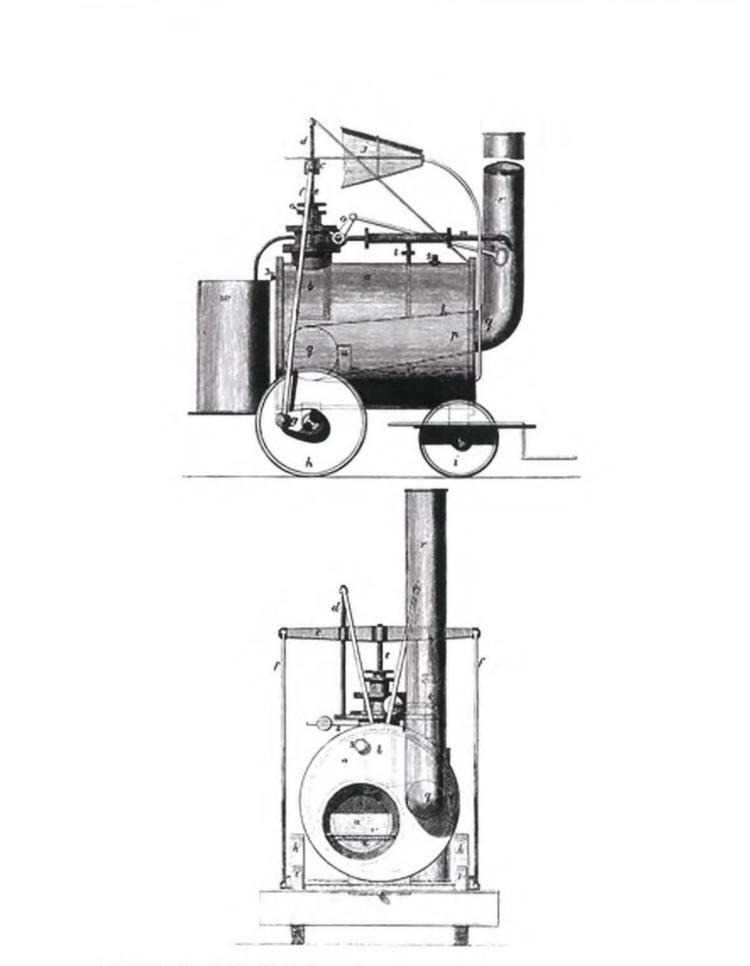


Fig 26 Richard Trevithick's Puffing Devil Locomotive

water.' Trapped and enclosed, intermittently revealed by puffs of steam, water's value was defined by productive symbolism; - it was now an expression of modern capitalism. Thus 'dominated by science and technics, water had become a safe economical value' (Guillerme, 1994, p. 16)

With the advent of modern public health, water's reclassification continued as preoccupation with the uncontrolled, stagnant waters of the wild translated into alarm at the cesspools and waste water collecting in the city. New scientific thinking on sanitation and infection simply increased the desire to control and manage water's various 'strains'. Citizen concern with urban water supply was seemingly allayed 'only when [water] had been channelled, surveyed and imprisoned.' Ironically it was the waterways and canals constructed for industry where the outbreaks of cholera and other water borne diseases developed. (Guillerme, 1994, p. 16)

The Emergence of an Instrumental Hegemony

The idea of water in such narrow productive or modern scientific terms alludes to simultaneous shifts within architecture. According to Dalibor Vesely, prior to the Renaissance, phenomena like water were grasped by the architecture and pre-modern sciences in a holistic sense. Representational meanings may be alluded to, but never defined as they are with modern science's specificity. When framed by particular public health and productive criteria the architecture of water amenity could be seen to break from its previous 'capacity to hold together different arts and at the same time meet all the important conditions of practical life.' (Vesely, 2004, p. 372)

Water architecture has always held a close relationship to technology and scientific methodology. However the ancient Greek definitions of *techne* meant this was grounded in a philosophical approach to building that served 'to approximate, mediate, and symbolize.' For instance concepts such as the movement of the planets were not framed as orbits, but were manifestations of cosmological cycles that originated in myth. Neither discrete or strictly measurable pre-modern sciences were sciences only by analogy 'Perspective and artisan mechanics, are concerned with particular situations, with human works and operations, and with contingent things.' (Vesely, 2004, p. 286/ 296)

However this type of holistic viewpoint was weakened by the Enlightenment's need to establish absolute truths. The role of humanities became undermined in spheres like Architecture and increasingly the processes of building were rationalised. The formalisation of the natural sciences also succeeded in isolating a world view that managed to 'strip nature of its anthropomorphic and spiritual qualities and reduce it to a meaningless mechanism.' The implication for water amenity was its reduction to scientifically framed production of a strictly defined element. (Feenberg, 2010, p. 183) Modern water amenity, can be laid to bear in the following 17th Century criticism of poetry;

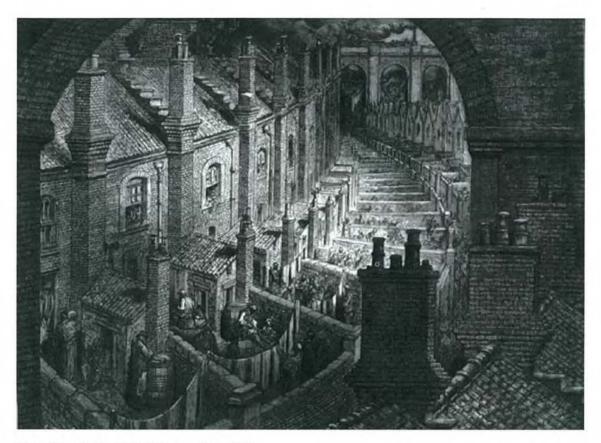


Fig 27 Over London by Rail Gustave Dore, 1870

'Prose is quite able to express anything you say in verse; it is more precise, more to the point and takes less time.' (Houdar de la Motte's commentary on Virgil's ode, quoted in Paul Hazard, *The European Mind 1680-1715*, 1953 (Vesely, 2010, p. 192)

Vesely argues that we have substituted our world of 'quality' under science and we have replaced it with a world of 'quantity' of 'reified geometry' where there is a place for everything but 'no place for man.' At the heart of the problem is the modern dilemma of two separate world views; - the absolute truth and measurability of the 'instrumental' and secondly the concept of *Lebenswelt* or 'Lived World.' The ascent of the modern sciences has pressed the former into a dominant role within architecture. (Vesely, 2010, p. 191)

For water amenity in the city the resultant outcome has been the hegemony of the instrumental. It ensures a 'technical way of making [that] has become the standard against which any kind of making is measured, reflecting what is usually referred to as the technical or technological imperative.' While new forms of water utilities addressed issues of demand and quality, they left unanswered questions around the place of water's mytho/ poetical role within of the city. (Vesely, 2010, p. 191)

19th Century Reform and Technology's Ascent

This also left questions regarding the public's role within water amenity. In solving the issues of supply, quality and accessibility the 19th century reform movement transformed the urban environment. Reinvigorated water amenity became a projection of the political and social aspirations of the urban collective. However the critical importance of these assets to the city and technocratic imperative was soon persuasive enough to situate the provisions of water and power beyond the reach of partisan politics. Direct democratic involvement was replaced by a 'systemised, hierarchical bureaucracy that favoured no-one.' (Poole, 1998, p. 130)

The general populace was to be distanced from the decision making, and the handling of water politics receded away from public view in the city much like the utility buildings themselves. Judged either too important to be subject to emotive debate or clearly outside the expertise of the public, the autonomy of water infrastructure was assured 'Today most technological choices are privately made and are protected from public involvement by... technocratic ideology' (Feenberg, 2010, p. 80)

Not that it was much of an issue for residents; - the volume of water supply was vastly improved and health standards were safeguarded. Considered by the community as an unqualified success, modern utilities offered radical advances in water accessibility and consumption rose rapidly from the 2/3 gallons supplied from city wells to 50-100 gallons of potable water per day. Domestic convenience and consumptive demand quickly absorbed the long held rituals of water gathering in public places. (Pursell, 2007, p. 141)



Fig 28 Crystal Palace Joseph Paxton

Technology in the Rational City

The 19th and early 20th century proclaimed a period where planners, engineers *and* architects concluded that technology would resolve all the ills of the modernising world. This was wrapped cleanly in unwavering visions for the city as a machine for living. In one example, Marinetti's Futurist manifesto clearly lays out the terms of relationship between machine and environment.

'Nothing is more beautiful than a great humming power-station, holding back the hydraulic pressures of a whole mountain range, and the electric power for a whole landscape, synthesised in control panels bristling with levers and gleaming commutators' {Marinetti Banham, 1960, p. 124}

It transpires that this excitement does not resonate with technology's dominant role within society today. Whilst technology may for instance offer solutions to the challenges of water supply it fails to acknowledge a capacity to evaluate anything outside its noncultural domain.

'The wholes established by technology do not make us feel complete or satisfied; they are still experienced as splintered wholes. Here and there, man recognises and greets a fragment of his former universe, integrated in a functional but alien and anonymous vehicle, in which he nevertheless must live. There is no other. Against that feeling and splintering, modern man feels a keen desire for all-inclusiveness, for synthesis. But alas, any synthesis produced by technology fails and comes to naught.' (Ellul, 1980, p. 45)

Transforming Building Craft

Finally from an architectural standpoint, the industrial revolution also fundamentally altered modes of construction. Aided by new technologies Crystal Palace ushered in a radical new vision of modern materials and building methods. The new modes of production extended to factory produced bricks and float glass, iron fabrication and new concrete construction techniques all assisted architectures transformation.

The outcome is technology's dominant role in the building process undermines that of the artist or craftsperson in the name of capital and architectural efficiency. This is in contrast to traditional construction methods which formed a single 'complex.' The craft person knows the 'right way to make things' and this involves realising the 'essence' of the artefact in the appropriate materials. Considerations such as beauty are thus not conceived as subjective values in mind of the craftsperson but as objective facts about the world. Technical knowledge and skill are required, but aesthetic and ethical principals also contribute to the outcome. Without the contribution these concepts of craft provide it is impossible to specify a culturally acceptable artefact. (Feenberg, 2010, p. 183)

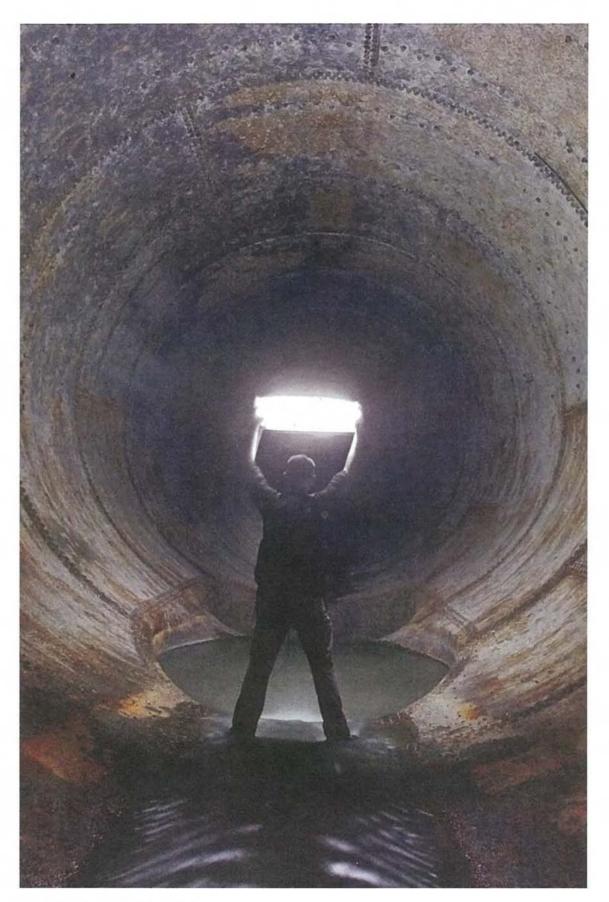


Fig 29 #1 Distributor Michael Cook

Accordingly the representation of water amenity structures that 'served and expressed a culture' shifted in projection where 'modern technology separated out from prevailing aesthetic and ethical values.' (Feenberg, 2010, p. 183) The creation of utilities building envelopes by civil engineers, without input from non-instrumental sources, has largely reinforced the anonymous nature of the processes within. Modern technological construction of this nature largely denies continuity with the past and 'therefore any possibility of building towards a future- it exists only in an impoverished present.' (McCarter, 1987, p. 8)

It suggests modern water utilities be placed alongside the parking lots and container deposits that contribute to 'forms of absence' in the city. These infrastructure and technological landscapes are created where 'horizontal occupation and dispersion prevail... blind egalitarian density without hierarchies or, finally, dissimulation.' The reality is water utilities make little contribution to sense of place perhaps due in part to their lack of 'morphological systems of reference and structuring.' (Gregotti, March 1994, p. 5)

Water Amenity's Contemporary Challenges

What is needed is a critical review of technology's place in water amenity and infrastructures relationship to live-world experience. Contemporary studies have argued that technological design is not value neutral and even the most abstract engineering structures depend on a dialogue with initial conditions. However modern architecture appears to be unable to reconcile water's non-instrumental representation by itself.

Therefore the intention is to offer three distinct parts to an overall design strategy to reconcile water amenity with the city and its people. This draws both precedent and strategy from architectural and non-architectural sources in order to form a composite design approach. They focus on the following perspectives:

- How can art may be used as a vehicle to re-envision symbolism within infrastructure ?
- Can infrastructures potential be realised through integrating site and concepts of landscape practice?
- How can water's be translated into the poetics of a buildings construction and materiality?

Ultimately infrastructure's disconnection and anonymity needs to be transformed via architectural representation. It is through this that we may provoke examination of the city's links to water.



Fig 30 Abbey Mills pumping station, London

Staines Water Works

So it leaps from your taps like a fish In its sixth and last purification It is given a coiling motion By the final rainbow-painted engines, which thunder The water is pumped free through these steel shells Which are conched like the sea-This is its release from the long train of events Called the Waterworks at Staines

River water gross as gravy is filtered from Its coarse detritus at the intake and piped To the sedimentation plant like an Egyptian nightmare, For it is a hall of twenty pyramids upside-down Balanced on their points each holding two hundred and fifty Thousand gallons making thus the alchemical sign For water and the female triangle

(Redgrove, 1994, p. 41)

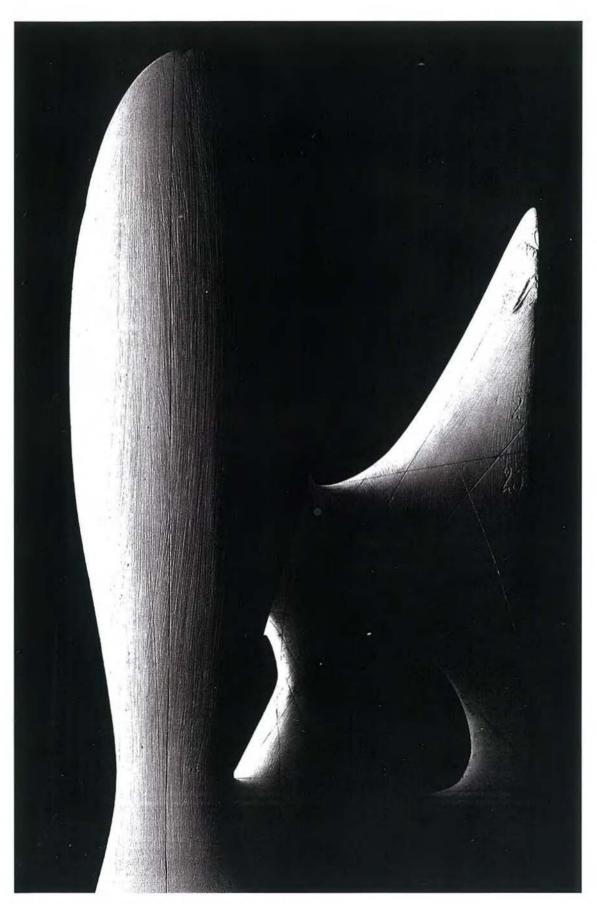


Fig 31 Diagonal Clobsch Surface, Hiroshi Sugimoto 2005

3. Design Strategy #1 / Instrumental and Symbolic

Contemporary engineering practices may have all but transformed the city's infrastructure into schematic perfection, but as Peter Redgrove's ode to the Staines Waterworks testifies, instrumental construction still holds residual symbolic content. It also suggests that such rational landscapes are not completely value neutral. Instead based on how we choose to interpret the role, functions and technologies of these buildings, there may exist valid design content. Should we wish to open our imaginations a little, we can find distinctly different visions of these un-fancied territories to enrich relationships between water and the city.

