Greening Transit Oriented Development and Subtropical Design

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Chapter 8: Greening transit oriented development and subtropical design

Bhishna Bajracharya, Daniel O'Hare and Jason Byrne

Introduction

In some Australian planning circles, transit oriented development (TOD) has been portrayed as a fad. Looking back though, we can see that nineteenth century and early twentieth century inner suburbs of most Australian capitals developed historically as 'TODs' (though not called that). Brisbane was no exception.[1] Many older Brisbane suburbs like West End and Woolloongabba developed by integrating higher density land use and built form around key tram stops and rail stations. Post–war developments in the city's outer suburbs mostly abandoned this notion as car-dependence swelled. [2]

In the 1990s, many Australian capitals experienced a resurgent interest in transit-oriented design catalysed by the Federal Labor Government's Building Better Cities Program (1991-1996), which required increased residential densities around transit hubs as a condition of Commonwealth funding.[3] And twenty-odd years on, at the end of the first decade of the new century, the twin imperatives of peak oil and climate change are propelling a new wave of TOD – with a decidedly green tinge. Nowhere is this more pronounced than in SEQ.

In this chapter we review the historical development of TOD as an idea in Queensland and discuss its evolution from an incipient 'walkability-oriented' design trend (intended to reduce car-dependence, congestion and pollution while bolstering the efficient use of infrastructure and services) to a more holistic concern with environmental quality. Transit oriented design initiatives have recently returned to the government policy agenda, largely driven by green concerns. For example, the Queensland Government's climate change strategy 'Climate Q' (released in mid 2009) elevates TOD as a principal design solution for climate change mitigation and adaptation. Other planning documents, including the SEQ Regional Plan 2009-2031[4], strongly articulate the public health and environmental benefits of TOD. As a design concept TOD has evolved as the growth machine risks colliding with ecological limits, necessitating more sustainable planning practices. Queensland now leads Australian 'subtropical design' and we can learn much from the state's planners and designers who are championing a 'climate-responsive TOD' and its requisite design principles.

Looking to these design lessons we examine: the role of green-space in transit oriented built environments; climate-responsive architecture; water-sensitive urban design; biodiverse sub-tropical landscaping; and new subtropical lifestyle – oriented spaces which promote walkability. To better illustrate these green challenges to TOD, we offer a conceptual framework focusing on subtropical design, and apply this framework to evaluate two SEQ case studies (inner city South Brisbane and Robina on the Gold Coast). Last, we look towards the future and where subtropical TOD might take Australian, and potentially international, subtropical cities.

Green TODs: principles and subtropical design

Upon first inspection, Australian TOD projects seem to have blithely imported American and European concepts. Yet few researchers have critically examined the historical, political, socio-cultural and environmental factors that have shaped Australian TOD.[5] Internationally, a number of features characterise TOD: integrating mixed use development with a mass transit system; incorporating 'walkability' as a central design feature; creating a dynamic and democratic public realm; and providing for housing diversity.[6] These features are said to foster increased walking and cycling and to boost use of public transportation, because the mix of land tenure, housing types and levels of housing affordability is believed to stimulate automobile-independent trips for entertainment, shopping and recreation..[7] How has Australian TOD differed?

The urban design charrette for Beacon Cove in Port Melbourne in 1992 was almost certainly the first Australian application of international TOD ideas. In Queensland, the notion of integrating higher density development and transit accessibility re-emerged during the mid 1990s. In 1994, for instance, the American practitioner credited with coining the term 'transit oriented development' - Peter Calthorpe - gave an invitation lecture to Brisbane's urban design and development professionals. Although his ideas were initially not well received, TOD later featured in Gold Coast City Council's 1995 Coomera design charrette. In both the Beacon Cove and Coomera charrettes (and several others around that time), high profile international TOD proponents jointly led the consultant team (e.g. Paul Murrain, UK; Chip Kaufmann, USA; and Wendy Morris, Australia). Leading Australian academic, Peter Newman, also did much to promote TOD nationally. But the federal government's Building Better Cities program arguably galvanised national action by disseminating TOD ideas and ensuring they were implemented through demonstration projects such as urban renewal projects in Brisbane inner city suburbs such as Fortitude Valley and Teneriffe, among others.[8]

State government departments like the Queensland Department of Business, Industry and Regional Development also played a role, through reports and policy initiatives intended to better integrate transport andmixed use developments. Queensland Transport first published its influential '*Shaping up'* report in 1998, a document that impelled action in Queensland.[9] More recently, the first SEQRP (2005) incorporated a version of TOD as a regional network, an idea strengthened by its 2009 successor. Rather than an overseas import, TOD actually represents a return to how Australian city planners and designers traditionally integrated land use and transport into walkable neighbourhoods. Although Australian transit-oriented development has shared international goals, it also exhibits some unique regional inflections and adaptations.

