Green and open space planning for urban consolidation – A review of the literature and best practice

Jason Byrne and Neil Sipe

Urban Research Program

Issues Paper 11
March 2010

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Brisbane, QLD 4111
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ISBN 978-1-921291-96-8

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Acknowledgements

This issues paper is based on work completed in a report that was commissioned and funded by the Queensland Department of Infrastructure and Planning.

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Introduction

Australian cities have undergone profound reforms over recent decades, as politicians, decision-makers and planners have sought to ensure our built environments remain liveable and can adapt to new lifestyles and demographic trends. Urban consolidation is one of these reforms.[1] Urban consolidation is a growth management policy that aims to direct growth away from green-field sites at the metropolitan periphery by increasing density in existing built environments, through smaller suburban lots and higher density dwellings – especially within the inner city.[2] The term is also related to, and sometimes conflated with, 'urban containment', 'smart growth', 'urban renewal', urban revitalisation' or simply 'densification'.[3-5] Proponents of consolidation argue it will lead to more efficient use of existing infrastructure and services, while simultaneously delivering multiple benefits such as: protecting valuable green-spaces on the fringes of metropolitan areas; reducing traffic congestion and pollution; and even combating obesity and sedentary lifestyles.[3, 6-10]

But various community groups and urban scholars have criticised urban consolidation, arguing that it compromises the character and heritage of inner city neighbourhoods, for example by losing precious public open space to urban infill, by placing residents in noisy locations, by concentrating social disadvantage, and by potentially undermining social cohesion.[4, 11-14] Such criticisms are certainly warranted in places where planners have failed to carefully manage consolidation to preserve the public domain, thus compromising residential amenity and the character of targeted neighbourhoods - for example by developing 'surplus' parkland for housing. This is especially the case where consolidation has been ad-hoc rather than managed through redevelopment schemes. The incremental demolition of single family houses and replacement with 'six-pack' and 'twelve-pack' style apartment blocks has incurred the wrath of many anti-consolidation community groups, largely because these types of developments can reduce privacy, increase noise levels, worsen road traffic, increase on-street parking and decrease greenspace within neighbourhoods, with little or no mitigation on the part of developers.[11, 15-17] Some planners, leisure scholars and greenspace theorists now suggest that Australian planning systems may not capable of responding to the challenges that densification and concomitant population increases place on urban open spaces and greenspace.[2, 18-21]

This review is a component of the Queensland Department of Infrastructure and Planning and Brisbane City Council's 'Liveable City Strategy'. The strategy will provide opportunities to enhance and interconnect public spaces to improve amenity within Brisbane's core urban area. A key focus will be: (i) identifying and protecting an 'integrated public space network' for the plan area; (ii) incorporating existing parks and squares with new spaces and linkages to the Brisbane River; and (iii) providing a public space network that will facilitate active recreation and healthy lifestyles. The strategy will also focus on the critical role of the Brisbane River.

Study area

The study area covers the inner 5 km of Brisbane City, including suburbs such as Auchenflower, Balmoral, Bowen Hills, Bulimba, Coorparoo, Dutton Park, Hawthorne, Highgate Hill, Kangaroo Point, Kelvin Grove, New Farm, Newstead, Norman Park, Paddington, Spring Hill, Toowong, West End and Woolloongabba (see Figure 1). Many of these suburbs have experienced increased residential densities in recent years, associated with various forms of consolidation, placing pressure on parks and other open spaces.[5] One of the goals of the liveable cities strategy is to prevent some of the problems referred to above, by retaining the qualities that make Brisbane special. To do this, decision-makers are looking to the literature on urban open space, parks, plazas, boulevards and other types of greenspace, as well as to best practice in other cities, for guidance.

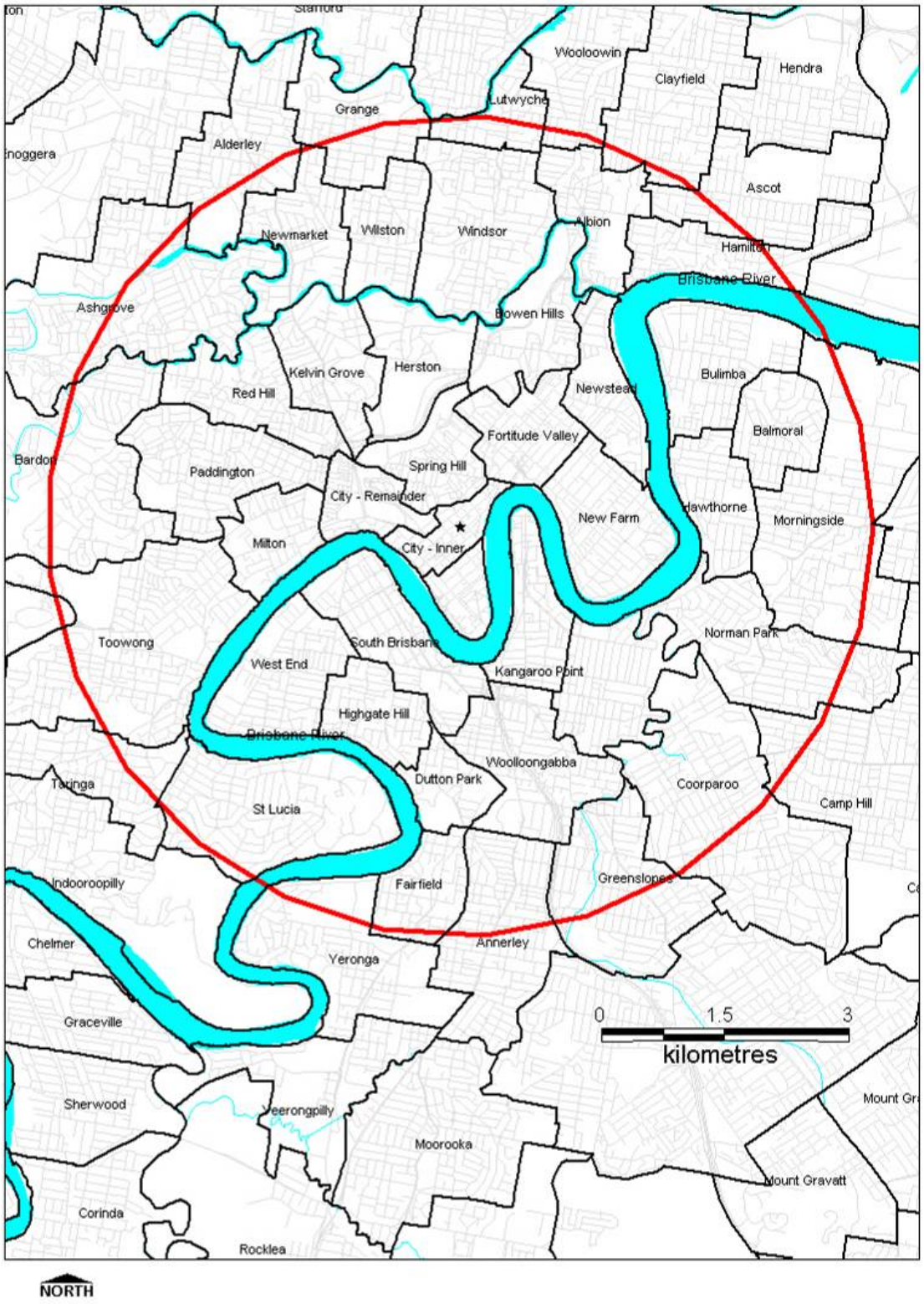

Figure 1: Study area

What types of spaces are being considered?

According to the Brisbane City Council, urban open spaces include: parks, sporting fields, bushland, creeks, the Brisbane River, Moreton Bay, private backyards and gardens, courtyards and balconies, attractive and safe streets, plazas and entrances to shopping centres, community gardens, bikeways and paths, spaces around libraries and art galleries and links between these elements.[22, 23] A better definition would arguably be limited to publicly accessible green and open spaces and would therefore exclude private backyards, gardens and balconies. But it would

include communal space around apartment buildings, cemeteries, rock walls, street verges and medians, school grounds, rooftop parks, stormwater channels, surplus parking lots and may include open-air, publicly accessible shopping malls that provide opportunities for passive recreation.[24, 25]

Scope and purpose of the review

This literature review covers recent research, planning standards and best planning practices for public urban space and greenspace planning. The purpose of the literature review is to enable a comparative analysis of the amount and quality of public urban and open space in other capital cities relative to Brisbane, considering examples of successful public spaces and their characteristics (e.g. dimensions, function, land use context and so forth). In the review we also consider, wherever possible, existing and emerging leisure patterns, employment patterns, housing preferences, household structure, lifestyle preferences, travel patterns, location preferences and the interrelationships between these factors. We draw these facets together to develop a typology for defining/categorising types of urban public space (specifically considering the role and function of various public/private tenure arrangements for managing 'public space'). The ultimate purpose of the literature review is to provide a foundation for a detailed physical audit of Brisbane's greenspace and public open space environments to facilitate better management and to enable the selective densification of some urban areas that policy makers deem suitable for 'infill' development and urban consolidation.

The review has included both scholarly research and publications and professional/lay publications. Material for the review was sourced from an extensive search of electronic databases, online publications and a reference collection of over 600 scholarly titles on parks and open space (see Appendix 1). The review has also considered international, national and state planning standards for urban green and recreational open space, to help planners and policy makers put the demands on Brisbane's urban greenspace within a national and international context. However, the review has not attempted to comprehensively address government documents or strategies on open space and greenspace (e.g. design guidelines, policy statements, area studies) unless they were seen as being exceptionally relevant. Finally, the review has sought to index public space provision within the study area against cities in Australia and internationally.[1]

Greenspace research

Over the past three decades research on parks and other types of greenspace has flourished. There is now a considerable body of scholarly work on urban greenspace, covering topics such as design, use of greenspace, greenspace values, environmental equity and the like. In this review, we limit our discussion to topics that are directly relevant to urban consolidation, namely: density and greenspace interactions – with a focus on equity and social justice, and we examine reasons for providing greenspace. We consider among other things why people use greenspace, how they use greenspace, the various factors that shape the use of greenspace, how the characteristics of greenspace in turn affect its use, and the many benefits of greenspace for its users.

Density and greenspace interactions

For some time now there has been an ongoing debate about the impacts that increased density has on urban greenspace use. Some theorists suggest that as density increases we should increase

[1] We recognise that the review is not exhaustive. It is likely that some relevant material has been omitted due to time limitations and resource constraints. Nonetheless, we are confident that we have reviewed the most current and relevant material. The authors welcome suggestions for additional material that we should consider in future research.

the amount of greenspace in a locality, thus offsetting the loss of private backyards.[15, 16, 26-38] The theory is that residents will compensate poor access to private greenspace by using public greenspaces such as parks – a notion referred to as the 'compensation hypothesis'.[39] The idea sounds plausible but is this really the case?

Recent research suggests that we should not assume that just because people live in denser environments with little access to private greenspace they will necessarily use neighbourhood public parks and other greenspaces more frequently.[39-41] Indeed, a paradox of urban consolidation is that it may actually stimulate leisure-based travel, as city dwellers seek to escape to the countryside or other places for leisure and recreational experiences.[39, 42-47] And existing parks and other greenspaces in higher density areas may be so congested with users or attract a clientele of 'undesirable users' that these parks may actually repel further use, making urban consolidation - without additional greenspace - highly inequitable.[25, 48-50]

There are three important factors to consider when planning for increased density and park use: (i) different types of people who live in higher density built environments will have different greenspace needs; (ii) because consolidation always involves existing built environments planners need to contend with how to integrate existing greenspaces into denser built environments – many parks for example will have historically been designed for a different clientele than the residents that consolidation brings; and (iii) the character of built environments has been shown to affect how people use urban greenspaces – urban design must ensure that greenspaces are easy to get to, safe and have high levels of environmental quality. The design of higher density development must therefore entail careful thinking about the greenspace needs of future residents relative to the capacity of the built environment to meet those needs.[25, 50]

Higher density residents and their greenspace needs

One of the problems with the simplistic notion that more parks are required when density is increased is that it does not consider the characteristics of people living in higher density environments. The idea assumes a homogeneous population of townhouse and apartment dwellers who need access to a generic park. And a common misconception is that small household live in small dwellings.[51] But if we take a closer look at who lives in townhouses, mid-rise and high-rise apartments in Australia, we find that populations are differentiated by income, age, sex, household composition and the like.[II] [4] In other words, there is no typical 'higher density resident'. This has prompted some commentators to suggest that there is excess park capacity in many inner city areas. But a closer look at the inter-relationships between greenspace users and greenspace characteristics suggests that we need to be very careful when planning for greenspace in urban consolidation projects.

People live in higher density dwellings for a variety of reasons. In some cases, but not all, apartments are cheaper than single-family houses, so income plays a role.[56-58] Some researchers have found that lower-income residents need better access to parks and open space because they cannot afford other forms of leisure (e.g. ski trips, horse-riding or golf).[57, 58] But not all higher density residents are impoverished. Many people seeking to live in apartments are actually older retirees seeking a 'sea-change' lifestyle, close to beaches and amenities. These residents choose to

[II] We note that many Australian cities are markedly different to their American and some Asian counterparts. In many cities in the United States that have not experienced large-scale gentrification, it is the poor who live in inner city locations, oftentimes in sub-standard housing and in semi-industrialised locations, with very limited access to urban greenspace.[37] Typically these residents are also 'people of colour' – that is so-called minorities – who are marginalised and vulnerable e.g. 'Latinos', 'African-Americans', 'Native Americans' etc. In South American and some Asian cities similar patterns exist, especially within squatter communities.[52, 53] And of course in larger Australian cities like Sydney and Melbourne, there are still substantial pockets of 'concentrated poverty' where lower-income immigrant groups live in crowded conditions with comparatively poor access to urban greenspace.[54] Some European cities are now exhibiting similar patterns as processes of globalisation concentrate undocumented workers in urban centres.[55]

live in luxury apartments to be close to shops, restaurants, entertainment venues and public transit routes; they usually have higher disposable incomes. Researchers have found that older people are less inclined to use parks and other greenspaces for reasons related to personal mobility, health and fear of other park users.[59-63] So there is an interaction effect here between density, income, age and park use that is difficult to tease apart.

The situation becomes even more complicated when we consider the presence of children in higher density dwellings. We might expect that people who live in apartments will have few if any children.[64] This is partly the result of development industry stereotypes of apartment dwellers, and partly the result of past self-selection practices based on concerns about the stigmas of higher density housing and the practicalities of needing room to raise children.[64-67] But a closer inspection of demographic data and recent research shows that increasing numbers of Australian apartment dwellers and inner city residents have children (this is the norm in high density Asian cities).[1, 50, 68-71] Younger people with children may not be able to afford a single-family house – at least within reasonable commuting distance of workplaces, but lifestyle values may play a role too. Some generation X and Y parents may choose to stay in inner city areas because they enjoy the cosmopolitan lifestyles on offer and are unprepared to leave higher density locations for suburbs they perceive as bland and boring.[72, 73]

Researchers have found that children living in higher density housing have a greater need for publicly accessible greenspaces for play, mental health and social and physical development.[35, 71, 74-81] While parents living within apartments may not be avid park-goers for their own benefit, they often visit parks so their children can play and vent excess energy.[82, 83] Apartment living means that time that would otherwise be spent on yard maintenance is available for taking children to parks for socialising and relaxing, even if this means forgoing personal recreation.[74, 84] Children's sporting activities may also necessitate night-time and weekend visits to playing fields.[85, 86] Apartment living may place unique demands upon children who may lack the private play spaces enjoyed by their low-density counterparts. Children need space to play away from traffic, where their parents can monitor them, and where their play will not disturb other apartment-dwellers. Yet most consolidation to date has failed to cater to children's needs.[50]

These various considerations mean that open space and greenspace near higher density dwellings must cater to very diverse populations – older people, children, adolescents, parents, wealthy people and the poor – with diverse expectations about the functions that greenspace should perform.[55, 87-92] A 'one size fits all' approach to greenspace design for higher density areas will be prone to failure.

No two parks are the same

A second issue is that few scholars and practitioners have recognised that urban greenspace is as widely differentiated as the populations who rely upon it. No two parks are the same. Parks differ according to their age, levels of maintenance, facilities, and size - partly due to the philosophy that motivated their creation and partly due to land development processes and municipal fiscal constraints.[93, 94] Parks differ according to their age because different ideas about the benefits parks provide have historically informed the people who design and develop parks.[95, 96] Early parks like Hyde Park in Sydney were created when colonial planning authorities required setting aside of open spaces for new settlers.[97] These parks - among the oldest public parks in the world – typically featured a long walk or 'promenade' where the gentry could stroll.[98] Later, when urban reformers in Europe and North America sought to manage the large populations that swelled industrial cities, ideas about parks changed.[99] Parks became 'democratic' spaces, melting pots where people from all walks of life could mingle; though there was another agenda at play too.[96] Park reformers believed that working class residents and immigrants needed access to nature to make them more civilised. By mingling with the gentry in immaculately landscaped spaces, it was

believed the working class would adopt the morals and values of the elite.[100, 101] Central Park in New York, completed in 1873, is an example of such a park created during this time.[102, 103]

Australian planners emulated these ideas. The new urban parks featured expansive gardens, expensive embellishments like fountains, benches, meandering walking paths and lakes, and ornate fixtures like bridges, signs, statues, lamp-posts and even bandstands and pagodas.[98] And like their European and North American counterparts, these parks had a code of conduct enforced through park rules and park police.[100, 102] These parks were often connected to large tree-lined boulevards that transected the city, and these various greenspaces were collectively regarded as the 'lungs of the city', purifying noxious air and cooling the hardscapes of roads and buildings alike.[101] Older Australian parks show how these ideas became enmeshed in the built environment (see Figures 2-4).

But it was not long though before the ideals of elaborately landscaped urban parks met the practicalities of providing recreational opportunities to the masses. At the same time a new philosophy of parks suggested that what was needed most were opportunities for citizens to exercise – to strengthen and discipline bodies, to temper immoral impulses and to give people a place to vent frustrations and escape from urban life.[96, 104, 105] The 'recreation movement' witnessed the paring down of parks to more closely resemble what we now call playing fields, with little ornamental vegetation, large expenses of grass, places for people to sit, with clubrooms for sporting teams, and facilities like goal posts, basketball hoops and cricket pitches.[106, 107]

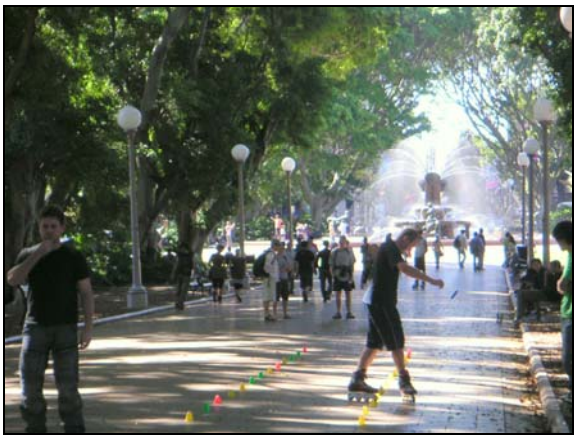

Figure 2: Promenade, Hyde Park, Sydney

Figure 3: Botanic gardens, Brisbane

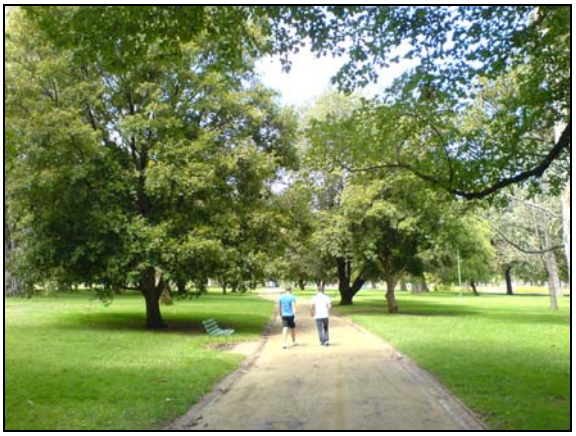

Figure 4: Park boulevard, Melbourne

Figure 5: Ecological park, Ipswich

More recently Australian park planners have been confronted by a new set of demands. Parks since the 1970s have increasingly been required to perform ecological functions – like stormwater interception and retention, providing habitat, preserving remnant vegetation, cooling urban temperatures and the like. Australian park planners have sought to incorporate ecological

principles into park-design and – like their European and North American counterparts, these newer Australian parks are more likely to include generous use of native vegetation, to protect watercourses and wetlands, and to provide spaces for wildlife as well as people (see Figure 5).[108-110] But at the same time, growing fiscal constraints have meant that less funding is available to spend on park maintenance. The quality of park spaces in the older middle ring suburbs has arguably deteriorated as a result.[17]

This colourful history of park-making has endowed Australian cities with a wide variety of parks and green spaces. Inner Brisbane for example is characterised by a diverse array of greenspaces including botanic gardens, riverfront parks, playgrounds, ecology parks, boulevards, playing fields, civic squares, community gardens, farmers' markets, rainforest walks, and even an urban beach at Southbank. It is logical that the quality, function, size, landscaping, and facilities of these varied greenspaces will affect how people use them. But the character of the built environment surrounding parks also affects how greenspaces are used.