Already stated is water infrastructure's need to once again enter into a more explicit dialog with the city utilising architectural representation. At one time the pre-modern building of *tecne* held 'values that reflected a wide range of human needs' (Feenberg, 2010, p. 213). The struggle is that contemporary building seems to lack an ability to communicate anything other than rational responses when urban utilities are designed. As Vesely argues a survey of the non-architectural arts could instead be investigated and may be better able to reconcile water's primary status in our existence.

What follows is an argument highlighting the importance of positioning water infrastructure with the concept of praxis. This is defined as architectures mode of 'responsibility' a design imperative that can ground these abstract extraction processes in the ethics of the everyday. It is only in the ordinary that we may fully grasp meaning behind these buildings and perhaps appreciate the city's water as an extraordinary element once again. Working at the juncture between nature and the artificial, the projects of artist Olafur Eliasson are investigated to assess how the fine arts may assist in re-envisioning symbolic representation within water infrastructure.

Water Infrastructure and the Place of Praxis.

'If the harmony in a society rests on an interpretation of the 'common good'... then the language of poetry may be more important here than the language of science.' (Werner Heisenberg in Vesely, 2004, p. 196)

In short praxis describes an obligation to recall the routines and situations of the everyday in the design of architecture. Praxis has the capacity to anticipate and receive multiple contexts and unlike instrumental thinking it can deliberate and be in dialog with ordinary lived experience. Collectively it is read as a language 'structured by similarities, metaphors and analogies, which may be described altogether as poetic paradigm.' (Vesely, 2004, p. 196)



Fig 32 Notion Motion Olafur Eliasson 2005

If this is examined deeper, historical situations become increasingly shared until the level of myth is reached 'which is their ultimate comprehensible foundation' It reasons that only in this setting can the making of architecture provide durable significance aided by both memory and history. This approach does not derive from scientific thought but has its origins in the wider arts, where meaning approaches something more cognitive. (Vesely, 2004, p. 196)

Myth operates at the centre of symbolic making. It provides culture with a way to unify and understand experiences of the world and offers interpretations of the primary symbols that form the basis of our existence. Praxis suggests architecture is not a direct translation of nature or of abstract ideas, but is the collection of human experience mediating between the two and 'serves as a vehicle of their unity.' Praxis allows an understanding of how the concepts of water infrastructure may engage with poetics. (Vesely, 2004, p. 372) Praxis by way of *Prepon* also asks what is appropriate. *Prepon* requires we seek a higher order with the design of water infrastructure and in a manner that is 'seen clearly, conspicuously.' (Vesely, 2004, p. 365)

Praxis therefore asks that processes and functions of water infrastructure be revealed for us so we might understand and grasp their importance to the city.

The role of metaphor is central to the communication of Praxis in architecture, articulating primary symbols through gesture, ritual, and spatial design. Here praxis functions like the other arts as a complement to the role of language. How metaphor and primary symbols occur in non-architectural areas of the arts; - theatre, painting, literature, or poetry may offer us unexpectedly rich understandings of architectural space and possibilities for the basic orientation of the scheme's design. 'It is mostly owing to the metaphorical structure of the visible world that we can identify and use the contributions from different levels of reality, bringing them into the sphere of architecture much as one can perform a melody in another way.' (Vesely, 2004, p. 388)

The Role of Art in the City

It is through the arts of which architecture is but one strand that we can directly enquire as to the nature of being. Artistic production within the city can have 'a social role of fundamental interest; that of being a vehicle of positivity...the primary motivation for the introduction of an artistic gesture into the urban panorama is the need to insert a different extraordinary element into the functional monotony of the city, which also plays on the ability of the work of art to generate a strong and diffuse connotative effect.' (Flanders, 2008, pp. 120-121)

At a basic architectural level, an investigation into art offers us themes and ideas about the light, nature and materiality of space in a far more explicit manner than building



Fig 33 Ice Pavilion Olafur Eliasson 1998

case studies alone. 'Making the invisible things of the world visible: this is the mission of architecture and, at the same time, the role of art' (Galofaro, 2003, p. 78) Art offers us a field not directly beholden to instrumental thinking, we are offered a way to register the meanings of our world at the level of myth or the 'silent background of the natural world' (Vesely, 2004, p. 378)

Art also distances itself from the realm of instrumental representation that aesthetics are wedded to. The categorisation of style and the criteria's of science that defines aesthetics, ensure that its empirical nature isolates it from practical life and from ethics. This is one of the dilemmas of architectural representation for the use of aesthetics results not in the reconciliation of poetics and architecture, but their subordination by science.

Studio Eliasson

The Danish artist Olafur Eliasson operates in collaboration with a large team that includes engineers and designers. He offers a multidisciplinary approach to art that routinely produces work that is simply executed but demonstrates profound relationships to light, water and other elements. His art is experimental but also firmly grounded in science, meteorology and engineering. Working closely with a team of architects, Eliasson's interdisciplinary collaborations result in a 'know-how and interest in space that is as fundamental as what we find in contemporary architecture.' (Ursrpung, 2008, p. 40)

Constructing art that has a high degree of visitor participation, Eliasson provides an extensive catalogue of ideas on how the public's re-engagement with water infrastructure might occur. Eliasson's interest in materials lies in their contextual reading via experience. This situates these elements within the lived-world, according them a degree of temporality within the flux of time. The use of water transforming from one state to another in many of his works is indicative of this.

Participant Observer

Ursprung describes that Eliasson's artistic mode of operation is one that means to 'move the observer, to arouse religious... [artistic] or political emotions, and to set off thought processes and encourage exploration and discourse.' The fact that his work often touches on subjects normally perceived to be ubiquitous provokes an exploration and personal reexamination of things visitors may normally have ignored. (Ursrpung, 2008, p. 11)

A passive observer becomes an active participant in Eliasson's work as the artist seeks his own version of Henry Lefebvre's 'unitary theory' that combines social, mental, architectural and historical space. Like Lefebvre, Eliasson attempts to avoid separating phenomena and interaction, preferring to create 'specific complex situations rather than to separate disciplines and practices' (Ursrpung, 2008, p. 14) He constructs environments that see an intriguing relationship with a type of nature that is explicitly artificial in



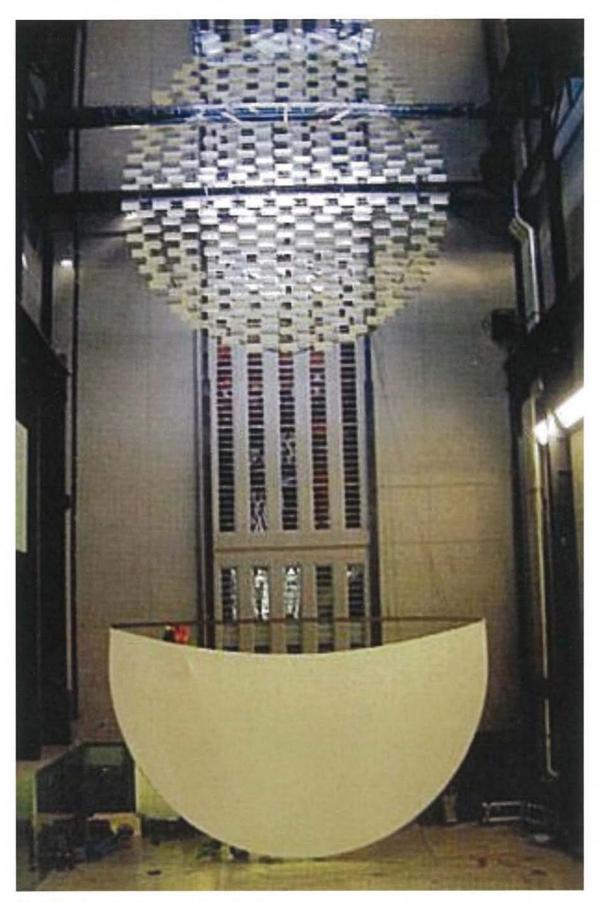


Fig 35 Weather Project in construction at the Tate

construction 'animated by performing machine, a universe knit together by waves, transactional loops, and the fluctuation of correlated variable that could only be called endless weather' (Kwinter, 2008, pp. 72-73)

Nature for Eliasson is not bound in 18th century romanticism, but neither is it neutrally constructed and perceived. Rather it is accorded through a given set of cultural and learnt conditions. It is part of a wider set of references which are situated in the everyday but which recognise a participatory role where 'we ourselves have something to contribute.' Strategies are not developed through critical analysis or theory that results in social, political and cultural ends being met schematically. Instead there is a desire in Eliasson's work to re-establish a 'connection to things that are considered more real than either formal autonomy or technological abstraction. And this real thing is somehow something you can touch.' (Foster, 2010, p. 179)

Much of the fundamental elements of Eliasson's philosophical positions were established by earlier 20th century artists such as Laszlo Moholy-Nagy whose art contemplated 4 dimensions each of which are relevant for the Water-Shed scheme;

- Space and Movement The work of art opens up into the space and involves moving objects
- 2. Perception Constantly changing kinetic shapes and lights call for an active, dynamic perception focusing on simultaneity and difference
- 3. Experimental Machinery To affect this new type of perception, the artist acts as a director staging situations with space, light, and props. The machinery employed may also be part of the staging.
- 4. Activating the viewer (participation) The goal of the artist's experiments with light and space is to activate in the viewer a process of recognition and understanding, challenging both the intellectual and emotional sides of his perception- that is, his feeling and his thought. (Broeker, 2004, p. 34)

Time at Sunset- The Weather Project

The elements of light, earth, fire, air and water lie at the centre of our world's ordering. Enriching our sense of existence via one of these primary connections to phenomena is explored in Eliasson's most seminal work; - the Weather Project at the Tate Modern.

For aeons the passing of time has been marked with the movement of celestial bodies where day and night are tracked with the perpetual rise and fall of the sun and moon. However within the confines of the turbine hall, the projection of an orange disc shrouded in fog halts this cycle. It presents the opportunity for the Weather Project to toy with our instinctual hardwiring. The ceaselessly glowing sun, paused on the horizon prompts body clocks to literally suspend their belief, as visitors lie down to contemplate this inexplicable solar event.

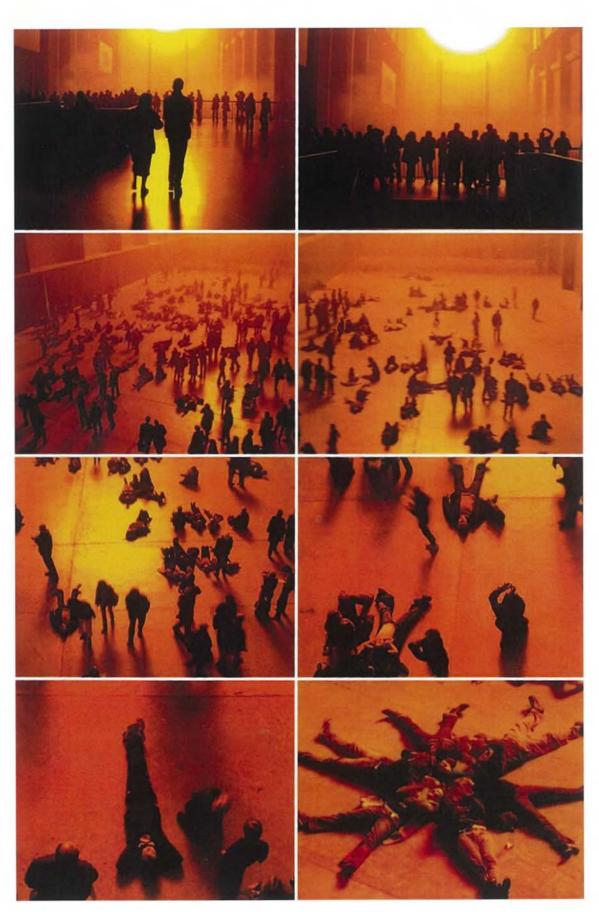


Fig 36 Installation views, Tate Modern 2003

The Weather Project operated under the auspices of an environmental setting; however it actually entailed a reintroduction of machines back into the Tate's turbine hall. The project became an exercise in the explicit juncture between elemental and artificial. Fog machines at the far end sprayed a fine mist of water over an array of lights reflecting off a semicircular disc. The adjoining roof was lined with aluminium mirrors to complete the mirage-like illusion of a sun, doubling the halls scale to 120 metre height.

This artifice of nature in this hall is plainly artificial; - the pumping of mist and the 200 radiating mono frequency lights powering the sun are obvious to those standing close to the installation- no attempt is made to shroud the solar creation in secrecy. In this respect there is an 'interplay of illusion and disillusion' as the mechanical vehicle and effect are simultaneously present. (Ursprung, 2008, p. 16) It is a cancelling out of cause and result so that 'it is the nature of the light that is the important question.' (Broeker, 2004, p. 41)

Participation by Seeing

Standing isolated or lying down in a group, the installation also presents the viewer with another dimension of engagement. As well as seeing themselves, the halls occupation by others positions them in dialog with a participatory collective. The other 'actors' in the hall operate as scale and reference to the smouldering sun.' Paradoxically, the less we look like individual, the more aware we become that we share a common humanity, that we are all members of the same species. Against the cataclysmic beauty of the evening sun, we sense our own insignificant place within the infinity of our solar system.' (May, 2005, p. 8)

Kwinter describes Weather Project as the west's restaged 'optical primal scene.' As an art work it presents a story of origins of the world, it enables us to situate ourselves in the world. The weather project is not an object but an art work to be physically immersed in 'we grasp it in our senses...we are not in the world but in fact are (part of) the world itself.' (Kwinter, 2008, p. 72)



Fig 37 Beauty Olafur Eliasson, 1993

Beauty

The Weather Project follows a number of works where Eliasson has appropriated natural occurrences. Almost all of these such as 1993's *Beauty* work to clarify and appraise singular events. Here a spotlight projects across a fine curtain of water in a darkened room. Moving around the light source glimpses of colour are caught until the visitor has positioned themselves at the appropriate angle, privileging them to view a rainbow's formation. With the backdrop of decaying old pillars, the observer is left wondering whether this is not some rebirth of light within an ancient church or a sign that moisture has somehow found its way inside.

Schemes like Beauty and the Weather Project pose a very interesting question. If we understand a rainbow or a 'fake' sun as the mechanised splitting of Newton's light spectrum, have we really been robbed of its splendour as argued by the Naturalists? Is there still a residuum of its meaning that still resonates no matter what its representational vehicle is? 'On the contrary, the semicircle of lamps in the Tate Modern is generally considered' beautiful' because it is associated with a natural phenomena, despite its obvious scientific- technical character.' (Broeker, 2004, p. 46)

Conclusion

Instrumental construction is valid only in as much as it achieves its own ends. Water amenity in its current form fails to acknowledge the extent of connection to people, city and landscape that such a system is tied to. To incorporate water's symbolic dimension does not require a return to pre modern forms of water architecture; rather the key lies within contemporary water infrastructure. From Redgrove's poem we understand these buildings do not suffer a lack of meaning but its displacement. It highlights the contradictions between the perceived representational monotony and sterility of such buildings and their actual underlying complexity. Viewed in terms of Praxis this displacement prompts consideration of what a more 'appropriate' representation of water infrastructure might be. The inability for architecture to provide alternatives to current rational infrastructural solutions suggest that such an investigation should be extended to include the wider arts that architecture was formally part of.

Olafur Eliasson's installations demonstrate how the capacity to re-represent natural phenomena using mechanical armature provides us with the ability to reappraise mans' primary relationships to the wider lived-world. His work untangles fixed meanings of both technology and nature using methods of viewing that ask visitor's to draw their own perspectives and take possession of these works.