Queensland's emerging subtropical design movement is a good example. Calling for subtropical design that will be very different to temperate counterparts, the Centre for Subtropical Design (CSD) - a joint initiative of the Queensland University of Technology, Brisbane City Council and Department of Infrastructure and Planning (founded in 2003) has identified a number of broad subtropical principles for the SEQ region which are relevant for TODs. SEQ is Australia's only subtropical metropolitan region, and is ill-suited to the wholesale deployment of temperate TOD design concepts. The SEQ Regional Plan 2009-2031 now requires 'climate-responsive design' that utilises passive cooling and heating systems to reduce energy consumption and concomitant greenhouse gas emissions. [10]

The plan requires new developments to incorporate subtropical design tenets such as orientation, siting and passive climate control, and highlights the need to cater for subtropical lifestyles by integrating accessible and high quality public spaces in major public buildings, regional activity centres and transit communities (i.e., TODs). According to the CSD, the characteristics of an idealised subtropical neighbourhood should include: integrated parks/green spaces; a vibrant community heart with neighbourhood centre and a mix of uses; interconnected street networks providing links to the centre and; neighbourhoods based on five-minute walkable catchments. Moreover, high-density housing should be broken into smaller massing and groups of buildings to maintain ventilation and landscape character. And the CSD suggests that safe and comfortable walking and cycling routes should link residential areas to community facilities and parks.[11]

Transit-integrated parks and green-space

Providing generous park spaces in TODs could have a range of long-term benefits. Researchers have found that parks can increase surrounding property values, improve the sociability of

residents, promote child development and foster healthy environments. Community gardens in these parks may further enhance resident's wellbeing, giving them access to fruits and vegetables. Parks can also regulate ambient temperatures, filter air, reduce noise, augment natural habitat and attenuate storm-water. Park vegetation sequesters carbon, further enhancing the potential climate-change benefits of subtropical TOD.[12] Despite these benefits, parks within most TODs are typically limited to a 'central plaza' - green-space appears little more than an after-thought.[13]

However, some international examples such as Westerpark (Amsterdam), the Lakefront Park, (Chicago), Greenwich Peninsular Park (London) and Canal-front parks (Hangzhou, China) show how green-space can be fundamentally integrated into TOD, rather than treated as an embellishment. Seamlessly integrated with public transit opportunities, these international TODs incorporate linear park networks that facilitate pedestrian and cycling movements, with excellent services (e.g. drinking fountains, sheltered bicycle racks, exercise equipment, dog-walking areas and the like). Ecological features such as wetlands, bird-viewing areas and urban forests together with mixed uses (e.g. cinemas, cafes, museums, restaurants) offer residents a wide variety of active and passive recreation opportunities. Beautiful parks like these encourage higher levels of use, and higher densities can be achieved than would otherwise be possible.[14] Such park facilities and features should be a key element of subtropical TOD.

Architectural design

Thermal comfort is an especially important consideration in subtropical climates due to temperature and humidity. Queensland designers have begun to advocate for buildings that can maximise thermal comfort without the need for energy intensive cooling or heating, by using various design features including: solar and wind orientation; retractable window awnings, window double glazing and / or window tinting; roof and wall insulation; and passive cooling through heat chimneys, and cross-ventilation.[15] Some of these ideas are already being implemented in other Australian cities. For example, Council House 2 in Melbourne – Australia's first six-star green rated municipal building – was developed in 2006 by the Melbourne City Council to showcase these principles.[16] But similar ideas have long been embodied in the vernacular architecture of 'the Queenslander' - a colonial design response to Brisbane's subtropical climate, these elevated wooden houses with corrugated iron pitched roofs, wide verandas, louvres, sun shades / shutters, and sleep-outs possess design features that are still relevant for contemporary subtropical housing.[17]

Urban design & landscaping

Moving subtropical design initiatives from the individual building level to a neighbourhood scale has required advances in urban design. Designers suggest these include: incentives for energy efficient site development; greater diversity of land use; encouragement of efficient transport forms; and urban water management. Other innovations include shaded arcades in commercial developments; mixed use development for traffic minimisation; and pedestrian friendly streets. Site and building orientation can promote an energy efficient urban layout by providing shading devices for open spaces and pedestrian pathways – features that also promote 'walkability'.[18]

Walkability: Salient within the TOD literature, 'walkability' is another key feature of subtropical design. Climate and local topography strongly influence distances that people are prepared to walk, and the time in which they can comfortably travel. [19] Without design interventions, heat, humidity, strong sunshine and torrential downpours can severely curtail the walkability of subtropical cities. Hilly topography, as in many Brisbane suburbs, can exacerbate pedestrians' thermal discomfort because the extra exertion required to walk uphill heightens sweating. Shade, shelter, and air movement can mitigate this discomfort and provide respite. Building awnings, as seen in traditional Australian main streets, shade out strong sunshine and also shelter passers-by from localised showers/storms. And street trees can lessen heat and humidity, drawing breezes down to footpath level via air pressure differentials.

Landscaping: With the increased density that is typical of TOD, comes an imperative for high quality landscaping of the public realm. Landscaping breaks up built form, provides privacy and relieves monotony by delighting residents with the varied colours, textures and fragrances of subtropical vegetation (and the birds and animals it attracts). Landscaping not only improves the liveability of TOD spaces, it can also significantly enhance the local character of a city. As has been highlighted in preceding sections, large shade trees can facilitate cooling, reduce flooding, suppress dust, filter air and improve biodiversity. But landscaping is more than vegetation - benches, rest areas, gazebos, barbecues, art (e.g. sculptures), courtyards and plazas can significantly enhance the public realm, drawing people into civic spaces, improving sociability and safety, and heightening the attractiveness of walking and cycling. But TODs that actually implement these ideas are rare, as many designers will attest.

