

***Article***

## **Vacating the Floodplain: Urban Property, Engineering, and Floods in Brisbane (1974-2011)**

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### **Abstract**

This article exposes the dominant socio-economic and political values that shaped flood management between 1974 and 2011 in Brisbane, Queensland, Australia. By the 1970s, international hazard scholarship advocated regulating land use as an effective flood mitigation tool. In 1974, floods devastated Southeast Queensland and highlighted the hazards of building on floodplains. Drawing on scholarship that frames floods as a cultural, rather than natural event, this paper shows that the state government of Queensland prioritised property development and continued to rely on dam building as a way of controlling floods. Dams were built with the aim of providing immunity from flooding, but tensions between State and local governments allowed both to evade responsibility for the growing hazard arising from continuing development in the floodplain. When legislation and regulations were introduced to control floodplain development, they reflected popular sentiment against land use restrictions and hence were limited in scope, non-mandatory, and riddled with loopholes. The results of these inadequate land use regulations and continued residential development below the 100-year flood level were fully exposed in 2011 when a substantial increase in damages accompanied flooding of the Brisbane River. Despite evidence and predictions of increased risk of more frequent and larger floods from a warming climate, both state and local governments have continued to promote development in the Brisbane River floodplain, and appear willing to subject the city and its residents to increased hazards and vulnerability.

**Keywords:** Brisbane River, floods, planning, urban development, flood mitigation, hazard, dam, floodplain, Queensland, Australia

### **INTRODUCTION**

In 1974, a major flood devastated Southeast Queensland causing 16 deaths and over AUD \$320 million in damages.<sup>1</sup> The aftermath revealed prevailing socio-economic values and systemic failures to regulate the floodplain. The government rejected calls for a public inquiry, wasting an opportunity to rectify policies. A blame game followed as government

and society created ‘layers of obfuscation’ to hide the problem and avoid responsibility for floodplain development (Steinberg 2000, xiv). The state government of Queensland remained committed to its technocratic strategy of flood control with the construction of a second flood mitigation dam. It delayed introducing floodplain regulations, and when implemented, the regulatory and legislative framework was limited in scope, minimising development restrictions and offering loopholes and compensation for developers. A legacy of poor planning and building, compensation laws and limited authority has hamstrung local government. Councils continued to approve construction below known flood levels due to the committed belief in property development as a stimulant for economic growth. As a result, buildings were constructed below the 1974 flood level, with dire consequences in 2011.

Scholars remind us that urban hazards have co-evolved within political, social and economic systems in a specific

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geography. Floods cannot be understood in isolation, devoid of their context. They are a cultural, as well as a natural, event. Their impact and the city's vulnerability is 'partly the result of historical development paths and governance processes' (White 2010: 19). Prevailing socio-economic values determine policies that create the urban hazard and determine flood mitigation strategies. Dominant cultural values are reflected in negotiations between the political actors (Pelling 1999; Wisner 2000; Wisner et al. 2003; Handmer and Dovers 2013). A case study of the years between the 1974 and 2011 floods in Brisbane illustrates how politics, economic, and cultural understandings shape a city's flood management policies.

Globally, until the mid-twentieth century floods were managed by engineering including canals, dredging, levees, cuttings, and dams. Structural control offered the answer to flood mitigation, reflecting a cultural ideology of human desire to conquer nature. Civil engineering was firmly entwined with notions of progress, order, and civilisation (Mitchell 2002; Soufoulis 2005; Blackbourn 2006; Cathcart 2009; O'Gorman 2012; Everard 2013). James Scott in *Seeing Like a State* has argued that this secular faith in engineering to control nature and provide social order reached new heights amongst high modernist States (Scott 1998). The trend to control nature with dams peaked globally in the 1970s (Everard 2013, 12). Australia proved no different with dams closely aligned to notions of nation building and progress (Sofoulis 2005; O'Gorman 2012).

American geographer, Gilbert White, challenged the technocratic approach in his 1942 thesis, declaring while floods were 'acts of God', 'flood losses are largely acts of man' (White, 1942: 2). Current hazard literature recognises that flood disasters are the result of human interaction with the environment (Wisner et al., 2000; Handmer and Dovers 2007; White, 2010). Mitigation strategies evolved to reflect the human element, recommending 'softer' options of public education, mapping, flood warnings, and land use planning be used to reduce the hazard, in conjunction with 'hard' structural engineering (White 1942; O'Keefe et al., 1976; SCARM 2000; Handmer and Dovers 2007; Finlinson 2012). Since the 1970s international and interstate jurisdictions gradually adopted non-structural strategies to mitigate floods.

In this paper, I argue that notions of taming nature through structural engineering continue to be used in Southeast Queensland despite broader recognition of their obvious flaws and empirical evidence of greater risk exposure for people living on the Brisbane River floodplain. The reliance of governments on policies that promote structural engineering solutions to river flooding, reflect the vested interests and political power of urban developers (D'Souza 2006; Everard 2013). A long succession of state and local governments in Queensland have regarded property development as an essential engine for growth. This ideological stance has benefitted big property developers and construction companies (Sofoulis 2005). In a political and cultural context that values urban property development so highly, any proposal to impose mandatory controls on floodplain development has been

unpalatable for the state and local governments. Hence, as this article will show, Brisbane has been set on a path dependence of intensive floodplain development that continually relies on engineering solutions for flood mitigation combined with inadequate and poorly implemented land use policies.