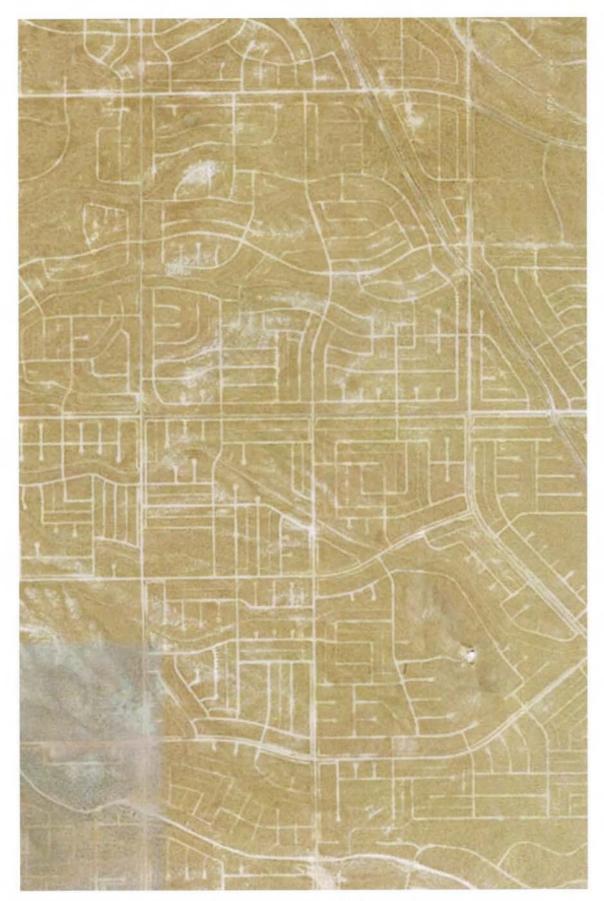


Fig 39 Abandoned Desert Suburb of California City 100km North of Los Angeles

4. Design Strategy #2 / Reconciling the Civic

Infrastructural utilities and their predecessors have long provided us solutions to manage the basic services of the city, aided and shaped in large part by engineering techniques of the day. However assessment of these amenities value to society has occurred only in the narrow empirical terms that technology defines. Water infrastructure does not acknowledge 'place', instead our cities contain a series self referencing systems left alone to project their own spatial characteristics. The only conscious relationships prescribed to these sites of technology seem to be the abstract processes of 'Euclidean zoning.' In planning terms their physical or cultural dimensions are evaluated simply by how segregated they are to the periphery, or how discrete its urban placement is. (Belanger, 2010, p. 324).

'In the absence of federal or state law on land or infrastructure, municipal governments took on the task of development while engineers totalised the design process by embracing the metrics, technology, and construction of new systems. (Belanger, 2010, p. 337)

However water infrastructure does not operate in isolation and it is not wholly invisible. When it breaks down or there is disruption to amenities the public are reminded of a series of physical locations and external connections normally ignored. The reality is the characteristics of both the network and water itself speak directly about the importance of site, of place and cycles of receipt, and usage that connects land, river sky and sea. Like wine even water's mineral content is in intimate dialog with geography. Water's place making also occurs in cultural terms and the urban rituals of its' gathering span thousands of years. Finally there is the notion that an urban resource such as water is shared by a collective. This brings with it a degree of responsibility of usage and highlights that these systems have a civic spatial quality.

To begin to reactivate contemporary meaning, water amenity must be in dialog with site. In doing so latent connections to landscape, hydrological character and dimensions of the civic can be re-established. By investigating physical and urban scale, and redefining nature and infrastructure and their relationship to one another, the intention is to devise strategies to re-imagine water infrastructure's urban place. Finally Alexandre Chemetoff's Gardens at Parc De Villett provides a post-modern narrative reconstructioning nature within infrastructure and the urban landscape.



Fig 40 Te Marua Reservoir, Wellington

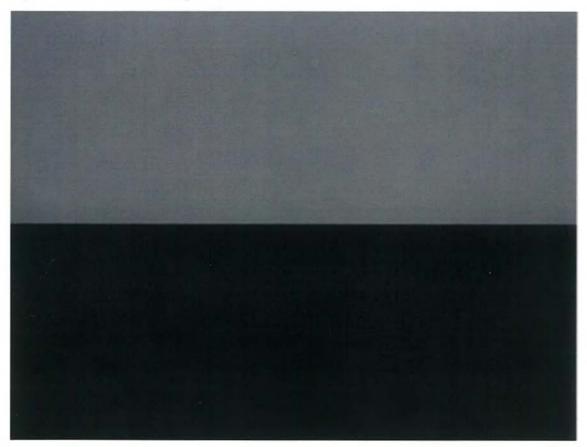


Fig 41 Sea Horizon Hiroshi Sugimoto

Water Infrastructure and the Landscape

A strategy to weave together the physical and projected landscapes of water amenity seems a logical step. For landscapes offer the 'power to illuminate and revive even the most dismal of territories.' Laura Allan writes that our 'environmental surroundings are anything but neutral and our response to them is or should be far from dispassionate.' (Allan, 2009, p. 124) An analysis of landscape offers a means to connect infrastructure to the city, to its constituency and to the wider environmental systems that help compose the system of supply. Landscape also allows offers an ability to explore scale- one of deterritorialised infrastructure's biggest hurdles.

The 19th century development of water reticulation occurred similarly to the era's railway networks. Both required a 'plan that determines everything beforehand such that the project follows its a priori logic.' This was ensued by modern technology allowing these networks to overcome physical impediment and geographic hurdles in the landscape in a way not previously contemplated. It left modern water systems to ignore underlying hydrological geographies to be rationalised exclusively in accordance with the cartographic layout and subdivision of the city. In simple became a further sign of mans will to dominate nature water now came to the people. (Vesely, 2004, p. 301)

In revisiting this position, a far more interesting proposition is whether architecture can reinterpret these landscapes. Rather than deny, could they instead extend and articulate parts of the bio-mechanical systems not currently comprehended or seen in the city. Interpreting infrastructure from a landscape perspective ensures that artesian water extraction is viewed through a far wider lens. Rather than attempting to subjugate nature the city may instead be thought of as a series of contingent relationships revealed to display the various dimensions of its built, natural, cultural and economic landscapes At its simplest level to distance the concept of city from its underlying structural connections, natural or otherwise, simply ignores the fact that 'Biophysical systems constitute significant and vigorous components in the formation of the city's cultural and physical development.' (Poole, 1998, p. 131)

Horizon and Elevation

To rethink water amenities representation in landscape terms, requires its place in relation to horizon to be considered. Horizon belongs to the human way of seeing the world, it holds the human situation together and gives it coherence and meaning, for the Greeks *Horismos* was not an ending but the presencing of beginning. In the context of site, horizon is integral to defining spatial situation as it represents the extent of a specific view. Grasping these concepts allows us to understand how water infrastructure may be located and read within the landscape.

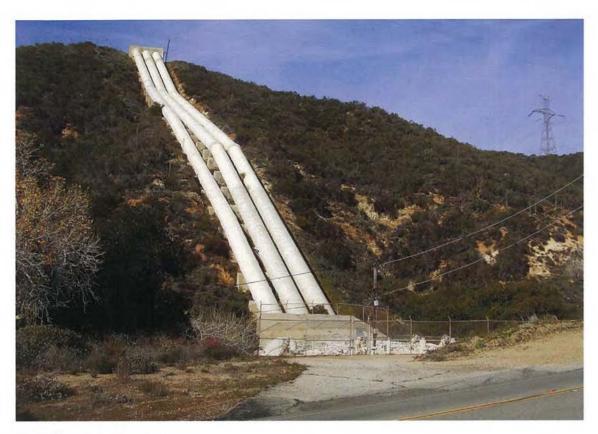


Fig 42 Los Angeles Aqueduct



Fig 43 Placa del Glories, Barcelona

While horizon refers to the horizontal periphery one should consider that 'the structure of space generated by horizon would be incomprehensible without references to its verticality.' This interpretation of site is charged symbolically when occupied by the physical body, for vertical counteraction with gravity occurs and 'the body plays the role of mediating link[s] between the celestial and terrestrial levels of reality.' This forms part of the collective lived-world dimensions that also includes:

- temporality (the main source of rhythm)
- regularity of movement and proportionality
- the question of centrality and periphery (Vesely, 2004, p. 380/384)

Movement, distance and scale are all things that act contingently to form individual perspectives of the lived world. Take the example of standing in front of a mountain range, it is difficult to evaluate how far away and tall the mountains are, however walking towards the mountains even after only a short period of time changes our perspective of them. When some of these mountains change dramatically in size we register they must be close by and taller than we initially expected, in this respect movement allows us to put a scale on things.

Navigating Landscape with Scale

Why is scale important? One challenge of this scheme is its' ability to grasp the range of scales related to the water network. The issue is made difficult given Wellington's water sources are spread across multiple sites and are either invisible (underground) or in remote areas. Domestic supply is hidden in pipes while the utility buildings themselves remain anonymous. All that is left is for water to mysteriously appear from the kitchen tap.

Contemplating the spatial or temporal dimensions of water amenity prompt consideration of 'urban scales [that] extend beyond what is visible from a particular site to scales at which planning has occurred that may have implicated and produced that site.' In this sense *ecological* scale comprehends hydrological, geological and vegetative cycles that may also be regarded as 'significant civic structures worthy of expression.' (Pollock, 2006, p. 129)

In addition scale can be used to resolve infrastructures' current separation from other functional components of the city. The aim should be the production of a varied set of social, natural spaces and infrastructural spaces at different scales. If wells providing water were once located in town squares, why couldn't our public spaces be juxtaposed with contemporary urban utilities? What new forms of civic architecture could negotiate the water supply?

Given the Petone scheme's proximity to major road networks and the town's centre, the integration of scale and multiple uses of Placa del Glories in Barcelona provide an

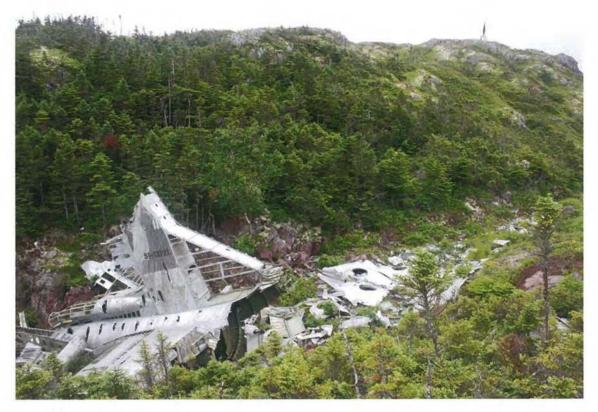


Fig 44 Plane crash, Newfoundland



Fig 45 Hylozoic Soil Phillip Beesly

interesting example. Read on one hand as a bypass for both local and metropolitan scale roadways it also intertwines 'parking structure, public landscape and a playground in one... the inscription of vegetation and bodies onto this vehicular infrastructure re-appropriates it as everyday urban space at the scale of the neighbourhood.' (Pollock, 2006, p. 133)

Three dimensions of scale

Finally if this project is about legibility of water infrastructure in the landscape, there is the question of how the Petone scheme should be interpreted according to perspectives of horizon and scale. We are offered Robert Thayer's 'Three Dimensions of Meaning' as a means to interpret this:

'It is possible to construct a three-dimensional framework for examining the meanings of landscape- particularly that which has been influenced by technology and utilitarian necessity- and its impact on human affect or emotional response. We respond to landscape as forms and patterns of light and dark distinguishable from background.'

- There is first a perceptual dimension, technological manifestations in the landscape. They are defined according their conspicuousness and legibility in the landscape as differentiated from an assumed 'natural' backdrop.
- The second dimension consists of the major and familiar groups of technologies the typical person might recognise in the landscape.
- Finally, the third dimension 'organizes technologies in terms of their symbolic implications with respect to the land.'

Thayer provides the example of a wrecked plan seen across a valley while hiking. At first the reflective aluminium nestled amongst bush in the distance is perceived as a technological intrusion on the hillside. Walking closer it is recognised to be the wreckage of a light plane. Peering inside the empty cockpit, the pilot's headphones are picked up and then speculates on the possibility of communicating with the dead.

In three simple scales we are offered a strategy for how a water utility may be perceived within the landscape via:

- 1. The perception of a technology
- 2. Recognition of that technology's function
- 3. Symbolic interpretation of that function. (Thayer, 1994, p. 104)

Scale is a means to allow the relationships between city, landscape and people to be identified and negotiated. The intention is for scale to assist with evaluating the perception and connections of a new water plant within Petone's urban landscape. It is also intended to help with understanding the cycle and contexts of artesian water.



Fig 46 Untitled Gerco de Ruiter



Fig 47 Chinese paddy fields in Yunnan province

The Constructions and Production of Urban Nature

If this scheme is about the representation of water defining a concept of nature (specifically urban nature) is required. A typical analysis of the built environment's relationship with nature tends to place the two into a set of dichotomies, where urban form and natural state are read as oppositional positions. This need not be the case given the real proximity of the two. They are far closer if we acknowledge nature is in fact a more 'constructed' phenomena than 'natural' one.

This pre-supposes that spheres of nature are unlikely to be in any way exclusive from the reach and influence of manmade intervention. Instead these dimensions of nature contain 'an inseparable web-work of human agency.' This suggests that any return or contemplation of 'nature' in pre-human, pristine state is impossible. An acceptance of this perhaps allows nature and infrastructure to seem less like uncomfortable bed fellows. A positive spin could be the possibility for us to:

'Consider fully employing the power of the architectural to uncover and produce new forms of nature. These new forms, in turn, might offer us a more socially complex and challenging image of nature, forcing us to reconsider how the nature produced in buildings limits or furthers our social desires.' (Gissen, 2007, p. 74)

As regards to its representation, the case for constructed nature becomes stronger when we contemplate how we for instance ascribe mature agricultural landscapes with a degree of beauty. Perhaps then if 'our crude and primitive industrial land-uses are ugly, so equally our mature industrial landscapes could develop their own beauties' (Fairbrother, 2002, p. 82)

Describing technological systems such as water infrastructure as 'productions of nature' gives us the potential to greatly expand the interaction between technology and the environment. For it 'promises much more than just remaking the chemical and physical metabolisms of nature inside of buildings...it is the technological networks of buildings; - plumbing, air and heating systems, lighting and electricity- that continually convert raw or semi-processed natural material into new matter.' (Gissen, 2007, p. 73)

This approach could allow a more meaningful dialog to occur between production parts of the urban ecosystem (i.e. water amenity) and the urban population. Howett asserts 'Recognizing that all life and the conditions that sustain life are interrelated...man can be, if he abandons his anthropometric assumptions, be a contributor to, rather than the destroyer of, the pattern of nature' (Howett, 2006, p. 109)

Whilst nature may be constructed the immeasurability of its mytho-symbolic status remains the same. How the nature technology relationship is represented will influence water's ability to retain its elemental immensity. 'We should seek to imbue our designs

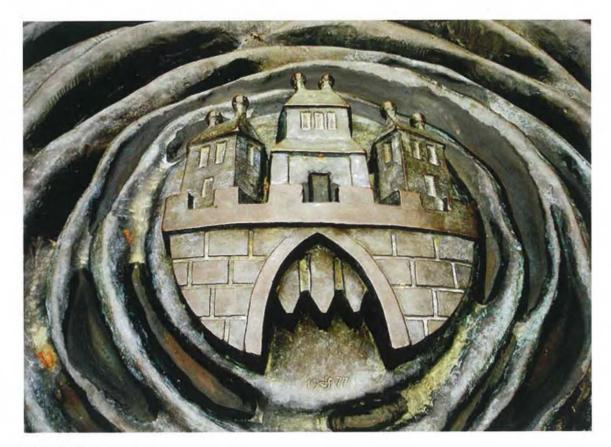


Fig 48 Wellcap, Bratislava.

with wonder (and its attendant qualities)...which do not imply possession but permit the 'other' to remain un-mastered. It is a foreignness that challenges the interface between rational and emotive understandings, a position with which we are empathetic but can never occupy.' (Poole, 1998, p. 141)

Civic Hydrology and Democratic Technology

Water also has a social-political dimension in the city, where its importance as a shared resource is projected spatially. 'Civitas', Latin for 'the condition or privileges of a citizen' establishes the idea of urban community and of collective association. However the concept of civic hydrology extends far beyond the location of a well in the middle of a town square. Fundamentally water asks us to take responsibility for a resource whose use extends into almost all spheres of public and private life.

'Civitas is less about place than it is about conduct, although as we all know at least intuitively, it is difficult to speak of one entirely without the other.' (Rowe, 1998, p. 9)

Incorporating civic frames of reference allows further design possibility. What constitutes a representation of 'shared' or public utilities like water? Civic hydrology could prompt water infrastructure to avoid the autonomy which leaves it ignorant of the complex interconnections of human settlement. 'The civic realm is that which is conceptually and physically common to all residents- a collective consciousness of what it means to be an inhabitant of a particular city...it supports the common good.' (Poole, 1998, p. 128)

One potential impediment to this process remains technology's autonomy. This must first be democratised. Water infrastructure must be re-positioned not just in relation to nature, but also re-orientated toward human/political spheres. 'Technological representation becomes salient when individuals find that important aspects of their humanity are not well served by the technical environment... Struggles over technology thus resemble political struggles in important respects' (Feenberg, 2010, p. 80)

Feenberg further argues that to democratise technology, knowledge must first be spread. This is consistent with the project's intentions to use architectural representation to reveal the processes of urban water extraction.