Planning for subtropical design

Queensland urban designers and planners are at the forefront of subtropical design. Our conversations with some of the state's leading urban designers[i] show that their ideas are reshaping how we view TOD, and how we might better integrate TOD and subtropical design. Six key elements underpin 'subtropicality' in TOD. These are: lifestyle; architectural design; public realm; transport; landscape and energy efficiency – elements that resonate with the principles we have discussed above.

1. Subtropical Lifestyle

Forward-looking practitioners in Queensland suggest that the tenets of subtropical TOD must be framed in the context of 'regional subtropical urbanism', which they argue is defined by collections of small buildings, variety in streetscapes, wide veranda spaces, shade trees, and vistas to landscape and natural surroundings. Collectively known as 'relaxed urbanism', this 'informality' is an integral part of the subtropical lifestyle (Figure 1). A subtropical lifestyle they further note, is afforded by openness and a strong relationship to green spaces, including the beach, with a focus on indoor/outdoor activities and permeable living spaces. A unique aspect of the subtropical context then is its sensual interplay of sight, sound, feeling, and smell – e.g. sweet pittosporum (*Pitttosporum undulatum*) wafting on warm breezes.

- Insert Figure 1 here -

2. Architectural Design

Queensland design professions have begun to realise that access to natural daylight and cross ventilation are essential ingredients of the subtropical built environment. For instance some designers have drawn upon qualities of the traditional 'Queenslander' to develop 'veranda apartments' with cross ventilation and access to natural lighting; they advocate taller buildings with smaller/thinner floor plates to maintain uninterrupted breezes and view lines. Other new Queensland planning ideas include providing actively-used indoor and outdoor spaces, good sized balconies (to accommodate gardens, barbecues and outdoor furniture), window louvres, movable screens, shade devices and planting to promote the interplay of light and shade (Figure 2). These practitioners feel that subtropical TOD should focus on precincts not just on buildings.

[i] (we spoke to Peter Richards, John Byrne, Rosemary Kennedy, Caroline Stalker, James Coutts, and Jemina Dunn)

Importantly, they recognise that no one single model of subtropical TOD is the answer - TODs must be individualised and contextualised according to locality.

- Insert Figure 2 and 3 here -

3. Integrating nature into the public realm

An environmental focus on the public realm is also emerging as an essential ingredient of subtropical urbanism. Several designers are now advocating that plazas and parks should be fundamentally integrated into any TOD. Higher density buildings have begun to focus upon the public realm - especially public parks (Figure 3) an initiative intended to effectively bring nature and its multiple benefits back into the built environment. And more attention needs to be given to vistas onto landscapes (ridges, mountains, trees) and green corridors, drawing the natural surroundings back into developments, as well as water features, for example by incorporating watercourses and floodplains as the focus of TOD town centres.

4. Walkability

Campaigning for a quality walking environment with proper shade and tree cover to protect people from rain and sun, some Queensland designers assert that subtropical developments must not only consider transit accessibility but also must act as attractive destinations that work climatically by providing thermal comfort. These built environment professionals suggest that both the transit node and area of accessibility must be considered when planning for TOD. Stations must be aesthetically pleasing with a light and airy feel with greater accessibility to breezes through elevated rather than sunken platforms, and design features must draw breezes down to sunken areas to provide relief during hot, humid conditions.

5. Landscaping

Landscaping and planting are also emerging as indispensable components of subtropical design, with several leading Queensland planners and designers drawing inspiration from the work of 'tropical' architects like Ken Yeang. These practitioners recognise the importance of 'deep planting' and suggest that 'green walls' should become integral components of subtropical TOD. Some have called for an 'in your face urbanism' with greenery, overhangs, pergolas and balconies. And the variety, informality and profusion of subtropical plantings are garnering attention as essential core component of subtropical character, rather than the staid 'avenue plantings' typical of temperate cities. Water management - such as harvesting rain water and recycling grey water - is also emerging as an integral part of subtropical design.

6. Energy efficiency

Finally, some leading Queensland design professionals have begun to call for 'a SEQ vernacular that's energy efficient'. Energy efficiency is emerging as an integral component of subtropical TOD development. Indeed, the Queensland Government has set a goal of making public buildings carbon neutral by 2020. By incorporating green design features like 'green walls' TOD designers can bolster energy efficiency, and can further enhance this efficiency by co-locating activities around TOD development.

Towards a framework for subtropical TODS

We have sought to synthesise these ideas from the literature and practitioners into a conceptual framework to show how the key elements of subtropical TOD are coming together in Queensland (see Figure 4 below). We see the key principles as interlocking and mutually reinforcing, represented here by nested hexagons and arrows. For example, the subtropical lifestyle informs the need for individual building design elements like wide balconies as well as civic spaces for outdoor recreation, dining and socialising. And bringing nature back into the built environment generates not only energy efficiency savings but also fosters subtropical lifestyles, creates opportunities for landscaping that is vibrant and builds biodiversity, and promotes overall sustainability. These interlocking principles are not intended to be prescriptive, but rather lay the foundation for a more place-sensitive TOD.