Reflecting a paucity of scholarly analysis of Brisbane floods, this article draws heavily on primary sources. Reports by engineers and meteorologists in 1974 provided information on the flood and its impact. Newspapers, government correspondence and *Queensland Parliamentary Debates* helped determine the political, economic, and social framework in which flood management decisions were made. Town planning reports and legislation documented change to floodplain management policies, as did the submissions and reports generated by the 2011 Queensland Floods Commission of Inquiry.

## A DISASTROUS FLOOD

Subtropical Southeast Queensland experiences both extreme drought and flood within the 13,500 km<sup>2</sup> Brisbane River catchment. The Brisbane River is 309 km long, its source near Mount Stanley and its mouth at Moreton Bay. The river and its tributaries (primarily the Bremer and Stanley Rivers, and Lockyer Creek), flow through small townships before reaching the major metropolitan areas of Ipswich and Brisbane (Figure 1).

Record-breaking rainfall in Queensland 1973–74 brought one of the wettest summers for many years (Queensland Flood Report 1974). Over 26 days in January 1974, the State capital, Brisbane, received 872 mm, the second highest

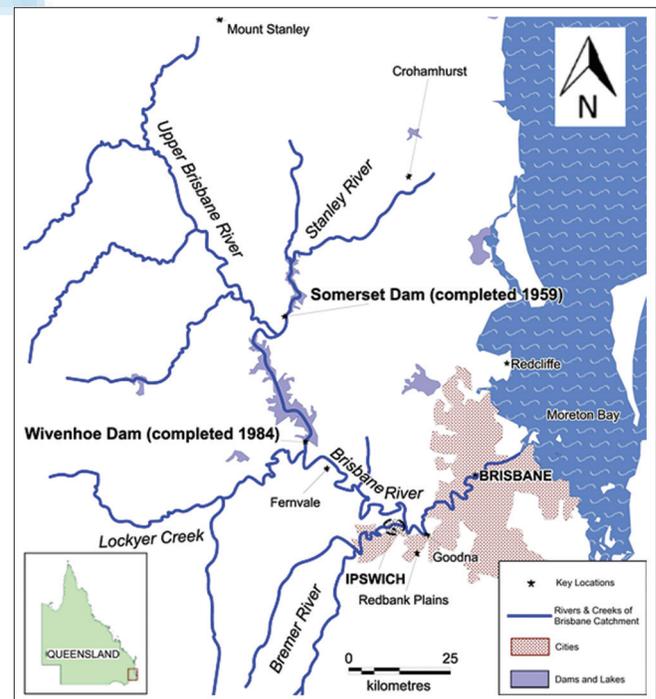


Figure 1  
Location map for the Brisbane River basin

rainfall recorded until that time. In the nearby upstream city of Ipswich an estimated 341 mm fell in 24 hours on 26 January, the highest daily total ever recorded there. On 26 January, Brisbane received 314 mm of rain, the wettest Brisbane day for 87 years, and only the second time the daily total exceeded the average monthly rainfall (Department of Science 1974, 26). The Brisbane River basin was drenched.

By 26 January the Stanley and Upper Brisbane Rivers and Lockyer Creek had reached major flood height.<sup>2</sup> Downstream the Bremer River rose fast and was unable to drain into a swollen Brisbane River. Ipswich recorded a flood peak of 20.7 m on 27 January (Heatherwick 1974: 65). Leaving Ipswich, the now-combined Bremer and Brisbane River floodwaters continued on their path to Moreton Bay. On 29 January, the flood peaked at 5.45 m at the Port Office Gauge in Brisbane, the highest since the level of 8.34 m in 1893 (Seqwater 2013: 35). Journalists took to the sky to report, describing the Brisbane River as more than 3 km wide, full of debris that 'bobbed along on top of the water headed for Moreton Bay'. Tree tops and coloured roofs were the only remaining landmarks (CM 30 January 1974: 2).

The 1974 floods claimed 14 lives in Brisbane and two in Ipswich.<sup>3</sup> In Brisbane, a city of over 712,500 people and 217,847 dwellings<sup>4</sup>, approximately 13,000 buildings were submerged, inundated, or damaged and the repair bill was AUD \$320 million. (Snowy Mountains Engineering Corporation, 1975: 10). In Ipswich, with 65,000 people and 18,889 dwellings, 41 houses were washed away, a further 1,800 residential or commercial premises were damaged. Approximately AUD 4 million in industrial losses occurred along with immediate unemployment of 500 people (Department of Science 8, CM 2 February 1974: 1).

### No Flood Inquiry

Hazard scholars remind us that floods can provide a catalyst for political, economic, or social change (Krüger et al. 2015, 6). Many people in Brisbane realised the need to assess the flood and perhaps alter policies and practices that contributed to the disaster. As the editor of the *Courier Mail* explained, 'Brisbane simply cannot afford another flood as disastrous as this. Yet, if nothing is done, it certainly will suffer one', offering an opinion shared by many Southeast Queenslanders (CM 1 February 1974, 4). The Queensland Opposition Leader, the Hon. John Houston called for a public inquiry to investigate the flood, not wanting 'to find a scapegoat' but to give people 'a chance to air their views and hear expert comment from a wide range of people' (*Telegraph* 31 January 1974: 2). Those supporting an inquiry recognised that human actions had created the hazard, citing land laws and development policies as principal causes. An inquiry could have revealed systemic contributions to the disaster. Newspaper editors joined the call for an inquiry, or Royal Commission, to investigate the flood and make recommendations on future flood mitigation, stating the 'laws on land use of the city's floodplains — or the lack of laws — are an obvious term of

reference. State and city authorities have been buck-passing on responsibility for residential development of flood-prone land' (CM 1 February 1974: 4). The public wanted mistakes identified to avoid their repetition and the floodplain controlled.