As early as 1924, social critic Lewis Mumford had castigated modern architects for romanticizing new technologies whilst ignoring the potential for making civil architecture from important everyday elements of the city, such as water towers and subways. He attacked the city beautiful movement for obscuring important structural and social developments saying that beautification was equivalent to 'the icing on a birthday cake' It detracted from the realism needed for the immense task of modernising the city. (Strang, 2002, p. 221)

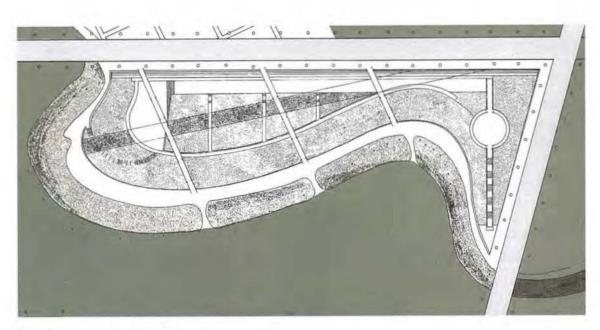


Fig 49 Jardin des Bamboos, Alexander Chemetoff

The realisation by Amidon and others is that these constructed landscapes need to highlight importance of water as a resource for the wider community in ways that foster participation and the 'desire to cultivate, desire to advocate' (Amidon, 2007, p. 178) The end result should be perception by communities that water amenity plays a valuable role as a constituent part of the city's structure. By understanding how 'infrastructure can positively or negatively impact [in the city] then they will value 'ecology' as more than an abstract principal.' (Poole, 1998, p. 138)

'One thing is clear: there is progress toward the performative matter of public space, toward reconciliation of nature and technology as an integrated application that is by necessity, environmentally productive and socially seductive...'Productive and seductive', the nature of the next generation of landscapes is not docile and controlled, but governed by the potent interaction of natural and human forces.' (Amidon, 2007, p. 171)

Jardin des Bamboos

Bernard Tschumi's Parc De Villett, holds several gardens, one of which, the remarkable Jardin des Bamboos, is a clear lesson in revealing the city's everyday elements. Designed by Alexander Chemetoff, the Parisian architect has presented a sort of archaeology of the local Parisian infrastructure. Sunken below ground plane, the garden collects together remnants of the sites original substrate constructions. Combined with contemporary elements it presents a thoroughly engaging experiment in crossing landscape architecture program with infrastructural memory and image.

The garden is located at the cross section of two of Parc De Villett's main promenades. Below the paths are the hard lines of two continuous retaining walls that enclose the gardens southern and western edges. Movement through the garden takes place by descending down stairs to one of two pathways through the collections of bamboo groves. The option is to take the first path whose winding length cannot be gauged, or a second which skirts the edge of the garden and follows the retaining wall to north-west point of the grove. The routes mimic the meandering nature of a creek and orthogonal lines of infrastructure before converging at steps that direct visitors back to ground level.

The Framed Sky

Descending into the garden the drop of depth and change in horizon rearranges the ground plane. Now sky becomes framed above, leaving the occupant below to balance between a degree of the enclosed and the boundless. The clustered orientation of the bamboo plantations offers a sense of both horizontal expanse and vertical connection between ground and sky. Disconnected from the park and the city, the occupant's senses are instead directed towards the amplified sounds of swaying bamboo and water flowing along irrigation channels which keep the air moist and humid. (Aben, 1999, p. 196)



Fig 50 Jardin des Bamboos, Alexander Chemetoff

Garden Themes

Chemetoff intended the bamboo garden to consider themes of climate soil and horticulture, but most importantly it was to create dialog and exploration with the almost invisible differences found within urban environments. Ostensibly the garden is a world of soft sounds 'calm and sheltered, humid, conducive to the growth of bamboo.' However, while this is a place of greenery it does not mask its' urban situation, the five metre excavation introduces depth and reveals the underground dimensions of the city's landscape. (Lavalou, 1996, p. 61)

As part of the initial site dig, it was discovered the park lay on top of a system of disused sewer pipes for a nearby 18th century slaughter house, their concrete construction predated municipal use by several decades. Subsequently Chemetoff decided to stage a record of these previously hidden topographies. This translated into a series of foot bridges across the garden using contemporary pipe channels and supported by metal lattice work. Where water and waste once flowed, feet now do.

Chemetoff points out usually it is only buildings that receive any design merit- even though infrastructure is widely acknowledged as a 'prime factor of any town, the linking and ordering factor' it is pushed to the city's perceptual boundaries. (Lavalou, 1996, p. 65) However integral to landscape architects are the concepts of edge condition, and Chemetoff took this also to mean the city's infrastructural peripheries and interior. 'The design proceeded from the site as a sub-urbanism.' With this in mind a key facet is connecting the park to the cities underlying physical structures. The sectional works and grading combine with the 'staging of horticultural and agricultural technologies.' By means of excavation, the garden became a volume rather than a surface, allowing its substrata to be explored. (Marot, 2006, p. 32)

Described as the 'Parisian wall', the normally stark act of a retaining wall along the northern edge of the garden is transformed to become a record of the excavation and construction of site. Designed with civil engineering specifications, with its regular columns of concrete, round holes and horizontal gutter channels, the wall is both an expression of the way it was actually built (rows of poured concrete panels successively coffered from below) and of the functions it is meant to perform. 'Retaining earth and heating the garden through light reflection, but also filtering, collecting and displaying the water sheets fed by the leaks from the nearby canal.' (Marot, 2006, p. 34)

Holding back the re-claimed terrain of the site, the hard lines of the wall are softened by moisture and detritus seeping through perforations. This becomes a visible record of the saturated earthwork and groundwater normally hidden from view. In this setting a simple wall takes an environmental performance role negotiating 'earth to space and from nature to garden' (Marot, 2006, p. 35)

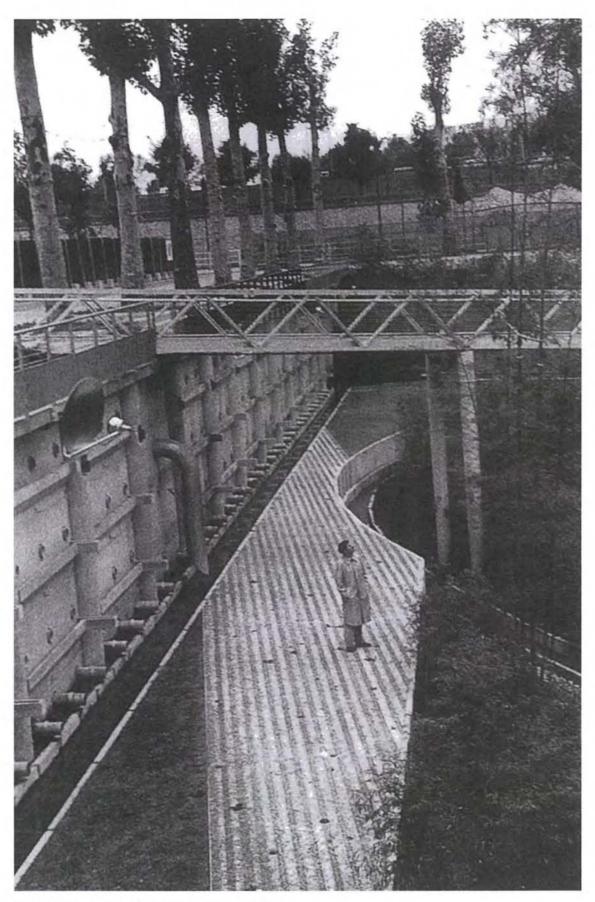


Fig 51 Jardin des Bamboos, Alexander Chemetoff

Much of the gardens' construction with its bridges and retaining walls, suggests a language of civil engineering. But the juxtaposition of this infrastructure with nature produces something different. 'What the garden thus operates, by bringing together these mundane infrastructural elements with rough river pebbles in the midst of a bamboo plantation, is a co-acclimatisation of nature and engineering that both evidence and stimulates their dialectical relationship.'

The garden produces an 'enjoyable milieu out of this unexpected encounter, disclosing the machinery of the sub-urban, thus rendering it both accessible and inviting.' It reveals the garden as a 'onsite representation and laboratory of the world we live in, so powerfully transformed by modern infrastructural networks' (Marot, 2006, p. 36)

Providing a micro urban environment, the garden marries the manmade with natural together in ways usually ignored or hidden from view. In doing so, the workings and interdependencies of the city are laid bare. The scheme offers a far more satisfying engagement with the bio-techno functioning's of the city than the small gestures of green walls or day lit storm water networks now commonly within a city. In Jardin des Bamboos environmental contingencies of the city are displayed for observation within technological and tectonic orderings.

Conclusion

The use of landscape technique, the acknowledgement of constructed nature, and the contexts of site and scale can provide water infrastructure with meaningful new architectural form within the city. Cartographic maps must replace zoning plans if we are to progress towards a framework that argues about geographical character of place. (Gissen, 2010, p. 42) It also requires the integration of the estranged disciplines of architecture, civil engineering, landscape design and biology in ways that projects like Jardins des Bamboos demonstrate are possible. However this is all of potentially limited success unless we also ensure the involvement of political and civic spheres of society.



Fig 52 Brion Chapel, Carlo Scarpa

5. Design Strategy #3 / Poetic Construction

Any artistic architectural idea is worthless, even ridiculous, if it cannot be expressed within the regular building process (Herzog, 1993, p. 7)

Reviewing the work and creative perspectives of Eliasson and Chemetoff has provided rich material for a new Petone Water Plant proposal. However the legitimacy of using these approaches to represent water's qualities and materiality, lies in their ability to be incorporated in the actual making of architecture. If preceding chapters have focussed on the reintroduction of poetics from the realms of art and landscape we can perhaps define this within architecture as the 'poetics of construction.' (Frampton, 1995, p. 4)

For this scheme to be architecturally successful the plant's craft, materiality and its 'tactile dimensions' must be at the centre of such a design strategy. The story of a building is represented by the substance of its make-up; - architecture's 'thingness.' In this way narrative dimensions are not mere adornment but manifest from within the architecture itself. (Frampton, 1995, p. 4)

Kenneth Frampton considers that a reading of architecture's thematics can be found in the convergence of three factors and their interplay; 'topos, typos and tectonic' drawing on the work of Gerhard Semper. Emerging from central European traditions of craft, the Swiss architects Herzog & DeMeuron (H&dM) realise their own particular vision of constructed symbolism. Materiality, manipulation of skin and other apparatus influence how nature & technology become present within their buildings. Their Signal Box projects- part of Basel's railway infrastructure, are referenced here with direct parallels to the urban utilities theme of this thesis. (Frampton, 1995, p. 2)

The Symbolic Elements of Construction

For Frampton the language of architecture comes from its process of making, with three formative elements. 'Topos' and 'Typos' can be elaborated as a building's relationship to site and its classification or program, while the final 'Tectonic' is derived from the Greek, '*Tekton* - to build.' Interestingly construction in ancient Greece under this definition held a dependence on achieving *usefulness* while the Greek writer Sappho assumed the role of the tekton or carpenter to be a poet. (Frampton, 1995, pp. 3-4)

This position alters the emphasis of Corbusier's idea that representation should follow function, it denotes something that is closer to Vesely's definition of Praxis. We ask- how can a building be made to be of *use* to something or somebody? The act of building therefore carries with it an emphasis of *responsibility* founded on 'relevance' to its intended purpose.



Fig 53 Laugiers Primitive Hut

For Frampton the foundations of constructive poetics are found in an analysis of the primitive hut where Gerhard Semper's reading of the symbolic and representational role of architecture can be traced back Laugier's mythical origin of building. (Bergdoll, 2000, p. 235) Examining how the elements of a building may be compiled can provide representational guidelines for water amenities' architectural themes.

In total there are four fundamental components to the primitive hut's taxonomy:

- the earthwork,
- the hearth,
- the frame work,
- the lightweight skin of the building.

Semper splits these four parts into two constructive dimensions- its tectonics and stereotomics. The assembly of the huts frame and skin, joined to create a spatial matrix, becomes its tectonics. Derived from the Greek *stereo* and *tomia* combine to mean 'cut solid' and the primitive hut's Stereotomics signify the mass and volume of the original stone masonry and earthwork hearth piled together. (Frampton, 1995, p. 5)

These two components provide the ability to distinguish basic construction typologies and provide a means to orientate the building to its' site. The suggestion of light and heavy elements makes a simple translation into two cosmological relationships. There is the 'Affinity of the frame for the immateriality of the sky' and the 'propensity of mass form...to gravitate to earth.' The act of building becomes both a derivation of the ground plane and the ascension from it. (Frampton, 1995, p. 7)

In the case of the proposed ground water scheme this observation provides potential to reflect on a utility structures orientation to site. How does the building negotiate both its own and waters general relationships with earth and sky? It is as Mario Botta said a means of 'Building the site.' (Frampton, 1995, p. 23)

Materiality as a Language of Ornament

Architectonics for Semper extended to define the materials used in a buildings construction and the frame's cladding in particular. Drawing on the ancient use of material in the covering of tents, cladding was a means in which to express the 'art' of a building, projecting its external representation. Semper argued that the manipulation of cladding raised 'the architectural type to the status of a symbol by transformation of material' (Kruft, 1994, p. 312). 'By focusing on *Gewand* or the surface ornament, Semper aims to reinforce its integral relationship with architonic space...[and the] visual perception of space that is given shape through the enclosure' (Asman, 2002, p. 390)

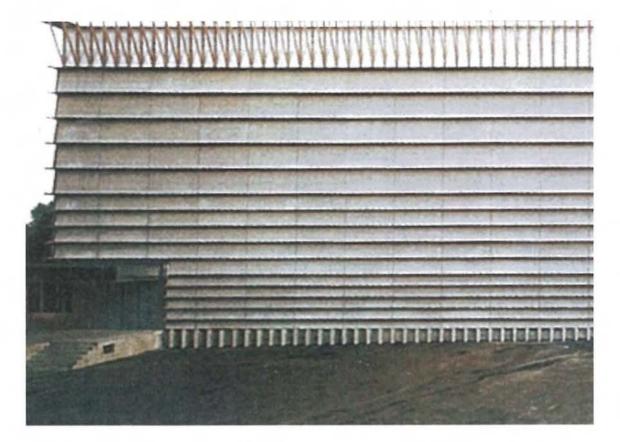


Fig 54 Ricola Storage Building, Herzog & de Meuron

He defined two types of wall cladding; - Die Wand describes light, screen type partitions, while *die Mauer* was a protective, fortification type wall with the associated implication of great mass. The reading of wall typologies in this way suggests a further light/ heavy language to consider with material selection and constructional approaches for building facades. (Frampton, 1995, p. 5)

For it to resonate as architecture of meaning, the formation of a buildings makeup is arguably dependent on 'its capacity to articulate both the poetic and the cognitive aspects of its substance.' In summary then Frampton describes this 'presencing' of architecture and associated symbolism should be 'inseparable from the manner of its foundation in the ground and the ascendancy of its' structure through the interplay of support, span seam , and joint- the rhythm of its revetment and the modulation for its fenestration.' (Frampton, 1995, p. 22)

The Strategies of Herzog & de Meuron

H&dM work through their own ethical codes of suitability, inquiry and evaluation, while a deep sense of programmatic interrogation helps to form their set of working principals. Here design processes centre on deciphering the possibilities that come from a building's intended use with particular emphasis on how the resultant artefact spatially and physically relates to these themes. Recurring throughout their work, is consideration for constructional relationships, expression of external skin, material exploration and an ongoing reflection of the nature of building. For H&dM tectonics offers an architectural means of expressing programmatic themes and cultural ideas.

Prevalent throughout their early projects was the role of typology as it was for other Swiss architecture of the late 1980s and 1990s. Seen in some respects as a conscious departure from formal expression, this group adopted their own form of praxis characterised by 'stronger responsibility to collective culture than to the ideal of individual creativity.' Typological issues were thoroughly disseminated and the contexts and wider programmatic purposes of a building deliberated over rather than a rush to meet specifics of an individual brief. (Meili, 1996, p. 24)

[Extra]Ordinary Matter

Another constant in this early work is not just their attraction to conventional materials and methods of construction, but often a re-appropriation of them. The intention being that powerful architectural moves are made by unexpected adjustments of the ordinary. Innovation in their work derives from the un-anticipated light qualities of rubble filled gabion walls or cast iron screens that recall drain grills, this re-orientates readily available materials towards new architectural roles.



