

# RE-IMAGINING THE CITY 2018: CLIMATE CHANGE ADAPTATION IN SOUTHSHORE AND SOUTH NEW BRIGHTON



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# INTRODUCTION

This report forms part of a partnership project between the University of Oxford and the University of Canterbury in Christchurch, New Zealand. Four students from the University of Oxford were asked to develop proposals to strengthen the resilience of Southshore and South New Brighton in the face of climate change and related extreme weather events. The following paper is the product of three weeks of learning and discussion surrounding a city in transition, and makes recommendations for the long, medium and short term future of these neighbourhoods.

## CONTEXT

South New Brighton and Southshore are going to face the effects of climate change over the coming century. On a global scale, the effects of climate change will be large and costly, particularly if adaptive measures are not put in place. Hinkel et al. (2014) estimate that if the sea level rises 1.23m by 2100, whilst no adaptation occurs, up to 4.6% of the global population will be flooded. This would result in estimated losses of over 9% of global domestic product, annually.

New Zealand is an island nation and the potential losses are great; 65% of the population and infrastructure is situated within 5 km of the coastline. Studies of exposed residents, buildings, and infrastructure by Bell, Paulik and Wadwha (2015) for the Parliamentary Commissioner for the Environment suggest that without adaptation, a sea level rise of up to 1.5m would affect over 133,000 people, damage buildings and result in a replacement cost of close to NZ\$20 billion (in 2011 terms). As the sea level rises, the associated costs will rise even faster. Without real investment in effective risk reduction and adaptation initiatives by both national and subnational governments, the human, ecological and monetary costs could be crippling.

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The impacts of climate change for Southshore and South New Brighton were presented within the 2017 Coastal Hazards Report (in itself a revised version of the document released in 2015). On average Christchurch has experienced a  $2.0 \pm 0.15$  mm/year sea level rise. This is over 15% higher than the New Zealand average. Severe southerly storm events have been increasingly erratic and resulted in erosion of up to 12m occurring along the South New Brighton shoreline over a 2 year period (Tonkin and Taylor 2017). In the event of a flood under 2065 RCP4.5 the same report details that the majority of Southshore and much of South New Brighton would see peak flood depths of over 0.8m. This is in addition to vulnerabilities caused by the effect of seismic events and the increased proximity of groundwater to surface.

Southshore and South New Brighton are clearly not the only areas affected, and to residents the current focus directed by the Coastal Futures project can seem unfairly targeted. However, the residents' proximity to the Red Zone and Regenerate Christchurch's interest in this makes them a focus of the discussion about climate change adaptation. We hope that this can be a positive development for the community, especially when considering the scope for innovation inherent in climate change adaptation models.

## LONG-TERM PROPOSALS

The implication of the Tonkin and Taylor report is that at some point in the next 50 to 100 years a significant portion of Southshore and South New Brighton may become uninhabitable. Moving out of the area is the option of last resort and presents significant up-front financial costs. Just as importantly there are significant intangible costs including social, emotional and psychological losses for the community. However a process of managed retreat, if needed, can be planned and implemented in stages, and community engagement processes should be central to any transition, ensuring that residents' voices are heard and that there is certainty regarding their future.

As part of our research on this we have considered case studies both within and beyond New Zealand. Engagement with the community at all levels of the process has been demonstrated to be of utmost importance. Two contrasting New Zealand examples are considered below, as well as a case from the United States.

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# CASE STUDIES

## Conflict and Miscommunication - Matata:

Matata is a town in the Bay of Plenty on the North Island, where homes were destroyed by rock flows in 2005. Residents were informed that risks could be mitigated and therefore rebuilt their homes. However, in 2012 they were told it was not safe to live there, and are now being asked to leave. The council has rezoned the area as non-residential but cannot compel people to leave without sufficient incentive - it would require an estimated NZ\$14.2 million to buy out homeowners. There have been significant and ongoing conflicts between homeowners and the council. Homeowners view their properties as being undervalued, and the council is considering forcing property owners off their land. The public response here demonstrates a lack of communication and cooperation between the council and the community.