Residents, such as architect and ex-AIF engineer, identified only as J. N. Allom, joined the call, hoping an inquiry would investigate council's failure 'to control the approval of construction projects on well-known flood prone land' with the hope of developing 'a more progressive policy on zoning standards and procedure.' Allom called for 'faults of the past', such as approvals on flood-prone land and poor zoning, to be 'identified and rectified' through legislation.<sup>5</sup> The Union of Australian Women demanded a full public inquiry into the state-wide flood.

We are convinced, like many other Queenslanders, that too many decisions about so-called development are made in the interest of profit for the 'developers' rather than improvement of the quality of the lives of the people and the security and safety of their homes. A closed top inquiry will not reassure Queenslanders that all relevant experiences will be taken into consideration.<sup>6</sup>

Like others, they believed land laws required investigation.

A community groundswell for an inquiry grew. On 28 July 1974 more than 400 people gathered at Roma Street Forum demanding an inquiry to form a blueprint for future flood mitigation. The community-based Brisbane and Ipswich Citizen's Flood Mitigation Committee recommended six points for an inquiry: engineering work, flood warning system, legislative change in flood prone areas, single water authority, operational emergency services and standardised aid or insurance (CM 29 July 1974: 8). The Chair, Ernest Oliver, declared there has been a 'great deal of buck-passing on flood mitigation' by politicians who had 'got away with a lot of promises and very little fulfilment' and something needed to be done (CM 29 July 1974: 8).

The call for an inquiry received bureaucratic support. Former Town Clerk, John Cameron Slaughter, supported an enquiry to pin-point flood prone land and prohibit future construction. Meteorology Bureau Director Arch Shields agreed: 'If flooding can't be stopped Brisbane has to plan to stop great public damage'. He found 'little real evidence, in the absence of an acceptable town plan, that floodplain management to avoid flood losses was given a very high priority, if indeed any at all', with public planning directed 'largely towards the provision of flood mitigation storages' (Heathcote 1979: 445). Like Shields, many inquiry supporters identified the lack of non-structural flood mitigation policies and land regulation in Southeast Queensland as a cause of the hazard.

However, the Premier, Johannes Bjelke-Petersen, refused to hold a flood inquiry. He asserted that criticism and recriminations arising from an inquiry were 'pointless' (QPD 5 March 1974: 2627). As he informed Parliament; 'we know the cause' — heavy rain. Besides, the State had already committed to building an expensive flood mitigation strategy — the Wivenhoe Dam. In November 1971, Bjelke-Petersen had announced plans to build Wivenhoe

Dam that, based on actuarial analysis, was expected to reduce the costs of flood damage from AUD 1,250,000 to AUD 250,000 annually (*Telegraph* 31 January 1974: 8). As the State promoted the flood as a natural disaster, it both absolved itself of responsibility for the damages and portrayed itself as the saviour, the provider of a dam. It claimed that since an engineering solution was being pursued, there was no need for an expensive public enquiry.

The construction of Wivenhoe Dam underscored the continued reliance on technology and the prevailing high modernist mindset (Scott 1998). According to political analyst Colin Hughes, Queensland politics at its heart 'was the politics of development, concerned with things and places, rather than people and ideas'. Since the 1950s the State had promoted the property industry as the key to economic progress (Wear 2002: 186; Spearritt 2008: 22). Premier Bjelke-Petersen reinforced this perspective, declaring in the Queensland Parliament that government's main role was to expand and develop the state. In the 1980s, Bjelke-Petersen boasted of the cranes on the horizon, his barometer of economic growth, to measure Brisbane's substantial development (Wear 2010). As a Premier who later listed Wivenhoe Dam as one of the top ten achievements of his Premiership (1968–1987) (Bjelke-Petersen 1990: 256), his commitment to the dam project was immutable. He asserted that the two dams — Somerset and Wivenhoe — would control the Brisbane River and protect the city from floods.

Bjelke-Petersen acknowledged the likelihood that Wivenhoe Dam would encourage 'further movement onto the floodplain'. Revealing his awareness of overseas flood mitigation strategies, he recognised 'dams alone were not the answer to reducing flood damage' and cited examples from the USA and UK where town planning measures had effectively managed floodplains and regulated construction.<sup>7</sup> In the USA, a ranking system for floods had been introduced in the 1930s, based on the likelihood of recurrence. Major floods were deemed to have an annual exceedence probability (AEP) of one per cent or an average recurrence interval (ARI) of 100 years. This ranking system was imported to Australia in the 1970s (BCC Flood Submission Two 2011: 8). The New South Wales (NSW) government introduced state-wide prescriptive and mandatory flood controls during this decade, not only preventing further development below the 1 in 100 level but also recommending the removal of earlier structures 'where practicable and appropriate'<sup>8</sup> (O'Gorman 2012: 190). The Victorian government, too, proclaimed flood-prone areas as those under the 1 in 100-year level and gave local authorities power to control development in those areas.<sup>9</sup> By contrast, the Queensland government had no state policy on floods and Bjelke-Petersen chose to ignore such flood control policies and mitigation approaches. A 'one-dimensional approach' of relying on hard engineering to reduce flood hazard prevailed (Chrichton 2012: 168).

### The Blame Game

Natural disasters, according to Tim Sherratt 'fracture relationships' and 'provide moments of collective shock,

and recrimination' (Sherratt et al. 2005, 4). John Handmer and Stephen Dovers have noted that once human agency is recognised as a contributor to the floods, the 'attribution of blame' is encouraged (Handmer and Dovers 2013: 20).