Fig 55 Riccola Factory Herzog & DeMeuron



Fig 56 Chinese Philosophers Stones, Rosenblum Collection

Projecting meaning from the use of the ordinary the architects offer a degree of poetics far richer than any overt post modern gesture. Form play and irony are cast aside instead undetected qualities of the mundane are often revealed. 'What embodies weight? What constitutes brightness? What is a wall, what is light? These concepts all bespeak our perception of the physical world on a conceptual, spiritual level. And this is precisely the level we want to reach, to target in our architecture: the conceptual level of perception.' (Wang, 1998, p. 186)

The foundation for this architecture may seem simple enough, but their work contains elements of the radical. 'It seeks the roots of ideas and construction, the basis of contemporary architectural communication, the rendering of visible prevailing conditions, whether these are of a programmatic or topographic nature, combining both seemingly archaic means as well as the most recent media.' (Mack, 2005, p. 13)

Nature and Construction

This sense of the ordinary is also examined with nature's recurring role in their architecture. The detritus of the everyday is exhibited as ornament, smudge and accretion, streaks and reflection all work with a building to become 'a filter between the artificial and the natural.' (Curtis, 2003, p. 4) The juxtaposition of the two by H&dM is explicitly undertaken because by doing so 'the vulnerability of both becomes evident.' (Curtis, 2003, p. 34) Focussing on the almost mundane interaction of their buildings with nature, H&dM wager such a primary architectural interface would allow form, material and presence to perhaps 'hint at the 'spirit' behind the natural world' (Curtis, 2003, p. 6)

They do however envisage a level of uncertainty around nature's urban construction. For H&dM this can be summarised with an examination of Chinese Philosopher rocks. Constituting a particular conceptual model for their work, the rocks lie somewhere between a natural and synthetic artifice. The folds, imperfections and shape of the original stones are honed to emphasise particularly favourable characteristics. They are coveted not only because of the finely crafted results but just as importantly because of the ambiguous line between what is natural and what has been manipulated. This artificially composed beauty creates a presence that eludes fixed interpretation. It suggests that man may intervene with nature in ways that increase rather than detract from is immeasurability- countering the idea that such a gesture introduces a completely explicit outcome. This is of significance when wrapping water's own boundless nature within infrastructure.

'You might compare it to cloud formations in which you can recognise various things, although the form in isolation can never be unmistakeably pinpointed and explained. This is an aspect of natural phenomena that interests us a great deal.' (Ursprung, 2002, p. 84)

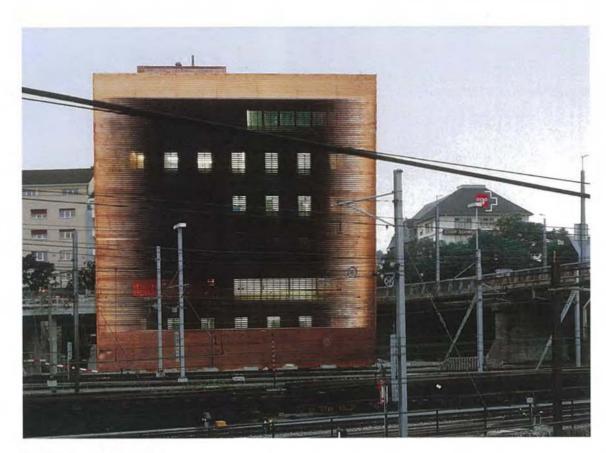


Fig 57 Signal Box 1, Basel

H&dM are clear however in the need to avoid deploying nature in a Disney-like display of mimetics. Organic architecture has usually been an abysmal failure 'precisely because [it has]...failed to achieve a sufficient distance from natural sources of inspiration.' (Herzog, 1993, p. 19) Their buildings are instead 'frames' to focus particular themes of the city and environment. Experiencing the realities of the natural, artificial and other dimensions of the world may be intensified through their 'controlled use of materials, reflections, geometry and lines of sight. The buildings sometimes act as incisions or magnets activating the surrounding field.' The Signal Box buildings of Basel are one such example. (Curtis, 2003, p. 35)

Signal Box Auf dem Wolf

With a requirement to house sensitive signal equipment for Swiss Railways, Basel's two H&dM designed signal boxes, present a quite different approach to the design of infrastructure. Containing small office spaces these predominant use is to hold railway switching equipment. However technology's place in these early utility buildings is a means- not an end. 'They avoid the structural and mechanistic rhetoric of 'high tech' preferring more modest solutions.' (Curtis, 2003, p. 4) For H&dM the intention of these towers is to create a piece of an architecture that is not just a technical construction but rather they should 'edify the utilitarian and give it the status of urban landmark.' This is something the Water-Shed scheme aims to achieve. (Curtis, 2003, p. 8)

Both Signal Boxes are tall six storied concrete constructions. On the exterior they are clad and insulated with 200mm wide strips of copper extending the full height of the towers. At certain points where there are openings these bands of copper twist to allow daylight to enter. The monolithic nature deflects any reading of the buildings separate floors prompting a projection as a whole in tandem with the scale of the surrounding rail lines and yard.

The two towers display an almost obsessive attention to material potentiality with this copper cladding. For 'not only does it limit the outside, regulating the ingress of light and water temperature; not only does it signify the appearance of the building; it is also a faraday cage; a copper wire envelope that deflects an electrical charge, should a discharge of electricity hit the building.' (Zaera Polo, 2002, p. 182) As a technique of construction it is also able to touch on 'subliminal memories of veils, window blinds, even of electric copper coils.' (Domus, 1994, p. 8)

It may be ostensibly a simply box, however the limited number of formal and expressive gestures provide enormous effect. The design of the signal boxes enters into symbiosis between program, material and construction to conceive a unified whole. The almost earnest way in which the functional aspects of the building are explored surprisingly creates architecture 'Both sensual and mysterious the Main Signal Box works along the knife-edge between utilitarian and artistic identities.' (Curtis, 2003, p. 41)

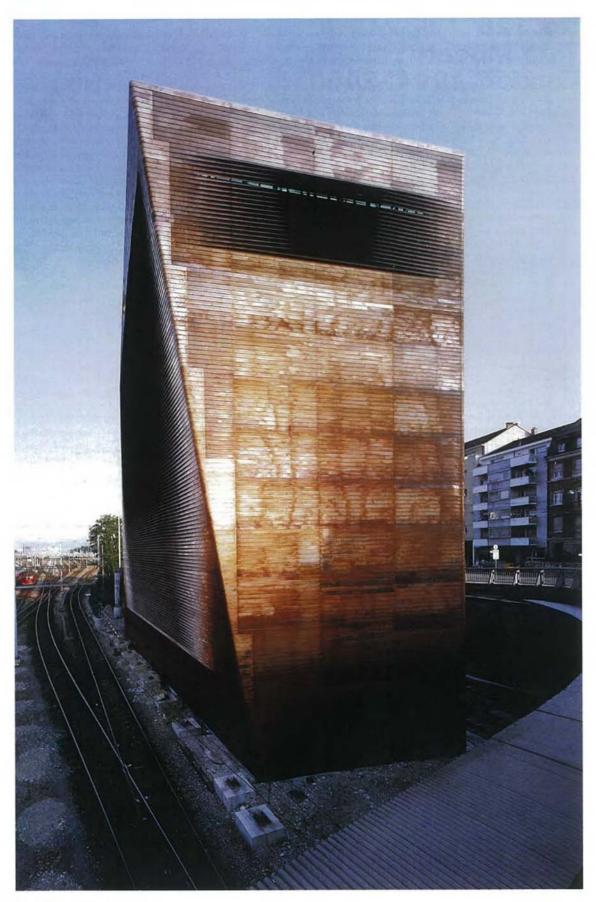


Fig 58 Signal Box 2, Basel

The design approaches for these two buildings suggest utilities have a potential role in assisting the restructuring of public space and collective identity in the city. The Signal Boxes take on a new archetypal character amongst Basel's public railway system, read like 'the yellow post office trucks or the national emblem of Swissair [and] need to be understood as signets of a contemporary branding that combines an increased mobility with recognition value. They could link geographic regions, mark axes and affiliations without being contextually occupied.' (Mack, 2005, pp. 18-19)

Although riding a cautionary line between aesthetics and beauty, the Signal Boxes reexamination of infrastructure and programmatic requirement yield a rich work of architecture. It displays a set of simple yet highly considered gestures of construction where the manipulation of material is able to derive poetics from utility. 'Centred on the horizons where these junctures of surface and depth, subtle and sublime, metaphor and reality, flux and permanence can be made to appear, their work keeps us hovering somewhere in between the transcendent and the real' (Olsberg, 2002, p. 8)

Conclusion

In returning to essential origins we can understand how the building arts were once legitimately connected to a language of metaphor. It is only through the making of architecture, its materiality and presence, that the themes of water extraction may become integrated. The Signal Box projects indicate how new architectural forms may be legitimately arrived at when the concepts of technology and states of nature are incorporated with this. Only then will it be possible to arrive at an alternative to water infrastructures strict instrumental basis.



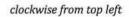












- Fig 59 Petone Railsheds and workers circa 1920 Fig 60 Railsheds looking south across Wgtn Harbour Fig 61 Workshop Machines Fig 62 View from Site looking East down Jackson St Fig 63 View Southwest towards site Fig 64 View Northeast towards site Fig 65 Railway Workshop



6. Design Part 1: Site and Function Analysis

The design of a new Water Extraction plant in Petone aims to reinterpret the instrumentalised and engineered landscape of urban water extraction. To begin to implement the design strategies, the proposed site, the hydrology of Waiwhetu Aquifer and current artesian water extraction processes at Waterloo plant and network must first be examined.

Petone

Petone is a small Hutt City borough with a population of approximately 6500. (Council, 2006, p. 12) It almost became the site of Wellington's first colony, the ill fated 'Britannia', which was to be established along the banks of the Hutt River, before the New Zealand company was encouraged to move to Thorndon in late 1840.(Johnston, 2007) Nonetheless Petone continued to develop, buoyed by its role of supply and trading between Wellington city and Lower Hutt and from an early stage maintained a keen community identity.

'[Early] Petone by local standards was densely populated and heavily industrialised. [It was] Ugly, grimy, lively and close-knit, more like an English industrial town than a New Zealand one.' From industries that emerged to become the pillars of the national economy, to its celebrated local football team Poneke, the town developed a fierce sense of pride which above all stemmed 'in being the scene of one of the founding episodes of colonial New Zealand.' (Butterworth, 1988, p. 13)

Many of those businesses' have since declined or left the borough and Petone suffered the same post industrial problems felt elsewhere in the 1970's and 1980's. However Petone's history, its geography and layout still pronounce a keen sense of self and community spirit. The borough has subsequently undergone a renewal of the early 20th century housing stock as new families have moved in stabilising the borough's population, while Jackson St is a destination once again, for its cafe's and shops. The town once again looks to the future.

The Treatment plant at Petone railway station is intended to supply the borough with a distinct and independent drinking water supply, motivated by:

- A critique against the centralised planning of the Wellington water network
- A geographical identity to for the Waiwhetu aquifer
- Petone's democratic decision to avoid fluoridation of their water
- Enhancing Petone's existing civic identity by reinvigorating communal amenity
- Revealing dormant infrastructural process in Petone.



Site and program for a new Artesian Water Plant

The new artesian water extraction plant for Petone is located to the western between SH2 and Hutt Road, at the head of Jackson Street. It occupies land currently used for Petone railway station's parking.

The site was selected because:

- 1. It offers a direct counterpoint to the Waterloo stations artesian plant.
- 2. It is highly visible beside a national highway and Hutt City's main road.
- 3. It is located symbolically at the head of Petone's historic Jackson Street.
- The surrounding site infrastructures; railway lines/ motorway and pedestrian over/ under passes, offer many design opportunities.
- 5. It is on historically important land once occupied by carriage workshops, Petone's second largest employer early last century. (Butterworth, 1988, p. 157)
- 6. It adjoins land once covered by Pito-one Pa, the main Maori Pa of the Petone area.
- 7. In addition Hutt District draft plan changes were introduced in August 2010, proposing rezoning Petone land between the railway station and the Esplanade suggesting;
- An extension to the 3-6 storey Jackson St shopping district to the edge of the Hutt Rd.
- 6 storey commercial/ residential buildings near the Railway station, decreasing in height towards existing residential areas.
- A conversion of land around the Railway station area from industrial to mixed use. (Schouton, 2010)

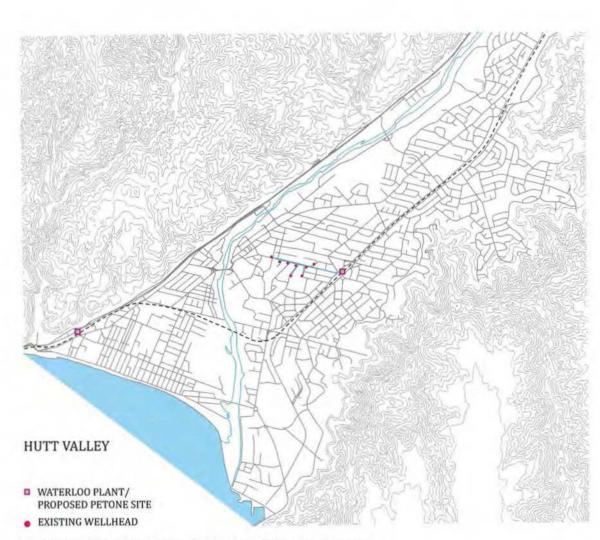


Fig 67 Map of Hutt Valley indicating Petone and Waterloo plant sites

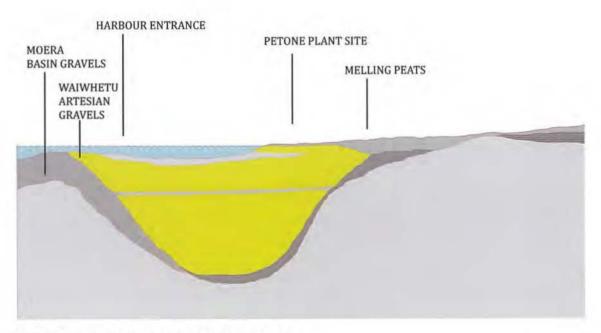


Fig 68 Cross-section of Huttvalley/ Wellington Harbour

The Hutt Valley's Geology and Hydrology

Petone is located at the bottom of the Hutt Valley, north of Wellington City. Hydrological action has informed the valley's geology since the last ice age 10,000 years ago. Subject to the erosive actions of water and ice, sediment accumulated in the 4 basins that cover the path of the Hutt River's, which once flowed to meet the sea10 kilometres south of Lyall Bay.

The gravel beds which that were laid down during this period act as filters and form the basis of the Wellington aquifer system. Collecting water from around Melling in Upper Hutt, these beds also seal water within the contained artesian system. A total of 3.8-5.7 million litres of water per hour travel in a confined state across the valley floor through layers of gravels below Waterloo and Petone and beyond until finally reaching points around the Port Nicholson's entrance.

Waiwhetu water's characteristics:

- Waiwhetu aquifer supplies water is comparable to many of the NZ bottled waters marketed for sale.
- The extracted water has a low pH value (approx 5.5-7). Untreated this would accelerate deterioration of the iron pipe supply network.
- Underground for 6-12 months Waiwhetu water has a high CO2/ low O2 content.

Greater Wellington Water Network

Wellingtons' water supply relies on the Waiwhetu Aquifer as well as the Te Marua and Wainui catchment basins. Water is either gravity fed or pumped throughout the network, with around 70 reservoirs storing the region's water. Treatment plants at Te Marua, Waterloo and Gear Island provide chlorine, lime or fluoride to the supply as required.

Waterloo Treatment Plant

The Waiwhetu aquifer accounts for 25% of Wellington's drinking water, which is extracted exclusively at Waterloo Treatment Plant in Lower Hutt. Using 8 small underground well heads, water is pumped east to the plant which sits alongside Waterloo train station.

The treatment plant is a long 80 metre rectilinear concrete slab building. At the north end the garage doors provide access to the transformer and generator/ motor hall, pedestrian access is at the middle of the building on Oxford Terrace. The main control & mess rooms sit above, while below are the dosing and lab rooms that adjoin another large hall (approx 15 m high) housing the main lime hopper. At the southern end are holding tanks and twin aeration chambers. Waterloo train station platforms start directly south of the plant.

The buildings monolithic character is a clear indication it was designed solely for its internal process engineering functions, with no recognition to a wider site context. Reinforced concrete buttresses line the building externally while the building envelope

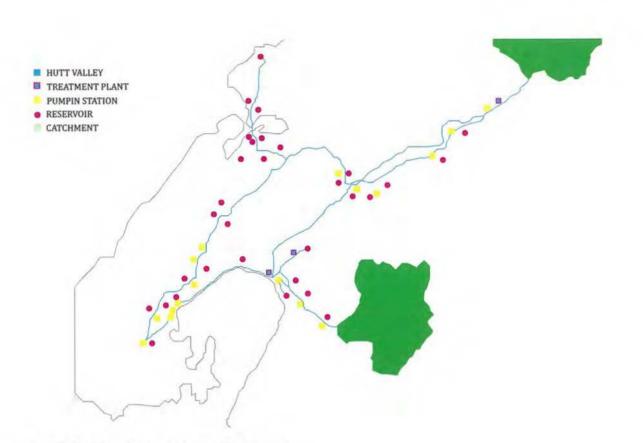


Fig 69 Greater Wellington Water Supply Network

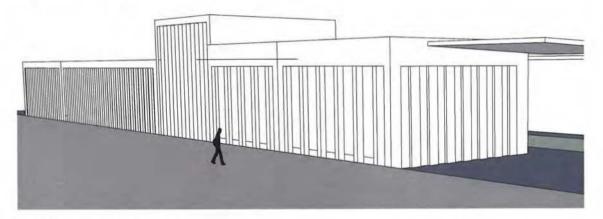


Fig 70 Waterloo Treatment Plant

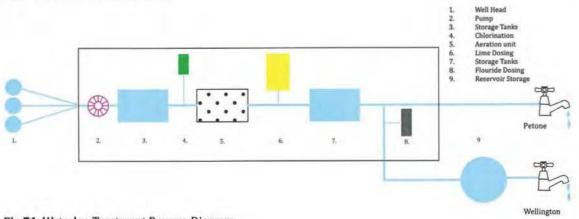


Fig 71 Waterloo Treatment Process Diagram

forms the main holding tanks and aeration chambers. Other than a single glazed entrance way on the west there is no indication of what occurs within the building.