How built environments affect greenspace use

A final consideration with regard to density and greenspace is that researchers have demonstrated that the nature of built environments impacts how people use urban spaces.[111-113] Built environments that feature greater connectivity are more likely to foster physical activity than those designed to limit traffic flow.[114] In other words, grid street patterns seem to lead people to exercise more than culs-de-sac. The main reason for this is that connectivity promotes walking for exercise and transport. People who live in neighbourhoods with a grid street pattern appear more inclined to walk to their local shops, use their local parks and walk or cycle to work than those who live in culs-de-sac neighbourhoods, because distances to these various destinations are more direct and thus take less time. Longer distances appear to promote car-based travel and sedentary lifestyles.[7, 8, 113, 115-120]

Ironically, the history of planning and property development in Australian and American cities means that inner city neighbourhoods, which typically have grid street patterns, are less likely to contain parks – especially large ones – when compared with suburban neighbourhoods.[85] And because park planning ideas changed post-second world war, suburbs which developed after that time are more likely to feature larger neighbourhood and regional parks.[34, 121] As we shall discuss in the next section, having good access to parks and other kinds of greenspace promotes wellbeing and health.[122-127] People with better access to parks and other greenspaces have been shown to live longer, are less stressed, become ill less often and are less likely to be overweight or obese.[31, 33, 77, 88, 90, 128-138] The one exception here is that people appear more inclined to travel further to visit and use parks and greenspaces that are aesthetically pleasing, have larger areas of vegetation, and offer a wide variety of activities and services, irrespective of their size (recognizing of course that larger greenspaces are more likely to possess such characteristics).[47, 139, 140]

Researchers in the US and Europe have also found that greenspaces that are connected with other green or open spaces through walking and cycling trails or greenways promote higher levels of physical activity and encourage more visits and longer stays.[141-146] What this means for any consideration of the role of greenspace in urban consolidation is that planners and policy makers should ensure that higher density neighbourhoods feature: (i) streets with good connectivity; (ii) good vegetation cover; (iii) a variety of facilities like benches and water fountains; and (iv) should also connect existing greenspaces via walking trails, cycleways, greenways or other such connective features.[147]

Reasons to provide greenspace

Parks and other greenspaces play multiple roles in making our cities more sustainable.[32] These include nature's services/ecological benefits (e.g. preserving biodiversity), social benefits (e.g.

socialisation and healthy living) and economic benefits (e.g. tourism). While identifying all these benefits could rapidly become a 'laundry list', it is useful to briefly overview the major benefits here because it helps us to better appreciate the taken-for-granted services that urban greenspace provides urban residents, and to counter myopic perspectives that suggest greenspace is a liability due to maintenance costs. A proper cost-benefit analysis of urban greenspace provision must factor in the wider variety of benefits that greenspace confers upon its users and the sometimes less tangible savings that greenspace affords.[148] For example, current research shows that greenspace benefits provide considerable potential costs-savings to local authorities (e.g. preventing health problems, increasing worker productivity, lessening infrastructure damage, attenuating flooding, cooling heat islands etc.).[36, 56, 87, 88, 90, 128, 130, 133, 149-153] While not immediately obvious, translating these cost savings into dollar values shows that urban greenspace can save municipalities millions of dollars annually – money that would otherwise have to be spent on flood barriers, air-conditioning, sick days, stress leave, and the like.[154]

But greenspace is also a potential net revenue earner.[155] In Australia's nascent carbon market, local authorities could foreseeably generate revenue from the carbon sequestering capacities of their urban greenspaces, providing a revenue stream for greenspace upkeep and for developing new parks and recreation facilities.[41, 154, 156-158] And many cities around the world are now allowing a range of commercial uses into their greenspaces – from the relatively innocuous renting of deck chairs in Hyde Park, London, to the IMAX theatre and Science Discovery Centre in Exposition Park - Los Angeles, California (see Figures 6-9). Many parks in France, England, the United States, China and other countries feature food concessions, kiosks, cafés, restaurants, beer gardens, equipment rental facilities and other sympathetic commercial uses that can provide a revenue stream to municipalities for funding ongoing maintenance and upkeep.

Figure 6: Deck chairs, Hyde Park, London

Figure 7: Kiosk, Jiang'an Park, Shanghai

Figure 8: Cafe, West Lake, Hangzhou

Figure 9: IMAX Theatre, Exposition Park, Los Angeles

The multiple benefits that greenspace provides can be categorised into ecological, social and economic benefits. A brief overview of these benefits helps to better contextualise greenspace acquisition and development.

Ecological benefits

Parks and other greenspaces provide many ecosystem benefits, such as regulating ambient temperatures, filtering air, reducing noise; sequestering carbon and attenuating storm-water.[159-161] Aside from these human benefits, carefully designed urban greenspaces can also protect habitats and preserve biodiversity.[162-164] Greenspaces that feature good connectivity and act as 'wildlife corridors' or function as 'urban forests', can maintain viable populations of species that would otherwise disappear from built environments.[165-167]

Social benefits

Urban greenspaces also provide a range of social benefits. Many studies show parks offer urban residents solace from their stressful lives, hasten recovery from disease or illness, and can foster active living, combating sedentary lifestyles associated with obesity, heart disease and several types of cancer [31, 133, 137, 168-175]. Community gardens, which have become a recent feature of many inner city parks, can give residents space for social interaction and enable people to supplement their diets with fresh fruit and vegetables.[176] They may also foster closer community ties.[133, 177-179] Parks can moderate incivility and cultivate child development.[25, 180-185] Given the opportunity, most children would prefer to play in outdoor spaces that provide them with a range of sensory experiences and which help them to refine their motor skills.[79, 186, 187]

Economic benefits

Finally, researchers have found that parks and greenways provide significant economic benefits. These include promoting tourism, lessening environmental impacts (e.g. carbon sequestration, stormwater attenuation), reducing pollution through decreased car-dependence by providing alternative transportation corridors, and reducing health care expenses by fostering healthy living (e.g. promoting regular exercise).[36, 55, 56, 62, 87, 153, 159, 171, 188-190] Parks exert a significant beneficial impact upon nearby property values.[191-198] Properties located near parks and greenways have been found to have higher re-sale value and homeowners value these spaces as important attributes when making decisions about residential location and housing choice.[199-201] Finally, a likely future economic benefit of urban greenspace is in adapting cities to the anticipated impacts of climate change such as higher temperatures, increased flooding, increased storminess and the like. Greenspace that is well integrated into urban environments will likely lessen the severity of many of these anticipated problems – providing significant economic benefits.[154, 202-205]

Synopsis

In summary, the literature suggests that past ideas about who lives in higher density residential areas may be wrong. Research shows that higher density residents are widely varied, differing by age, income, race/ethnicity, household composition, family status and the like. Different types of people use parks and other kinds of greenspace for a variety of reasons, based upon their needs, preferences, available time and physical capabilities. Older people are generally less likely to use large park spaces than younger people. Working families may face time constraints limiting the time they can spend visiting parks and greenspaces, but may generally need more frequent access to pocket parks for walking young children and easy access to sporting/recreation facilities for older children's sports. Adolescents and young singles may require spaces for active recreation such as skateboard parks, ovals for sports, tennis courts, swimming pools and even rock climbing walls as well as spaces to socialise away from the public gaze.[35, 78, 80, 92, 186, 206-208]

Complicating these patterns of greenspace use is the fact that older parks were often designed with different uses in mind than those resulting from urban consolidation. Australia's early park

designers never envisaged the invention of Frisbees, archery parks, rollerblades or community gardens, and spaces like lawn-bowls greens or cricket ovals cannot accommodate such demands. Older parks located within the inner suburbs are often smaller than their suburban counterparts, are more likely to feature promenades, fountains and ornamental gardens rather than expansive grassy areas, and may be less able to accommodate the diverse demands that higher density lifestyles and increased numbers of residents would place upon them. Any proposal to increase residential densities in inner city areas should first consider the availability and characteristics of urban greenspace. Such an exercise requires a typology for classifying various greenspaces - that is the purpose of the next section of this report.

A typology of urban green/open spaces

There are various ways to classify urban open space and greenspace, such as its size, how people use it, its intended function, its location etc. Here we review the literature and suggest a framework for classifying greenspace that does not lock planners into rigid categories – as new types of greenspace are always being developed – but rather recognises the dimensions of greenspace that are important when planning for consolidation (i.e. size, naturalness, activity types etc.). We limit our discussion to parks, plazas, urban trails and streets, though other typologies that include cemeteries, rail reserves, roof-tops and the like are also possible.

Parks

Even a casual inspection of most local authority web pages reveals some form of typology that has been applied to classify park, greenspace and open space assets. Typically classification schemas are based upon the size of the park, its deemed function, it geographic location and the types of facilities present within the park and sometimes the degree of naturalness of the park. Figure 10 below shows how these typologies are operationalised. Parks can be variously described as urban parks, nature parks, pocket parks, district parks, community parks, neighbourhood parks, sporting fields, urban forests and the like (see Table 1 for examples).[209] But there are other ways of classifying parks too. These include factors such as the activities that occur within the park (e.g. cricket oval, skateboard park, bowling green), the agency responsible for managing the park (e.g. national park, state park, city park), the history of the park (e.g. heritage rose garden or Bora Ring[III] park), the condition of the park, the land use history of the area (e.g. Victorian-era park or street-corner neighbourhood park), the types of people who use the park, landscaping and embellishments (e.g. sculpture park, dog park, bike park or Chinese garden) and the philosophy behind the park's development (e.g. recreation reserve or civic square).[210] Combining these various factors can result in all sorts of combinations and permutations, rendering a standardised method of classifying parks virtually impossible and rather pointless.

[III] A Bora Ring is an Aboriginal Australian ceremonial ring – typically made of stones. The North Burleigh Bora Park is an example.

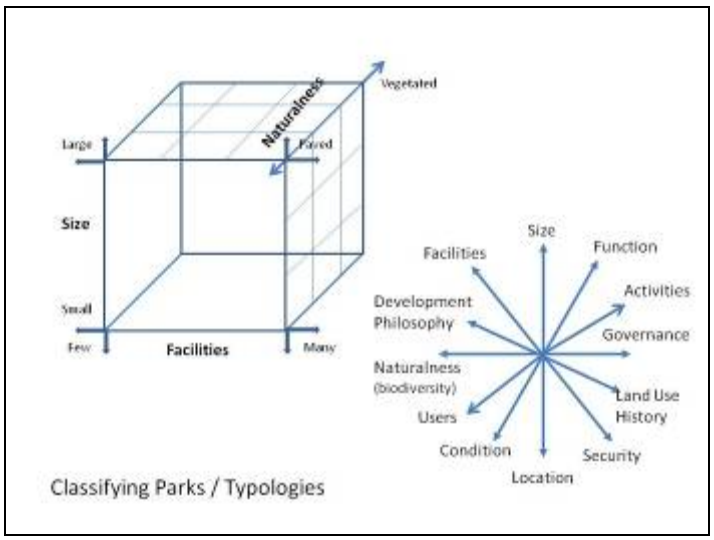

Figure 10: Typologies of parks

Making the task of classifying various parks all the more difficult is the issue of scale. As the first public parks evolved from scattered parks into organised greenspace systems, a philosophy of 'nesting' emerged (see Figure 11). What we mean by this is that park administrators believed that various sorts of parks held certain functions. And these functions were related to the size of the park. So for example, a national park is a very large greenspace which is seen to have iconic value and national significance (e.g. Yosemite, Yellowstone, the Blue Mountains, Mount Tambourine). National parks, by virtue of their size and the landscapes they contain, attract visitors from around the globe. In other words, they have very large catchments or ranges. Because these parks are so big, there are fewer of them. As we noted earlier, following the Second World War, as suburbanisation escalated in developed countries, newer types of park arose, such as the regional park. These parks are typically not as large as national parks and serve smaller populations. As their name implies, such parks are believed to have regional catchments – that is they serve areas that are typically comprised of several municipalities.[211]

Regional parks also typically contain many more facilities than smaller parks, because they are believed to serve relatively large populations. Examples of these facilities include archery ranges, equestrian facilities, water-sports (e.g. sailing or rowing), football ovals and the like. District parks are designed to serve several neighbourhoods whereas neighbourhood parks – also termed community parks – serve a single neighbourhood. Finally local parks serve a few blocks and pocket parks a single street. As Table 1 indicates, pocket parks can be very small, consisting of not much more than a bench, some trees and a small patch of grass. Nature strips and traffic islands are not really parks. They tend to be the most common type of urban greenspace though, typically because they represent left-over space that developers cannot use. Sited at the end of streets, alongside busy intersections or next to canal-heads, they have very little active recreational value. But carefully planted and maintained, they nonetheless can contribute to the overall aesthetics of an area and provide visual and psychological relief from the built environment.

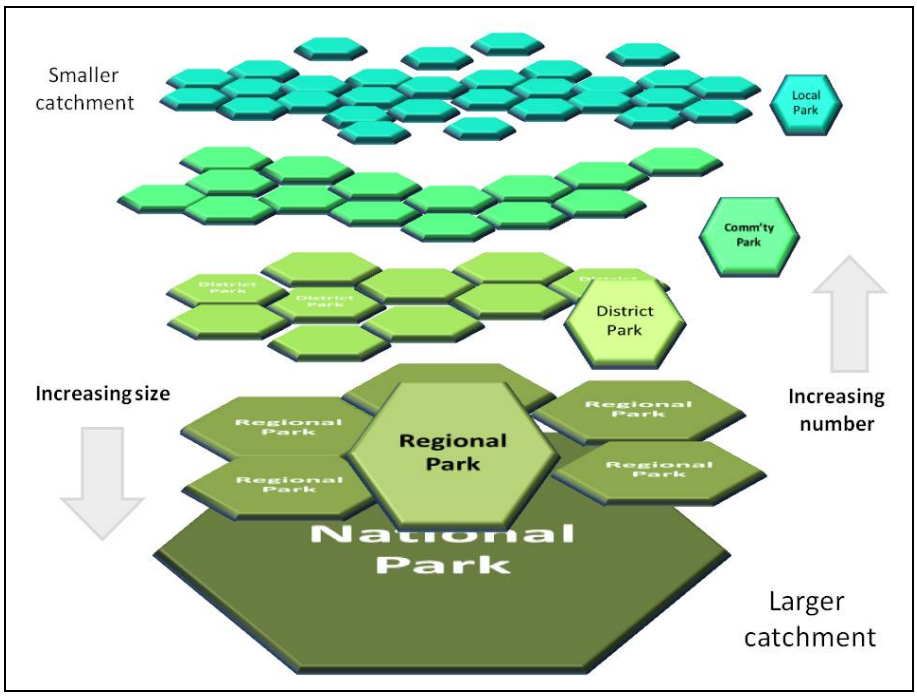

Figure 11: Park nesting and range

Many scholarly studies of urban greenspaces have also sought to classify parks according to typologies. Kevin Lynch has made a lasting contribution. He identified greenbelts, green wedges, regional, suburban and city parks, linear parks, plazas, playing fields & lots and playgrounds as well as 'wastelands' as various types of urban green/open space. A number of authors have since proposed assorted 'theoretical' typologies based on his suggestions.[95, 96, 108, 109, 161, 212] But these schemas are all only partially suitable for the purpose of our review, because they typically assess only psychometric variables (e.g. attitudes, values, perception), are too detailed, or are oriented towards non-park facilities. Nonetheless, several criteria from these typologies are instructive. They include: the philosophy underpinning park design; land use histories; the function, location, size, level of governance, and range of the park, and the facilities located within the park, as well as park safety.[213] Three criteria stand out as most useful – size, facilities, and 'naturalness'. These criteria could be used to develop a simple typology as illustrated in Table 1, below. It should be notes that we treat plazas as a distinctive type of urban open space, addressing them in a separate section of this report.

Table 1: A basic park typology

Type	Size (ha)	Typical Densities	Visit Length	Facilities	Naturalness	Image
Pocket park/ Playground/ Dog park	< 1	<50+ persons per ha	10 minutes – 1 hour	Few facilities – typically just play equipment and maybe benches	Few natural features – just a small grassed area with a few shade trees.	
Neighbourhood park	0.11 – 4.9	40 – 100+ persons per ha	30 mins – 1.5 hours	Limited number of sports facilities. Play equipment, picnic sites, BBQ facilities & green-space set aside for organised sport.	Larger areas of lawn, a field or two for organised sports and plantings of ornamental vegetation with shade trees. Some areas of impermeable surface.	
Community park	5 – 9.9	50 – 200+ persons per ha	30 minutes – 3 hours	Some active recreation or organised sports facilities. May include community centre.	Large areas of managed landscape, abundant lawn, shade trees and ornamental vegetation. Larger areas of impermeable surface.	
District park	10 - 24.9	50 – 1,000+ persons per ha	1 hour – 5 hours	Many sports facilities. Community centre, sports fields for football, soccer basketball courts, tennis courts etc.	Generous areas of managed landscape abundant lawn, shade trees and ornamental vegetation. Several grassed areas dedicated to organised sports. Several areas of impermeable surface.	
Regional park	25 – 500+	<150+ persons per ha	2 hours to 1 day	Range of facilities e.g. large scale recreational activities – field sports, archery, canoeing, nature trails etc.	Abundant natural features, mixture of managed landscapes and endemic vegetation. Much lower percentage of park is comprised of impermeable surfaces.	
Nature/ wilderness park/ National Park	25 – 1000+	<10 persons per ha	½ day to1 week +	Few if any active recreation or organised sports facilities.	Few managed features and largely dedicated to preservation of endemic species. May include a landscape feature such as a wetland, hills or canyon(s). May contain interpretative signage.	

(Adapted from Baud-Bovy and Lawson[214])

Recognising the difficulties associated with classifying parks according to any sort of standard schema, and the further problem of trying to classify the variety of inner city greenspaces, we propose a more pragmatic approach. By combining the above-described criteria into an assessment tool, it would be relatively straightforward to assess various forms of greenspace and then classify them not based on 'a priori' definitions, but rather on their individual characteristics. Each greenspace within a study area would be scored according to the classes of attributes to be assessed (e.g. size, activities, condition etc.). Scores would be summed to generate an overall rating for each factor. These scores could then be illustrated on a spider or radar diagram, providing a ready comparison of park types and giving a much better overall assessment of the type and quality of each park or green space – as indicated in Figure 12 below. This approach was recently taken by Sister et al. in their extensive study of Los Angeles greenspaces and proved to be quite effective.[213]

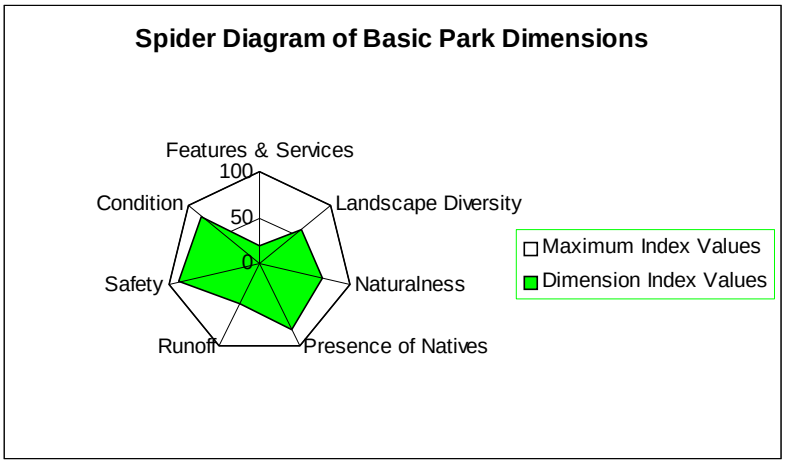

Figure 12: Spider diagram of potential indicators

Parks are not the only type of urban greenspace though. In most cities while parks comprise a large portion of green and open space, other types of urban greenspace and open spaces are present too including plazas, urban trails and even well-vegetated streets. We consider some of these in detail below. The above-described classification method should work equally well on these types of urban green/open spaces.

Plazas

The scholarly literature on urban consolidation and plazas is relatively limited when compared with parks. Few if any studies have investigated plazas in the context of urban densification.