## Communication and Resolution - Twin Streams:

Twin Streams is located in Waitakere City in Auckland. Stormwater studies commissioned in 1997 explored the effects of stormwater on the Oratia and Opanuku Streams. Subsequently Project Twin Streams, a large-scale stormwater management project, was developed in 2002. This project, executed over 10 years, was a comprehensive scheme that involved the purchase and removal of houses in flood plains. The new space created became an overflow area, or stormwater management reserve, which is able to absorb higher-than-normal stream levels. Due to the city's status as an eco-city (declared in 1993) the focus was on working with nature rather than putting in "hard" engineering solutions. A voluntary approach to property purchases took place, at a fair market price; 78 properties were purchased and 78 part-purchased. An initial engagement process made this possible; the need to move was linked to environmental, social, economic and cultural goals.

## Co-operation and Innovation - Blue Acres Buyout Programme, New Jersey, USA:

Coastal and riverside regions of New Jersey, USA, face significant flood threats from an increased number of high-intensity storms in recent years. In the aftermath of Hurricane Irene in August 2011 a buyout-scheme was trialed in a limited area. It failed, largely due to poorly aligned funding which left homeowners out of pocket or in

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temporary accommodation for extended periods of time. This caused many to simply rebuild their houses on a higher level. Following Hurricane Sandy in 2012, the programme was given Federal funding of US\$300 million, with the aim of buying 1300 homes, moving families out of high flood-risk areas and mitigating future flood risk by creating hazard “sponges” in cleared areas. Houses are bought at pre-storm prices, and only those in a neighbourhood or “cluster” of houses willing to be purchased can be considered for the scheme. For this reason, case managers assigned to each “cluster” of houses have proved invaluable in smoothing the way for deals to be closed once a few residents have registered interest, each meeting a community’s concerns on a case-by-case basis. There is minimal cost to the homeowner, generally limited to securing an attorney representative at closing. As of 15/09/2018, the scheme was operating in 9 counties, had closed on 648 properties, and was in the process of creating nature reserves in cleared areas to mitigate hazards for the wider region.

A successful process of managed retreat requires that the authorities must be clear with residents, approach the issue in a sensitive way and plan the process over a long period of time. Residents should not feel coerced or rushed into making a decision; and element of independent decision-making will make them more likely to eventually agree to take part in a land-acquisition scheme.

We have considered the potential options to make moving from the area, if it is necessary, as painless as possible for residents of Southshore and South New Brighton. The schemes detailed below may also be applicable within a wider national and international context.

## LEASE-BACK SCHEMES

A lease-back scheme involves central or local government buying land that is most at threat, and then leasing it back for a fixed term. In this way, land can still be occupied until the danger is realised, and residents can receive some level of certainty in a fundamentally uncertain situation.

The idea of a lease back scheme to tackle climate change issues has been considered before. For instance, a report to the New Zealand Treasury on new funding instruments for climate change (Boston and Lawrence, 2017) discusses “the removal of residential status of land to support buy- and lease-back arrangements”.

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Similarly, in the UK, the 2009/10 House of Commons Environmental Committee highlights the push to get ministers to consider a “sale leaseback arrangement for people who were at risk of losing properties to coastal erosion”. However, none of these schemes have ever actually been put in place.

This may be due to the potential stumbling-blocks associated with lease-back schemes and land acquisition schemes in general. Certainly the outcome seen in Matata is more typical than those experienced in the Twin Streams or Blue Acres projects. Such schemes can represent an overreach of government into private lives, or indeed an abandonment of individuals to climate change by an unfeeling central authority.

This might be complicated by pre-existing insurance schemes that allow for continued development in high-risk areas. If government-subsidised, they can contribute to a false sense of security in flooding-prone regions and to a sense of intergenerational inequity when risks are exacerbated and passed from one generation to the next. In addition, they remain expensive. The level of state funding granted to the Blue Acres program is not necessarily scaleable to Christchurch. There are also political issues in promoting a scheme which allows citizens to live in high-risk areas in the medium or long term at the expense of taxpayers on higher ground.