- Insert Figure 4here -

SEQ case-studies: A tale of two TODs

The two case studies selected for this study represent two key types of centres designated for TOD development in the SEQRP. The first, South Brisbane, is an inner suburb with both long established railway infrastructure and more recently introduced busway infrastructure. The second case study, Robina, is one of fifteen designated Principal Regional Centres in the SEQRP, and is based around rail infrastructure. Although neither of these examples was deliberately constructed as TOD, both embrace TOD objectives to varying degrees. Each tells a different story of how subtropical TOD has worked or not in SEQ.

South Brisbane

South Brisbane, like a number of other Australian inner suburban centres, developed historically as a transit-integrated development. During a long period of decline in the twentieth century, the

wharves and port related businesses that characterised South Brisbane were progressively cleared away. In recent decades, the area has been revived through the successive development of: (i) the Queensland Cultural Centre (QCC), (ii) World Expo88, and (iii) the subsequent development of South Bank Parklands - a major regional recreational precinct visited by over ten million people annually Developers' responses to Brisbane City Council's urban renewal strategies, and the impact of the South East Busway and expanded QCC since 2000, have further revitalised the area. The core of the South Brisbane case study area is illustrated in Figures 5 and 6.

- *Insert Figure 5 here* –

'Relaxed urbanism' in South Brisbane is demonstrated by an informal atmosphere and the presence of a variety of cultural and recreational activities, including a very popular artificial beach. Around the QCC, this quality of *subtropical lifestyle* is manifest in a series of interlinked open green spaces that unfortunately eschew the legibility, connectedness, 'eyes on the street' and weather protection advocated in the subtropical design literature. A more 'urban' relaxed quality is achieved in the SW1 precinct, with a legible network of pedestrian paths that allow natural surveillance and opportunities for people to enjoy the subtropical climate while sitting outdoors with shade and rain protection.

The area's main streets, Grey Street and Melbourne Street, have benefited from the South Bank Corporation's and Brisbane City Council's respective 'subtropical boulevard' design strategies over the past decade. But Grey Street displays few of these design qualities in the area within 400 metres of the South Brisbane transit node. Within 200 metres of the transit node, Melbourne Street's subtropical boulevard qualities are severely reduced by the South East Busway and poorly-designed property frontages.

- *Insert Figure 6 here* –

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The area's performance against our *climate responsive urban design & architecture* criterion is somewhat mixed. The rail and bus platforms offer shade and shelter to waiting passengers, but little shelter is available on the 200 metre walk between these two stations (comprising a single transit node). The covered pedestrian bridge above the bus station provides shelter for pedestrian movement between Queensland Performing Arts Centre (QPAC) and the Museum and Queensland Art Gallery but pedestrian links between these buildings and the State Library and Gallery of Modern

Art (GOMA) are exposed to the weather. The Kurilpa pedestrian-cycle bridge, opened in 2009, provides shelter and some shade, but pedestrian links to it exhibit a low responsiveness to the climate. The 300 metre long Victoria Bridge leaves pedestrians exposed to sun, rain, and vehicles. South Bank has been designed to celebrate the subtropical climate, and the main walkways provide shade for cooling and glare reduction, particularly on the river promenade with its dense Moreton Bay fig trees (*Ficus macrophylla*), and a renowned arbour with its colourful bougainvillea.

The riverside location offers cooling breezes but there is scant shelter from rain. Little Stanley Street, lined with cafes facing the park, enjoys sun, shade and breezes. Businesses here run through the narrow block to Grey Street, where they present less active frontages, thereby falling short of South Bank Corporation's vision for this street to be 'one of the world's great boulevards'. SW1 provides through-block walks, courtyards and eating areas with a good balance of access to sun, shade and rain shelter. This block, with its open street frontages, courtyards, lanes and richly-layered detailing, heightens opportunities to appreciate the subtropical climate. Open spaces around the Cultural Centre allow summer breezes and winter sun through, but the bulky 400 metre long Brisbane Convention and Exhibition Centre (BCEC) blocks the cooling breezes from penetrating further from the river.

South Bank provides an excellent example of transit-integrated parkland. This high *quality public realm* is exemplified by the children's playground that allows parents to combine supervision with socialising and enjoying coffee from adjoining cafes. The Parklands are backed by ten to fourteen storey office buildings and high density five storey apartments overlooking parklands and river. Away from the parklands, there is little evidence of climatically responsive siting of open spaces. Other than at South Bank, visual awareness of the river and landscape setting is relatively low. In contrast, SW1 appropriately has its highest densities facing Melbourne Street and Musgrave Park. SW1 is only 200 metre direct walk to South Bank Parklands, but the dark Russell Street tunnel under BCEC is forbidding to pedestrians.

In South Brisbane the topography is relatively flat, allowing short walking distances and climatic comfort. *Walking and cycling* are somewhat integrated. Unfortunately, two blocks of Melbourne Street present confusing and dangerous pedestrian conditions, due to the parallel Busway and car lanes creating two sets of two-way traffic in the one street. Fencing and poor traffic light sequencing can frustrate pedestrians. The Cultural Centre Bus Station, completed in 2000 as part of the South East Busway, is the busiest bus station in Translink's network, and not surprisingly,

many pedestrians have been hit by buses and cars in the first decade of operation. Pedestrian routes through QCC are illegible and key links offer virtually no shelter. The highest quality walks are within the parklands rather than in the urban streets. Cyclists fare little better - bike lanes are marked on Grey Street, Melbourne Street and Victoria Bridge, but lanes are perilously narrow for considerable distances. Cyclists share with pedestrians the river boardwalk and promenade, causing conflict, and bike connections towards the river are almost non-existent.