Plazas are traditional open spaces in Chinese, Italian, Spanish and meso- and Latin-American cities – often acting as civic focal points. Typically they are paved spaces in between or completely surrounded by buildings, and function as meeting places.[215] Plazas often take the form of a public square – but their shapes can vary widely.[216] 'Squares', though similar to plazas, represent a sort of hybrid space between parks and plazas.[217] Like parks, there is no 'archetypal' plaza. Some plazas contain no vegetation whereas others are richly planted. Some have dirt bases whereas others are ornately paved. Some are intimate and cosy whereas others are massive and imposing. The most successful have evolved over time. As with all forms of open space, the activities that occur in plazas are often highly regulated, because conflicts can easily erupt over their appropriate use.[218] And design is of central importance as paved plazas without shade or trees can be unbearably hot in summer and bitterly cold in winter. Moreover, as public art is often incorporated into plazas they can become contested places – opinions will vary widely about the aesthetic appeal of sculptural or art objects.[219] More recently there has also been a trend for privately owned plazas – the courtyards or lobbies of corporate office buildings. Some scholars have criticised these spaces as exclusionary, lifeless and lacking imagination.[220]

Because plazas are most typically gathering places, their use is more transitory than parks.[221] Many plazas have been designed as 'events spaces' where large crowds can be accommodated.[222] Such spaces can easily feel lonely and alienating (see Figures 14 and 16). Given the temperature extremes that characterise many plazas, lack of shelter and few opportunities for sitting, plazas are often underutilised public spaces. Well-designed plazas though will overcome these limitations by encouraging people to linger, as shown in Figures 13 and 15 below.[223]

For example, plaza-design research by the Project for Public Places and Marcus et al., among others, shows that the best plazas will evoke a sense of place, are easily accessible, provide a variety of nested or interconnected spaces – with intimate corners as well as large expanses, have a broad range of amenities including seating (e.g. steps, ledges, benches, chairs & tables), fountains, toilets, arbours, shady rest areas and the like, are flexible spaces that can be used for a wide variety of activities, are complemented by sympathetic commercial uses (e.g. cafes), and enhance the civic/public domain of libraries, museums and other such spaces — rather than being just 'afterthoughts or embellishments.[215, 224]

Well-designed plazas can be used for 'strolling, sitting, eating, and watching the world go by'.[215] They will encourage a variety of other activities such as reading, dancing, listening to music, people-watching, exercise and even informal street vending and farmer's markets. The best plazas will also feature good access to winter sunshine, shade from the summer sun, shelter from wind and rain, generous greenery to rest the mind and will be interconnected with other plazas, parks and pedestrian streets by greenways, bicycle trails and walking paths.[215] An equally important consideration is that plazas should be designed with regard to adjacent land uses so that a: 'mix of retail, entertainment and dining opportunities attract a steady stream of users to the space'.[215]

Figure 13: Musicians enliven a downtown plaza in Copenhagen, Denmark

Figure 14: Austere oceanfront plaza, Beihai, China

Figure 15: Inviting spaces in Wu Shan municipal plaza, Hangzhou, China

Figure 16: Desolate art gallery plaza, Brisbane

A typology of plazas

From the above discussion we can see that plazas come in a wide variety of forms. Some scholars have attempted to categorise these public spaces into typologies according to criteria such as: size, function, location, visual complexity, ownership, ornamentation (e.g. seating, sculpture & water features), uses/activities, and degree of vegetation.[215] For example Marcus et al. have identified pedestrian malls/street plazas, corporate foyers, urban oases, transit plazas and grand civic squares/plazas as encompassing the range of such spaces. What is required though, when considering how to 'operationalise' or put these ideas into action, is an understanding of: 'people's [actual] needs and desires in public settings' (op. cit. p. 15). For the purpose of this report, it is not useful to arbitrarily categorise plazas within the inner 5 km of Brisbane into pre-existing schemas from elsewhere in the world, but rather to assess those spaces according to the guidelines we described in the previous section on parks, allowing for a better understanding of the plaza spaces that have already been created, their purpose, their size, features/attributes they contain and how they are articulated with/connected to other public spaces in the city. For instance, the public health/active living and urban ecology literatures tell us that for urban public spaces like parks and plazas to provide recreational, active living and biodiversity benefits, they must be interconnected with each other through linear corridors like urban trails/greenways.

Urban trails/greenways

Urban trails – also known as greenways – are linear corridors used for walking, cycling, jogging, skating (both in-line and skateboarding) and even horse-back riding.[144] Some trails are intentionally designed for this purpose whereas other have been converted from disused rail corridors or retrofitted to easements like power transmission corridors. Trails are usually paved, with surfaces of asphalt or concrete, but unpaved trails are common features in older built environments or on the rural-urban fringe (see Figures 17-20). Some nineteenth century back alleys for instance may be unpaved and may function as urban trails. Urban trails traverse varied landscapes including floodplains, river banks, lakefronts, woodlands and sea-sides. Trails also cross a wide range of land uses from industrial areas and vacant land to residential areas and nature reserves. Such trails are usually referred to as greenways where they have been constructed along abandoned railway lines or other 'infrastructure corridors', bikeways where they have been designed specifically for bicycle use or hiking trails where they have been designed for hikers and pass through more scenic landscapes.[225-228]

There have been a handful of studies of urban trails over the past decade all with a common emphasis on the recreational and aesthetic benefits of urban trails, and the challenges faced by planners in the design and maintenance of such trails. These studies have found that access to nature, exercising, commuting and relaxation are key motivations for trail use.[226, 229-231] Recently there has there been a discernable shift in emphasis towards a focus on the public health benefits of trails. Newer studies suggest that urban trails can increase the physical activity levels of residents, thus combating chronic diseases associated with sedentary lifestyles, especially where trails are connected to other greenspaces.[142, 231-237] While there are few studies that have directly examined the role and function of trails in satisfying the demands of residents living in higher density built environments, there are broad findings from the urban trails literature of relevance here.[238] These include a sex skew among trail users (males use trails more for active recreation like cycling than females who prefer strolling), an overwhelming preponderance of White, young to middle-aged, wealthy and well educated users on trails, and highly localised trail use.[142, 143, 225, 226] Several studies have emphasised rapid distance decay – the steep decline in number of users visiting the trail as distance from the trail increases, finding that most users live within five kilometres of the trails they regularly visit.[226, 235]

Studies have also found that a range of factors potentially affect trail use.[144, 229, 239-241] Variations in trail use reflect weather events, changes to trail facilities and crime, with lower trail use following criminal activity or bad weather. Trail location, the surface of the trails, maintenance, the density

of adjoining vegetation, information about the trails, signage and user's perceptions of trail safety have all been found to affect how people use trails.[226, 242, 243] Difficult road crossings, busy traffic, poor trailside facilities, unleashed dogs and potential conflict with other users may deter potential users.[227, 231, 244]

Figure 17: White Rock Lake trail, Dallas

Figure 18: Lakefront Trail, Chicago

Figure 19: Park trail, Hangzhou, China

Figure 20: Shoreline trail, Sydney

Streets

Most cities have a hierarchy of street types ranging from small alleys to large expressways. Many of these streets could not be considered as green or open spaces as they are major traffic arteries. But some, like boulevards, lanes and pedestrian-only streets (malls) can perform functions other than acting as transport corridors. For example Copenhagen's 3.2 km long Strøget which was closed to traffic in 1962 is reputedly the longest pedestrian-only street in the world (see Figure Figure 21) and is a cherished open space within that city.[245] Similarly Curitiba's Rua XV de Novembro also known as flower street, is a pedestrian mall that was created by closing the street to traffic in 1972. It has since earned an international reputation as a fine civic space.[246] Australia's capital cities have similar pedestrian malls including Perth's Hay Street Mall, Adelaide's Rundle Street Mall, Melbourne's Bourke Street Mall and Brisbane's Queen Street Mall, albeit much shorter in length. They function mostly as sites of passive recreation where people stroll, shop and watch other people.

But a problem with relying upon streets as public spaces, in lieu of parks, is that growing numbers of streets that serve entertainment, shopping or pedestrian functions have limited accessibility – they are only quasi-public spaces. Devices such as street furniture, surveillance cameras, security guards, concealed entrances etc. can function to limit the truly 'public' nature of these spaces, marking them instead as privatised spaces – spaces of exclusion rather than inclusion.[247] A real danger in urban consolidation projects that create these types of spaces is that

the public domain will be eroded not enhanced, limiting the recreation and leisure options of residents – especially youth who may for example be ostracised for skateboarding in streets.[248, 249]

(Source: http://www.copenhagenet.dk)

Figure 21: Copenhagen's Strøget – a public open space

For streets to work as effective public spaces, they need to be 'lively', safe and to foster social interactions.[250-252] Researchers have recently begun to rediscover the street as a public domain – they were once praised by urbanists like the late Jane Jacobs - and some studies have richly catalogued a range of activities that occur in streets and street margins (i.e. footpaths).[253] These include playing games, shopping, reading, eating, sleeping, strolling, busking and various other behaviours.[250] Design elements that foster social interaction in streets, thus making them effective public spaces, include: the presence of street trees; comfortable places to sit; wider footpaths to accommodate more pedestrians and activities like al fresco dining; buildings with sympathetic frontages such as alcoves or awnings that provide variety, shelter and shade; and other street furniture like bicycle racks and water fountains.[250, 254, 255] In commercial streets shops with bright and interesting window displays can add vitality to streets and in residential streets porches, verandas and other semi-private building frontages can enhance feelings of security and promote greater social interaction.[256]

But the use of streets as open space should not be limited to footpaths or verges. Imagine a street painted to look like a rainforest canyon. The surface of the street would give the illusion of depth and volume, and treatments along the edges - including planter boxes, permeable pavements, vines on walls, and rainforest tree canopies – would complete the illusion. This is what could be done to select streets in consolidation projects within inner city Brisbane. Artist Edgar Mueller has shown that streets should not be limited to monotonous black asphalt, but instead can ignite the imagination and delight residents and visitors alike. His installation in Ireland for example (Figure 22) shows how an ordinary street can be made extraordinary.

(Source: http://www.metanamorph.com)

Figure 22: Edgar Mueller art installation, Dun Laoghaire, Ireland

While many of these ideas about effective public spaces may seem commonsense, examples of lively and inclusionary public spaces in urban consolidation projects are not widely documented in the relevant literature. Perhaps this is why planners have sought to codify good examples into 'standards', encouraging developers to replicate a model that is believed to work well. But standards can unintentionally stifle creativity and rule out flexible solutions. Such open space standards and their relative merits and failings are the subject of the next section of this report.

Synopsis

A wide variety of different types of open space make up the build environment of cities. In lower density cities these are predominantly comprised of parks and gardens. But as densities and land values increase, it can become difficult for civic leaders and urban managers to see the merits of acquiring large areas of expensive land for parks. Clearly this can be a problem, as any increase in the number of people in an area would logically increase the demand for access to urban green/open space. Civic leaders from earlier generations left a legacy of large beautiful parks in many cities (e.g. Kings Park in Perth, Golden Gate Park in San Francisco, Central Park, New York or Hyde Park, London) which make them liveable and sought-after places.[183] Smart leaders will follow their initiatives.

Yet park supply is only part of the equation. We also need to account for lifestyle preferences, recreation trends and socio-demographic characteristics when attempting to identify the level and type of open space required to satisfy any increase in park-demand due to higher densities. Are the newer residents predominantly childless couples or will families be moving into the higher density dwellings? How many older people will live in the area? Are there cultural differences that need to be accounted for? Many international migrants for instance are now coming from Asia where urban densities are higher, but where urban green/open spaces generally also have a higher level of landscape quality and more passive recreation facilities (e.g. mah-jong tables, tranquil gardens, plazas for social gatherings). What will their expectation be for green/open spaces in inner city Brisbane? We take up these themes in the next section.

For these reasons, many planners, urban land managers and civic leaders are turning to solutions based upon the supply of a diverse array of green/open spaces from small pocket parks, community gardens and street-corner plazas to larger civic plazas and iconic city parks, interconnected through a network of landscaped multiple use trails or 'greenways'. There are several important lessons offered by the literature on urban green/open space and density when planning for the future needs of inner city Brisbane:

1. Provide versatile spaces that can be adapted for future needs – do not let design strangle a space;
2. Be generous in the provision of green space as it bolsters mental health and physical activity levels while also providing a range of 'free' ecosystem services (e.g. cooling heat islands, sequestering carbon, reducing pollution, intercepting stormwater). Land values are also significantly higher around urban greenspaces – thus improving municipal revenue;
3. Ensure that green/open spaces offer a range of informal services and programmed activities e.g. dance lessons or programmed sports events as well as weekend markets, food vending, or informal recreation such as tai chi groups;
4. Allow for smaller intimate spaces such as plazas and courtyards where people can gather to watch other people, read a book, eat lunch or just watch the world go by;
5. Require developers to locate commercial activities (e.g. shops with bright and interesting window displays, bookstores or cafes) next to green/open spaces as they can add vitality, excitement and safety to such spaces;
6. Make sure that urban green/open spaces: are easily accessible; provide intimate corners as well as large expanses; have a broad range of amenities (e.g. seating, fountains, toilets and the like); offer access to winter sunshine, shade from summer heat and shelter from the high winds; are flexible spaces that can be used for a wide variety of activities; are complemented by sympathetic commercial uses (e.g. cafes);
7. Design for new types of spaces such as green roofs, green walls, skateboard parks and community gardens;
8. Interconnect green/open spaces via pedestrian pathways and/or multiple use trails (e.g. cycling, walking, roller-blading etc).

Planning standards

Parks and other types of greenspace can play a valuable role in sustainable development. It is therefore useful to consider how planners have traditionally planned for parks and open space. Typically, a certain amount of open space is required in any development, based on longstanding assumptions about park use. Oftentimes this required amount of green or open space is calculated according to formulas enshrined as a 'standard' in planning legislation and/or policies. The 'standards approach' has conventionally provided certainty in greenspace planning. One set of rules are applied uniformly to all situations. But research has shown that many local authorities facing development pressure fail to implement their 'standards'.[17, 183, 257] A newer 'needs-assessment' approach recognises that different people have widely varying 'needs' for access to urban greenspace and that innovative solutions can satisfy these requirements.[24]

Standards vs. needs

The standards approach for parks and open space provision dates back to the early twentieth century when park reformers sought to establish minimum acceptable park allocations for urban residents.[102, 258] For example, the firm of Olmstead, Bartholomew and Associates – responsible for designing many early American parks - specified that no resident should be further than ¼ mile (400 metres) from a park (op. cit.). And early legislation in Massachusetts for instance, established a minimum of 1 playground per 20,000 residents (op. cit.). These ideas were modified

over time, eventually being enshrined in US national standards by the National Recreation and Park Association (NRPA) in the early 1970s. [259, 260] The NRPA standards prescribed a park allocation of 10 acres (4 ha) per 1,000 residents, with variations by park size and political/administrative jurisdiction (see Table 2).[261]

Similar trends occurred in the United Kingdom. In the 1920s a standard of 6 acres (2.4 ha) per 1,000 residents was adopted by the National Playing Fields Association and not long after the Second World War, a national standard emerged of four acres of open space per 1,000 residents, with no resident living more than a half-mile from a park.[262, 263]

Australia appears to have followed a comparable trajectory to the United Kingdom. In Australia a national standard of 7 acres (3 ha) per 1,000 residents emerged in the 1940s.[263, 264] Some Australian states have also implemented spatial standards whereby a proportion of the developable area (typically 10%) is expected to be provided for parks and recreation.[265, 266] In Queensland, there is a generally accepted standard of 4 – 5 ha per 1,000 residents, and on the Gold Coast, a desired standard of service policy requires between 3.7 and 5.1 ha per 1,000 residents.[264, 267]

Table 2: Comparison of international and Australian park standards

Place	Year	Size	Population	Distance
United States	1970s	10 acres/ 4 ha	1,000 residents	¼ mile/400 metres
United Kingdom	1920s	6 acres/2.4 ha	1,000 residents	unspecified
United Kingdom	1950s	4 acres/1.6 ha	1,000 residents	½ mile/800 metres
Australia	1940s	7 acres/3 ha	1,000 residents	unspecified
Western Australia	1955	10% subdivision	n/a	unspecified
Queensland	present	4-5 ha	1,000 residents	unspecified

From 1970s though, the parks standards approach has received increasing criticism for failing to deliver quality parks and open space, and for producing bland green-spaces that people do not use.[268] Studies have also found that recommended park service areas (catchments) were beyond many people's typical walking distance.[269] Some scholars have castigated planners for blindly applying park standards that failed to account for changing demographic patterns, changes in leisure preferences and behaviours, and which ignored the capabilities of older and younger people.[258] Many of these standards have never been empirically evaluated or 'scientifically' tested.[258] Where standards have been scrutinised, they have been found to be problematic. For instance, recent studies of United States municipalities found that local authorities have seldom achieved the standards articulated in their planning instruments; many are unable to provide parks even within a mile (1.6 km) of most residents.[257] Other commentators have criticised the boring park landscapes that a standards approach produces.[35, 262, 270] And public health researchers have recently argued that the whole notion of 'walking distance' to parks and other greenspaces that most standards are based on is spurious. Many people may not be able to accurately judge how far their home is from a park and even the ¼ mile (400 metre) standard may be beyond the time, physical or motivational capabilities of most residents.[47, 257, 271] It is therefore reasonable to conclude that a standards approach poorly serves park and greenspace users.

As we noted earlier, in denser inner-city environments, populations are seldom homogeneous. Given the diversity of these areas, a number of factors must be considered when seeking to meet the needs of higher density residents for access to urban greenspace. A 'needs-based' assessment has emerged as the preferred technique for forecasting and supplying urban greenspace. Such an approach necessarily considers the characteristics of a given population, forecasts population

change based on socio-demographic surveys and focus groups, and then estimates the likely greenspace requirements for that population. We discuss a needs-based assessment in more detail shortly. But first, planners must better understand the various factors that influence how people use green and open space.

Factors affecting park and green/open space use

Open space use is closely associated with the pool of potential users – that is, the people who live within a specific community who would normally want or need to access and use urban green and open spaces.[47] But not all potential users will be the same; they will vary from each other by age, sex, race, ethnicity, education, income levels, disability, physical fitness, home ownership, and household composition.[33, 123, 272, 273] And green/open space use is also closely associated with the physical characteristics of parks, playgrounds, plazas etc. and the neighbourhoods within which these spaces are situated.[31, 124, 274] Spaces that are larger and contain more facilities – especially paved trails and wooded areas – will likely be used more often.[275, 276] Preferences for different recreational activities will also influence how far a person travels to access a particular type of green/open space.[139] Even a cursory examination of the literature shows how some of these differences can profoundly influence how different people use parks and other types of greenspace.

Safety

Many studies of how women perceive and use park spaces, have found that women feel less safe in parks than men, perceive parks as spaces of potential danger, and feel that parks do not properly provide for women's needs.[277, 278] The location of toilets, pathways, lighting, car-parking, children's play areas, signage, and park security may all impact how women and children perceive and use park spaces.[63, 279-284]

Cultural differences

Because how we perceive a place is shaped by both individual differences and cultural values - people from diverse socio-cultural and socio-demographic backgrounds will likely perceive and use the same park space very differently.[59, 285-291] Most Australian cities exhibit relatively high levels of cultural diversity, and studies of Australian parks have found that people from different cultural backgrounds use parks in ways that may be different to those of Anglo-Celtic Australians. Some Muslim people for instance, may use parks for religious festivities; some Vietnamese and Arabic Australians are known to socialise in park spaces in the evening, some Australians from Asian backgrounds have been found to practice subsistence fishing in parks, and some Macedonian-Australians are known to enjoy singing, drinking and dancing in parks.[292-294]Immigrants bring with them a range of new demands upon open/green spaces.

Aesthetics

Research into greenspace aesthetics and values also tells us that greenspace users express differing preferences for features like varied terrain and topography, water, diverse vegetation and the presence or absence of tree cover.[38, 63, 295, 296] Studies have found that many greenspace users place an equally high value on natural landscapes and settings and recreational opportunities.[297-299] And some people may not even need direct access to parks to benefit from their presence. Just looking out onto greenspace may help people better recover from mental and physical trauma and enjoy more stable domestic environments.[171, 173, 190, 300-302]

Time, transport, attitudes, preferences & ability

Other factors also potentially influence how and why people will use parks and other forms of greenspace. These include: where potential users live; whether they have access to public transportation; the amount of time people have for recreation; their attitudes towards nature; and

their leisure preferences.[40, 47, 58, 59, 296, 303, 304] Many of these variables may in turn affect how potential users perceive particular greenspaces and whether they will use those spaces e.g. whether or not a park accommodates people with disability or whether urban trails are safe, welcoming, or threatening.[145, 272, 305] Researchers have shown that some constraints consistently limit greenspace use including limited time, family responsibilities, fear of crime, poor information about available park spaces, illness, distance to parks, crowding, cost and poor access to public transportation.[144, 306, 307] Any assessment of the needs of a particular community for access to urban greenspace should therefore attempt to 'factor in' as many of the aforementioned variables as possible. As we stated previously, a 'one size fits all' approach to providing urban greenspaces is unlikely work.