Although of high natural quality, several treatment processes at Waterloo are required to ensure it meets the standards needed for the region's water network. These are:

- To raise the pH level and alkalinity levels to a neutral level (7.8), lime is added
- To ensure an efficient chemical reaction CO2 must first be stripped from the ground supply and oxygenated, reducing the amount of lime required
- Addition of Fluoride (except for Petone) to meet Government health standards
- Chlorination to meet Ministry of Health water quality standards and to prevent any contamination in storage.

Water cycle at Waterloo:

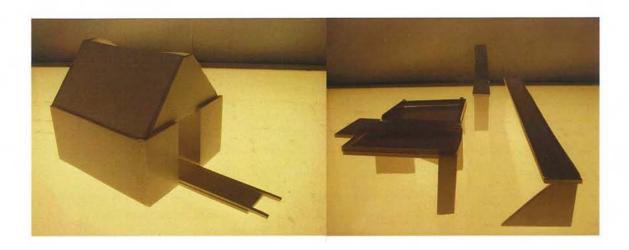
- Water enters the plant from the 8 bore heads splitting into two identical holding chambers.
- Chlorine is dosed for the network (except for Hutt City's supply)
- It passes into a second chamber aerated by two blades stripping the water of approx 30% of its CO2.
- Hydrated Lime from a large internal hopper is added to the supply.
- It is then left in two further holding tanks
- Naenae and Gracefield water supplies are dosed with fluoride.
- Wellington's supply is dosed at Gear Island (due to the requirement that Petone's supply must be first provided un-fluoridated)
- It is then pumped in reservoirs for supply to the network

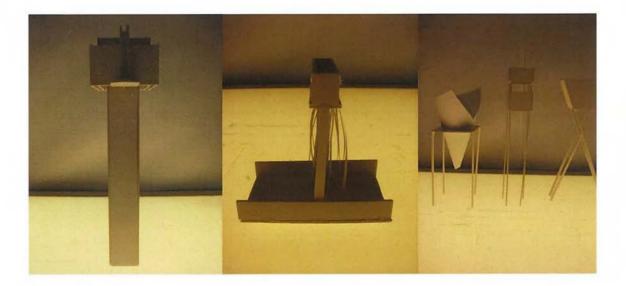
Note:

- 20 tonnes of lime are used every 10 days at Waterloo.
- The water pressure generated assist the network right through to McAllister Park in Newtown (as Wellington Central has no hill top reservoirs to do this)



Fig 72 Waterloo Treatment Plant Cross-Section





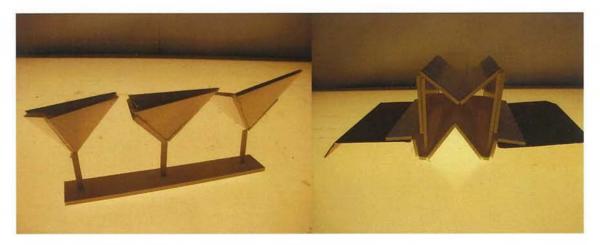


Fig 73 Clockwise from top left Rail 1 & 2, Squid, 3 Runts, WM, Tri tri, Golem

8. Design Part 2: Development and Documentation

Models

As well as development via sketch book, early models assisted in documenting the reconfigured water extraction processes.

Golem considered ideas of the ground plane, looking at artesian water's concepts depth and the well. There were also ideas of ascension and water flows of a city fountain passing over the top of the structure before dropping between two sets of walls or travelling along a channel down to a collection point.

Squid takes a more performative approach, delicate lime filled filaments envisioned to be tentacles moving according to the channel of water that they were dosing.

Rail#1 & Rail#2 investigated how water infrastructure and the rail line could be physically merged, along with converging pedestrian access between the railway platforms and plant.

Rail#2 also considered noted how the existing pedestrian overpass met the sky and the underpass met the ground. It left questions of how thresholds and entrance ways could be informed by existing site conditions (negotiation the highway and the railway) and the nature of artesian water- how could the ground be received or departed from spatially.

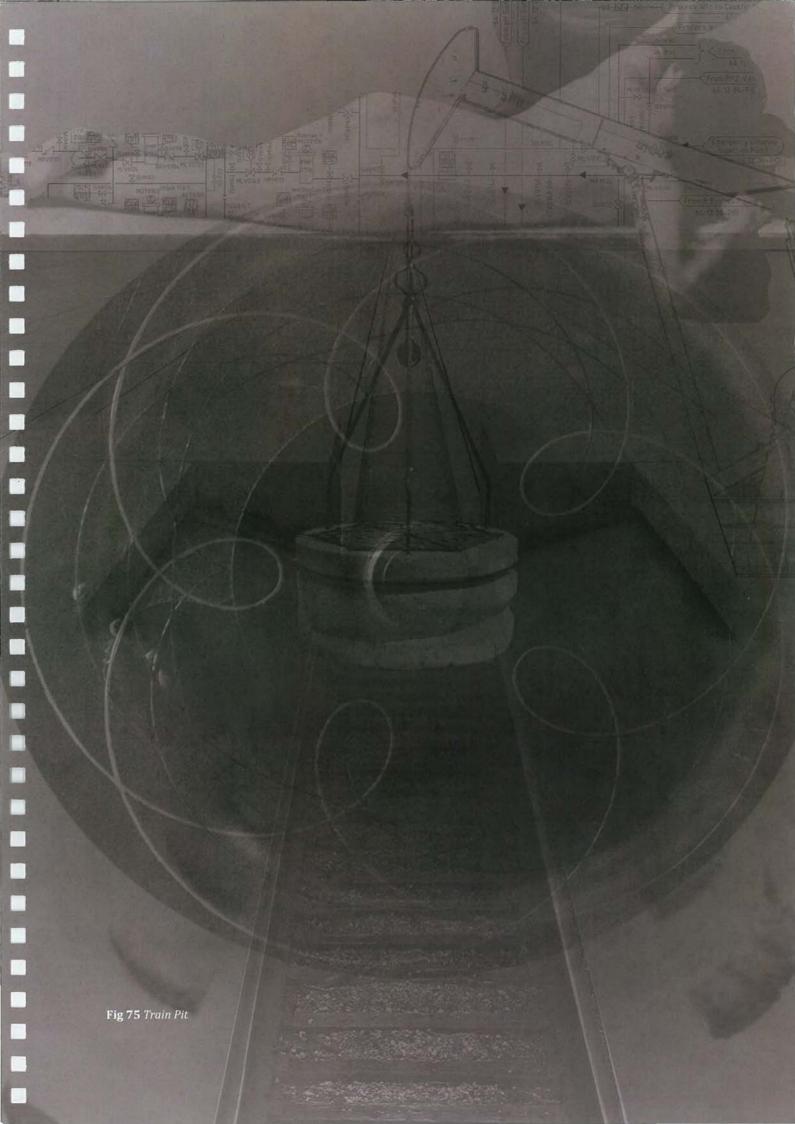
Try tri invokes Peter Redgrove's abstract pyramids offering up ideas of what role limestone hoppers could play the architecture.

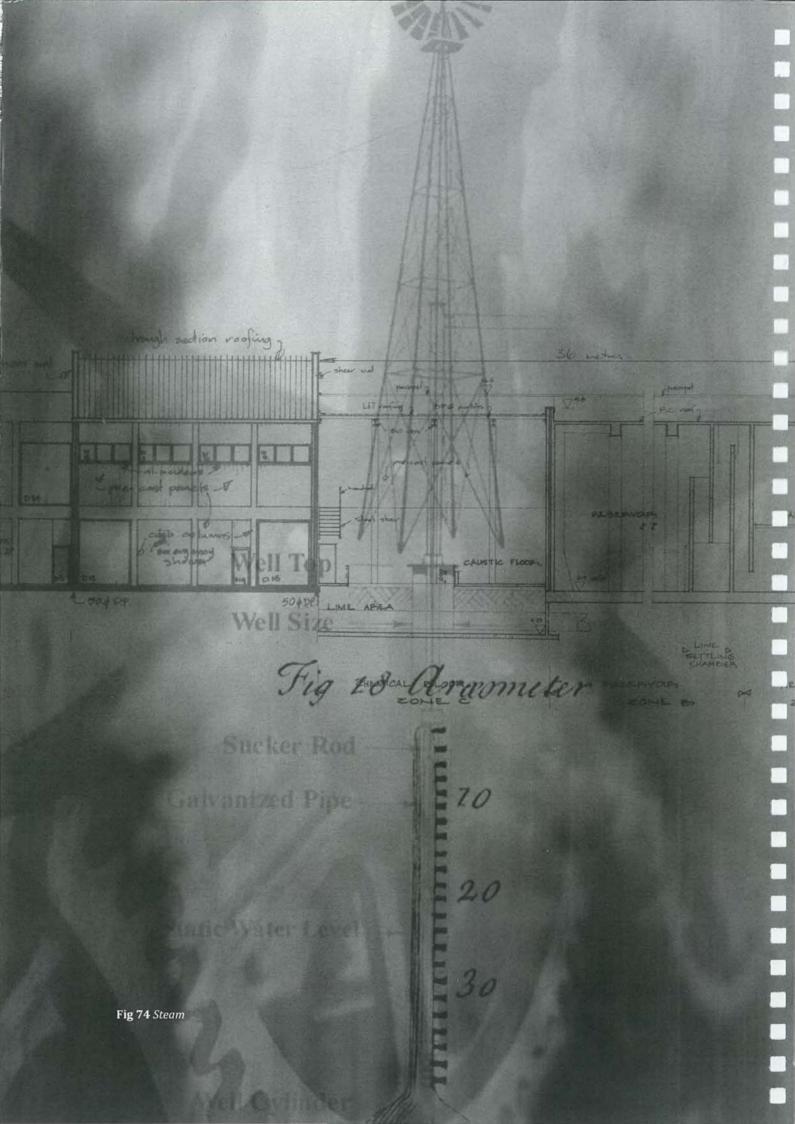
3 Runts examines water towers, and their place elevated in the landscape and how this acts as signpost for function.

Finally *WM* and others looked at water moving across surfaces, water as a medium for light to pass through or reflect off, to be surrounded by, or to be contained.

Imagery

Along with extensive sketches, at a similar time to the model, two 'mind maps' were produced;- Steam & Train Pit. Dalibor Vesely's writing had inspired interpretations of water's technological and symbolic dimensions. Windmill pumps merged with antique water gauges, combined with water vapour, cogs of industry and Waterloo plant buildings. Elsewhere train tracks descend into wells, plundered by pump-jacks and encircled by cycles of infinity and bath house occupants.





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Fig 76 Screen Tests 1

Screen Tests 1

In artesian water systems the process of gravel bed filtration acts to purify water. In line with H&dM's approaches, a persistent question throughout the scheme's development was how this filtration could symbolically and practically translate architectural with both water and to light.

First, several basic screen forms were made with various fenestrations. When two patterned screens overlapped a dynamic view of the object resulted. It was a starting point to understanding that the building itself could offer its own water-like sense of flux.

Fig 77 Screen Tests 2

Screen Tests 2

The next task was to look at how existing filtration materials could be used tectonically in the form of meshes and screens. Single material elements interacting with light and water form some of Olafur Eliasson's most successful installations, and were the background to experiments. Observing these screen elements in isolation suggested distinct aesthetic qualities, however it was their interaction with water that shifted perception to something closer to beauty.

The simple act of droplets held by the screens in surface tension offered infinite pattern outcomes. Testing different sized and shaped holes affected water retention but more importantly how the water engaged with light. Refracting through water light, bends sometimes to the point where it splits completely. It demonstrated an almost magical relationship, whereby the screen became a more ambiguous material. To combine water with light using treatment apparatus became a critical dimension of the project.



Fig 78 Willy Wonka and The Choclate Factory, Waterfall Scene

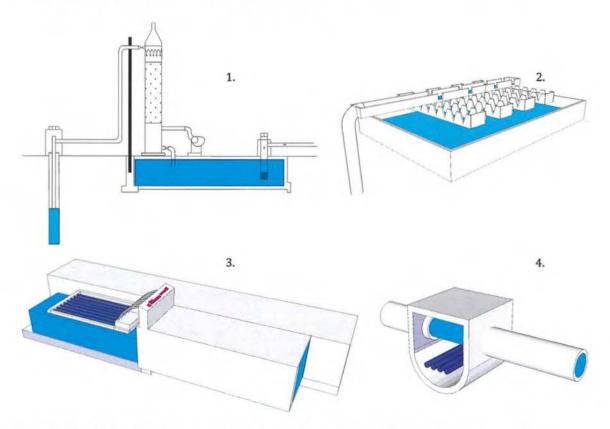


Fig 79 Technologies;- 1. Packed Tower Unit, 2. Trough Unit, 3. Waste Water UV, 4. Drinking Water UV

Re-Evaluating Chocolate Waterfalls

Central to the scheme's design was the intention to reconfigure the engineering found at Waterloo. In Roald Dahl's Charlie and the Chocolate Factory, Willy Wonka reveals to children the alchemy of chocolate making. Far from the gloomy industrial processes of Slugworths, the making chocolate becomes an act of celebration where to mix the chocolate becomes an excuse to create a water fall. It adds symbolic value to a process normally with none, because to one man (and many children) chocolate transcends something more than mere consumer product.

Reducing Lime Usage Through Improved Aeration

If the aeration processes at Waterloo were improved then the level of lime used could be reduced. Whilst the aeration blade technique used at the plant is common, the plant operators conceded that efficiency improvements could made. There are alternative aeration options available with potentially greater release of CO2.

Packed Tower Aeration Units are most commonly used for chemical engineering and works by pumping water up a large 10-20 metre tower. It is then sprayed internally down the enclosed tower whilst air is pumped upwards. A second type, *Trough Aeration Distributers*, water travels along channels and over gaps to drop to layers below, aerating as it does so. Pondering the beauty of Eliasson's projects and Mr Wonka's chocolate making, could a waterfall be incorporated to operate the aeration stage of the scheme?