There was plenty of recrimination, blaming, and scapegoating in Brisbane following the 1974 floods. 'We did not learn much of a lesson from the 1893 flood. Of course, the generation now will not learn any lesson from the 1974 flood either', the Hon. Robert Moore, Member for Windsor, told Parliament after touring flooded homes (*QPD*, 5 March 1974: 2694). Many potential villains were identified in Southeast Queensland, including the community, building owners, developers, insurers, and state and local Councils.

Arguments over responsibility revealed prevailing societal attitudes and values, as well as the influence of the development and building sectors. Community apathy or complacency, driven by environmental ignorance, was regarded a problem. *The Courier Mail* editorial identified a prevalent 'it can't happen here attitude', a belief encouraged by many dry years and faith that Somerset Dam prevented flooding (*CM* 28 January 1974: 4). As Russell Hinze, the Member for the South Coast informed Parliament, 'we all believed that such a flood could never occur again'. He noted that the community believed Brisbane to be flood proof, stating 'we honestly believed that, because of the dams we have built, we would never see a repetition of the 1893 flood' (*QPD* 5 March 1974: 2652). As it happened in other parts of the world, Brisbane's faith in technology had increased its vulnerability (Slovic 2000; Kelman 2003; Chrichton 2012).

Robert Moore despaired of human nature, arguing that if the local authority, the Brisbane City Council (BCC) kept flooded land vacant, with time there would be pressure to release it (*QPD* 5 March 1974: 2694). He believed that flood infrequency created complacency and fuelled greed. He observed that as the memory of the floods receded with time, people would forget the damaging effects of floodplain development. The real estate industry claimed this view, declaring as early as 4 February that entrepreneurs were buying 'soggy' houses, hoping that when things dried out 'people would be rushing to buy land that was flooded back in January' (*CM* 4 February 1974: 4). A local surveyor bluntly expressed a popular intention to remain on the floodplain saying 'how often do you have to suffer a flood like this? I'd live in one of these beautiful flood-prone suburbs. And take my chances on having a flood every 50 years, or whatever it has to be' (*CM* 4 February 1974: 4).

Some public commentators saw vacating flood prone land as foolish, restricting development for infrequent floods. Journalist John Bragg wrote in the *Sunday Mail* that 'Brisbane has to live with floods'. Bragg stated that the people had to recognise the calculated risk of living on a sub-tropical river floodplain which could be subject to one in 100 years floods severe enough to destroy homes. He maintained that not building on the floodplain was unviable and argued that one third of Brisbane, including the central business district, would never have been built if such a policy had been in force. Bragg cited Peter Lightfoot, General Manager of the property

development company, Hooker Centenary, claiming that if the floodplains were cleared, Brisbane would be an uneconomical 160 km strip of land (*SM* 3 February 1974: 6). Capitalism and progress justified floodplain development. Many land owners saw it as their inalienable right to build on floodplains, resorting to court if refused.

For many others, developers were the real culprits. Jack Egerton, Queensland President of the Australian Labor Party, and member of the Greater Brisbane Town Planning Committee, believed developers had 'reaped millions' by developing on floodplains, although well aware of earlier flood levels which they consciously ignored (*CM* 4 February 1974: 4). The Hon. William Morrison, Federal Science Minister, agreed. Developers had filled in many natural water-courses and built homes or factories too close to the river or in areas with regular flooding (*CM* 28 January 1974: 2). Letters to the newspapers reflected the same sentiment. Mrs K. Thomas of Murarrie blamed developers selling land to 'young couples, to migrants or people from other parts of Australia who had no experience of Brisbane flood conditions' (*CM* 31 January 1974: 4). In her opinion, unscrupulous developers exploited the unaware.

Developers challenged their culpability. Bill Bowden, State President of the Urban Development Institute of Australia, exonerated them, declaring they could not accept responsibility for a 'freak of nature' (*CM* 1 February 1974: 4). His colleague, Allen Vogan, President of the Urban Development Institute, considered blaming developers as 'absurd and immature'; since floods were inevitable. Even if they built within prescribed flood levels and zoning constraints, a larger flood would make these precautions pointless (*CM* 1 February 1974: 7). The Surveyor-General, Alexander Barr Yeates, offered an explanation highlighting the profit-motive and individual self-interest, declaring that, 'the developer is a human being. He wants to do the best for himself and his family by making profits. He is not restricted by the fine ethical principles of flooding in the future' (*CM* 4 February 1974: 4). John Hattrick, Queensland Director of LJ Hooker, weighed in, stating 'no company develops any land without local-authority approval' (*CM* 4 February 1974: 4). Developers shifted the blame to councils for approving subdivisions and developments.

Councils were a popular scapegoat, their weak planning rules held responsible. Local government had power to implement zoning and assess development applications. Brisbane residents clearly considered BCC negligent in permitting development on flood areas. State politicians, keen to divert blame, held Councils responsible. The Hon. Geoffrey Chinchin, member for Mount Gravatt, stated in Parliament, zoning, a local government responsibility, had been badly executed and Southeast Queensland paid the price. He maintained BCC had approved ill-advised zoning and issued building permits for building where it should not be allowed (*QPD* 5 March 1974: 2682). The Hon. Charles Porter, member for Toowong, maintained that BCC had the 'worst record of any local authority in permitting what it knew should not be permitted' claiming that two-thirds of houses

flooded in 1974 were constructed in the previous 10 to 12 years (*QPD* 5 March 1974: 2675). *The Courier Mail* cited evidence of creeks being filled in and natural areas of flood mitigation altered to 'provide playing fields, industrial and housing estates, and other purposes'. Newspapers agreed. Council approvals for homes had 'been permitted in areas' where they should have been prohibited (*CM* 28 January 1974: 4).