Needs-based assessments

The alternative to a standards approach is a 'needs based' assessment, which considers the socio-demographic and bio-physical characteristics of areas for which parks are needed, or where park facilities will be upgraded. There are several underlying assumptions to a needs-based assessment. First, needs assessment is driven by the idea that the population for whom a greenspace is planned should be calculated according to need.[308, 309] Second, needs-assessment assumes that the spatial distribution of both populations and resources within a given area will be uneven.[33, 309-313] Third, needs-assessment assumes that people will minimise travel costs (e.g. time, fuel costs, energy) by using the closest available resource.[39, 46, 257, 271, 314, 315]

A needs based approach considers not only the absolute number of people within a given geographic area, but importantly also accounts for their socio-demographic composition, their leisure and recreation preferences and those of various sub-groups within this population, and the type and number of facilities required to serve those needs. These considerations should also reflect projected residential densities, which can change population compositions. Such a needs-based assessment is necessarily based on analysis of census data and where possible, on detailed community surveys, participant observation, focus group research, ethnographic data, and detailed assessments of existing parks to determine likely demand for - and rates of participation in - certain activities.[316-318]

While considerably more time consuming and resource intensive than a standards approach, a needs-based assessment may provide the capability to better estimate the amount of open space required, the design of that space, and the facilities and programs that foster recreation within that space. This is especially important for areas where density increases are planned, but where there is little or no opportunity for additional greenspace – either because there are insufficient funds available to purchase new parks, because relevant agencies have other priorities, or because there is simply no land available for new parks (excluding compulsory acquisition and demolition of existing building stock – now a common practice in large Chinese cities). But a needs-based assessment must necessarily go beyond the needs of existing residents to also forecast those of future residents – a difficult task.[319-321] This necessitates a very good understanding of the likely demographics that new built environments will foster. As we have mentioned earlier, consolidation can have some unexpected and perverse impacts – greater numbers of transient residents (renters), polarised demographics (younger and older people) and conflicting recreation demands.[4] It is beyond the scope of this paper to evaluate the various techniques for forecasting greenspace use, but there are several options available that merit closer attention.[319, 320, 322-327]

Planners who undertake needs-based assessments invariably conclude that they require parks and greenspaces that are versatile and flexible in their design – capable of sustaining present trends but also future activities that may be beyond their capability to accurately forecast.[41, 328-332] And the latest park planning trends suggest that we will continue to see more unconventional greenspaces and alternative uses of existing greenspaces. For example some foreshore parks of the Seine River in Paris have recently been converted into beaches for sunbathing – like the Southbank

Lagoon in Brisbane.[333] Other examples include climbing walls, green walls, green roofs, fully contained parks, urban micro-pocket parks, densely planted medians/verges and greening streets via permeable pavements – trends we revisit later in the paper.[334]

Best practice in needs-based greenspace planning

An example of best practice in needs-based greenspace planning can be found in the Town of Mammoth Lakes, California Parks and Recreation Master Plan.[335] Recognising the deficiencies of a standards approach, the consultants for the master plan developed a 'tailored approach' to park and recreation planning which recognised the needs of residents and sought to anticipate future recreation trends. The plan began by collecting socio-demographic information on the town's residents and mapping the existing recreation and green space facilities. Next all the greenspaces and recreational facilities were inventoried and assessed through site inspections. These included parks, playgrounds, public pools, tennis courts, recreational watercourses, multiple use trails, shopping malls and the town plaza. Then a series of public meetings were conducted with residents to discuss their use of facilities, deficiencies in the existing greenspace and future needs. The consultants then distributed a 'parks and recreation needs assessment survey' to residents and analysed the results. From the meetings and survey a draft master plan was prepared with recommendations for maintaining and enhancing existing facilities and for acquiring new facilities/greenspaces. A suggested implementation strategy accompanied the plan. Finally the draft plans were released for public comment and revised according to feedback received from submissions. Importantly, part of the facilities assessment sought to ascertain the maximum range that residents were prepared to travel to use the various facilities in the study area.

We take up the latest directions in best planning practice in the next section of the report, where we review techniques similar to those used for Mammoth Lakes, but we also explore cutting edge methods that have been developed over the past few years.

Synopsis

Park standards were introduced by early park and open space planners to ensure a level of consistency. With the advent of the recreation movement, standards were designed to provide a minimum level of service while limiting the expense of maintaining park and recreation assets. But recent research has shown us that park standards were not based upon empirical research (scientifically verifiable data) but rather the assumptions of the designers. Although these standards became enshrined in best practice and even legislation in some instances, they do not necessarily provide for the needs of residents. Scholars from the environmental health and built environment professions have recently revealed that people are not inclined to walk the distances that many standards advocate. Some people from diverse cultural backgrounds find that the spaces standards produce are boring and unappealing. And standards cannot respond to socio-demographic change in urban populations.

A needs-based assessment is better able to respond to the requirements of urban populations. By surveying the recreational and open-space needs of urban residents and identifying trends from census data, and combining the results with a detailed inventory of green/open space facilities, planners employing a needs-based approach can better meet the demands of higher density residents for green/open space access. A 'one size fits all' approach to providing urban green/open spaces is unlikely work.

Best planning practice in green/open space assessment

Given that standards-based approaches to providing parks are problematic, what techniques are best suited to address the need for parks and recreation facilities in any proposed transit-oriented development? Over the past decade, researchers in the United States have suggested that a

geographic information systems (GIS) analysis could better assess the diverse needs of potential park users by evaluating the socio-demographic composition of park catchments.[213, 310-312] The idea is to examine whether or not residents within a particular locality have equitable access to parks and open space. Notions of equity pivot upon ideas of "fairness". But the critical question is "fair for whom?"

Four conceptions of equity might be considered when developing a needs based GIS assessment technique: (i) equitable distribution – where all members of society receive the same benefits regardless of existing levels of need; (ii) compensatory equity where resources are redistributed to those most in need to ameliorate inequalities; (iii) demand distribution where the most vocal residents get the most resources; and (iv) market based distribution, where people who can afford to pay the most for a service get access to that service or resource. But compensatory equity would seem to have the most utility for planners.[311, 312]

Essentially GIS enables the researcher to compare spatial relationships between resource distribution (e.g. the location of parks) and resource need (when people who most need parks actually live). Park accessibility can be measured on four parameters – (i) the gravity model where demand for parks falls off at a negative rate with increasing distance; (ii) minimizing travel cost; (iii) covering objectives – which establish a critical distance for service provision and; (iv) minimum distance - which seeks to minimise inequality by decreasing the distance people must travel to access parks and open space.[311, 312]

For example, Sarah Nicholls drew upon Talen's work in a 2001 study that used GIS to examine the distribution of public parks in Bryan, Texas.[310] Nicholls employed a compensatory or needs based assessment of greenspace, and was specifically interested in testing the application of the National Recreation and Park Association (NRPA) standard of 10 acres of open space per 1,000 residents. Nicholls identified those groups most in need of access to parks and open space as non-whites, lower income earners (approximated by those who rent as opposed to own their home, and those whose property or rental value is lower than average), youth, the elderly, and people who live in higher density areas and lack access to private greenspace. What Nicholls found was that park distribution in her study area was equitable, but access to parks was not. The reason for this was that barriers such as highways or a lack of safe footpaths and cycle-ways hampered people's ability to access parks that were within reasonable walking distance.[310]

In Los Angeles, Wolch, Wilson and Feherenbach analysed US census data and the distribution of local parks using a GIS. What they found was that socio-economically and socio-culturally marginalised and disadvantaged groups lacked access to urban parks and open space. This disparity was exacerbated by unequal allocation of new park funding within the city, because suburbs already having excellent park facilities continue to receive funding for new parks, whereas those areas with a dearth of greenspace received comparatively insubstantial park funding.[85]

Most recently two studies published in 2009, based in Baltimore Maryland and Los Angeles, California, used GIS to undertake an equity mapping analysis of parks. Unlike the above described studies, these two investigations used Thiessen polygons to first define a service area for each park in the study area, and then analysed the parks according to 'potential park congestion' or 'pressure' in each park service area.[48, 49] The purpose was to see if some greenspaces are used more intensively than others. This type of analysis could be used to further characterize greenspaces in inner Brisbane as it will provide an indicator of the 'saturation level' of park use. If parks are already at capacity, there will be a need to purchase or develop other greenspaces to provide sufficient recreational opportunities for residents.

Greenspace needs assessment in inner Brisbane

When considering the needs of residents insofar as access to open space is concerned, planners must take into account a number of variables. These variables should include the location of existing parks and recreation areas and socio-demographic factors that will shape the needs of residents (including available leisure time, age, gender, income, ethno/racial identity and the like). Although we touched on many of these factors in our review of the literature, we also need to consider the spatial distribution of green/open space in the study area and whether areas targeted for higher density will be capable of meeting the recreational needs of present and future residents.

Drawing upon the international research discussed in previous sections, we recommend that future research into green/open space provision in the inner 5km of Brisbane begin with an audit of park and open space facilities. It is important to find out what types of green/open space are present in the study area, to ascertain their size and condition and the types of facilities that are present within them (e.g. fountains, dog parks etc). We also recommend using a Geographic Information System (GIS) to characterise the socio-demographic and biophysical characteristics of the population residing within the study area. An important consideration is the distance people are prepared/capable of travelling to access various forms of greenspace.

Walking and cycling distance

To characterise the study area, future research should use national and international data on walking and cycling distances to best estimate the distance that residents may be prepared to travel to access green/open space. There are three possible travel distances (zones). The first is 400 metres, which represents the maximum distance that an adult who was physically unfit, older or not able bodied would be likely to cover in a 10 minute walk. The second zone is 800 metres and represents the maximum average distance that a fit or able-bodied adult could be expected to cover in a 10 minute walk. The final zone is 2.5 kilometres and represents the maximum average distance that a physically fit adult could be expected to cycle over the same time period.[139, 310, 336]

Characterising greenspace in the study area

Using the typology we outlined earlier in this paper, future research should also characterise the types of green/open space within the study area and then identify the proportion of the different forms of green/open space that can be found with the three above-described zones.

Socio-demographic characteristics of the study area

Future research should also characterise the current socio-demographic character of the study area using the latest Australian Bureau of Statistics (ABS) census data. The key indicators for a needs-based assessment of the study area will include sex, age, income, ethnicity, education, occupation, country of origin and household composition. What is important here is not to simply paint a portrait of who lives within the study area, but rather to establish the 'need' of residents for accessing green/open space. Based on our review of the literature, the indicator variables should be: age (people aged less than 14 and over 55); sex; income (low-income earners); occupation (service-sector employees); ethnicity (non-White); education (high-school graduate or below); country of origin (overseas born); and household composition (single-parents). People falling within these categories will have the highest level of need. These variables may identify for example, people living in apartments with little or no private space, who are single parents, who are children or are retired, and who have low-education and income levels and who are recent immigrants – essentially those people who may have greater need for access to parks and recreational resources.[309-312] But future research should also use these variables to build an index of green/open space-need, to allow spatial mapping to show the highest areas of need across the study area, compared to the types of green/open space available to residents.

This will enable planners who are contemplating consolidation to redress inequities and avoid compounding relative deprivation.

We want to note here that it is difficult to determine what the future needs of the locality will be (on the basis of planned urban consolidation) without knowing the type, scale, density etc. of envisaged future urban forms. Nonetheless, the literature offers some guidance in identifying the population numbers and socio-demographic composition of urban areas that have undergone consolidation/densification. If we are to assume that these patterns are generalisable, then we can expect future developments in inner-Brisbane to be higher density than many suburbs within the 5 km radius defined by this study. We can also expect a higher proportion of residents who are young professionals, retirees, and couples with one to two younger children, but also a rising number of recent immigrants with young families. Many of these people will be dependent upon public transportation. But these speculative comments will need to be tested against areas in Australia that have recently experienced urban consolidation (e.g. inner-Sydney) – a study that lies beyond the scope of this report. Nonetheless, an examination of some national and international case studies will illustrate how planners and land managers are beginning to grapple with the green/open space challenges posed by urban consolidation – a task we take up in the next section.

Synopsis

International studies have recently shown that a GIS-based assessment of green/open space assets can reveal areas where access is limited or where park assets are 'over-subscribed', and hence where action is required. Such an analysis requires two things: (1) a needs-based assessment of the users of green/open space; (2) an inventory of green/open space assets within the study area. The inventory of assets will identify the location of parks or other types of open space with relatively few facilities or in relatively poor condition. By comparing the location of these assets with areas of comparatively higher demand and higher need for access to green/open space we can identify parts of the built environment that require either more green/open space or improvements to existing facilities. We suggest that a needs-based assessment must focus upon urban populations with the following characteristics: people aged less than 14 and over 55; lower-income earners; service-sector employees; non-White and overseas-born people; high-school graduates or below and single-parents. By doing this it will be possible to build an index of vulnerability/need to inform future planning.

Australian case studies

The last two sections of this report consider some national and international examples of green and open space provision in higher density areas. We have selected national examples based upon our familiarity with these places and because they exemplify many of the issues we have raised in our review. They include: the East Perth redevelopment project; Darling Harbour, Sydney; Federation Square, Melbourne and Southbank in Brisbane.

East Perth, WA

The East Perth redevelopment project is an urban consolidation demonstration site constructed under the aegis of the Commonwealth Government's Building Better Cities Program of the early 1990s. The Western Australian State Government created a land development agency – the East Perth Redevelopment Authority – to oversee the process of assembling 'surplus' government land such as rail yards and consolidating them into a 120ha developable site. The project was intended to demonstrate the feasibility and attractiveness of higher density inner city living to a then unconvinced private property development industry, and to remediate a polluted industrial site – an example of positive planning.[337] From this perspective the project has been a resounding success. But the project has also been justly criticised for displacing many vulnerable residents

including Aboriginal people, migrants and the poor.[14, 338] Although it has won national acclaim as an example of good urban consolidation, the project actually resulted in a net loss of available urban greenspace, a reduction in the amount of affordable housing and created a gentrification effect on surrounding properties. We list the project here not to suggest that it should be emulated in its entirety, as it has many flaws, but rather to highlight the way that designers have treated greenspace within the site.

Although Haig Park, a large urban park once at the heart of the district, was significantly reduced in area, the overall quality of greenspace in the East Perth redevelopment area has been significantly improved from its pre-development state. Claisebrook – a heavily contaminated waterway/drain was excavated and turned into a small harbour (see Figure 23). Public art was placed around the water body and sculptural and ornamental water features have drawn the river back into the city. Large stretches of couch grass have been replaced with native vegetation, canopy shade trees, paved walkways and plazas. The project resulted in the creation of both vibrant and intimate public spaces including terraces with cafes, al fresco dining precincts and sunny harbour-side walkways and grassy hillocks. The key lesson for the inner city Brisbane area is how public art, water-features and a wide variety of useable open spaces can increase the vitality and liveability of a higher density residential area.

Figure 23: East Perth redevelopment project

Darling Harbour, Sydney, NSW

Darling Harbour was created in the late 1980s as an inner city redevelopment project associated with Australia's bicentenary. As with East Perth, Darling Harbour was developed by a government statutory authority – the Darling Harbour Authority. The 50 hectare site bears many of the hallmarks of large scale waterfront urban renewal projects of the time, largely modelled on the Baltimore Inner Harbour project. They include a conference centre, exhibition centre, aquarium, shopping precincts, up-scale apartments etc.[339] And like East Perth, the development has experienced some problems, among them criticism for its exclusionary planning practices and lack of attention to social equity.[340]

But there are elements of Darling Harbour that offer lessons for future urban consolidation in inner Brisbane: (1) the site takes advantage of otherwise deleterious conditions. For instance a long water feature acts as a sound barrier, attenuating noise from the Cahill Expressway (see Figure 24); (2) the site provides a range of green/open spaces from Chinese gardens through large plazas to secluded lawns with benches; (3) these multi-functional spaces encourage pedestrians to venture further to explore the open space environment. They enable a wide variety of uses, including both active and passive recreation, and foster intermingling and conviviality; (4) and like East Perth, many of these spaces draw water into the built environment. The water features shown in the photographs below provide a connection with the Sydney Harbour –

drawing pedestrians underneath a busy freeway – a link which would otherwise be lost. Perhaps one very real draw back though is the lack of shade trees.

Figure 24: Darling Harbour green and open spaces

Federation Square, Melbourne, VIC

Opened in 2002, Federation Square in Melbourne is not a project that was created as a component of an urban consolidation effort. Situated across the road from the central railway station and sited on the banks of the Yarra River, Federation Square is a popular destination for tourists and locals alike. It is not a square per se, but rather is a plaza. The site includes restaurants, beer gardens, art galleries, cafes, and a television station studio among other features. Though the development encountered some opposition prior to its official opening, it is now prised by many local residents.[341]

Federation Square offers some useful lessons about how public plazas might be integrated into urban open spaces in areas undergoing densification – such as those in inner Brisbane: (1) the site is readily adaptable to events attracting large crowds but also includes a variety of more intimate spaces; (2) changes in grade, building materials and pavement materials and textures give the area visual appeal; (3) a wide variety of seating as well as shade trees mean that the plaza is well used by pedestrians and people-watchers. It attracts workers and shoppers for lunch-time outings and also casual passers-by; (4) residents of nearby higher density dwellings use the site for leisure and recreation activities; (5) Federation Square is highly accessible from public transportation, offers good visibility and passive surveillance and is a democratic space, having been constructed as a civic space not a corporate one. The scholarly literature on Federation Square though limited, is positive – and deservedly so (see Figure 25).

Figure 25: Federation Square, Melbourne

Southbank, Brisbane, QLD

Like the East Perth Project and Darling Harbour, Southbank has been rightly criticised for displacing residents and others who formerly used the space.[342] Created following the Brisbane Expo in 1988, its redevelopment was not open, participatory or inclusive – much the same as East Perth and Darling Harbour. Though and over a decade has pasted since its construction some people still mourn the loss of their connection with this place. For example Southbank has been nominated for the Project for Public Spaces' 'hall of shame' for displacing original residents, reducing the availability of low-cost housing, for its exclusionary practices – especially where security personnel move on so-called 'undesirables', and for being a tourist space rather than a local space.[255, 343, 344] Much of the housing in the redevelopment areas adjoining the parkland is 'high-end' and affordable housing is virtually non-existent. Having said this, Southbank still has some very positive aspects that are worth considering when evaluating the green/open space options for inner-Brisbane.

First, the presence of a sandy beach in the middle of a city is intriguing. It is arguably the only permanent such 'CBD beach' in the world – recognizing that Paris has an annual event where the banks of the Seine are temporarily transformed into a beach of sorts.[333, 345] The beach attracts both adults and children and celebrates Brisbane's subtropical climate – though its corporate sponsorship is disappointing as it continues neoliberal practices of privatising public spaces. Southbank also features a beautiful bougainvillea arbour, and a long walking trail and riverside promenade that interconnect café strips with music stages, university campuses, art galleries and parks (see Figure 26). The site has excellent access to public transportation and in most places has good connectivity to the Brisbane River. The parklands and plazas offer users access to restaurants and a weekend market broadens the diversity of users. Shelter from the sun and rain is generally good, although some places could do much better. What Southbank does do exceptionally well is offer a range of smaller spaces that invite exploration and make the site appear much larger than it really is. The diversity of spaces fosters walking and provides for a variety of active recreation activities – though pastimes like kicking a football or skateboarding are excluded thus reducing the utility of the site for local residents.

(Source: Daniel O'Hare, Bond University)

Figure 26: Southbank promenade and arbour, Brisbane

Synopsis

The lessons learned from these various projects tell us that what works best in planning for green and open spaces in higher density urban environments. Providing interconnected public spaces with high levels of amenity such as good seating, shade from summer sunshine and access to winter sun; trees, public art and high accessibility is crucial if green and open spaces are to meet the various needs of residents. Giving people the opportunity to mingle with others but also to find seclusion is also very important. All the above-described case studies have excellent

connections to the waterways that they border, bringing water into the city. Another important lesson they offer is that such green and open spaces must be inclusionary rather than excluding people or activities seen as inappropriate. They must celebrate the interplay of sight, sound, fragrances, textures and other sensory experiences that make public spaces memorable if they are to work. They must also be able to accommodate daily and seasonal variations in use and importantly, must be flexible in allowing people to use them in a wide variety of ways – thus promoting liveliness and sense of place.