Landscape quality within the area is highly variable. Some areas exhibit rich subtropical landscape character – for example the South Bank arbour and shady rainforest trees (e.g. Tuckeroos - *Cupaniopsis anacardioides*) - whereas others have very poor quality landscape treatments. For instance, large paved areas trap summer heat and do not allow *stormwater* infiltration. The Melbourne Street subtropical boulevard contributes to an informal Brisbane urban landscape, and drainage design in this street facilitates the watering of the lush vegetation. But outside South Bank, there is little manifestation of the 'in your face' green urbanism advocated by some avant-garde designers. Nonetheless, SW1 and the State Library contribute some of these qualities through a combination of greenery, overhangs, pergolas and balconies, but little evidence suggests that *energy efficiency* was a design criterion in the South Brisbane case study area.

Robina (Gold Coast)

Robina town centre has been developing on a greenfields site, since the mid-1990s, as the intended heart of a major master-planned community. Robina's current stage of development does not display TOD to any great extent. Robina Land Corporation depicts the station as a hub for eleven precincts, including a high school, hospital, major stadium, shopping centre, two residential precincts, three commercial precincts, a planned mixed use precinct and Gold Coast City's 'Green Heart' - a 1,000 hectares regional urban green-space still in the design stage. Despite their proximity, these precincts have very poor pedestrian links to the transit node and each other. For instance, the namesake major shopping centre remains separated from the rail station by over ten hectares of vacant land. Several precincts have a component of mixed use, for example ground floor retail, but streets typically lack connectivity and shelter for pedestrians. While there are pockets of subtropical design the streets, as the main elements of the public realm, do not foster walkability. The case study area is illustrated in Figures 7 and 8.

- *Insert Figure 7 here* –

'Relaxed' *subtropical lifestyle* design qualities are not yet 'fully present', due to: (i) the incomplete stage of current development, and (ii) the stand-alone 'campus' nature of key precincts (Hospital, High School, major shopping centre). Parks are extensive, but are poorly integrated with restaurants, theatres, shopping, and transit. While the intended development of the Green Heart parklands by Gold Coast City Council promises a quality transit oriented park of regional standing, the 120,000 square metre 'big box' shopping centre presents blank walls (cinemas, carparks, backs of shops) to the majority of its street frontages. This shopping centre was recently converted into a conventional enclosed and air conditioned centre for weather protection, at the cost of subtropical design qualities such as access to winter sun, summer breezes, and views across the floodplain to the coastal skyline.

Robina Riverwalk, inspired by San Antonio's acclaimed '*Riverwalk'*, responds to the linear lake. [20]There is a relaxed openness to its design but despite density, an 'urban character' is not achieved. Illegible pathways do not lead clearly from residences to the 'main street' of this precinct. Pedestrian qualities suffer from ambiguity between the fronts and backs of townhouses, and between public and private status of key green spaces.

There is little evidence of *climate-responsive urban design* at Robina. Street trees lack continuity and their canopies are still relatively immature. The upper concourse of the railway station exhibits a subtropical airiness and lightness, but the platforms are buried below it. Although this guarantees shelter from the hot sun and rain, it also shuts passengers in rather than celebrating the views to hinterland rainforests and the coast. Some residential apartment buildings feature wide balconies and offer vistas over waterways, but the overall feel is of a fragmented landscape rather than the integrated, climate responsive, design that one would expect from a sub-tropical TOD. Pedestrians are forced to trek long distances without shelter and many of the buildings thus far constructed make little effort to optimise solar access and natural ventilation.

The overall *quality of the public realm* is poor. Park spaces are not integrated throughout the area and opportunities for multi-purpose linear parklands have not been capitalised on. While there are some excellent ecological areas bordering the Skilled Park stadium, as yet they are poorly integrated within the development. The extensive town centre area is based on a large scale road network for cars. Pedestrian connections and qualities are poor, both within and between precincts. The flat topography gives the area potential for climatically comfortable walking but pedestrian desire lines in worn grass show that twelve years after development, paved footpaths

are still missing across much of the site. Robina Community Centre and Library turn their backs to Robina Town Centre Drive and this has impeded the creation of a civic heart and worked against the activation of the arcaded street frontage of the shopping centre in this area.

- Insert Figure 8 here -

To date w*alking, cycling and public transit* are poorly integrated, having been subordinated to cars as the primary mode of transport. The immediate environs of the rail station and bus interchange are dominated by roads and car-parking rather than walkable streets. Robina Hospital, directly opposite the station is hidden by trees; walking distance is increased by more than 200 metres due to absence of a direct path. Extra distances discourage walking in a subtropical climate, especially where the streets have little or no shade or shelter. Street oriented development is beginning to occur near the station along Laver Drive, where 'the Rocket' office tower and Wharf Apartments present active frontages, awnings and street trees. And similar developments are anticipated to improve the walk between the station and major shops - but there is little evidence that walkable streets are a design priority in this car-dependent part of SEQ. Although, bike lockers are provided at the train station, and cycle lanes are marked on major routes, the major sports stadium is perhaps the only development thus far to prioritise walking and public transport.