In Council's defence, Alderman Clem Jones, the long-standing Lord Mayor of Brisbane (1961–1975), stated 'We have been doing all we can'. He rebutted any criticism that the council had been wantonly allowing floodplains to be developed. In his view, Council had 'no control on industrial development on floodplains and it had little more control on residential development in these areas'. Legislation enshrining the rights of appeal against Council decisions had rendered them hamstrung. Clem Jones explained: 'We have taken some firms to court, unsuccessfully, in an effort to stop this development' (*CM* 30 January 1974: 7). The courts protected individual's alienable rights and council could not prevent 'people from building in low-lying areas' (*Telegraph* 29 January 1974: 3). Jim Slaughter supported this claim arguing that for many years 'we tried to keep people off the floodplains', but people successfully objected. For example, 'when we refused subdivision on low land at Sherwood, the first point of call for the buyers were the politicians and next thing we were interfering with the rights of private people' (*The Australian* 4 February 1974: 9). Council claimed powerlessness.

The Lord Mayor's claim was not simply a reaction to criticism after the 1974 flood. During the 1972 Council election, Jones had appealed to the Premier to create stronger legislation to stop development on floodplains and leave flood areas 'as buffers against flash floods and tidal floods'.<sup>10</sup> Council argued it had tried to stop development and repeatedly lost appeals in the Local Government Appeals Court, particularly for factories and warehouses on low-lying ground (*SM* 3 February 1974: 6). Jack Egerton agreed with Jones. The Brisbane planning committee lacked 'power to prevent exploitation by developers'. He called on the State government 'to give the City Council power to stop building in danger areas' or 'resume flooded areas in Brisbane as parks and resettle residents in alternative housing to prevent a reoccurrence' (*SM* 27 January 1974: 4; *Telegraph* 30 January 1974: 7). Council wanted an amendment to the *City of Brisbane Act* to grant them more authority to stop development.

Behind the blame game, the underlying questions remained unanswered. Who had the power, or inclination, to address flood mitigation? If land use planning offered the best non-structural engineering option to reduce the flood hazard, what land planning and building controls did exist in Southeast Queensland after 1974? Did local government have the power to prevent future development on floodplains or enforce removal of properties? It was beyond the power of local government to address these questions. The State government continued to focus on engineering solutions for managing river water and refused to grant Councils greater autonomy for better land use planning. The only consensus between state and local

government was to allow development on the floodplain in the name of progress.

### FLOOD MITIGATION THROUGH URBAN PLANNING

Southeast Queensland's flood policies were fraught with legacy issues, the product of governance driven by political imperatives. Constraints on property development were politically unpalatable with land ownership considered a right of citizenship (Bolton 1981: 10; O'Neill 2006: 5).

The State was slow to devolve authority to local governments. The *Local Government Act of 1878* provided local councils limited land management and resumptive powers, while the town planning movement of the 1920s accelerated moves towards land zoning. The *Local Authorities Act of 1923* gave councils some control over land use, subdivisions and drainage. This was replaced by the *Local Government Act 1936*, designed to consolidate local government law in Queensland. This Act offered an opportunity to implement state-wide flood policies and floodplain controls but failed. No such measures were introduced, with the status quo remaining.

The 1936 Act also enshrined financial compensation for landowners adversely affected by changes to any planning scheme. This policy was underpinned by the ideology that government's main purpose was to protect the liberty and private property of individuals. The requirement to pay compensation for three years after the implementation of the planning scheme impeded flood mitigation planning (Robertson 2002: 20). Similarly, the *Acquisition of Land Act 1967* which may have permitted compulsory government land acquisition for flood control, required councils to provide three years' compensation.<sup>11</sup> Hence, the legal and fiscal constraint of compensation and rights of appeal thwarted flood mitigation efforts by local councils.

Ordinances and by-laws were the only tools available to local authorities, which resulted in ramshackle and uncoordinated development of the metropolitan area (Cole 1984: 22 and 36). Brisbane developed without a Town Plan until 1965. Even then, the plan only dealt with 'drainage problem areas', allowing Council control of development in swampy areas. Non-residential development was not restricted.<sup>12</sup>

Upstream on the Bremer River, floodplain management at Ipswich fared no better. Ipswich too had grown in an 'unguided' and 'haphazard' manner. When the first by-laws were enacted in 1923 (and updated in 1952) floods and zoning were ignored. A 1947 consultants' report highlighted a need to undertake regional planning for flood prevention and directing future development (Scorer et al. 1947: 38). Despite offering many sound recommendations, the 1949 Ipswich Town Plan did not prevent building on the floodplain or introduce measures for reclamation. Likewise, there were no provisions to mitigate flooding in the 1953 or 1957 Ipswich Planning Schemes, or the 1966/67 interim development by-laws.

It was only in the 1970s that the BCC mapped Flood Regulation Lines and introduced flood management guidelines

to restrict development near creeks and waterways below the 1 in 100-year flood. After the 1974 flood, Queensland Councils were permitted to determine their own flood management strategies, rather than conform to state-wide flood policies as was the case in NSW and Victoria. Councils adopted a Defined Flood Event (DFE) to guide planning and policy. Development was discouraged below the Defined Flood Level (DFL).