To answer the questions posed by critics of this sort of scheme, it is worth highlighting the following points. As our case studies demonstrate, making the community active participants in the process is key to its success, and should avoid accusations of abandonment or interference. Additionally, a lease-back scheme is at the very least less expensive than a land-acquisition program, subsidising homeowners rather than buying them out completely. The cost of the lease can be altered to reflect house-prices, the socio-economic situation of homeowners, the length of the lease and the public funds available for the project. Finally, and most importantly, lease-back schemes can and should be tied to other forms of insurance, modes of which are detailed below. A form of insurance, community fund or annuity resulting in a payout upon relocation achieves several objectives. It avoids a situation in which a leaseholder with a case of “disaster amnesia”, having re-invested compensation received decades ago in redevelopment of their home, is left out of pocket in an expensive relocation. It prevents efforts to delegitimize a lease-back scheme in which the leaseholder is cast as a victim of a sudden natural disaster and demands further compensation. In this way it may also contribute to a fairer spread of costs amongst New Zealand taxpayers.

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Overall these schemes remain attractive because they allow citizens to continue living within their community and in an area that they have a significant psychological and emotional attachment to. But it also acknowledges the fact that the effects of climate change are likely to lead to some residential land becoming uninhabitable. In this way it aligns with the New Zealand's Ministry of Environment's approach of 'dynamic adaptive pathways planning' in coastal regions. The time-frame granted can be tailored to the specific predictions given in Southshore and South New Brighton, and individual leases can be re-granted in a scenario in which climate change threats are mitigated or fail to materialise.

## INSURANCE

According to the Intergovernmental Panel on Climate Change, the global average sea level will rise by 44-55 cm by 2100 based on current global emissions. A report for Parliamentary Commissioner for the Environment indicates that this rise could impact the 8,806 homes within 50cm of high spring tide and a further 43,683 homes within 1.5m of the high tide. The thousands of New Zealand residents that face the prospect of rising seas also face the threat of rising insurance premiums. It is important to note that rising insurance costs can play a key role in driving people out of highly hazardous areas. However, it seems irresponsible for the national governments to rely on choices of private insurance companies in order to protect its residents from hazards. Furthermore, insurance is only a complementary tool to robust risk management and cannot be relied on totally to protect citizens. A focus on rational financial choices also does not acknowledge the deep connection to place that may lead many to choose to stay in the high-risk area uninsured. This could lead to issues of social equity, as well as to greater financial cost to both the Crown and the individual citizen in the case of a flood.

Currently in New Zealand the Earthquake Commission (EQC) offers governmental support for disaster protection, allowing residents to afford hazard insurance. However, in terms of flood protection it is a limited tool, only covering damage to the land and providing no structural or contents insurance. Considering the growing scale of flood risk to coastal areas, it is seems clear that there will be a need for expansion of EQC's cover or for a flood reinsurance body to be establish. The United Kingdom, which faces a similarly large-scale coastal risk, established Flood Re, a reinsurance body that works with private insurance companies to keep premiums affordable in flood prone areas. Insurers pay a levy into Flood Re, creating a fund of £180 million per year. This allows for residents to make a claim and for insurers to be reimbursed. We think that such scheme would be appealing in New Zealand as it offers flood specific protection

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and it would hold private insurers accountable.

We have also considered smaller scale options that are community focused and remove the involvement of private insurers. Community based microinsurance schemes have on the whole been tested in developing countries. However some schemes have been implemented on a large scale, such as the Kisiizi Community Health Insurance Scheme in Uganda which currently serves 35,000 people. These community based health insurance models usually have the following features:

Prepayment mechanism

Flat rate membership premiums regardless of individual risk

Entitlement of benefits on the condition of membership (and payment into the scheme)

Voluntary

Non-profit

These models might be desirable to inhabitants of areas of South New Brighton and Southshore as they remove the element of profit-maximisation that can make commercial insurance inaccessible. However, disaster insurance can be a problematic insurance model as it impacts a whole community and there is a much higher cost for covering the greater range of risks related to disasters. Therefore, a community based insurance model for this kind of risk would need to be carefully reinsured and diversified. This could come in the form of a hybrid community - governmental model i.e. the community pays a fee into a fund for their area that is supplemented and reinsured by a government funding body. Other options could be a flexible saving scheme in which the community pay into an insurance fund dedicated to flood protection.