Some residential areas feature lush gardens, but overall the *landscaping* lacks unity and fails to convey a sense of 'green urbanism'. Although the area is still evolving, the poor attention to landscape detail severely detracts from achievement of a subtropical ambience, particularly in the streets. There is little evidence of *water sensitive urban design* outside the confines of the Rail Station. Public spaces in the centre fail to take full advantage of the views towards the lush rainforest covered hills behind the development. And while the Robina Land Corporation is reputedly moving towards a policy of developing to a 5-Star Green Star rating, *Energy efficiency* does not seem to have been an overt design criterion for much of the built environment to date.

Our two case examples clearly demonstrate that we have a long way to go before SEQ can claim to have a truly subtropical TOD. While South Brisbane shows some promising developments that embody subtropical design principles and suggest a greening of TOD ideas in the State, Robina demonstrates few of these ideas.

Conclusion and future directions

In this chapter we have argued that while TOD seemingly has been uncritically imported into Australia, with no apparent attention to local context, evidence suggests this is not the case. We have shown how leading design professionals in Queensland have begun to articulate cutting edge ideas about effective subtropical design and in the process have begun to 'green' TOD. What we feel we have done here though, is to begin a conversation about subtropical TOD – and like any conversation much more remains to be said. Substantial scope exists for new research into green urbanism and TOD in SEQ, especially given that the lessons learned here may inform new development in other Australian states and elsewhere. For example, could incentives prompt TOD developers to respond more positively to subtropical design principles? And if so, what tools might best achieve this (e.g. density bonuses, relaxation of car parking requirements etc.)?[21] The Brisbane City Council has recently developed a point system to encourage developers to integrate sustainable development measures in return for reduced infrastructure charges. Could similar measures promote subtropical TODs?

The large differences between our two case studies suggest that there is much we still have to learn about the role of government in shaping TOD in Queensland and in other Australian states (e.g. time lags in the diffusion and implementation of new ideas, and the roles of the various stakeholders in determining the success or otherwise of TOD outcomes). For example, when Robina town centre was master planned in the early 1990s, private automobiles ruled. The reformulation of ideas of integrated planning into 'TOD' was embryonic at that time. For the same reason, the Gold Coast railway to Robina, built in the mid-1990s, largely ignored TOD principles - despite the TOD orientation of the Building Better Cities program's Gold Coast Railway Area Strategy, and despite the efforts of the State Government's senior urban designer and others. Railway engineers were only concerned with the rail line, not the urban structure; they saw park and ride as the only option.

We believe there is potential for the Queensland State Government – through its new Urban Land Development Authority (ULDA) - to develop demonstration projects on subtropical TOD located in highly visible and accessible areas to push the development industry to embrace TOD – 'positive planning'.[22] But would this step convince the community and developers to embark on subtropical TOD projects? What has been the experience elsewhere with such initiatives, and what lessons could we learn from these places? While the changing climate of planning for

subtropical development in Queensland suggests that the future may be greener than the past, we still have some way to go before achieving a truly green TOD.

[1] John William McCarthy & Carl Boris Schedvin (eds), *Australian Capital Cities: Historical Essays*, Sydney University Press, Sydney, 1978

2 See Peter Newman & Jeff Kenworthy, *Sustainability and cities: overcoming automobile dependence,* Island Press, Washington, DC, 1999 and Peter Newman, Timothy Beatley & Heather Boyer, *Resilient Cities: Responding to Peak Oil and Climate Change,* Island Press, Washington, D.C., 2009.

[3] Tony Collins, *Living for the City: urban Australia, crisis or challenge,* ABC Books, Sydney, 1993.

[4] Queensland Government, 'The draft south east Queensland regional plan, 2009-2031', Department of Infrastructure and Planning, The State of Queensland (Department of Infrastructure and Planning), Brisbane, 2008.

[5] Caroline Stalker, 'Climate change and cultural change – some subtropical design alternatives', in *Subtropical cities conference* Queensland University of Technology, Brisbane, 2006.

[6] Robert Dunphy, Robert Cervero, Frederick Dock, Maureen McAvey, Douglas Porter & Carol Swenson, *Developing around transit: strategies and solutions that work,* Urban Land Institute, Washington DC, 2004. For a Queensland take see Dale Gilbert & Simon Ginn, '*Transit oriented sustainable developments*', Queensland Department of Public Works, Built Environment Research Unit, Brisbane, 2001 and Bhishna Bajracharya & Shahed Khan, 'Sustainability frameworks for transit oriented development in South East Queensland', in *Queensland: geographical perspectives*, (ed) by Iraphne Childs & Brian Hudson, Royal Geographic Society of Queensland Inc., Brisbane, 2006, pp. 31-54.