But we can also learn much from international case-studies, and this is the purpose of the next section, where we review successful green/open spaces in Europe, the United States and Asia.

International case studies

Looking to cities outside Australia can provide us with useful insights into how best to incorporate green and open space into urban consolidation projects. Here we consider selected projects in the United States, Europe and Asia with which we are familiar. European and Asian cities are generally more compact that their Australian counterparts and space is thus a luxury. Many of these cities we showcase here feature innovative green and open spaces that take full advantage of every piece of spare space to seamlessly weave into the urban fabric opportunities for relaxing, exercising or just escaping the hustle and bustle of city life. Such spaces make city living pleasurable rather than bearable – they enhance everyday life and give higher density living attractiveness that we are yet to fully appreciate in Australia. The cities we examine are London, Amsterdam, Copenhagen, Paris, Malmo, Chicago, Los Angeles and Hangzhou. Each of these places offers lessons for planners considering how to provide green and open space in Brisbane urban consolidation projects, lessons that are too important to ignore. We acknowledge that the literature points to other examples such as False Creek in Vancouver, Canada; Inner City Portland, USA; and mid-town Houston, USA. We encourage readers to explore these and other examples for the lessons they may also offer.

Millennium Village, London

Stepping out from the North Greenwich Station in London, one emerges into an urban redevelopment site which includes the Greenwich Millennium Village – a mixed use, high density, environment-oriented, urban village on the Thames River. Already home to the O2 or former 'Millennium Dome' concert venue, and the David Beckham Soccer Academy, the site is being redeveloped to include extensive parklands. The Greenwich Peninsula Ecology Park protects a substantial pocket of urban nature. New parks will comprise a continuous shoreline system with extensive cycle-ways and boardwalks. A new yacht club provides boating enthusiasts with world-class facilities and a primary school has also been opened in the area. The new parklands are serviced by London's Underground and by bus and ferry systems. Future development will include high density housing, cafés, shopping precincts and entertainment facilities. The precinct has emerged as a model transit-oriented development.[346] Figure 27 below shows one of the new riverfront plazas with interesting public art – opposite an old armoury and a new boardwalk that runs from the high density housing along the river to the subway. The entire development shows how formerly blighted spaces can be reinvigorated and local ecologies restored.

Figure 27: Plaza and walking trail, Greenwich Ecology Park, London

Amsterdam, the Netherlands

Amsterdam exhibits many of the properties of green and public open spaces that we have attempted to articulate in this report. In many ways it is a model for what higher density housing should seek to achieve and it is not surprising that many scholars have cited it as an example of a sustainable city.[32, 347] Amsterdam's streets are lively and filled with people enjoying watching other people, going about their shopping, having a coffee or lunch under tree canopies, or cycling to work. There are few cars on these streets. Bicycles are the dominant form of transportation. Tree canopies encase the streets, gently filtering out harsh sunlight and these green fingers reach out, connecting into plazas, parks and nature trails (see Figure 28). Public transportation is always just a short walk away. Even though the densities are considerably higher than Australian cities, one does not feel overcrowded – on the contrary. Streets are abuzz with exciting activities; on them one can experience the aromas of coffee and cooking food and the sounds of people enjoying life. Children have places to safely play, older people can watch the world go by without walking far from home and teens and young singles have plenty of intimate spaces to socialise or be alone. A good example of a successful public place is Westerpark.

Figure 28: Canal, green-street and street cafés, Amsterdam

Westerpark, Amersterdam

Westerpark is not Amsterdam's largest park, nor its most frequently visited. From an urban consolidation perspective though, what makes Westerpark unique is that an original 19th century neighbourhood park has been radically transformed.[348] Following remediation, the former glassworks was developed as a 'culture park'. The new park runs alongside a major rail line, and is very close to the heart of the city.[349] It is surrounded by medium to high density apartment buildings and contains both active and passive recreation elements. Park facilities include an art

house cinema, art gallery, two cafés/restaurants, theatre, and events stage among others. Some of these facilities are heritage listed former factories (see Figure 29).[350] Perhaps the most impressive aspect of the park design is the use of flexible spaces that have been established as incubators for creative industries and entrepreneurs and which also promote and protect local ecologies.[351] The park is free and has become a treasured haven for residents and visitors alike. Skateboarders rub shoulders with artists; dog-walkers can enjoy a beer; older people can watch art-house movies; and young entrepreneurs can see a concert after work. We believe that this is the type of green and open space that new higher density developments in Brisbane should strive to achieve.

Figure 29: Canal-side restaurant and nature trail, Westerpark, Amsterdam

Copenhagen, Denmark

Known as a liveable city, internationally renowned design scholars have citied Copenhagen as a place to emulate, especially the quality of its public realm.[245] Copenhagen features some excellent examples of green and open spaces that complement higher density living. The city contains a wide variety of parks, plazas, walking trails, cycle routes and green streets. The city has managed to strike a balance between hard-scaped civic spaces and relatively intact ecological spaces (see Figure 30). And like Amsterdam, many of these spaces are integrated into a wider open space network that is easily accessible by public transportation. While parts of Copenhagen are very dense by Australian standards, these civic spaces make higher density living an enjoyable way of life for many of the city's residents.

Figure 30: Inner city plaza and park, Copenhagen

Paris, France

Out of all the cities discussed in this section of the report, Paris is best known for its parks, plazas, boulevards and other civic spaces.[352, 353] Indeed there are too many to discuss in detail

here. What we want to highlight though are the small green spaces in Paris. One does not have to venture far to stumble upon a sculpture, fountain or garden in the spaces between the city's buildings. And these small greenspaces delight residents and visitors lucky enough to venture upon them. As Figure 31 shows, street-side fountains and parks in church grounds really enhance the built environment of Paris, making the higher density living that characterises the city one of its selling points. Australian designers of green and open spaces in urban consolation projects would do well to study how Paris has benefitted from its greenspaces.

Figure 31: Street-side water-feature and church-ground buskers, Paris

Malmö, Sweden

Developed in 2001 as part of a Swedish housing exposition, the new oceanfront residential development in Malmö in Sweden provides some good examples of how green and open spaces can dramatically improve higher density living.[354] Like Copenhagen – its nearby neighbour – this development in Malmö, known as the Bo, features a range of green and open spaces (see Figure 32). The development is reputedly one of the more sustainable developments in the region, showcasing wetlands that recycle grey-water and energy efficient buildings. The buildings closer to the ocean are taller as a design feature to shelter the landwards components of the development from bitter winter winds. But the development has been criticised for lacking affordable housing, for poor transit accessibility and for the very high costs of construction.[354] The oceanfront plaza has become a popular meeting space for residents and visitors alike.

Figure 32: Ocean-front plaza and nearby ecology park, Malmö

Chicago, USA

The Lakefront Park fringes the shoreline of Lake Michigan in Chicago, providing the city with valuable transit-oriented greenspace. Comprised of a series of parks including Lincoln Park,

North Pond, South Pond, Loyola Park, Centennial Park, Millennium Park and Burnham Park among many others, this linear parkland is accessible via the Loop (downtown rail network) and bus services. The parkland boasts a range of facilities including museums, bird-watching areas, cafés, an outdoor cinema, sporting facilities, nature reserves and public art.[355] Medium to higher density housing and a university campus adjoin the park (see Figure 33). The lakefront trail connects these disparate greenspaces and has become one of the most popular walking and cycling trails in the U.S.

Figure 33: Lakefront Trail and nearby apartments, Chicago

Los Angeles, USA

Los Angeles is among the most park-deprived cities in the United States. Inner city residents typically have limited access to greenspace. For every 1,000 residents less than the size of a suburban backyard is available as accessible park-land, a dismal situation given the concentration of marginalised and vulnerable people living within the inner-city.[356] In recent years though Los Angeles has been undergoing a kind of parks renaissance, in conjunction with moves to increase inner city residential densities and to attract residents back into the urban core. Citizen initiated referendums have required that federal, state and local authorities – oftentimes working in partnership – acquire and develop land for new parks, plazas and greenspace in the park-deprived core.[356] Park bonds have enabled authorities to raise revenue for this purpose. But land available for parks is somewhat scarce in this metropolis and authorities have been forced to turn to innovative initiatives to create more park-space.

Some parks have been created from former industrial or 'brownfield' sites. The Kenneth Hahn State Recreation Area atop the Baldwin Hills is an example. This park was once a functioning oilfield. The Taylor Yards – until recently a commercial rail yard – is another example. This brownfield in downtown Los Angeles is currently being developed by the State of California Parks Department in Partnership with the City of Los Angeles for a major new inner-city park. The State acquired 23.5 hectares in 2000 for US$45 million and the eventual park is proposed to be around 40 hectares in area. The new park will recreate riparian habitat in the heart of this bustling metropolis, complete with playgrounds, outdoor classroom facilities, picnic facilities and potentially an amphitheatre.[357, 358]

But new parks of this size are rare. Oftentimes opportunities for smaller sites can produce just as impressive results. The Augustus-Hawkins Nature Park in South Los Angeles is a good example. It shows how new types of green/open space can be created in park-deprived urban cores.

The Augustus Hawkins Nature Park

The Augustus-Hawkins nature park is a former brownfield site South Los Angeles. Located in the heart of an industrialised neighbourhood, the park provides a welcome respite for local

residents. The 3.4 hectare park was funded through California park bonds and cost US$4.5 million.[359] Built by the Santa Monica Mountains Conservancy and the Mountains Recreation and Conservation Authority, and designed by Berkeley landscape architect Randolph Hester, the park opened to the public on December 16, 2000.[360] The park was later transferred to the City of Los Angeles in 2005.

What is interesting about this park is that it was created as an 'urban nature park'. Workshops with local residents, who are predominantly lower income Latinos and African Americans, revealed that residents wanted a nature park – not another playing field or recreation facility.[359-362] The park was once a Los Angeles Department of Water and Power pipe-storage yard and substantial remediation was required to remove soil contaminants prior to park development. The park is now focused upon a constructed wetland, and is densely landscaped with native vegetation. When it first opened the park was even staffed by a park ranger.[363]

The Augustus Hawkins Park presently features a spacious Craftsman-style community centre with after-school nature education programs for children as well as picnic areas, gardening boxes, toilets, water fountains and other amenities (Figure 34). Prior to being taken over by the City of Los Angeles the park also functioned as an 'urban trailhead' for the Santa Monica Mountains National Recreation Area. Every weekend busses took urban residents out to the mountains so that they could experience the coastal sagescrub environment that had been recreated in the park.[359, 360] The park is treasured by local residents and the fact that its ornately decorated iron and stone fences and generous facilities have not been vandalised speaks to the importance of this recreational asset.[362] Even local gangs enforce a truce within the park grounds, and the park is widely heralded as a success story for improving the conviviality of surrounding areas.[364] The lessons for Brisbane are that even in areas where acquiring land for parks seems impossible, beautiful urban greenspaces can be created and they need not be expensive to be successful. Park designers would do well to abandon assumptions about what is needed and instead talk with residents about what they want. Well designed parks in the right places can transform bleak landscapes into urban oases.

Figure 34: Augustus Hawkins Nature Park, Los Angeles

Hangzhou, China

Within China, Hangzhou is renowned for its beautiful parks, manicured gardens, forested hillsides, ancient temples and unparalleled urban landscaping. Marco Polo reputedly described it as 'the most beautiful city in the world'. The Chinese Central Government has recognised Hangzhou as a 'top tourism city'. Until recently though, the urban canals of Hangzhou were not on the list of the city's environmental assets. For many years they were dilapidated and sometimes filled with household trash, rank water and building rubble. But now, Hangzhou is a city in the midst of a green transformation. The China Sports Lottery has provided a vehicle for

ecological restoration and social revitalisation. Many canals are now fringed by world-class parklands, landscaped gardens and physical fitness trails with a range of exercise equipment. And most of these parklands are within walking distance of high density urban villages, railway stations, bus-lines and electric trolleys. These ubiquitous public transport linkages will soon be joined by a modern subway system – six lines are presently under construction.

Complementing the canal parks are new types of urban greenspace including China's first urban wetlands park - the Xi Xi wetlands, and a new agricultural park, which provide city-dwellers with access to their bucolic past. Many of these new parks include a range of active and passive recreation areas, tea-houses, restaurants, heritage facilities, interpretative materials and sites for cultural festivals.

But what makes Hangzhou commendable from an urban consolidation perspective is the massive urban greening program that is underway – retrofitting greenspace to the city's dense urban fabric. Covering some 6,083km^2 and having a population of around 6 million, Hangzhou is a dense city. Almost the entire population resides in low to high rise apartment buildings and within the city limits virtually all the available space has been built over. But the municipal government has been greening every available space. Land next to canals, railway lines, freeways, factories and even city streets has been turned into flowerbeds, ornate gardens and immaculately landscaped parks. And stepping just several metres off any of the city's busy streets into one of these greenspaces, one immediately notices the tranquillity of this new 'urban green'. The city's residents cherish these spaces and use them from dawn until dusk for exercise, relaxation, socialising and even for impromptu farmer's markets (see Figures 35-40). Australian cities could learn much from Hangzhou, especially the way that greenspaces can be interwoven into just about any left-over urban space. Without these green jewels Hangzhou would be a desolate place. Thankfully the city's administrators have instead made it the envy of many Chinese.

Figure 35: Rail-side park farmer's market

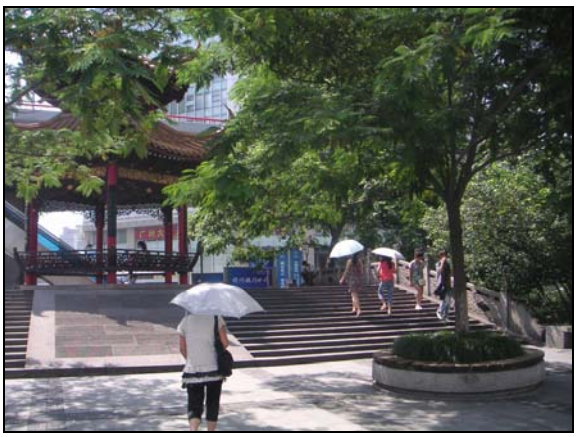

Figure 36: Green street-corner plaza

Figure 37: Canal-side parks & housing

Figure 38: Canal-side walking trail

Figure 39: Park adjacent freeway

Figure 40: Green streetscape

Synopsis

Looking outside Australia to international examples of successful green and open spaces reveals some surprising strategies to incorporate opportunities for recreation, leisure, entertainment, social interaction and access to nature. In Hangzhou, Paris and Amsterdam – where space is at a premium, green and open space designers have cleverly blended greenspaces and beautifully designed civic areas into the most mundane of spaces. Street verges, freeway margins, leftover industrial land and once-neglected spaces like railway easements have become gardens, sculpture parks, plazas, terraces, walking trails and parkland. Moreover, many of these spaces are interconnected, so that greenery and opportunities for social interaction permeate urban life, rather than being relegated to designated areas for a privileged few. The result is that these cities contain very democratic and widespread civic and natural spaces that considerably enhance the everyday lives of higher density residents. We would do well to learn from them.

Conclusion

This report, commissioned by Queensland's Department of Infrastructure and Planning, has examined how green and open spaces like parks, plazas, recreational trails, boulevards and other such amenities might be better integrated into higher density built environments that are created through urban consolidation. Urban consolidation in Australia, the report has noted, has a poor track record when it comes to the provision of parks and open space. This is partly because municipalities and government agencies have struggled to meet planning standards for park provision. Arguably, such standards do not provide the types of green/open spaces that higher density residents need. By carefully auditing existing greenspaces and surveying the needs of residents, for instance using focus groups and survey research as part of a comprehensive needs assessment, we might better provide for parks and open space in higher density built environments.

Incorporating green and open space into higher density built environments makes sense for many reasons. The academic literature points numerous benefits that green and open space provides – which span economic, social and environmental dimensions. Green and open space can make residents healthier, less stressed, happier and more convivial. Such spaces can reduce many of the costs associated with maintaining urban infrastructure by lessening flooding, suppressing dust, cooling hot areas and reducing wind-speeds and storm damage. And bringing greenspace back into urban areas also bolsters urban habitats, increasing biodiversity and enhancing ecological connectivity.

It is telling that research on transit-oriented development (TOD) in the United States – a form of urban consolidation – has revealed that the primary driver of residents' satisfaction with built environments is access to high quality parks and open space.[365, 366] Bernick and Cervero for instance have found in their TOD research that most "…people preferred tightly spaced two-and-a-half-storey row [terrace] houses with modest backyards, located near a public park" (Bernick and Cervero (1997: 147).[367] Yet such spaces have more often than not been an afterthought or secondary consideration in urban consolidation planning.

Looking to examples from Australia and internationally, we can see that planners can do much better than they have done in previous urban consolation projects. Providing green and open space is not expensive – it may actually save money. Carefully designed green and open spaces can even make money for municipalities by fostering tourism, attracting residents to invest in their communities and bolstering the standard of living in higher density built environments. The challenge is to get past short term thinking and to see the bigger picture. Brisbane is well situated to learn from national and international lessons and what remains is for the city to take up the challenge of providing adequate green/open space in higher density developments, and perhaps become a national leader in this field. With political will and planning vision much is possible.

References

1 Forster, C., 2006, 'The challenge of change: Australian cities and urban planning in the new millennium', *Geographical Research* 44, pp. 173-82.

2 Gleeson, B. and Douglas, P., 2006, 'Towards a new Australian suburbanism', *Australian Planner* 43, pp. 10–3.

3 Alexander, D. and Tomalty, R., 2002, 'Smart growth and sustainable development: challenges, solutions and policy directions', *Local Environment* 7, pp. 397-409.

4 Randolph, B., 2006, 'Delivering the compact city in Australia: current trends and future implications', *Urban Policy and Research* 24, pp. 473-90.

5 Michell, A., Wadley, D.A. and Minnery, J., 2004, 'The process and progress of urban consolidation: perspectives from Brisbane', *Australian Planner* 41, pp. 56-65.

6 Brownstone, D. and Golob, T., 2009, 'The impact of residential density on vehicle usage and energy consumption', *Journal of Urban Economics* 65, pp. 91-8.

7 Ewing, R., Schmid, T, Killingsworth, R, Zlot, A, and Raudenbush, S., 2003, 'Relationship between urban sprawl and physical activity, obesity and morbidity', *American Journal of Preventative Medicine* 18, pp. 47-69.

8 Frank, L., Saelens, B., Powell, K. and Chapman, J., 2007, 'Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity?', *Social Science & Medicine* 65, pp. 1898-914.

9 Newman, P. and Jennings, I., 2008, *Cities as Sustainable Ecosystems: Principles and Practices,* Island Press, Washington, D.C.

10 Newman, P. and Kenworthy, J., 1999, *Sustainability and cities: overcoming automobile dependence,* Island Press, Washington, DC.

11 Searle, G., 2004, 'The limits to urban consolidation', *Australian Planner* 41, pp. 42-8.

12 Troy, P.N., 1996, *The Perils of Urban Consolidation: A Discussion of Australian Housing and Urban Development Policies,* Federation Press, Annandale, NSW.

13 Hall, T., 2007, 'Where have all the gardens gone? An investigation into the disappearance of backyards in the newer Australian suburb', (ed) by Jago Dodson, Urban Research Program, Griffith University, Brisbane, pp. 1-42.

14 Byrne, J. and Houston, D., 2005, 'Ghosts in the city: redevelopment, race and urban memory in East Perth', in *Consent and Consensus: Politics, Media and Governance in Twentieth Century Australia*, Denis Cryle & Jean Hillier (eds), API network, Perth, pp. 319-49.

15 Bamford, G., 2003, 'A tale of two cities: urban form, housing densities and amenity', in *State of Australian Cities*, (ed) by Urban Frontiers Program, University of Western Sydney, Parramatta, pp. 1-18.

16 Searle, G., 2007, 'Sydney's urban consolidation experience: power, politics and community', (ed) by Jago Dodson, Urban Research Program, Griffith University, Brisbane, pp. 1-16.

17 ———, 2009, 'The fiscal crisis of the local state, urban consolidation and local open space provision in Sydney', paper presented to State of Australian Cities Conference, Perth, November 24-27.

18 Gleeson, B., Darbas, T. and Lawson, S., 2004, 'Governance, sustainability and recent Australian metropolitan strategies: a socio-theoretic analysis', *Urban Policy and Research* 22, pp. 345-66.