Removing the chlorination of water

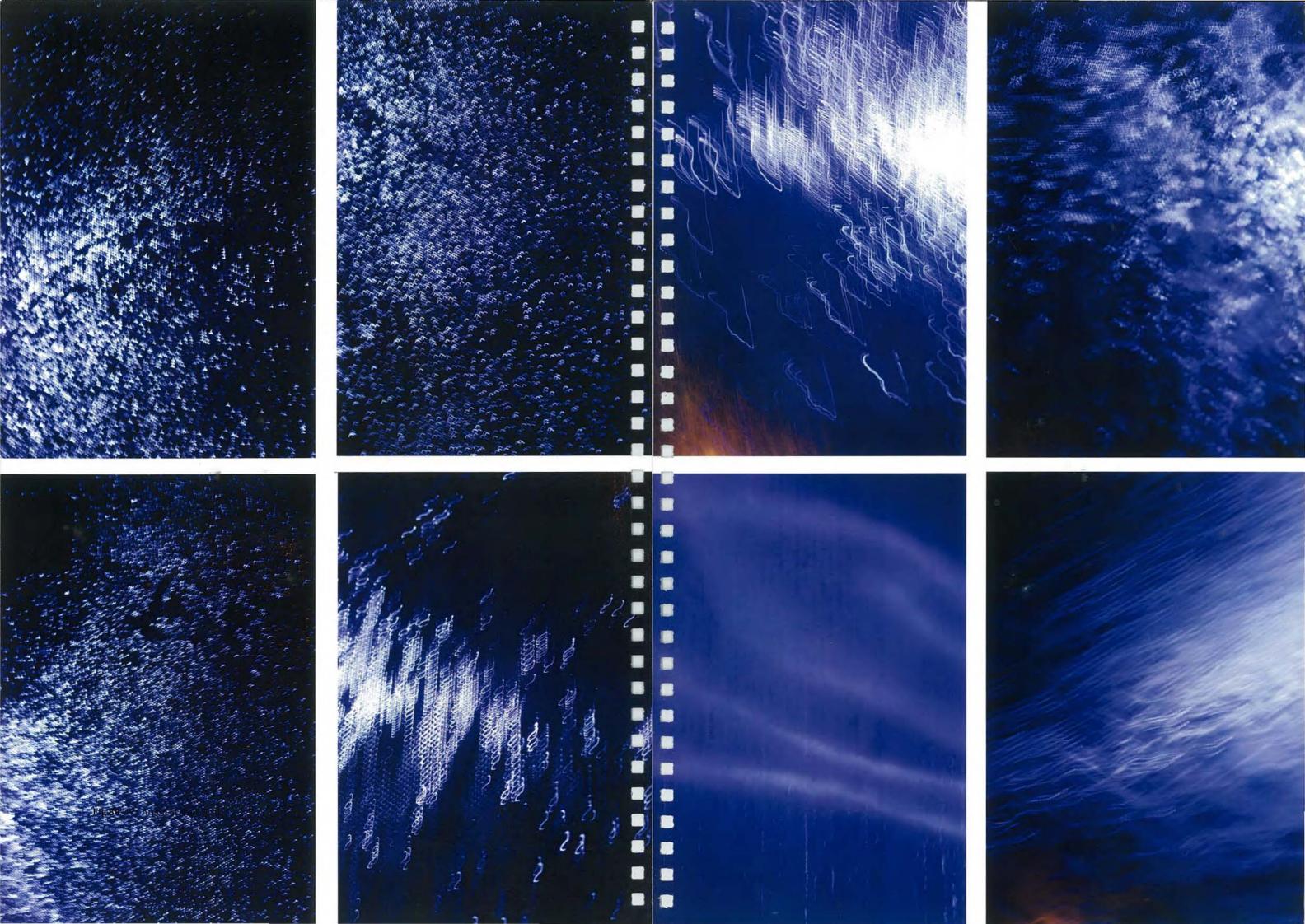
In voting for non fluoridated water, Petone residents wanted their supply to be as pure as possible. Lime use might be reduced but what about the inclusion of chlorine? Avoiding the use of chlorine requires residual ground water bacteria to be removed with other means. One alternative is the use of ultraviolet radiation.

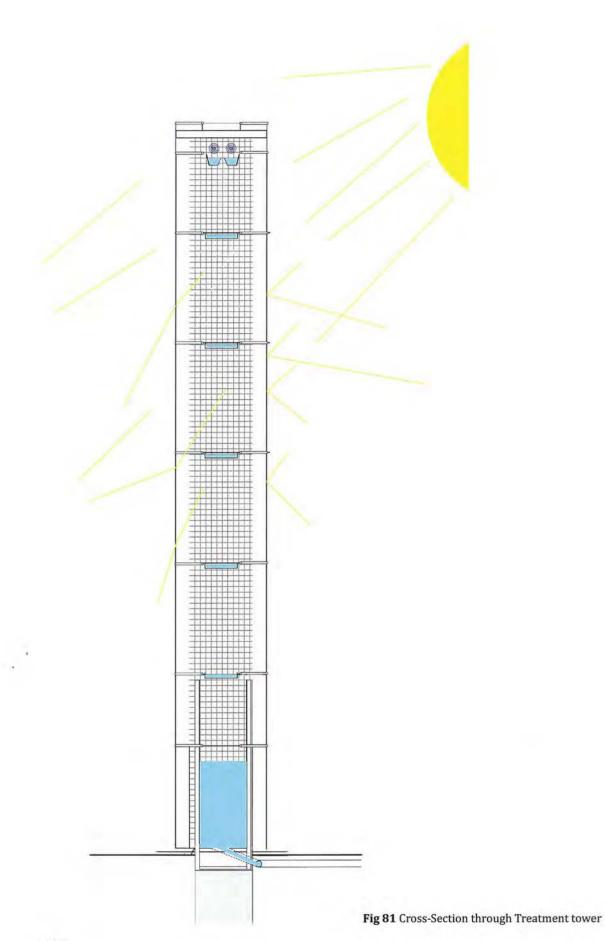
UV treatment:

- Leaves no smell or taste in treated water
- Requires little contact time with water
- Improves taste because containments and microorganisms are destroyed
- does not affect natural mineral content

UV/ Argon Screen Tests

This use of ultra violet water treatment locates light at the centre of scheme. It led to further tests with illuminated mesh, an argon light source, close to ultraviolet on the light spectrum, was used. In these experiments the camera was left on long exposure allowing light and movement of the mesh screen to be captured.





Final Water-Shed Proposal

Using the symbolic qualities of water, re-configured treatment technology and the reevaluation of site, urban water amenity is re-activated. By revealing part of the water network, the intention is to also ask residents to contemplate their use of water and their own place within a wider set of urban ecologies.

Water Cycle at the Water-Shed

The Petone Water Scheme provides an alternative to Wellington's treatment plant reenvisaging existing treatment processes using the following steps managed by the control room which overlooks the tower;

- 1. Water is brought up to the surface from the bore head via an adjacent pump room
- 2. It is then pumped to parallel holding tray sat the top of the water tower
- 3. Exposed to the light filaments, UV treatment takes place
- Water overflows from the trays and drops through a series of metal grates that aerate the water.
- Water drops into a tub suspended above a pedestrian access way and is gravity fed into a nearby underground holding tank
- 6. Water is then pumped from the holding tank and hydrated lime is added before being feeding directly into Petone's supply network via a second tank
- 7. Water is assessed for quality at each stage of the process via the testing lab.

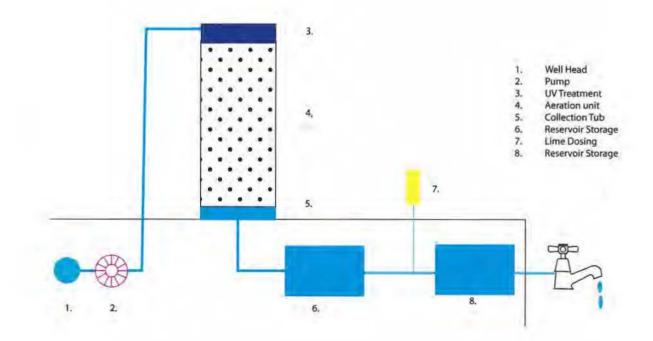
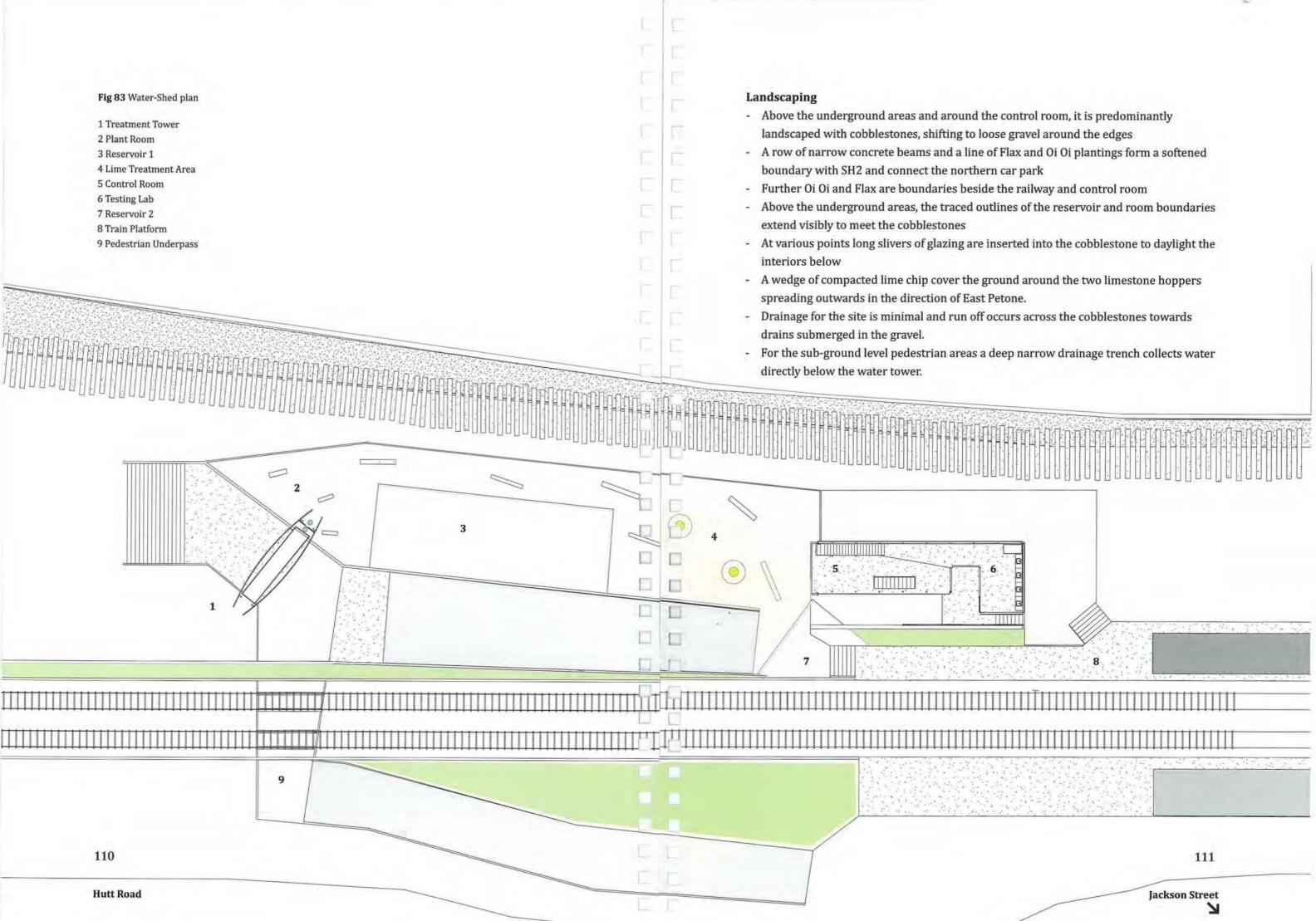
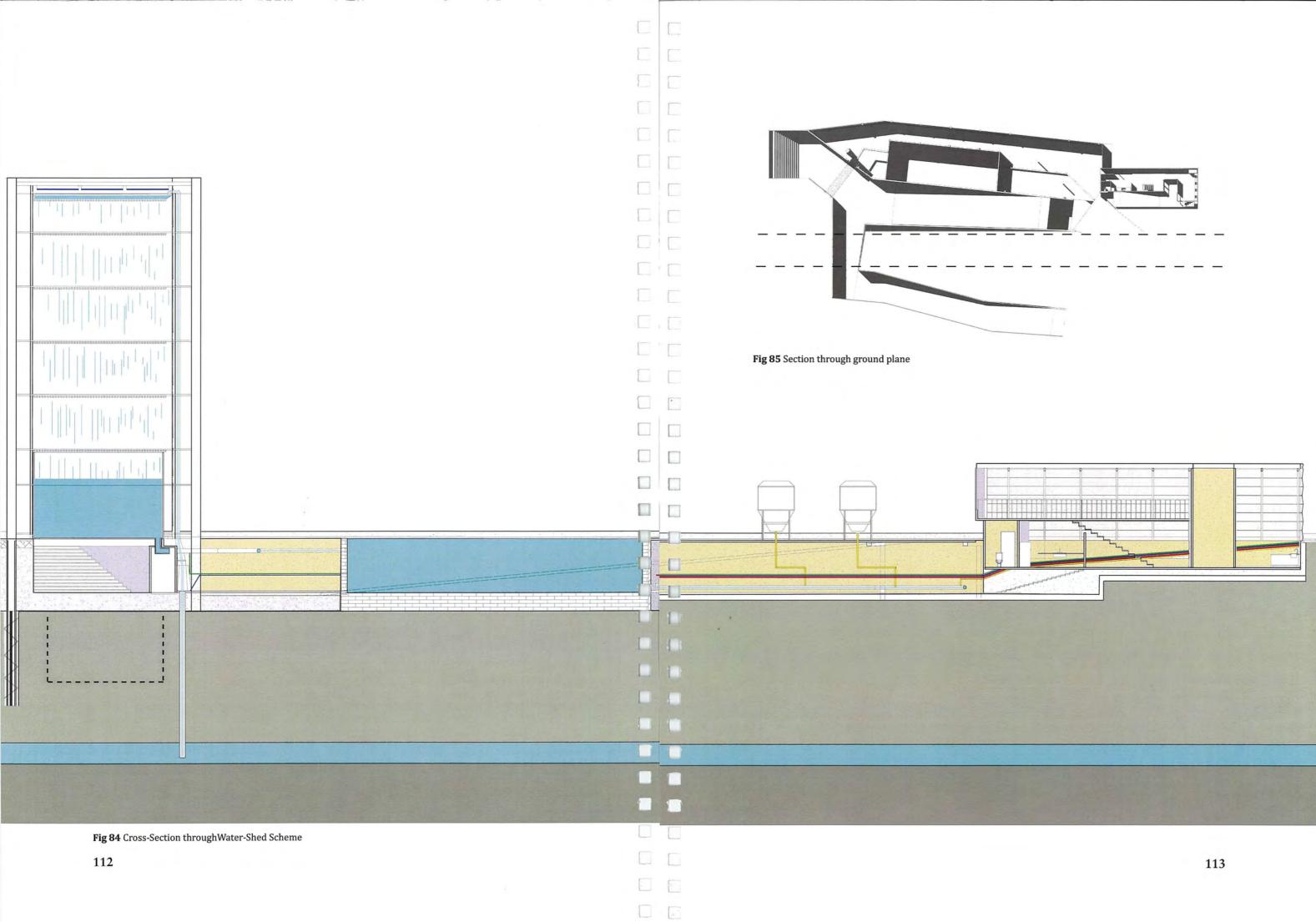


Fig 82 Water-Shed water treatment process





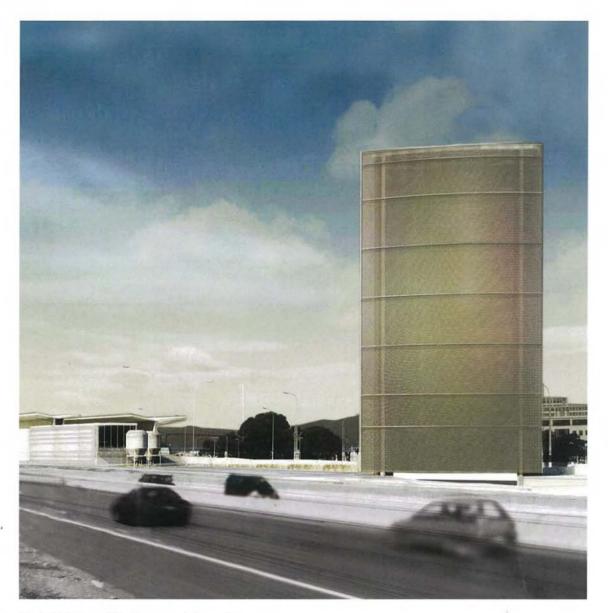


Fig 86 NE View of the Tower and Control Room

Well Head and Plant Room

- The underground pump room that includes the water bore head is accessible from either a passageway alongside the first storage tank or service doors above the plant machinery
- Past the storage tank, a further underground room manages the lime hydration process
- The East facing external walls are limestone slab.