[7] Jason Byrne & Christina Qi Li, 'Nerang as a regional centre; transit-oriented parks', in *Queensland Development Research Institute* Griffith University Urban Research Program Monographs, Brisbane, 2008 and Jason Byrne & Neil Sipe, '*Transit oriented parks*', paper presented to National Conference of the Planning Institute of Australia (PIA), Darwin, Northern Territory, 2009.

[8] L Neilson, 'S. The'Building Better Cities' program 1991-96: a nation-building initiative of the Commonwealth Government', *Australia Under Construction: Nation-building: Past, Present and Future* 2008, pp. 83.

[9] Queensland Transport, 'Shaping up : a guide to the better practice and integration of transport, land use and urban design techniques : shaping urban communities to support public transport, cycling and walking in Queensland ', Queensland Department of Transport, Queensland Main Roads Department & Queensland Deptartment of Local Government and Planning, Main Roads / Queensland Transport, Brisbane, 1998.

[10] Office of Urban Management (OUM), '*South east Queensland regional plan 2005-2026*', Department of Local Government Planning Sports and Recreation, Queensland Government, Brisbane, 2005.

[11] Centre for Subtropical Design, 'Subtropical values and principles of subtropical design for the south east Queensland region', Queensland University of Technology, Brisbane, 2004.

[12] Jason Byrne & Jennifer Wolch, 'Nature, race, and parks: past research and future directions for geographic research', *Progress in Human Geography* 2009, pp. 0309132509103156 and Chen Yu & Wong Hien, 'Thermal benefits of city parks', *Energy and Buildings* 38, 2006, pp. 105-20.

[13] Monica Vinluan, 'Making parks and recreation a priority. Advocacy update: in step with health', *Parks and Recreation* 42, 2007, pp. 16-9

[14] Peter Harnik, 'The excellent city park system: what makes it great and how to get there', in *The humane metropolis: people and nature in the 21st-century city*, Rutherford Platt (ed) University of Massachusetts Press, Amherst, Ma., 2006, pp. 47-60.

[15] Nick Hollo, *Warm house cool house: inspirational designs for low-energy housing,* Choice Books, Sydney, NSW, 2001. and David Gissen (ed), *Big and green: toward sustainable architecture in the 21st century*, Princeton Architectural Press, New York, 2002.

[16] City of Melbourne, 'CH2: Setting a new world standard in green building design', Melbourne City Council, <http://www.melbourne.vic.gov.au/info.cfm?top=171&pg=1933> [Accessed September 8 2009].

[17] Bhishna Bajracharya, Anoma Kumarasuriyar & Nur Demirbilek, 'Vernacular architecture in Queensland, Australia: current planning issues and opportunities', in *International conference on quality of urban life: policy versus practice* Istanbul Technical University, Urban and Environmental Planning and Research Center, Istanbul, 2003.

[18] Rohint Emmanuel, *An urban approach to climate sensitive design: strategies for the tropics,* Spon Press, Abingdon, Oxon, 2005.

[19] Daniel O'Hare, 'Urban walkability in the subtropical city: some intemperate observations from SEQ', paper presented to Subtropical Cities conference, Queensland University of Technology, Brisbane, 2006

[20] Daniel O'Hare, 'Missing the Gold Coast train', paper presented to International Planning History Conference, Chicago, 2008

[21] Daniel O'Hare, Bhishna Bajracharya, Anne Miller & Rosemary Kennedy, 'Incentives for innovative sustainable development through statutory planning and development regulation in a subtropical climate', Centre for Subtropical Design, Queensland University of Technology, Brisbane, 2004.

[22] Brendan Gleeson & Eddo Coiacetto, 'Positive planning in Australia: a review of historical and emergent rationales', *Urban Policy and Research* 25, 2007, pp. 5-19.