19 Gillen, M., 2005, 'Tapping the potential or cramming them in: developing new tools to assess the suitability and capacity of densification for South East Queensland', in *State of Australian Cities II*, (ed) by Patrick Troy, Urban Research Program, Griffith University, Brisbane, Queensland, p. Str 27.

20 Gleeson, B., 2008, 'Critical commentary. waking from the dream: an Australian perspective on urban resilience', *Urban Studies* 45, pp. 2653-68.

21 Gleeson, B., Woolcock, G. and Hamnett, S., 2007, 'Child-Friendly Cities: Critically Exploring the Evidence Base of a Resurgent Agenda', URI http://www. unisa. edu. au/soac2007/default. asp.

22 Brisbane City Council, undated, 'Open Space Strategy', Brisbane City Council, <http://www.brisbane.qld.gov.au/BCC:BASE:416706992:pc=PC_2506> [Accessed August 28 2009].

23 ———, 1994, 'Brisbane 2011: The Livable City for the Future. Environment & Recreation', Brisbane City Council, Brisbane.

24 Harnik, P., 2009, 'Shoehorn parks', *Landscape Architecture Magazine* May, pp. 42.

25 Pincetl, S. and Gearin, E., 2005, 'The reinvention of public green space', *Urban Geography* 26, pp. 365-84.

26 Mulholland, M., Dewar, D. and Plant, L., 2006, 'Integrating large shade trees with higher density development', paper presented to Subtropical Cities Conference, Queensland University of Technology, Brisbane,

27 Giridharan, R., Lau, S.S.Y., Ganesan, S. and Givoni, B., 2007, 'Lowering the outdoor temperature in high-rise high-density residential developments of coastal Hong Kong: The vegetation influence', *Building and Environment* 43, pp. 1583-95.

28 Luxmoore, D., Jayasinghe, M. and Mahendran, M., 2005, 'Mitigating temperature increases in high lot density sub-tropical residential developments', *Energy & Buildings* 37, pp. 1212-24.

29 Ng, E., 2008, 'An investigation into parameters affecting an optimum ventilation design of high density cities', *International Journal of Ventilation* 6, pp. 349-57.

30 Iverson, L.R. and Cook, E.A., 2000, 'Urban forest cover of the Chicago region and its relation to household density and income', *Urban Ecosystems* 4, pp. 105-24.

31 Bedimo-Rung, A., Mowen, A.J. and Cohen, D.A., 2005, 'The significance of parks to physical activity and public health', *American Journal of Preventative Medicine* 28, pp. 159-68.

32 Chiesura, A., 2004, 'The role of urban parks for the sustainable city', *Landscape and Urban Planning* 68, pp. 129-38.

33 Coen, S.E. and Ross, N.A., 2006, 'Exploring the material basis for health: characteristics of parks in Montreal neighborhoods with contrasting health outcomes', *Health and Place* 12, pp. 361-71.

34 Koehler, D.H. and Wrightson, M.T., 1987, 'Inequality in the delivery of urban services: A reconsideration of the Chicago Parks', *The Journal of Politics* 49, pp. 80-99.

35 Loukaitou-Sideris, A. and Stieglitz, O., 2002, 'Children in Los Angeles' parks: A study of equity, quality and children's satisfaction with neighborhood parks', *Town Planning Review* 73, pp. 467-88.

36 Sherer, P., 2006, 'The Benefits of Parks: Why America Needs More City Parks and Open Space', *San Francisco: The Trust for Public Land.*

37 Wolch, J., Wilson, J. and Fehrenbach, J., 2005, 'Parks and park funding in Los Angeles: an equity-mapping analysis', *Urban Geography* 26, pp. 4-35.

38 Yuen, B., 1996, 'Use and experience of neighborhood parks in Singapore', *Journal of Leisure Research* 28, pp. 293-311.

39 Maat, K. and de Vries, P., 2006, 'The influence of the residential environment on green-space travel: testing the compensation hypothesis', *Environment and Planning A* 38, pp. 2111-27.

40 Syme, G., Fenton, D. and Coakes, S., 2001, 'Lot size, garden satisfaction and local park and wetland visitation', *Landscape and Urban Planning* 56, pp. 161-70.

41 Grose, M., 2009, 'Changing relationships in public open space and private open space in suburbs in south-western Australia', *Landscape and Urban Planning* 92, pp. 53-63.

42 Aguiléra, A., Wenglenski, S. and Proulhac, L., 2009, 'Employment suburbanisation, reverse commuting and travel behaviour by residents of the central city in the Paris metropolitan area', *Transportation Research Part A* 43, pp. 685-91.

43 Holden, E., 2007, *Achieving Sustainable Mobility: Everyday and Leisure-time Travel in the EU,* Ashgate, Aldershot.

44 Limtanakool, N., Dijst, M. and Schwanen, T., 2006, 'The influence of socioeconomic characteristics, land use and travel time considerations on mode choice for medium-and longer-distance trips', *Journal of Transport Geography* 14, pp. 327-41.

45 Naess, P., 2005, 'Residential location affects travel behavior—but how and why? The case of Copenhagen metropolitan area', *Progress in Planning* 63, pp. 167-257.

46 Smith, S.L.J., 1980, 'Intervening opportunities and travel to urban recreation centers', *Journal of Leisure Research* 12, pp. 296-308.

47 Giles-Corti, B., Broomhall, M.H., Knuiman, M., Collins, C., Douglas, K., Ng, K., Lange, A. and Donovan, R.J., 2005, 'Increasing walking: How important is distance to attractiveness and size of public open space?', *American Journal of Preventative Medicine* 28, pp. 169-76.

48 Boone, C.G., Buckley, G.L., Grove, J.M. and Sister, C., 2009, 'Parks and people: an environmental justice inquiry in Baltimore, Maryland', *Annals of the Association of American Geographers* 99, pp. 767-87.

49 Sister, C., Wolch, J. and Wilson, J., 2009, 'Got green? addressing environmental justice in park provision', *GeoJournal*doi 10.1007/s10708-009-9303-8.

50 Randolph, B., 2006, 'Children in the Compact City: Fairfield as a Suburban Case Study', City Futures Research Centre, University of New South Wales, Sydney.

51 Wulff, M., Healy, E. and Reynolds, M., 2004, 'Why don't small households live in small dwellings? disentangling a planning dilemma', *People and Place* 12, pp. 58-71.

52 Rabinovitch, J. and Leitman, J., 2004, 'Urban planning in Curitiba', in *The Sustainable Urban Development Reader*, Stephen Maxwell Wheeler & Timothy Beatley (eds), Routledge, London, pp. 237-48.

53 Pezzoli, K., 2000, *Human settlements and Planning for Ecological Sustainability: the Case of Mexico City,* The MIT Press, Cambridge, MA.

54 Stilwell, F.J.B. and Jordan, K., 2007, *Who Gets What?: Analysing Economic Inequality in Australia,* Cambridge University Press, Melbourne.

55 Seeland, K., Dübendorfer, S. and Hansmann, R., 2009, 'Making friends in Zurich's urban forests and parks: The role of public green space for social inclusion of youths from different cultures', *Forest Policy and Economics* 11, pp. 10-7.

56 Arvanitidis, P., Lalenis, K., Petrakos, G. and Psycharis, Y., 2009, 'Economic aspects of urban green space: a survey of perceptions and attitudes', *International Journal of Environmental Technology and Management* 11, pp. 143-68.

57 More, T. and Stevens, T., 2000, 'Do user fees exclude low-income people from resource-based recreation?', *Journal of Leisure Research* 32, pp. 341-57.

58 Scott, D. and Munson, W., 1994, 'Perceived constraints to park usage among individuals with low incomes', *Journal of Park and Recreation Administration* 12, pp. 79-96.

59 Payne, L.L., Mowen, A.J. and Orsega-Smith, E., 2002, 'An examination of park preferences and behaviors among urban residents: The role of residential location, race and age', *Leisure Sciences* 24, pp. 181-98.

60 Talbot, J.F. and Kaplan, R., 1993, 'Preferences for nearby natural settings: ethnic and age variations', in *Managing Urban and High-use Recreation Settings*, P. Gobster (ed) U.S. Department of Agriculture, Forest Service, St. Paul, MN.

61 Tierney, P.T., Dahl, R. and Chavez, D.J., 2001, 'Cultural diversity in use of undeveloped natural areas by Los Angeles County residents', *Tourism Management* 22, pp. 271-7.

62 Tinsley, H.E.A., Tinsley, D.J. and Croskeys, C.E., 2002, 'Park usage, social milieu and psychosocial benefits of park use reported by older urban park users from four ethnic groups', *Leisure Sciences* 24, pp. 199-218.

63 Burgess, J., Harrisson, C.M. and Limb, M., 1988, 'People, parks and the urban green: A study of popular meanings and values for open spaces in the city', *Urban Studies* 25, pp. 455-73.

64 Gifford, R., 2007, 'The consequences of living in high-rise buildings', *Architectural Science Review* 50, pp. 2-17.

65 Fincher, R., 2004, 'Gender and life course in the narratives of Melbourne's high-rise housing developers', *Australian Geographical Studies* 42, pp. 325-38.

66 ———, 2007, 'Is high-rise housing innovative? Developers' contradictory narratives of high-rise housing in Melbourne', *Urban Studies* 44, pp. 631-49.

67 Costello, L., 2005, 'From prisons to penthouses: the changing images of high-rise living in Melbourne', *Housing Studies* 20, pp. 49-62.

68 Bunker, R., Holloway, D. and Randolph, B., 2005, 'The expansion of urban consolidation in Sydney: social impacts and implications', *Australian Planner* 42, pp. 16-25.

69 Randolph, B., 2008, 'Socially Inclusive Urban Renewal in Low Value Suburbs: A Synopsis of Issues and an Agenda for Action', City Future Research Centre, University of New South Wales, Sydney.

70 Yuen, B., 2005, 'Romancing the high-rise in Singapore', *Cities* 22, pp. 3-13.

71 Crane, P., Wyeth, S., Brough, M. and Spencer, A., 2006, 'Children in inner city suburbia: the case of New Farm, Brisbane', in *2nd Creating Child-Friendly Cities Symposium* Sydney.

72 Stimson, R., Mullins, P., Baum, S., Davis, R., Gleeson, S. and Shaw, K., 2000, 'Inner-City Renaissance: The changing face, functions and structure of Brisbane's inner-city', *Techtrade, Brisbane*.

73 Searle, G. and Byrne, J., 2002, 'Selective memories, sanitised futures: constructing visions of future place in Sydney', *Urban Policy and Research* 20, pp. 7-25.

74 Brown, P.R., Brown, W.J., Miller, Y.D. and Hansen, V., 2001, 'Perceived constraints and social support for active leisure among mothers with young children', *Leisure Sciences* 23, pp. 131-44.

75 Cutumisu, N. and Spence, J., 2008, 'Exploring associations between urban environments and children's physical activity: Making the case for space syntax', *Journal of Science and Medicine in Sport*.

76 Woolley, H., 2006, 'Freedom of the city: Contemporary issues and policy influences on children and young people's use of public open space in England', *Children's Geographies* 4, pp. 45-59.

77 Ziviani, J., Wadley, D., Ward, H., Macdonald, D., Jenkins, D. and Rodger, S., 2008, 'A place to play: Socioeconomic and spatial factors in children's physical activity', *Australian Occupational Therapy Journal* 55, pp. 2.

78 Woolley, H., 2006, 'Freedom of the city: contemporary issues and policy influences on children and young people's use of public open space in England', *Children s Geographies* 4, pp. 45-59.

79 Gilliland, J., Holmes, M., Irwin, J. and Tucker, P., 2006, 'Environmental equity is child's play: Mapping public provision of recreation opportunities in urban neighbourhoods', *Vulnerable Children and Youth Studies* 1, pp. 256-68.

80 Woolley, H., 2008, 'Watch This Space! Designing for Children's Play in Public Open Spaces', *Geography Compass* 2, pp. 495-512.

81 L'Aoustet, O. and Griffet, J., 2004, 'Sharing Public Space: Youth Experience and Socialisation in Marseille's Borely Park', *Space and Culture* 7, pp. 173.

82 Miller, Y. and Brown, W., 2005, 'Determinants of active leisure for women with young children—an "ethic of care" prevails', *Leisure Sciences* 27, pp. 405-20.

83 Bittman, M. and Wajcman, J., 2004, 'The quality of leisure time and gender equity', in *Family Time: The Social Organisation of Care*, N. Folbre & M. Bittman (eds), Routledge, London, pp. 171-93.

84 Claxton, A. and Perry-Jenkins, M., 2008, 'No fun anymore: leisure and marital quality across the transition to parenthood', *Journal of Marriage and Family* 70, pp. 28-43.

85 Wolch, J., Wilson, J.P. and Fehrenbach, J., 2005, 'Parks and park funding in Los Angeles: An equity-mapping analysis', *Urban Geography* 26, pp. 4-35.

86 Miles, M.P., Good, D.J., McDonald, B., Schultz, R.J. and Capella, L.M., 1993, 'Parenthood and wildland recreation consumption: An unexplored phenomenon', *Psychology and Marketing* 10, pp. 131-49.

87 Barbosa, O., Tratalos, J., Armsworth, P., Davies, R., Fuller, R., Johnson, P. and Gaston, K., 2007, 'Who benefits from access to green space? A case study from Sheffield, UK', *Landscape and Urban Planning* 83, pp. 187-95.

88 Groenewegen, P., van den Berg, A., de Vries, S. and Verheij, R., 2006, 'Vitamin G: effects of green space on health, well-being, and social safety', *BMC Public Health* 6, pp. 149.

89 Heynen, N., Perkins, H.A. and Roy, P., 2006, 'The political ecology of uneven urban green space: the impact of political economy on race and ethnicity in producing environmental inequality in Milwaukee', *Urban Affairs Review* 42, pp. 3.

90 Hillsdon, M., Panter, J., Foster, C. and Jones, A., 2006, 'The relationship between access and quality of urban green space with population physical activity', *Public Health* 120, pp. 1127-32.

91 James, P., Tzoulas, K., Adams, M., Barber, A., Box, J., Breuste, J., Elmqvist, T., Frith, M., Gordon, C. and Greening, K., 2009, 'Towards an integrated understanding of green space in the European built environment', *Urban Forestry & Urban Greening* 8, pp. 65-75.

92 Mäkinen, K. and Tyrväinen, L., 2008, 'Teenage experiences of public green spaces in suburban Helsinki', *Urban Forestry & Urban Greening* 7, pp. 277-89.

93 Byrne, J. and Wolch, J., 2009, 'Nature, race, and parks: past research and future directions for geographic research', *Progress in Human Geography*0309132509103156v1.

94 Loukaitou-Sideris, A., 1995, 'Urban form and social context: cultural differentiation in the uses of urban parks', *Journal of Planning Education and Research* 14, pp. 89.

95 Cranz, G., 1982, *The Politics of Park Design: A History of Urban Parks,* Harvard University Press, Cambridge, MA.

96 ———, 1978, 'Changing roles of urban parks: From pleasure gardens to open space', *Landscape* 22/23, pp. 9-18.

97 Hoskins, I., 2003, 'The core of the city: Public parks, respectability and civic regulation in Sydney', *National Identities* 5, pp. 7-24.

98 White, C., 2006, 'Promenading and picnicking: The performance of middle-class masculinity in nineteenth-century Sydney', *Journal of Australian Studies* 30, pp. 27-40.

99 Boyer, P., 1978, *Urban Masses and Moral Order in America, 1820-1920,* Harvard University Press, Cambridge, Ma.

100 Rosenzweig, R. and Blackmar, E., 1992, *The Park and the People,* Cornell University Press, Ithaca.

101 Gandy, M., 2002, *Concrete and Clay: Reworking Nature in New York City,* The MIT press, Cambridge, Ma.

102 Taylor, D.E., 1999, 'Central Park as a model for social control: Urban parks, social class and leisure behavior in Nineteenth-Century America', *Journal of Leisure Research* 31, pp. 420-77.

103 Young, T., 1996, 'Social reform through parks: the American Civic Association's program for a better America', *Journal of Historical Geography* 22, pp. 460-72.

104 Gagen, E.A., 2004, 'Making America flesh" physicality and nationhood in early twentieth-century education reform', *Cultural Geographies* 11, pp. 417-42.

105 Marne, P., 2001, 'Whose public space was it anyway? Class, gender and ethnicity in the creation of Sefton and Stanley Parks, Liverpool: 1875-1872', *Social and Cultural Geography* 2, pp. 421-43.

106 Young, T., 1995, 'Modern urban parks', *Geographical Review* 85, pp. 535-51.

107 Freestone, R. and Nichols, D., 2004, 'Realising new leisure opportunities for old urban parks: the internal reserve in Australia', *Landscape and Urban Planning* 68, pp. 109-20.

108 Cranz, G. and Boland, M., 2003, 'The ecological park as an emerging type', *Places* 15, pp. 44-7.

109 ———, 2004, 'Defining the sustainable park: a fifth model for urban parks', *Landscape Journal* 23, pp. 102-20.

110 City of Melbourne, 2003, 'Growing Green: An environmental sustainability plan for the City of Melbourne's open space and recreation facilities', Melbourne City Council, Melbourne.

111 Duncan, M. and Mummery, K., 2005, 'Psychosocial and environmental factors associated with physical activity among city dwellers in regional Queensland', *Preventive Medicine* 40, pp. 363-72.

112 Hoehner, C., Brennan, L., Brownson, R., Handy, S. and Killingsworth, R., 2003, 'Opportunities for integrating public health and urban planning approaches to promote active community environments', *American Journal of Health Promotion* 18, pp. 14-20.

113 Saelens, B.E., Sallis, J.F. and Frank, L.D., 2003, 'Environmental correlates of walking and cycling: findings from transportation, urban design and planning literatures', *Annals of Behavioral Medicine* 25, pp. 80-91.

114 Oakes, J., Forsyth, A. and Schmitz, K., 2007, 'The effects of neighborhood density and street connectivity on walking behavior: the Twin Cities walking study', *Epidemiologic Perspectives & Innovations* 4, pp. 16.

115 Frank, L., Kerr, J., Sallis, J., Miles, R. and Chapman, J., 2008, 'A hierarchy of sociodemographic and environmental correlates of walking and obesity', *Preventive Medicine* 47, pp. 172-8.

116 Frank, L.D., Schmid, T L, Sallis, J F, Chapman, J, and Saelens, B E, 2005, 'Linking objectively measured physical activity with objectively measured urban form: Findings from SMARTRAQ', *American Journal of Preventative Medicine* 28, pp. 117-25.

117 Frank, L.D. and Engelke, P.O., 2001, 'The built environment and human activity patterns: exploring the impacts of urban form on public health', *Journal of Planning Literature* 16, pp. 202-18.

118 Forsyth, A., Michael Oakes, J., Lee, B. and Schmitz, K., 2009, 'The built environment, walking, and physical activity: Is the environment more important to some people than others?', *Transportation Research Part D* 14, pp. 42-9.

119 Frumkin, H., 2005, 'Health, equity and the built environment', *Environmental Health Perspectives* 113, pp. A290-A1.

120 Timperio, A., Salmon, J., Telford, A. and Crawford, D., 2005, 'Perceptions of local neighborhood environments and their relationship to childhood overweight and obesity', *International Journal of Obesity* 29, pp. 170-5.

121 Erickson, D., 2004, 'The relationship of historic city form and contemporary greenway implementation: a comparison of Milwaukee, Wisconsin (USA) and Ottawa, Ontario (Canada)', *Landscape and Urban Planning* 68, pp. 199-221.

122 Floyd, M.F., Spengler, J.O., Maddock, J.E., Gobster, P.H. and Suau, L.J., 2008, 'Park-based physical activity in diverse communities of two US cities', *American Journal of Preventive Medicine* 34, pp. 299-305.

123 ———, 2008, 'Environmental and social correlates of physical activity in neighborhood parks: an observational study in Tampa and Chicago', *Leisure Sciences* 30, pp. 360-75.

124 Shores, K.A. and West, S.T., 2008, 'The relationship between built park environments and physical activity in four park locations', *Journal of Public Health Management and Practice* 14, pp. E9-E16.

125 Taylor, W.C., Floyd, M.F., Whitt-Glover, M.C. and Brooks, J., 2007, 'Environmental justice: a framework for collaboration between the public health and parks and recreation fields to study disparities in physical activity', *Journal of Physical Activity & Health* 4, pp. S50-S63.