We believe these models could be adapted for innovative insurance solutions in areas of New Zealand's coastal regions. Such non-profit solutions may become more prevalent when these areas face the reality of private insurers pulling their funding in the near future. Whilst there is an aspect of moral hazard with disaster insurance (it might lead residents to become complacent or to continue building unsuitable structures in high risks areas) we believe it is still a key component of risk adaptation.

The creation of a national government fund that is less a reactive, 'after-the-fact' response to crises (such as the Natural Disaster Fund administered by the EQC) will be necessary over the coming years. A future-oriented fund could lower the long-



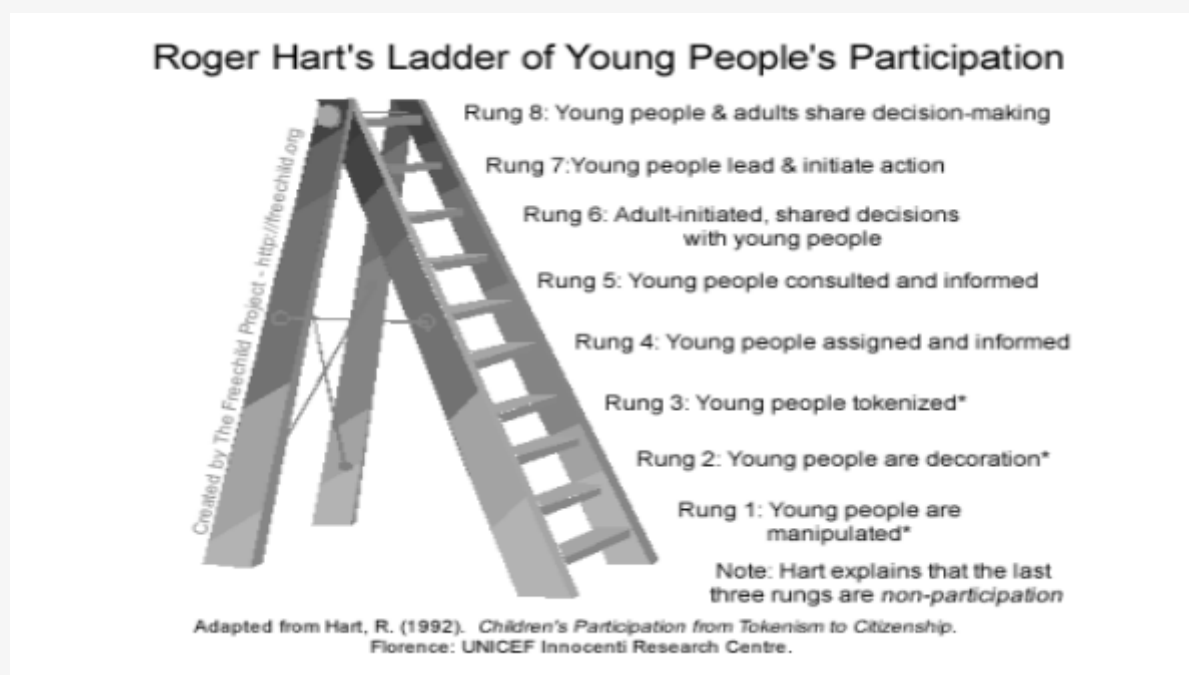
-term risks associated with climate change, allow for more comprehensive adaptive planning and save money for taxpayers.