In 1974, the BCC introduced a land-exchange scheme for owners of flood-damaged homes to relocate to and obtain property on alternative Council land, but only 35 home owners satisfied the strict qualifications (BCC Annual Report 1973–1974: 12). The Council claimed owners had refused to sell their houses in low-lying areas (*Telegraph* 29 January 1974: 3). Apart from owner reluctance, the expense made the scheme limited in its scope. As a senior government engineer stated, 'We can't move whole suburbs because the cost would be prohibitive' (*SM* 3 February 1974: 6). Council agreed acquiring 'all land affected by floodwaters' was 'impractical', requiring acquisition of a 'third of Brisbane', with the possibility that 'another flood could be higher again' (*CM* 30 January 1974: 7). Repossessing houses, BCC argued, would have a minimal impact and vast expense.

The BCC adopted the recommended 1 in 100-year DFL (known as Q100) in 1976, but subsequently reduced the height in the 1978 Town Plan Lower than the 1974 flood, the height was based on the calculated 3 m mitigating effect of Wivenhoe Dam. All habitable floors had to be above this reduced DFL (BCC Submission Two: 9). A higher flood level was rejected by Council, believing restrictions below the 1974 flood would have 'high consequences on the city's urban, social and economic fabric'. Although a higher DFL would reduce risk and potential damage, Council argued the 'costs could outweigh the benefits' (JFT Report: 34). A 3.7 m DFL was considered the acceptable balance between economic progress and flood hazard. These building restrictions applied only to new buildings and had little impact on older areas. Retrospective codes could not be introduced. Older houses had to rely on the city's 'path dependence on historical practices', and in Brisbane this meant a continued over-reliance on dams (Colten 2005, 159, Stunden Bower 2010, 66). In 1976, Ipswich Town Plan adopted a 1 in 20-year flood height as the DFL, a level well below the 1974 flood height. Not until 2004 did Ipswich comprehensively implement the recommended 1 in 100-year DFL (known as Q100) but even then, exceptions were made for existing buildings.<sup>13</sup>

Under Brisbane's City Plan 2000, the BCC adopted the DFL of 3.7 m plus a 500 mm freeboard margin for habitable areas to 'allow for a factor of safety, uncertainties and localised effects' (JFT Report: 17). Commercial and industrial development could be lower, 300 mm above the DFL. Alternatively, a 'risk management approach', could be utilised indicating flexibility in approvals (BCC Submission Two: 14).<sup>14</sup> Ipswich continued to rely on the mandatory Q100 level. Both were lower than the 1974 flood, based on the mitigating effects of Wivenhoe Dam. Yet despite the urban myth to the contrary, Wivenhoe Dam had not given Brisbane flood immunity from a Q100 flood, much

less the larger floods that had occurred in 1841 and 1893. The conservative modelled Q100 level had increased vulnerability.

Short term expenditure outweighed considerations of long-term benefits of hazard reduction. Legislative prevention of further construction in the floodplain offered a much wider scope.

For flood managers, a DFE is the ‘compromise between the level of protection we can afford and the risk we are prepared to take with the consequences of larger floods’ (Scarm 2000: 1). It is a risk management approach that finds a balance between the advantages and potential damage of building on the floodplain. In Southeast Queensland, rather than adopt an historical flood height, councils adopted a modelled flood height.

### The State Government’s Slow Response

After unbroken rule by conservative governments in Queensland since 1957, the Goss Labor government came to power (1989 to 1996) with an agenda of administrative and legislative reform (Wanna 2003: 359). The *Local Government (Planning and Environment) Act 1990* replaced the *Local Government Act 1936*. This new Act failed to redress planning problems and protected lawful non-conforming uses. Worse still, it retained the right to three years’ compensation which Councils wanted removed and permitted appeals in a planning and environment court established by the State (Davis 2011: 3–4). The rights of the individual property owner continued to over-rule mandatory flood planning, as Clem Jones had claimed in 1974. Although the Act stipulated that Council consider flooding when rezoning, the final decision rested with the State.

The Goss Labor government was succeeded by the Borbidge conservative government (1996–1998) which promoted urban development and made infrastructure a priority (Wear 2003: 390–3). To streamline the process, the Borbidge government introduced the *Integrated Planning Act 1997*, a significant change in planning legislation (Davis 2011: 5). State Planning Policy (SPP) 1/03 ‘Mitigating the Adverse Impacts of Flood, Bushfire and Landslide’ was introduced. Twenty years after NSW and Victoria, Queensland finally had a state-wide flood policy. The policy was clear: ‘the Queensland Government considers that development should minimise the potential adverse impacts of flood, bushfire and landslide on people, property, economic activity and the environment’ (SPP 1/03, 1). Councils were to provide two years’ compensation, adopt the Q100 level and use land regulations to reduce the communities’ vulnerability to natural hazards. The rhetoric suggested a move away from a total reliance on dams, yet little had changed.

In 2009, when the *Sustainable Planning Act* superseded the *Integrated Planning Act*, councils were encouraged to adopt the State Planning Policy, undertake a flood study with mapping and establish a DFE. Significantly, these requirements were not mandatory. Loopholes were also available. For example, lower habitable heights were permitted in six Brisbane localities, a ‘risk management approach’ could be used if implementation of the DFL created an ‘an undesirable outcome’ and if a development met a particular need it could

‘override some aspects of risk associated with the natural hazard’ (BCC Submission Two: 14; JFT Report: 17). Councils had, and utilised, flexibility in the system to allow development below the accepted DFL. The underlying policy was clear: development controls should not reduce the ‘capacity to use the land within the floodplain’ (SPP 1/03, Annex 4: 18).

The *Sustainable Planning Act* offered allowed negotiation, rather than prohibition of development below the DFL. Queensland retained the rights of appeal and one year’s compensation. The legislation enshrined other legacy problems. A building removed from site, with no material change of use, could be replaced within two years providing it maintained the same footprint without requiring Council approval. Building approvals could be granted by private certifiers. No changes to design or building materials, both recognised as hazard reduction tools, were required. Houses destroyed by flood could be rebuilt with little change. Local governments had no powers to stop it.