126 Frumkin, H., 2003, 'Healthy places: exploring the evidence', *American Journal of Public Health* 93, pp. 1451-6.

127 Santana, P., Santos, R. and Costa, C., 2009, 'Walkable Urban Green Spaces: Health Impact Assessment in Amadora, Portugal', in *REAL CORP 2009: CITIES 3.0 – Smart, Sustainable, Integrative Strategies, Concepts and Technologies for Planning the Urban Future*, (ed) by Manfred Schrenk, Vasily V. Popovich, Dirk Engelke & Pietro Elisei, Real Corp, Tagungsband, Germany, pp. 579-85.

128 Cohen, D., McKenzie, T., Sehgal, A., Williamson, S., Golinelli, D. and Lurie, N., 2007, 'Contribution of public parks to physical activity', *American Journal of Public Health* 97, pp. 509.

129 Kaczynski, A. and Henderson, K., 2007, 'Environmental correlates of physical activity: A review of evidence about parks and recreation', *Leisure Sciences* 29, pp. 315-54.

130 Guite, H., Clark, C. and Ackrill, G., 2006, 'The impact of the physical and urban environment on mental well-being', *Public Health* 120, pp. 1117-26.

131 Hartig, T. and Fransson, U., 2009, 'Leisure home ownership, access to nature, and health: a longitudinal study of urban residents in Sweden', *Environment and Planning A* 41, pp.

132 Maas, J., Verheij, R., Groenewegen, P., de Vries, S. and Spreeuwenberg, P., 2006, 'Green space, urbanity, and health: how strong is the relation?', *British Medical Journal* 60, pp. 587.

133 Maller, C., Townsend, M., Pryor, A., Brown, P. and St Leger, L., 2006, 'Healthy nature healthy people:'contact with nature'as an upstream health promotion intervention for populations', *Health Promotion International* 21, pp. 45-54.

134 McKenna, J., 2002, 'Health and greening the city: new visions for health promoters', *Journal of Epidemiology and Community Health* 56, pp. 896.

135 Mitchell, R. and Popham, F., 2008, 'Effect of exposure to natural environment on health inequalities: an observational population study', *The Lancet* 372, pp. 1655-60.

136 Nielsen, T. and Hansen, K., 2007, 'Do green areas affect health? Results from a Danish survey on the use of green areas and health indicators', *Health and Place* 13, pp. 839-50.

137 Orsega-Smith, E., Mowen, A.J., Payne, L.L. and Godbey, G., 2004, 'The interaction of stress and park use on psycho-physiological health in older adults', *Journal of Leisure Research* 36, pp. 232-56.

138 Townshend, T. and Lake, A.A., 2009, 'Obesogenic urban form: Theory, policy and practice', *Health and Place* 15, pp. 909-16.

139 McCormack, G.R., Giles-Corti, B., Bulsara, M. and Pikora, T.J., 2006, 'Correlates of distances traveled to use recreational facilities for physical activity behaviors', *International Journal of Behavioral Nutrition and Physical Activity* 3, pp. 18-28.

140 Epstein, L., Raja, S., Gold, S., Paluch, R., Pak, Y. and Roemmich, J., 2006, 'Reducing sedentary behavior: the relationship between park area and the physical activity of youth', *Psychological Science* 17, pp. 654-9.

141 Moore, R.L. and Scott, D., 2004, 'Place attachment and context: Comparing a park and a trail within', *Forest Science* 48, pp. 877-84.

142 Reynolds, K.D., Wolch, J., Byrne, J., Chou, C.-P., Feng, G., Weaver, S. and Jerrett, M., 2007, 'Trail characteristics as correlates of urban trail use', *American Journal of Health Promotion* 21, pp. 335-45.

143 Troped, P.J., Saunders, R.P. and Pate, R.R., 2005, 'Comparisons between rail trail users and non users and men and women's patterns of use in a suburban community', *Journal of Physical Activity and Health* 2, pp. 169-80.

144 Lindsey, G., Maraj, M. and Kuan, S.-C., 2001, 'Access, equity and urban greenways: an exploratory investigation', *The Professional Geographer* 53, pp. 332-46.

145 Luymes, D. and Tamminga, K., 1995, 'Integrating public safety and use into planning urban greenways', *Landscape and Urban Planning* 33, pp. 391-400.

146 Toccolini, A., Fumagalli, N. and Senes, G., 2006, 'Greenways planning in Italy: the Lambro River Valley greenways system', *Landscape and Urban Planning* 76, pp. 98-111.

147 Jim, C.Y. and Chen, S.S., 2003, 'Comprehensive greenspace planning based on landscape ecology principles in compact Nanjing city, China', *Landscape and Urban Planning* 65, pp. 95-116.

148 Chen, W. and Jim, C., 2008, 'Cost–benefit analysis of the leisure value of urban greening in the new Chinese city of Zhuhai', *Cities* 25, pp. 298-309.

149 Pearson, L., Heyenga, S., Wang, X. and Whitten, S., 2007, 'Environmental Asset Management Plan Feasibility Study–Brisbane City Council', CSIRO Sustainable Ecosystems, Brisbane.

150 Conner, N., 2007, 'Economic Impacts of Parks on Surrounding Communities: Findings from New South Wales', in *Tourism and Protected Areas: Benefits Beyond Boundaries*, R. Bushell & P.F.J. Eagles (eds), CAB International, Wallingford, UK, pp. 210-30.

151 Bedimo-Rung, A.L., Mowen, A.J. and Cohen, D.A., 2005, 'The significance of parks to physical activity and public health: a conceptual model', *American Journal of Preventive Medicine* 28, pp. 159-68.

152 Endlicher, W., Jendritzky, G., Fischer, J. and Redlich, J.P., 2008, 'Heat waves, urban climate and human health', in *Urban Ecology: An International Perspective on the Interaction Between Humans and Nature*, John Marzluff, Eric Schulenberger, Wilfried Endlicher, Marina Alberti, Gordon Bradley, Clare Ryan, Ute Simon & Craig ZimBrunnen (eds), Springer, New York, pp. 269-78.

153 Irwin, E. and Bockstael, N., 2004, 'Land use externalities, open space preservation, and urban sprawl', *Regional Science and Urban Economics* 34, pp. 705-25.

154 Byrne, J., 2009 (forthcoming), 'Can greenspace combat climate change?: towards a subtropical cities research agenda', *Australian Planner*.

155 Rosenberg, E., 1996, 'Public works and public space: rethinking the urban park', *Journal of Architectural Education* 50, pp. 89-103.

156 Peng, L., Chen, S., Liu, Y. and Wang, J., 2008, 'Application of CITYgreen model in benefit assessment of Nanjing urban green space in carbon fixation and runoff reduction', *Frontiers of Forestry in China* 3, pp. 177-82.

157 Moore, G.M., 2006, 'Urban trees and the global greenhouse', in *Seventh National Street Tree Symposium* Adelaide, pp. 23-8.

158 Killey, P., Brack, C., McElhinny, C., Cary, G. and King, K., 2008, 'A Carbon Sequestration Audit of Vegetation Biomass in the Australian Capital Territory', Australian National University, Canberra.

159 Bolund, P. and Hunhammar, S., 1999, 'Ecosystem services in urban areas', *Ecological Economics* 29, pp. 293-301.

160 Heynen, N., Perkins, H. and Roy, P., 2006, 'The political ecology of uneven urban green space: The impact of political economy on race and ethnicity in producing environmental inequality in Milwaukee', *Urban Affairs Review* 42, pp. 3.

161 Swanwick, C., Dunnett, N. and Woolley, H., 2003, 'Nature, role and value of green space in towns and cities: An overview', *Built Environment* 29, pp. 94-106.

162 Wilby, R.L. and Perry, G.L.W., 2006, 'Climate change, biodiversity and the urban environment: a critical review based on London, UK', *Progress in Physical Geography* 30, pp. 73.

163 Hougner, C., Colding, J. and Söderqvist, T., 2006, 'Economic valuation of a seed dispersal service in the Stockholm National Urban Park, Sweden', *Ecological Economics* 59, pp. 364-74.

164 Moroney, J. and Jones, D., 2006, 'Biodiversity space in urban environments: implications of changing lot size', *Australian Planner* 43, pp. 22-7.

165 Fernández-Juricic, E., 2000, 'Bird community composition patterns in urban parks of Madrid: the role of age, size and isolation', *Ecological Research* 15, pp. 373-83.

166 Fernández-Juricic, E. and Jokimäki, J., 2001, 'A habitat island approach to conserving birds in urban landscapes: case studies from southern and northern Europe', *Biodiversity and Conservation* 10, pp. 2023-43.

167 Melles, S., Glenn, S. and Martin, K., 2003, 'Urban bird diversity and landscape complexity: species-environment associations along a multiscale habitat gradient', *Conservation Ecology* 7, pp. [online].

168 de Vries, S., Verheij, R.A., Groenewegen, P.P. and Spreeuwenberg, P., 2003, 'Natural environments - Healthy environments? An exploratory analysis of the relationship between greenspace and health', *Environment and Planning A* 35, pp. 1717-31.

169 Ho, C., Sasidharan, V., Elmendorf, W., Willits, F.K., Graefe, A. and Godbey, G., 2005, 'Gender and ethnic variations in urban park preferences, visitation and perceived benefits', *Journal of Leisure Research* 37, pp. 281-306.

170 Hung, K. and Crompton, J.L., 2006, 'Benefits and constraints associated with the use of an urban park reported by a sample of elderly in Hong Kong', *Leisure Sciences* 25, pp. 291-311.

171 Kaplan, R., 2001, 'The nature of the view from home: Psychological benefits', *Environment and Behavior* 33, pp. 507-42.

172 Kleiber, D.A., Hutchison, S.L. and Williams, R., 2002, 'Leisure as a resource in transcending negative life events: Self protection, self restoration and personal transformation', *Leisure Sciences* 24, pp. 219-35.

173 Kuo, F.E., 2001, 'Coping with poverty: Impacts of environment and attention in the inner city', *Environment and Behavior* 33, pp. 5-34.

174 Miller, J., 2005, 'Biodiversity conservation and the extinction of experience', *Trends in Ecology & Evolution* 20, pp. 430-4.

175 Townsend, M., 2006, 'Feel blue? Touch green! Participation in forest/woodland management as a treatment for depression', *Urban Forestry and Urban Greening* 5, pp. 111-20.

176 Shinew, K.J., Floyd, M.F. and Parry, D., 2004, 'Understanding the relationship between race and leisure activities and constraints: Exploring an alternative framework', *Leisure Sciences* 26, pp. 181-99.

177 Armstrong, D., 2000, 'A survey of community gardens in upstate New York: implications for health promotion and community development', *Health and Place* 6, pp. 319-27.

178 Nuru, M. and Konschink, K., 2000, 'Taking the lead in building community: San Francisco league of urban gardeners', *Race, Poverty and the Environment* 7, pp. 50-1.

179 Wakefield, S., Yeudall, F., Taron, C., Reynolds, J. and Skinner, A., 2007, 'Growing urban health: Community gardening in South-East Toronto', *Health Promotion International* 22, pp. 92.

180 Aminzadeh, B. and Afshar, D., 2004, 'Urban parks and addiction', *Journal of Urban Design* 9, pp. 73-87.

181 Crewe, K., 2001, 'Linear parks and urban neighborhoods: A study of the crime impact of the Boston south west corridor', *Journal of Urban Design* 6, pp. 245-64.

182 Gray, D.E., 1973, 'The un-hostile park', in *Reflections on the Recreation and Park Movement*, D. Gray & D.A. Pelegrino (eds), W.C. Brown Company, Dubuque, Iowa, pp. 235-8.

183 Harnik, P., 2000, *Inside City parks,* The Urban Land Institute, Washington, D.C.

184 Jones, K.R. and Wills, J., 2005, *The Invention of the Park: From the Garden of Eden to Disney's Magic Kingdom,* Polity Press, Cambridge.

185 Tandy, C.A., 1999, 'Children's diminishing play space: a study of inter-generational change in children's use of their neighbourhoods', *Australian Geographical Studies* 37, pp. 154-64.

186 Gearin, E. and Kahle, C., 2006, 'Teen and adult perceptions of urban green space in Los Angeles', *Children Youth and Environments* 16, pp. 25-48.

187 Malone, K. and Tranter, P., 2003, 'Children's environmental learning and the use, design and management of school grounds', *Children, Youth and Environments* 13, pp.

188 Lockwood, M. and Tracy, K., 1995, 'Nonmarket economic valuation of an urban recreation park', *Journal of Leisure Research* 27, pp. 155-67.

189 McIntyre, N., Cuskelly, G. and Auld, C., 1991, 'The benefits of urban parks: A market segmentation approach', *Australian Parks and Recreation* 27, pp. 11-8.

190 Ulrich, R.S. and Addoms, D.L., 1981, 'Psychological and recreational benefits of a residential park', *Journal of Leisure Research* 13, pp. 43-65.

191 Bolitzer, B. and Netusil, N., 2000, 'The impact of open spaces on property values in Portland, Oregon', *Journal of Environmental Management* 59, pp. 185-93.

192 Crompton, J.L., 2007, 'The Role of the Proximate Principle in the Emergence of Urban Parks in the United Kingdom and in the United States', *Leisure Studies* 26, pp. 213-34.

193 King, D.A., White, J.L. and Shaw, W.W., 1990, 'Influence of urban wildlife habitats on the value of residential properties', in *Proceedings of a National Symposium on Urban Wildlfe*, (ed) by L.W. Adams & D.L. Leedy, National Institute for Urban Wildlife, Columbia, MD, Cedar Rapids, Iowa, pp. 165-9.

194 Schroeder, H.W., 1982, 'Preferred features of urban parks and forests', *Journal of Arboriculture* 8, pp. 317-22.

195 Schroeder, T.D., 1981, *Local parks and recreation services and property values: a review and bibliography,* Vance Bibliographies, Monticello, Ill.

196 Tajima, K., 2003, 'New estimates of the demand for urban green space: implications for valuing the environmental benefits of Boston's big dig project', *Journal of Urban Affairs* 25, pp. 641-55.

197 Troy, A. and Grove, J., 2008, 'Property values, parks, and crime: A hedonic analysis in Baltimore, MD', *Landscape and Urban Planning* 87, pp. 233-45.

198 Weigher, J. and Zerbst, R., 1973, 'The externalities of neighborhood parks: an empirical investigation', *Land Economics*99-105.

199 Crompton, J., 2005, 'The impact of parks on property values: empirical evidence from the past two decades in the United States', *Managing Leisure* 10, pp. 203-18.

200 Hobden, D., Laughton, G. and Morgan, K., 2004, 'Green space borders—a tangible benefit? Evidence from four neighbourhoods in Surrey, British Columbia, 1980–2001', *Land Use Policy* 21, pp. 129-38.

201 Peiser, R.B. and Schwann, G.M., 1993, 'The private value of public open space within subdivisions', *Journal of Architectural and Planning Research* 10, pp. 91-104.

202 Carthey, J., Chandra, V. and Loosemore, M., 2009, 'Adapting Australian health facilities to cope with climate-related extreme weather events', *Journal of Facilities Management* 7, pp. 36-51.

203 Emmanuel, R. and Fernando, H., 2007, 'Urban heat islands in humid and arid climates: role of urban form and thermal properties in Colombo, Sri Lanka and Phoenix, USA', *Climate Research* 34, pp. 241.

204 Gill, S.E., Handley, J.F., Ennos, A.R. and Pauleit, S., 2007, 'Adapting cities for climate change: the role of the green infrastructure', *Built Environment* 33, pp. 115-33.

205 Pyke, C., Johnson, T., Scharfenberg, J., Groth, P., Freed, R., Schroeer, W. and Main, E., 2007, 'Adapting to climate change through neighborhood design', *CTG Energetics White Paper, May* 18, pp. 2007.

206 Owens, P., 1988, 'Natural landscapes, gathering places, and prospect refuges: characteristics of outdoor places valued by teens', *Children's Environments Quarterly* 5, pp. 17-24.

207 Owens, P.E., 2002, 'No teens allowed: The exclusion of adolescents from public spaces', *Landscape Journal* 21, pp. 156-63.

208 Schaefer-McDaniel, N., 2007, '" They Be Doing Illegal Things": Early Adolescents Talk About Their Inner-City Neighborhoods', *Journal of Adolescent Research* 22, pp. 413.

209 EDAW and Skyes Humphrey's Consulting, 2008, 'Creating Better Parks: Brimbank Open Space and Playground Policy and Plan', EDAW and Skyes Humphrey's Consulting, Brimbank, Melbourne.

210 Bowdler, S., 1999, 'A study of Indigenous ceremonial ("Bora") sites in eastern Australia', paper presented to Heritage Landscapes: Understanding Place and Communities, Southern Cross University, Lismore, November, 1999.

211 State of Queensland Department of Communities, 2009, 'Capalaba Regional Park All Abilities Playground', Queensland State Government, <http://www.disability.qld.gov.au/community/all-abilities-playground/capalaba.html> [Accessed October 23 2009].

212 Gobster, P., 1995, 'Perception and use of a metropolitan greenway system for recreation', *Landscape and Urban Planning* 33, pp. 401-13.

213 Sister, C., Wolch, J., Wilson, J., Linder, A., Seymour, M., Byrne, J. and Swift, J., 2007, 'Park and open space resources in the Green Visions Plan area', Centre for Sustainable Cities & GIS Research Lab, University of Southern California, Los Angeles.

214 Baud-Bovy, M. and Lawson, F., 1998, *Tourism and Recreation Handbook of Planning and Design,* Architectural Press, Oxford.

215 Marcus, C.C., Francis, C. and Russell, R., 1998, 'Urban Plazas', in *People Places: Design Guidelines for Urban Open Space*, Clare Cooper Marcus & Carolyn Francis (eds), John Wiley and Sons, New York.

216 Kidder, T.R., 2004, 'Plazas as architecture: an example from the Raffman site, northeast Louisiana', *American Antiquity* 69, pp. 514-32.

217 Childs, M.C., 2006, *Squares: a Public Place Design Guide for Urbanists,* University of New Mexico Press, Albuquerque.

218 Mitchell, D. and Staeheli, L., 2005, 'Turning social relations into space: Property, law and the plaza of Santa Fe, New Mexico', *Landscape Research* 30, pp. 361-78.

219 Miller, K.F., 2007, *Designs on the Public: the Private lives of New York's Public Spaces,* University of Minnesota Press, Minneapolis.

220 Loukaitou-Sideris, A. and Banerjee, T., 1993, 'The negotiated plaza: design and development of corporate open space in downtown Los Angeles and San Francisco', *Journal of Planning Education and Research* 13, pp. 1-12.

221 Herzog, L.A., 2006, *Return to the Center: Culture, Public Space, and City Building in a Global Era,* University of Texas Press, Austin.

222 Li, P.Y., Chen, M.S., Hibino, H., Koyama, S. and Zheng, M.C., 2009, 'Rest facilities at commercial plazas through user behavior perspective', *Journal of Asian Architecture and Building Engineering* 8, pp. 127-34.

223 Shaftoe, H., 2008, *Convivial Urban Spaces: Creating Effective Public Places,* Earthscan/James & James, London.

224 Project for Public Spaces, 2009, 'Ten principles for creating successful squares' <http://www.pps.org/squares/info/squares_articles/squares_principles> [Accessed October 23 2009].

225 Gobster, P.H., 1988, 'Urban bicycle trails: Use patterns and user preferences', *Trends* 25, pp. 21-5.

226 ———, 1995, 'Perception and use of a metropolitan greenway system for recreation', *Landscape and Urban Planning* 33, pp. 401.

227 Lindsey, G. and Nguyen, D.B.L., 2004, 'Use of Greenway Trails in Indiana', *Journal of Urban Planning and Development* 130, pp. 213-7.

228 Hellmund, P.C. and Smith, D.S., 2006, *Designing Greenways: Sustainable Landscapes for Nature and People,* Island Press, Washington, D.C.

229 Shafer, S.C., Lee, B.K. and Turner, S., 2000, 'A tale of three greenway trails: user perceptions related to quality of life', *Landscape and Urban Planning* 49, pp. 163-78.

230 Lee, B.-K. and Shafer, C.S., 2002, 'The dynamic nature of leisure experience: An application of Affect Control Theory', *Journal of Leisure Research* 34, pp. 290-310.

231 Troped, P.J., Saunders, R.P., Pate, R.R., Reininger, B., Ureda, J.R. and Thompson, S.J., 2001, 'Associations between self-reported and objective physical environmental factors and use of a community rail-trail', *Preventative Medicine* 32, pp. 191-200.

232 Brownson, R.C., Housemann, R.A., Brown, D.R., Jackson-Thompson, J., King, A.C., Malone, B.R. and Sallis, J.F., 2000, 'Promoting physical activity in rural communities: walking trail access, use, and effects', *American Journal of Preventative Medicine* 18, pp. 235-41.