Water Tower

- The overall scheme is underpinned by a 20m high, 1.5m wide 'blade' structure at the southern end of the site.
- This consists of metal moment frames fixed by SHS columns with 15 metre foundations
- The moment frames hold a series of metal grate sieves which span the frames width
- At the top of the tower is an enclosed area which houses a set of UV lights and two holding trays
- Glazing round the top allows some of the UV light to diffuse from the top of the building
- The entire tower is enclosed with a fine mesh to ensure that contaminants and foreign bodies are kept out and water confined within tower



Fig 87 Interior view of Plant Room looking north

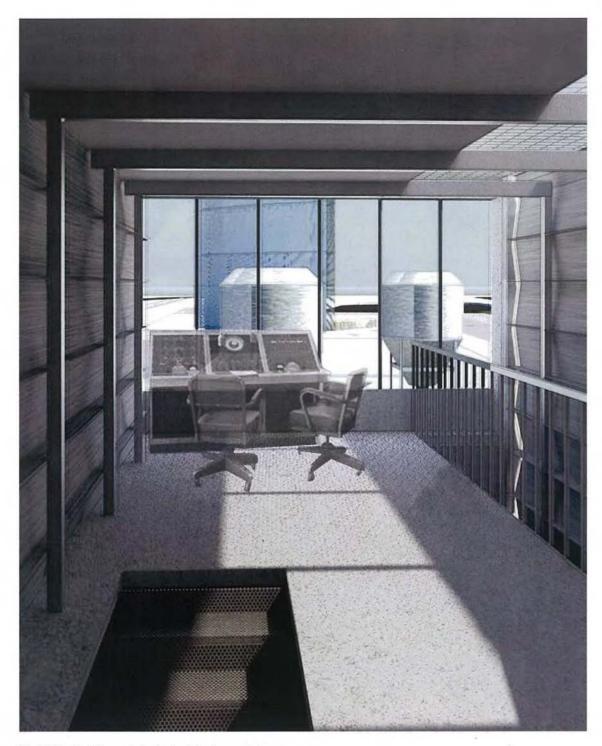


Fig 88 Control Room Interior looking towards tower

Control room and lab

- Steps lead up from the lime hydration area to the testing lab, kitchen and WC facilities which all sit below 1.5 metres below ground level
- The control room is located on a mezzanine level above
- Access to the building is on the east side of the lab from northern steps of a southern ramp
- The building is clad in monolithic, aluminium sheets
- The entrance way and foyer are also framed by the same grate cladding
- Natural lighting is diffused through a series of ceiling grates identical to those used to break up water in the tower.
- Samples from each stage of the treatment process arrive in colour coded pipes
- 2.5 metre tall hoppers sit directly in front of the control room.

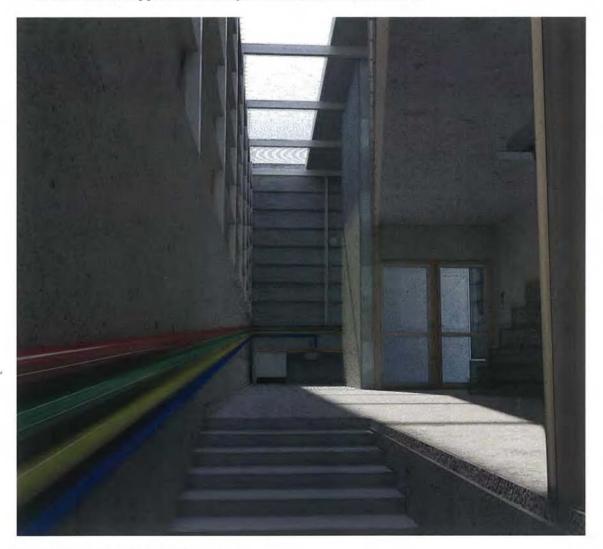


Fig 89 View up stairs looking to lab area



Fig 90 View of the Control builidng entrance and train platform

Pedestrian Access

- Pedestrian access from Hutt Rd/Jackson St uses the existing underpass for the railway station.
- Walking underneath the railway line the underground passage is daylight between exposed railway tracks.
- Pedestrians cross under the water tower and move up steps towards a car park or continue north up a ramp alongside the reservoir towards the western train platform which runs the length of the control room.

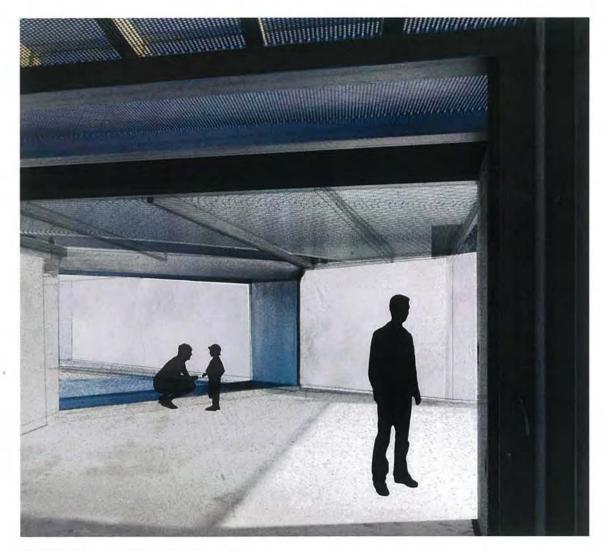


Fig 91 Exiting west of the pedestrian underpass

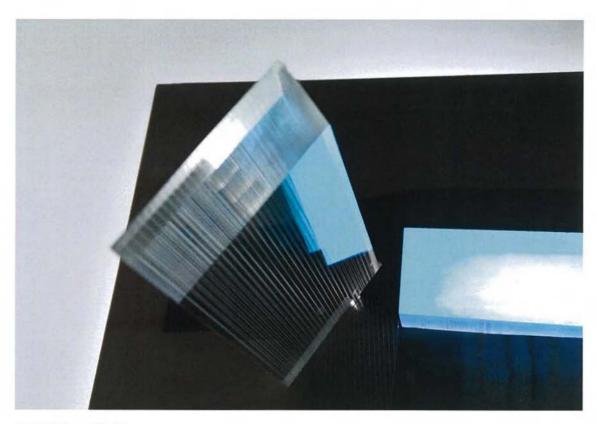


Fig 92 Scheme Model

Water becomes light

Water-Shed operates at several different scales of recognition and reflecting on Robert Thayer's reading of infrastructural landscape, three levels of meaning emerge:

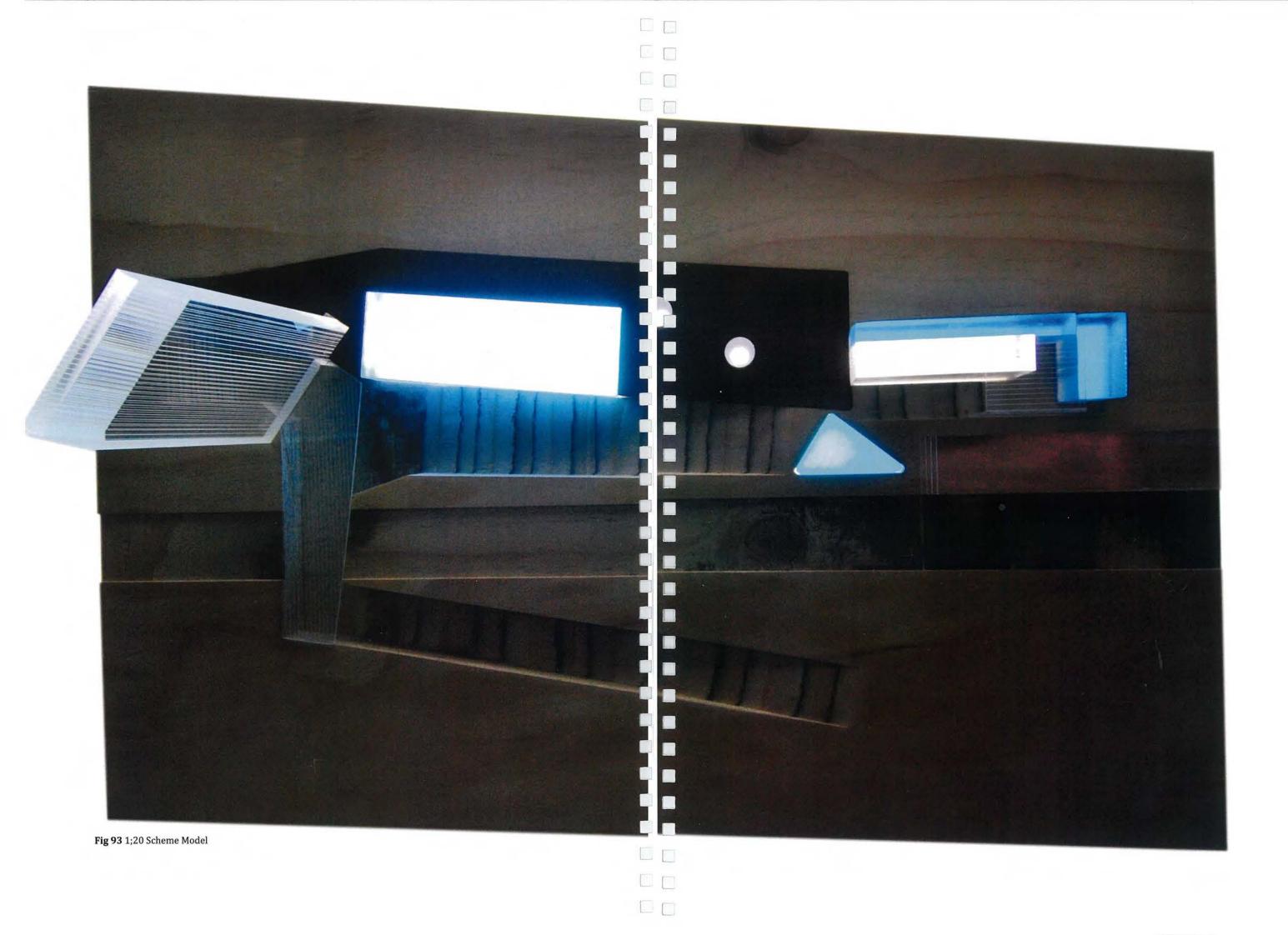
- At 20 metres high the water tower is an urban light box and its presence extends beyond much of the surrounding low level buildings. Visible from each of the 3 roads, the tower becomes a civic monument visible in the distance at the head of Jackson St, a glowing soft blue symbol of Petone's exclusive pure water. The tower operates as a vertical element breaking above the horizon.
- 2. Passing alongside the tower by car, water appears to crash through the horizontal grates, while fine droplets of mist cling to the mesh screens. Refracted light creates a brilliant rainbow effect transforming as perspectives of the tower change. Pedestrians walking around the Water-Shed see the scheme functioning and comprehend the processes locations that contribute to their local water supply. The control room's horizontal lines stress the same dynamics of train platforms and the movement of surrounding vehicles and underground water supply.
- 3. Walking underneath the tower as water crashes into the drum recounts the immense power of a waterfall. While the deep cold drainage pit below the pedestrian underpass conjures up the presence of a well's depth. Each phenomenon operates to return the representation of water to a primary level and to project the marvel of water's symbolic presence as an immeasurable aspect of life.

A place for mundane water affects

While the focus might be directed to waters extraction processes, its' presence is throughout the site by virtue of more incidental representation. Subject to the cycles of weather, the mundane registration of water, found as streaks on Herzog & de Meuron's buildings reappear down the reflective facade of the control tower. With no gutters on its roof, water is left to slither down the aluminium cladding, collecting and dispersing among the cobbles, where lack of drainage allows puddles and small pools of water to randomly form and disperse. Rough and smooth surfaces contrast as water also collects on the long rectangles of glazing and top edges of the underground walls refracting light downwards into the rooms below.

The play of light

Light flickers off stone and steel, children splash in puddles and infrastructure is returned to realms of the ordinary. Light is manipulated elsewhere too, the grates that have broken and aerated the CO2 rich water, are used to split light Newtonian-like, controlled through the facades of the control room entrance and testing lab roof.



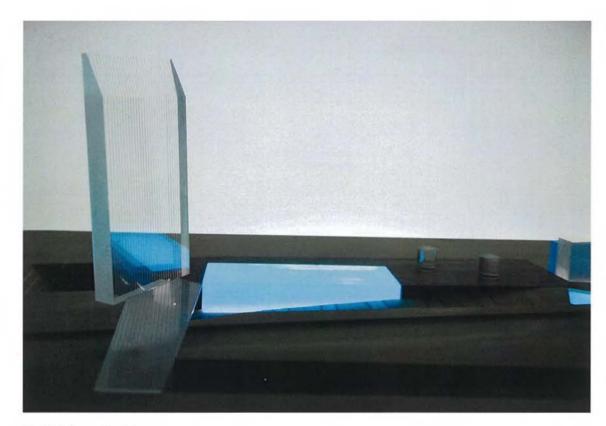


Fig 94 Scheme Model

Descent into knowledge

Entering the site people are reminded of the relationships artesian water has with the ground and the sky. Access to each major part involves descending and ascending thresholds- moving above and below. To gain entrance to the building you must proceed downwards. The light that comes from above, down to the lab and through the day lit railway tracks to the pedestrian underpass below act to submerge the occupant.

Civic Hydrology Brightens the Sky

This redressed along the Train Platform for the management of the water is democratic- it belongs to the citizens of Petone. So waiting for a train there is an awareness that one is standing on the same level as the room that controls the water supply.

Finally as it feeds directly into Petone's supply network, all eyes are on Petone's consumptive behaviour. Increased demand is immediately met by an increased extraction rate. The water passes through the towers trays at quicker rate and in order to treat the water to the same level the UV light must be increased in strength. As a result drivers and passersby are able to incidentally observe and contemplate Petone's water usage by the brightness of the UV light.



Conclusion

The symbolic basis of Petone's Water-Shed offers one of the same fundamentals as that of a water well; the illumination of knowledge. Using architectural technique, light is used to create new interpretations of the borough's water supply. This scheme did not result in combining 'lost' values with instrumentalised water utilities. Instead it became about the rehabilitation of water's urban representation, already there lying dormant within the machines and systems of infrastructure.

Each part of the scheme plays a role in conjuring both everyday experiences of water, as well as exhibiting the immeasurable dimensions of water that re-enage the city and its people. These moments are shaped and framed by water's relationships to the object-field. Whether it is the dark depths of the drainage pit, scattered reflections on cobblestones and metal sidings, a misty blue glow on the horizon or colour refracting off mesh walls, light combined with materiality, works incidentally and directly to reactivate water's place in the city.

To create this required consideration of how such phenomena may be conceived, constructed and perceived. This was only possible through the use of a framework compiled from art, landscape and architecture practice. Crucially it also involved conscious engagement with existing technologies of water infrastructure. A thorough understanding of these industrial systems allowed their re-appropriation to occur at the Water-Shed.

The outcome continues to be legitimate processes of extraction; however these are manipulated in ways that also allow water's role within the city to be better interpreted. For instance the variance of UV light that signifies water demand and usage becomes a byproduct of required purification processes and not an ad-hoc afterthought.

Water's supply by utilities in their present form should be acknowledged for its overwhelming success in overcoming the obstacles of geography, extending water's availability and influencing urban form. However the limits to this method are clear when the limits of water resources are approached. Freed of an exclusively utilitarian existence, these systems no longer retain their optimised and calculated forms. Their reorientation using research and experimentation undermines the autonomy of technology, re-grounding it within human experience and dimensions of lived-world discovery. Technology's residual symbolism then becomes encountered, allowing emotional reengagement with the mechanisms of city function. Architectural representation becomes the vehicle for water extraction processes to be revealed and understood. In other dimensions of the scheme, the material elements of its' construction combine to contribute their own set of meanings. For example, the use of mesh and grates are conceived as a way not only to filter the water supply, but also to diffuse internal light within the laboratory. Consideration of how architecture's 'matter' is compiled sits at the heart of the scheme's poetics and its compositional relationship to horizon and ground plane now successfully understands waters own connections to earth and sky.

Water-Shed also acknowledges that it is party to constructed natures and artificial landscapes of the city. This has been liberating because these definitions avoid placing water and the city in oppositional terms. Instead of being a point of conflict the productive characteristics of water infrastructure can be manipulated positively. It is now possible to envision new forms of water and nature when combined with technology, architecture and infrastructure at places like the Water-Shed.

This project offers a small step in what can occur with the development of mature industrial landscapes. For these utilities have a role to play in navigating water amenities relationships to the city that reinforce the hydrological character and identity of towns and cities. The Water-Shed returns water amenity to a building form that people can collectively understand and relate to, projecting a civic identity of this shared resource.

Acknowledging and accepting water's productive dimension in the city is also a given with the Water-Shed. For in this productive capacity lies another way to define waters value and identity. Water-Shed describes a new 20 metre tower not as the proud projection of the pure, blue, image of a bottled water company, but instead for an unfashionable municipal supply.

It is worth mentioning what was not achieved with this scheme. The water supply network remains complex and highly difficult grasp even within theoretical format. Further potential lies in linking the geographies and locations of water amenities constituent parts. Whether it is negotiating the watersheds that collect supply, or the domestic taps that dispense it, each of these things can be re-imagined in ways that also contribute to waters value and identity.

Also noted is the choice of site, this was selected to take advantage of and respond to other infrastructures, however it would be interesting to see how such an amenity would negotiate the confines of a town centre replacing a well which found there. Perhaps the scheme could be cross-programmed in other ways? The large volumes and flow of water lends itself to a range of ancillary uses in other water connected industries. Architecture has a responsibility to argue for new approaches and visions to the infrastructures that shape, manage and sustain our cities. It is time to reclaim these instrumentalised landscapes and engage with other design and non design disciplines, to work beyond purely extractive responses to our cities needs. Central to this will role of water, the material basis of man's relationship to the environment. Whilst Wellington is not a desert, water is by no means an unlimited resource and we must conceive of our own version of value. **The Water-Shed begins to do this.**

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