The planning legislation and loopholes reflected political and cultural conditions. In Southeast Queensland, the priorities remained growth and urban consolidation. Between 1995 and 2006 Brisbane became Australia’s fastest growing city (ABS 2006). In 2005, the Southeast Queensland Regional Plan identified the need for an additional 156,000 dwellings in Brisbane by 2031. Redevelopment and infill in existing urban areas were to provide at least 138,000 additional dwellings, with flood-prone suburbs identified as potential growth areas (BCC Submission Two: 15).

The Federal Government’s ‘Building Better Cities Programmes’ promoted urban renewal. Under the urban renewal schemes BCC constructed a continuous 14 km Riverwalk in the inner city, 17 river ferry terminals and waterfront parkland, all vulnerable to flooding. After 1992, stand-alone buildings were replaced with medium to high density residential accommodation in inner city suburbs, often in high flood risk areas (Felton 2011). The Urban Renewal Taskforce, charged with ‘revitalising derelict industrial suburbs in Brisbane’ concentrated their efforts in the inner (and low-lying) suburbs with plans to replace industrial and warehouse sites with over 6500 new homes.<sup>15</sup> Between 2005 and 2011 BCC approved 1,811 development applications within the 1974 flood footprint. In the years between the floods of 1974 and 2011, both Brisbane and Ipswich grew substantially (Table 1). As Southeast Queensland endured the longest drought on record from 1996 to 2009, strong flood mitigation strategies seemed unnecessary. Urban growth expanded onto the floodplain (Table 2).

When the drought ended in 2011 with heavy sub-tropical rains, all rivers in the Brisbane River basin were in major flood by January. The Brisbane River peaked at 4.46 m at the Port Office Gauge on 13 January 2011, less than the 5.45 m recorded in 1974. Wivenhoe Dam reduced the flood by approximately 2 m, rather than the modelled 3 m (Seqwater, iv). Floods caused 23 deaths in the Lockyer Valley and one in Brisbane. In Ipswich, approximately 7221 properties were flood affected, 1000 homes inundated. In Brisbane, 14,100 properties were

**Table 1**  
*Brisbane and Ipswich Statistics in 1973 and 2011 (ABS and profile.id)*

Year	City	Population	Dwelling numbers	City	Population	Dwelling numbers
June 1973	Brisbane	712,500	217,847	Ipswich	65,000	18,889
2011	Brisbane	2,065,998	822,174	Ipswich	166,908	63,136

**Table 2**  
*Number of BCC Properties within the DFE area (JFT Report, 31)*

DFE Scenario	Current Q 100	Current DFE	Jan 2011	1974 flood 5.54m	Jan 2011 - DFE
Commercial	1,171	1,178	2,759	2,907	1,581
Industrial	783	1,589	2,000	2,482	411
Community	24	34	46	48	12
Multi-Dwelling Residential	6,814	10,756	15,834	18,025	5,078
Single Dwelling residential	4,666	7,543	10,228	12,306	2,685
Total	13,445	21,100	30,867	35,768	9,767

affected across 94 suburbs: 1203 houses and 557 business were completely inundated, a further 1879 were partially inundated (QFC Interim Report, 27). The cost was crippling: \$440 million to the BCC alone, \$100 million for ICC.<sup>16</sup> Residents and businesses submitted 38,000 insurance claims, worth \$1.5 billion (Griffiths 2011).

All peak flood levels recorded in the 2011 flood were higher than the existing Defined Flood Level. An additional 9,767 properties were flooded between the modelled DFE and 2011 flood height. The BCC acknowledged that if councils had adopted the 1974 DFL and not over-relied on Wivenhoe Dam, more buildings could have been saved from inundation (BCC Submission Two: 34; JFT Report: 31).

## DISCUSSION

Municipalities have the capacity to shape urban geographies, particularly through town planning, zoning and building approvals (Cronon 1991; Piper 2013). Land use planning is 'perhaps the most fundamental tool for main-streaming disaster risk reduction into urban development processes' (UN-Habitat 2007: 205). Brisbane, as Cole (1984) has argued, is a city-state. The BCC is unique in Australia in terms of power and size. Created in 1925 as an amalgam of two cities, six towns and 12 shires, Greater Brisbane is Australia's largest local authority by population in an area of 1,367 km<sup>2</sup>. Consequently, BCC has sole control of much of the Brisbane River floodplain up to the boundary with Ipswich. In other states in Australia, much of the responsibilities undertaken by the BCC are administered by the state or statutory bodies.

Given this context, it would appear that the BCC had considerable opportunity to utilise land use planning and zoning regulations to reduce flood damage. In reality, however, its apparent autonomy and ability to control development is often thwarted by the contested nature of government jurisdiction (O'Neill 2006; Stunden Bower 2010).

Like any local government in Queensland, the BCC 'remains essentially limited by the sovereign prerogatives of the State' (Cole 1984: 407-9). Councils are created by the State to which they are financially dependent. This reduces

local government control of floodplains. The State can, and does, intervene, in planning matters. In Southeast Queensland, floods exposed the frequently tense relationship between local and state politics, characterised by conflict and buck passing (QPD 5 March 1974: 2682; Cole 1984: 407). The 1974 floods provided an opportunity to reassess Southeast Queensland's flood risk and minimise the hazard. But as the state and councils fought to ascribe or avoid blame for the floods, neither took a firm lead on hazard reduction. The lack of political courage to regulate floodplain development after the 1974 flood resulted in subsequent policies that increased the hazard during the 2011 floods.