Queen Street, Brisbane James Street, Fortitude Valley

Figure 1: Subtropical lifestyle and relaxed urbanism

Use of balconies and louvers

High density development around parks

Figure 2: Subtropical design

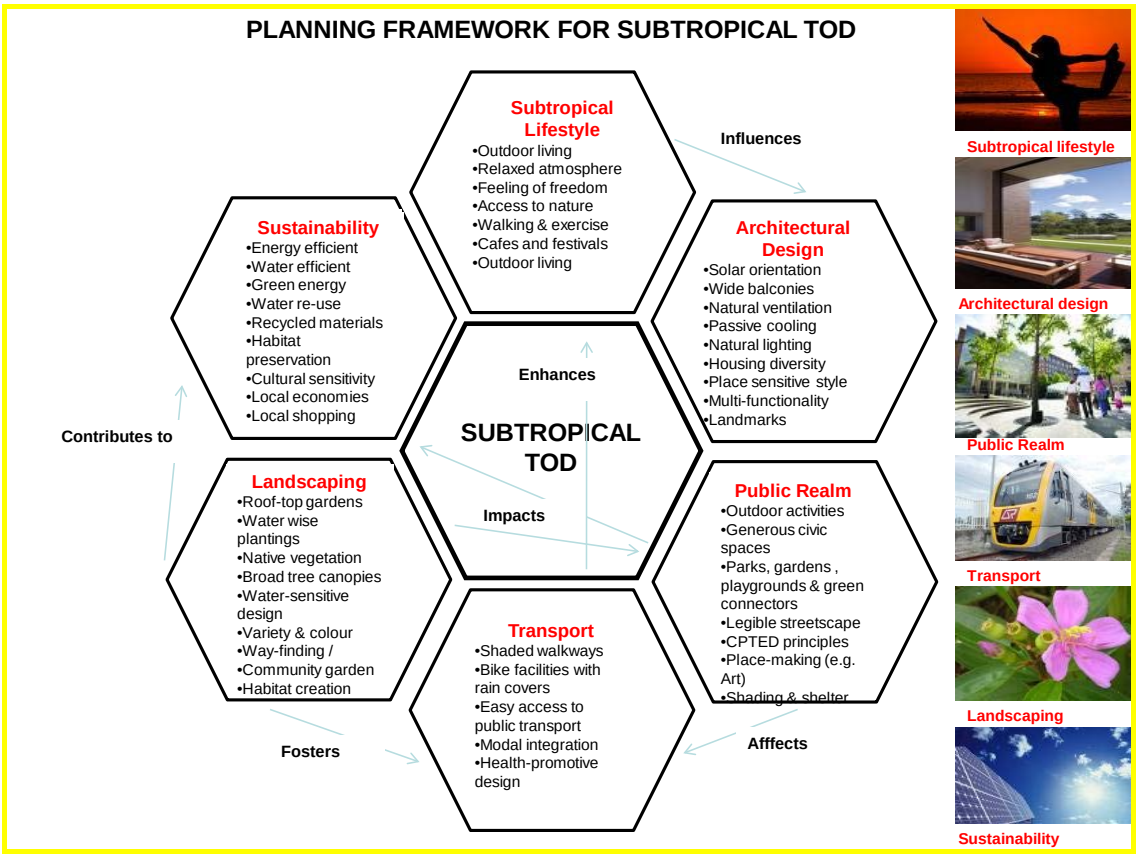

Figure 3: Proposed Planning Framework for Subtropical TODS

Figure 4: Location map of South Brisbane Station

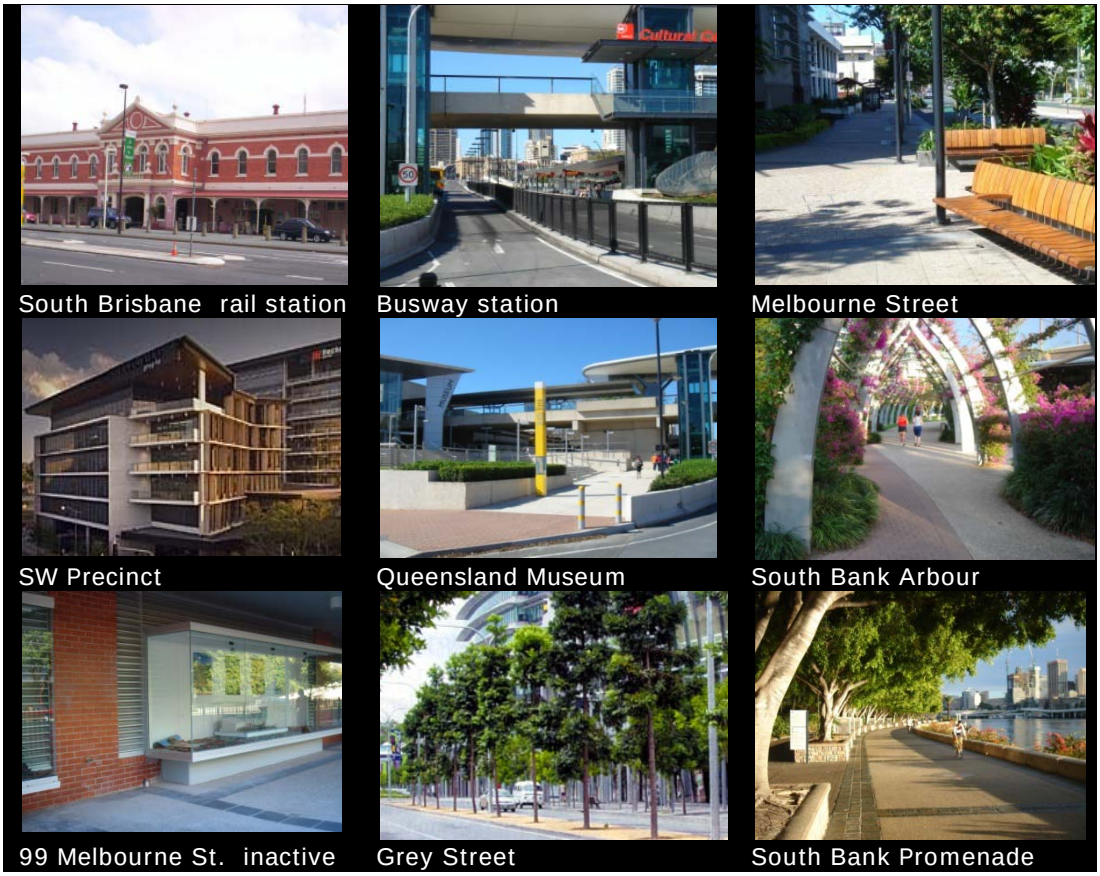

Figure 5: Montage of South Brisbane

Figure 6: Location map of Robina Station

Figure 7: Montage of Robina Station