## SHORT-TERM PROPOSALS

### *Community Participation:*

Community participation, rather than community engagement, ensures that the local residents can shape their own future. Regenerate Christchurch has done much to ensure community voices are being listened to but the sentiment on the ground is that more could be done. The long-term nature of the challenges facing Southshore and South New Brighton also highlight the necessity of an intergenerational approach. The Tonkin and Taylor (2017) report is highly inaccessible, even to those with a related academic background. Whilst the summary which is due to be released shortly will likely be more comprehensive, it must highlight the opportunities that come with transition may be beneficial rather than inadvertently stigmatise the community by only mentioning the environmental vulnerabilities.

Literature surrounding disaster recovery and climate change resilience emphasises how promoting the day-to-day relevance of issues helps to motivate people to seek further information and engage in productive discussion (Scannell and Gifford 2013). This is particularly the case for children. Hart's (1992) ladder, below, highlights various degrees of youth participation.



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Discussions with teachers at the South New Brighton School revealed that students have been involved in sustainability-focused activities such as cleaning up rubbish in their local area and building their own sand dunes in order to understand their importance - aligning with rung 6 of the ladder.

Reaching rung 8 of Hart's ladder - shared decision-making - will require further training for teachers to ensure children are informed of climate issues affecting their local area in a sensible, proactive manner. Teachers suggested that this could be done by integrating issues into a range of subjects. For example, maths questions could be framed around sea level rise, e.g. *by how many millimeters did the sea level rise between 1950 and 2000* - as this would help prompt discussion. Taber and Taylor's (2009) paper on teaching Australian children aged 10-11 years old about global warming suggests visual resources such as concept cartoons and trips are especially helpful. These can then be used to initiate wider projects, e.g. a youth audit, on how children imagine their area to look in 50 years, taking into account innovations such as tiny houses and environmental challenges. Following the 2017 Christchurch Youth Action Plan, further talks by city council staff in schools and the opportunity to present to the council would also solidify civic engagement and feelings of equality among children.

#### *Resilient transition:*

Southshore and South New Brighton have dealt with a lack of facilities central to community life since the 2011 earthquakes. They lack the bar, shops and restaurants which might act as gathering spaces for residents. The projected shoreline retreat in the area of ~100m (Tonkin and Taylor 2013) means facilities should be restored in a way which works with these parameters. It is excellent progress that the landlord of a plot on Estuary Road has agreed to allow the community to use the plot for pop-up businesses for 2 years, but more must be done in order to avoid the amplification of secondary stressors to members of the community who deserve and require stability in their lives. In addition, it is essential that what is created in the area reflects people's sense of place.

Moveable and immediate structures present the most viable solution to these challenges. They can be built to last periods of fifty years or more and be assembled in a number of weeks. This has been demonstrated recently with the case of the Little Andromeda Theatre which is due to be constructed over just a few weeks in Christchurch. Furthermore the ability to move these buildings, as demonstrated by the Re:Start Mall, which was relocated to Kaikoura to serve as the UpLift Hub, would

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ensure that financial loss is minimised in the event of rising sea levels. It is worth noting that both the examples mentioned have experienced funding issues. Therefore we suggest the council creates a fund, similar to the NZ\$40 million seed fund of the Red Zone, available specifically for commercial and community projects in South New Brighton and Southshore.

## CONCLUSIONS

The communities of Southshore and South New Brighton should be supported in the short and medium term through ensuring participation in the adaptation process, by facilitating new commercial initiatives in the area, and with innovative insurance models. In the long term, depending on the rate of sea level rise, there may be a need for some residents to move out of the Southshore area. Local and national government should have a long term, adaptive plan for such an occurrence. This could be achieved through a buy out and leaseback scheme, which would alleviate financial losses to individuals and to government as well as allowing people to remain in the community for as long as is physically possible.

Our proposals should be seen as elements of a fundamentally cohesive blueprint. A community-orientated insurance scheme can make a lease-back program politically and financially viable. Offering children the opportunity to present their own visions for the community they live in can help foment transitional entrepreneurship. Clear, concise information on the realities of climate change can spur participation in creating a lease-back scheme. Overall, South New Brighton and Southshore present an exciting opportunity for innovative solutions to rising seas and climate change.

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