This case study highlights the socio-political nature of floods. In Queensland, growth for economic development has been a continuous political lynchpin with construction employment relied upon to boost the economy. Although by the 1970s, there was widespread international recognition that hazard management was critically dependent on land use regulation to mitigate flood damage, this was ignored in Southeast Queensland. The continuing adherence to modernist faith in engineering solutions to river management resulted in the belief that the construction of the Somerset and Wivenhoe Dam would control floods and thus release the constraints on development in the Brisbane River floodplain.

When Southeast Queensland's town plans and legislation did implement land regulations to control floodplain development, the measures adopted were conservative and able to be manipulated through loopholes. Rules of compensation and discretionary powers were enshrined in government legislation. Both State and local governments adopted a DFL for development that was lower than the modelled 1974 flood height. Their view was that the 1974 flood level would be too restrictive for development controls, and that with the calculated mitigating effect of Wivenhoe Dam, the lower DFL would fall within the realm of acceptable risk. Prevention of development below the DFL was, therefore, not mandatory, and building was permitted below this level if councils considered them as being within the boundaries of acceptable risk. As a consequence, development on the floodplain flourished, buoyed by an unrealistic faith in Wivenhoe Dam's

mitigation capabilities, and permitted by legislation and council regulations until they faced a serious reality check with the major flood event in January 2011.

### CONCLUSION

Power devolution implies shared responsibility. As Karen O'Neill (2006, xv) has shown in USA, by failing to devolve councils' authority to prevent floodplain development, the State of Louisiana increased its culpability for flood disaster by perpetuating dam dependence. Ben Wisner has argued, stronger policies will only be implemented and succeed if 'compatible with the existing patterns of power and material interests'. Furthermore, 'full hazard mitigation, as a mainstream part of sustainable development', Wisner maintains, 'is impossible without challenging the prevailing ideals of limitless growth, of ever decreasing governmental regulation, and the dominance of market values' (Wisner 2000: 59–61).

In 2017, riverside development in Brisbane is thriving on land flooded in 2011, with all buildings approved and constructed within the constraints of State legislation and Council regulations. Strong regulation of the floodplain remains politically unpalatable. Existing development controls remain conservative and flexible, designed to facilitate development. Southeast Queensland is locked into a cycle of destruction and rebuilding, with continuing systemic failure to adequately control development on the floodplain. The local government authorities, the key decision makers for where new structures can be built, cannot resist the temptation to raise more rate revenue, so they continue to allow residential, commercial and industrial building on low-lying land. The state government, which has the legislative right to acquire land cheaply, rarely exercises that right. It too profits from development through stamp duties levied on new properties and residential subdivisions. To avoid culpability, BCC – which controls over half of the metropolitan area – proudly advises potential owners and builders to check its web-based site showing what areas might flood. But when it comes to rebuilding after a flood, most property owners are allowed to proceed unhindered.

The Brisbane River floodplain will never be vacated until a future, catastrophic flood, takes all before it. With the current warming trend of climate change, driving warmer ocean waters and monsoonal rains, that flood is likely to happen sooner rather than later.

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### NOTES

1. All heights are measured using Australian Height Datum. Brisbane city heights are recorded at the Port Office Gauge. All dollar values are in Australian dollars.
2. Rainfalls were significant: 507 mm fell in the Stanley River catchment; 280 mm in the Upper Brisbane River; 350 mm in Lockyer Creek and 461 mm in the Bremer River.
3. Australian Government Bureau of Meteorology, June 2015. [http://www.bom.gov.au/qld/flood/fld\\_history/brisbane\\_history.shtml](http://www.bom.gov.au/qld/flood/fld_history/brisbane_history.shtml)
4. Population and dwelling figures for Brisbane and Ipswich are from 30 June 1973. Australian Bureau of Statistics, *Statistical Summary Queensland Local Authority Areas*, 30 September 1974, 8.
5. Allom, J.N. to Premier, 6 July 1974, Floods and cyclones – December, 1973/January 1974 Cyclone 'Una' and 'Wanda' Part 6 410T. QSA ID 540161.
6. Bacon, E. Hon Secretary, Union of Australian Women to The Premier, 6 March 1974. Floods and Cyclones – December, 1973/January 1974 Cyclone 'Una' and 'Wanda', 410T Part 3. QSA ID 540062.
7. Joh Bjelke-Petersen Press Release, no date. QSA ID 568998.
8. Statement of Policy, 1978. NSW Planning and Environment Commission (Circular 15. 16/8/78).
9. The *Drainage of Land Act 1975* granted these powers.
10. Lord Mayor, Clem Jones, to The Hon. J Bjelke-Petersen, 7 September 1972. 8026 B409Y. QSA ID 5400011; *QPD*, 5 March 1974, 2671).
11. *Acquisition of Land Act 1967*, Section 19 (3)
12. City of Brisbane Ordinances. 1965. Chapter 8, Part 8, Clause 2, *Queensland Government Gazette*, 1 December.
13. Moreton Shire, which amalgamated with Ipswich in 1995, introduced the 1974 flood level as the DFL.
14. This level was known as Q50. This is the height for new roads.
15. Urban Renewal Brisbane – Our First 20 Years. <http://www.planning.org.au/documents/item/3245>, Accessed 10/10/2016.
16. Fact Sheet: Brisbane City Council 12-month Flood Recovery Report, January 2012, 1. This sheet counts 22,000 homes and 7,6000 businesses flooded. *Queensland Times (QT)*, 6 February 2013.

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