233 Centers for Disease Control and Prevention, 2004, 'Physical activity for everyone: Trails for health', Centers for Disease Control, <http://www.cdc.gov/nccdphp/dnpa/physical/trails.htm> [Accessed June 1, 2006 2006].

234 Evenson, K.R., Herring, A.H. and Huston, S.L., 2005, 'Evaluating change in physical activity with the building of a multi-use trail: Research and intervention opportunities', *American Journal of Preventative Medicine* 28, pp. 177-85.

235 Gordon, P.M., Zizzi, S.J. and Pauline, J., 2004, 'Use of a community trail among new and habitual exercisers: a preliminary assessment', *Prevention of Chronic Disease* 1, pp. A11.

236 Gobster, P., 2005, 'Recreation and leisure research from an active living perspective: taking a second look at urban trail use data', *Leisure Sciences* 27, pp. 367-83.

237 Lee, C. and Moudon, A., 2006, 'The 3Ds+ R: Quantifying land use and urban form correlates of walking', *Transportation Research Part D* 11, pp. 204-15.

238 Shank, H., 2006, 'Urbanism and Greenway Design: a New Vision for the Redevelopment of the Erie Boulevard East Corridor in Syracuse, New York' (MA, State University of New York).

239 Furuseth, O.J., 1989, 'Greenway user characteristics and attitudes: A study of the McAlpine Greenway, Charleotte, North Carolina. ', paper presented to International Conference on Parkways, Greenways and Riverways, Ashville, North Carolina, 22 September.

240 Furuseth, O.J. and Altman, R.E., 1991, 'Who's on the greenway: socioeconomic, demographic, and locational characteristics of greenway users', *Environmental Management* 15, pp. 329-36.

241 Hunter, W. and Huang, H., 1995, 'User counts on bicycle lanes and multiuse trails in the United States', *Transportation Research Record*45-57.

242 Reynolds, K., Wolch, J., Byrne, J., Chou, C., Feng, G., Weaver, S. and Jerrett, M., 2007, 'Trail characteristics as correlates of urban trail use', *American Journal of Health Promotion* 21, pp. 335-45.

243 Luymes, D.T. and Tamminga, K., 1995, 'Integrating public safety and use into planning urban greenways', *Landscape and Urban Planning* 33, pp. 391-400.

244 Yabes, R., Shetter, K. and Schneeman, J., 1997, 'Urban waterways: changing historical uses and users in a southwestern desert city', *Community Design* 39, pp. 167.

245 Gehl, J., 2007, 'Public spaces for a changing public life', in *Open space: People Space*, Catherine Ward Thompson & Penny Travlou (eds), Taylor and Francis, Abingdon, Oxon, pp. 3-10.

246 Downton, P., 2009, *Ecopolis: Architecture and Cities for a Changing Climate,* Springer, Dordrecht.

247 Van Melik, R., Van Aalst, I. and Van Weesep, J., 2007, 'Fear and fantasy in the public domain: the development of secured and themed urban space', *Journal of Urban Design* 12, pp. 25-42.

248 Rogers, P., 2007, 'Young people's participation in the renaissance of public space-a case study in Newcastle upon Tyne, UK', *Children, Youth and Environments* 16, pp. 105-30.

249 Németh, J., 2006, 'Conflict, exclusion, relocation: skateboarding and public space', *Journal of Urban Design* 11, pp. 297-318.

250 Mehta, V., 2007, 'Lively streets: determining environmental characteristics to support social behavior', *Journal of Planning Education and Research* 27, pp. 165.

251 ———, 2008, 'Walkable streets: pedestrian behavior, perceptions and attitudes', *Journal of Urbanism: International Research on Placemaking and Urban Sustainability* 1, pp. 217-45.

252 ———, 2009, 'Look closely and you will see, listen carefully and you will hear: urban design and social interaction on streets', *Journal of Urban Design* 14, pp. 29-64.

253 Jacobs, J., 1992, *The Death and Life of Great American Cities,* Vintage Press, New York.

254 Bailey, C., Miles, S. and Stark, P., 2004, 'Culture-led urban regeneration and the revitalisation of identities in Newcastle, Gateshead and the North East of England', *International Journal of Cultural Policy* 10, pp. 47-65.

255 Bajracharya, B., O'Hare, D. and Byrne, J., 2010 (forthcoming), 'Greening transit oriented development and subtropical design', in *The Bellwether Zone: Planning South-East Queensland*, B. Gleeson & W. Steele (eds), Queensland University Press, Brisbane.

256 Macdonald, E., 2005, 'Street-facing dwelling units and livability: the impacts of emerging building types in Vancouver's new high-density residential neighbourhoods', *Journal of Urban Design* 10, pp. 13-38.

257 Harnik, P. and Simms, J., 2004, 'Parks: how far is too far?', *Planning Magazine* 70, pp. 8-11.

258 Wilkinson, P., 1985, 'The golden fleece: the search for standards', *Leisure Studies* 4, pp. 189-203.

259 Buechner, R.D., 1971, *National Park, Recreation and Open Space Standards,* National Recreation and Park Asociation, Washington, D.C.

260 Haley, A.J., 1988, 'Municipal recreation and park standards in the United States: central cities and suburbs, 1975-1980', *Leisure Sciences* 7, pp. 175-88.

261 Hendon, W.S., 1974, 'Park service areas and residential property values', *American Journal of Economics and Sociology* 33, pp. 175-83.

262 Hindley, J., 2007, 'A park for the 21st century. Observations on the transformation of mile end park', *Capitalism Nature Socialism* 18, pp. 104-24.

263 Veal, A.J., 2008, 'Open space planning standards in Australia: in search of origins', School of Leisure, Sport and Tourism, University of Technology, Sydney, Sydney.

264 Queensland Government, 2003, 'Open Space for Sport and Recreation: Planning Principles and Implementation Notes for Local Government', Department of Sport and Recreation, Queensland Government, Brisbane.

265 Grose, M.J., 2007, 'Perth's Stephenson-Hepburn Plan of 1955', *Australian Planner* 44, pp. 20-1.

266 Moir, J., 1995, 'Regional parks in Perth, Western Australia', *Australian Planner* 32, pp. 88-95.

267 Gold Coast City Council, 2006, 'Planning scheme policies: policy 16 - recreation facilities network developer contributions', Environment and Transport Planning, Gold Coast City Council, Gold Coast.

268 Gold, S., 1977, 'Neighborhood parks: the non-use phenomenon', *Evaluation Review* 1, pp. 319-28.

269 Bangs Jr., H.P. and Mahler, S., 1970, 'Users of local parks', *Journal of the American Planning Association* 35, pp. 330-4.

270 Loukaitou-Sideris, A., 1995, 'Urban form and social context: Cultural differentiation in the uses of urban parks', *Journal of Planning Education and Research* 14, pp. 89-102.

271 Macintyre, S., Macdonald, L. and Ellaway, A., 2008, 'Lack of agreement between measured and self-reported distance from public green parks in Glasgow, Scotland', *International Journal of Behavioral Nutrition and Physical Activity* 5, pp. [online].

272 Burns, R.C. and Graefe, A.R., 2007, 'Constraints to outdoor recreation: Exploring the effects of disabilities on perceptions and participation', *Journal of Leisure Research* 39, pp. 156-81.

273 Kemperman, A. and Timmermans, H.J.P., 2008, 'Influence of socio-demographics and residential environment on leisure activity participation', *Leisure Sciences* 30, pp. 306-24.

274 Pikora, T.J., Giles-Corti, B., Knuiman, M.W., Bull, F.C., Jamrozik, K. and Donovon, R.J., 2006, 'Neighborhood environmental factors correlated with walking near home: using SPACES', *Medicine and Science in Sports and Exercise* 38, pp. 708-14.

275 Crawford, D., Timperio, A., Giles-Corti, B., Ball, K., Hume, C., Roberts, R., Andrianopoulos, N. and Salmon, J., 2008, 'Do features of public open spaces vary according to neighbourhood socio-economic status?', *Health and Place* 14, pp. 887-91.

276 Kaczynski, A.T., Potwarka, L.R. and Saelens, B.E., 2008, 'Association of park size, distance and features with physical activity in neighbourhood parks', *American Journal of Public Health* 98, pp. 1451-6.

277 Bird, C.E. and Fremont, A.M., 1991, 'Gender, time use, and health', *Journal of Health and Social Behavior* 32, pp. 114-29.

278 Madge, C., 1997, 'Public parks and the geography of fear', *Tijdschrift voor Economische en Sociale Geografie* 88, pp. 237-50.

279 Burgess, J., 1996, 'Focusing on fear: the use of focus groups in a project for the Community Forest Unit, Countryside Commission', *Area* 28, pp. 130-5.

280 Koskela, H., 1999, "Gendered exclusions': Women's fear of violence and changing relations to space', *Geografiska Annaler B* 81, pp. 111-24.

281 Krenichyn, K., 2006, "The only place to go and be in the city': women talk about exercise, being outdoors, and the meanings of a large urban park', *Health and Place* 12, pp. 631-43.

282 Valentine, G., 1991, 'Women's fear and the design of public space', *Built Environment* 16, pp. 288-303.

283 Westover, T.N., 1985, 'Perceptions of crime and safety in three midwestern parks', *Professional Geographer* 37, pp. 410-20.

284 Whitzman, C., 2002, 'Feminist activism for safer social space in High Park, Toronto: How women got lost in the woods', *Canadian Journal of Urban Research* 11, pp. 299-321.

285 Baas, J.M., Ewert, A. and Chavez, D.J., 1993, 'Influence of ethnicity on recreation and natural environment use patterns: Managing recreation sites for ethnic and racial diversity', *Environmental Management* 17, pp. 523-9.

286 Ewert, A.W., Chavez, D.J. and Magill, A.W. (eds), 1993, *Culture, Conflict and Communications at the Wildlands-Urban Interface*, Westview Press, Boulder.

287 Floyd, M.F., 2001, 'Managing parks in a multicultural society: Searching for common ground', *Managing Recreation Use* 18, pp. 41-51.

288 Gobster, P.H., 2002, 'Managing urban parks for racially and ethnically diverse clientele', *Leisure Sciences* 24, pp. 143-59.

289 Gollege, R.G. and Stimson, R.J., 1997, *Spatial Behavior: A Geographic Perspective,* The Guildford Press, New York.

290 West, P.C., 1989, 'Urban region parks and black minorities: Subculture, marginality and interracial relations in park use in the Detroit metropolitan area', *Leisure Sciences* 11, pp. 11-28.

291 ———, 1993, 'The tyranny of metaphor: Interracial relations, minority recreation, and the wildlands-urban interface', in *Culture, Conflict and Communication in the Wildlands-Urban Interface*, A. Ewert, D.J. Chavez & A.W. Magill (eds), Westview Press, Boulder.

292 Byrne, D., Goodall, H., Wearing, S. and Cadzow, A., 2006, 'Enchanted parklands', *Australian Geographer* 37, pp. 103-15.

293 Goodall, H., Wearing, S., Byrne, D. and Kijas, J., 2004, 'Recognising cultural diversity: The Georges River project in south-western Sydney', *Sustainability and Social Science Round Table Proceedings*.

294 Thomas, M., 2002, *Moving Landscapes: National Parks and the Vietnamese Experience,* National Parks and Wildlife Service & Pluto Press, Hurtsville, NSW.

295 Gold, S.M., 1986, 'User characteristics and response to vegetation in neighbourhood parks', *Arboricultural Journal* 10, pp. 275-87.

296 Zhang, T. and Gobster, P., 1998, 'Leisure preferences and open space needs in an urban Chinese-American community', *Journal of Architectural and Planning Research* 15, pp. 338-55.

297 Lieber, S. and Allton, D., 1983, 'Modeling trail area evaluations in Metropolitan Chicago', *Journal of Leisure Research* 15, pp. 184-202.

298 Lieber, S. and Fesenmaier, D., 1984, 'Modelling recreation choice: A case study of management alternatives in Chicago', *Regional Studies* 18, pp. 31-43.

299 ———, 1985, 'Physical and social conditions affecting recreation site preferences', *Environment and Planning A* 17, pp. 1613-25.

300 Kaplan, R., 1984, 'Wilderness perception and psychological benefits: An analysis of a continuiing program', *Leisure Sciences* 6, pp. 271-90.

301 Ulrich, R.S., 1984, 'View through a window may influence recovery from surgery', *Science* 224, pp. 420-1.

302 Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A. and Zelson, M., 1991, 'Stress recovery during exposure to natural and urban environments', *Journal of Environmental Psychology* 11, pp. 201-30.

303 Thompson, C., 2002, 'Urban open space in the 21st century', *Landscape and Urban Planning* 60, pp. 59-72.

304 Wolch, J. and Zhang, J., 2004, 'Beach recreation, cultural diversity and attitudes toward nature', *Journal of Leisure Research* 36, pp. 414-44.

305 Niepoth, W., 1973, 'Users and non-users of recreation and park services', in *Reflections on the Recreation and Park Movement*, D. Gray & D.A. Pelegrino (eds), W.C. Brown Company, Dubuque, Iowa, pp. 131-42.

306 Mowen, A.J., Payne, L.L. and Scott, D., 2005, 'Change and stability in park visitation: constraints revisited', *Leisure Sciences* 27, pp. 191-204.

307 Jackson, E.L., 1994, 'Geographical aspects of constraints on leisure and recreation', *The Canadian Geographer* 38, pp. 110-21.

308 Lucy, W., 1981, 'Equity and planning for local services', *Journal of the American Planning Association* 47, pp. 447-57.

309 Smoyer-Tomic, K.E., Hewko, J.N. and Hodgson, M.J., 2004, 'Spatial accessibility and equity of playgrounds in Edmonton, Canada', *The Canadian Geographer* 48, pp. 287-302.

310 Nicholls, S., 2001, 'Measuring the accessibility and equity of public parks: A case study using GIS', *Managing Leisure* 6, pp. 201-19.

311 Talen, E., 1998, 'Visualizing fairness: equity maps for planners', *Journal of the American Planning Association* 64, pp. 22-38.

312 Talen, E. and Anselin, L., 1998, 'Assessing spatial equity: an evaluation of measures of accessibility to public playgrounds', *Environment and planning A* 30, pp. 595-613.

313 Talen, E., 1997, 'The social equity of urban service distribution: An exploration of park access in Pueblo, Colorado, and Macon, Georgia', *Urban Geography* 18, pp. 521-41.

314 Hanink, D.M. and White, K., 1999, 'Distance effects in the demand for wildland recreation services: the case of national parks in the United States', *Environment and Planning A* 31, pp. 477-92.

315 Stouffer, S.A., 1940, 'Intervening opportunities: a theory relating to mobility and distance', *American Scoiological Review* 5, pp. 845-67.

316 Buttram, J., 1990, 'Focus groups: a starting point for needs assessment', *American Journal of Evaluation* 11, pp. 207.

317 Mitra, A., 1994, 'Use of focus groups in the design of recreation needs assessment questionnaires', *Evaluation and Program Planning* 17, pp. 133-40.

318 Anderson, L. and Heyne, L., 2000, 'A statewide needs assessment using focus groups: perceived challenges and goals in providing inclusive recreation services in rural communities', *Journal of Park and Recreation Administration* 18, pp. 17-37.

319 Chen, R.J.C., Bloomfield, P. and Fu, J.S., 2003, 'An evaluation of alternative forecasting methods to recreation visitation', *Journal of Leisure Research* 35, pp. 441-55.

320 Cicchetti, C.J., Smith, V.K., Knetsch, J.L. and Patton, R.A., 1972, 'Recreation benefit estimation and forecasting: implications of the identification problem', *Water Resources Research* 8, pp. 840-50.

321 Glover, P. and Prideaux, B., 2008, 'Using population projections to identify aspects of future tourism demand', *Advances in Hospitality and Leisure* 4, pp. 185-209.

322 Cummings, L.E. and Busser, J.A., 1994, 'Forecasting in recreation and park management: need, substance, and reasonableness', *Journal of Park and Recreation Administration* 12, pp. 35-50.

323 Train, K.E., 1998, 'Recreation demand models with taste differences over people', *Land Economics* 74, pp. 230-9.

324 Rosenthal, D.H., 1987, 'The necessity for substitute prices in recreation demand analyses', *American Journal of Agricultural Economics* 69, pp. 828-37.

325 Witt, S.F. and Witt, C.A., 1995, 'Forecasting tourism demand: a review of empirical research', *International Journal of Forecasting* 11, pp. 447-75.

326 Cordell, H. and Bergstrom, J., 1991, 'A methodology for assessing national outdoor recreation demand and supply trends', *Leisure Sciences* 13, pp. 1-20.

327 Veal, A.J., 2003, 'Forecasting', in *Encyclopedia of Leisure and Outdoor Recreation*, J.M. Jenkins & J.J. Pigram (eds), Routledge, London, pp. 184-5.

328 Lavery, P., 1975, 'The demand for recreation: a review of studies', *The Town Planning Review* 46, pp. 185-200.

329 Dredge, D. and Moore, S., 1992, 'A methodology for the integration of tourism in town planning', *Journal of Tourism Studies* 3, pp. 8-21.

330 Fesenmaier, D.R. and Lieber, S.R., 1985, 'Spatial structure and behavior response in outdoor recreation participaton', *Geografiska Annaler. Series B. Human Geography* 67, pp. 131-8.

331 Jim, C., 1989, 'Changing patterns of country-park recreation in Hong Kong', *The Geographical Journal* 155, pp. 167-78.

332 Maruani, T. and Amit-Cohen, I., 2007, 'Open space planning models: a review of approaches and methods', *Landscape and Urban Planning* 81, pp. 1-13.

333 Nicklin, M.W., 2009, 'Sunbathing on the Seine: The 8th annual Paris-Plages draws a crowd', Luxury Travel Advisor, Questex Media Group, Inc., <http://www.luxuryta.com/france/sunbathing-seine-8th-annual-paris-plages-draws-crowd-1195> [Accessed August 27 2009].

334 Gobster, P.H. and Dickhut, K.E., 1995, 'Exploring interspace: open space opportunities in dense urban areas', in *Inside Urban Ecosystems: Proceedings of the 7th National Urban Forestry Conference*, (ed) by Cheryl Kollin & Michael Barratt, American Forests, New York, pp. 70-3.

335 Wallace Roberts and Todd Inc, 2008, 'Town of Mammoth Lakes Draft Parks and Recreation Master Plan', Wallace Roberts and Todd, Inc., San Diego, California.

336 Oh, K. and Jeong, S., 2007, 'Assessing the spatial distribution of urban parks using GIS', *Landscape and Urban Planning* 82, pp. 25-32.

337 Gleeson, B. and Coiacetto, E., 2007, 'Positive planning in Australia: a review of historical and emergent rationales', *Urban Policy and Research* 25, pp. 5-19.

338 Crawford, E., 2003, 'Equity and the city: the case of the East Perth redevelopment', *Urban Policy and Research* 21, pp. 81-92.

339 Bounds, M. and Morris, A., 2006, 'Second wave gentrification in inner-city Sydney', *Cities* 23, pp. 99-108.

340 Hall, C.M., 1998, 'The politics of decision making and top down planning: Darling Harbour, Sydney', in *Managing Tourism in Cities: Policy, Process and Practice*, D. Tyler, Y. Guerrier & M. Robertson (eds), John Wiley and Sons, Chichester, N.Y, pp. 9-24.

341 Bishop, A., 2007, 'Outside the square? Aesthetic response to the contemporary architecture of Federation Square, Melbourne', *The Environmentalist* 27, pp. 63-72.

342 Keniger, M.D., Noble, L.A., Reilly, A. and Klug, M., 2001, 'The evaluation of public space: a comparative study of South Bank and internationally noted public spaces', Department of Architecture, University of Queensland, Brisbane, pp. 1-36.

343 Project for Public Spaces, 2009, 'Hall of shame nominee: Southbank Brisbane', Project for Public Spaces, <http://www.pps.org/great_public_spaces/one?public_place_id=501> [Accessed October 24 2009].

344 Spearritt, P., 2009, 'The 200 km city: Brisbane, the Gold Coast and Sunshine Coast', *Australian Economic History Review* 49, pp. 87-106.

345 Huntsman, L., 2001, *Sand in our Souls: The Beach in Australian History,* Melbourne University Press, Melbourne.

346 Smith, C., Clayden, A. and Dunnett, N., 2009, 'An exploration of the effect of housing unit density on aspects of residential landscape sustainability in England', *Journal of Urban Design* 14, pp. 163-87.

347 Beatley, T., 2000, *Green Urbanism: Learning from European Cities,* Island Press, Washington, D.C.

348 Amsterdam.info, 2003-2009, 'Westerpark, Amsterdam', Amsterdam.info, <http://www.amsterdam.info/parks/westerpark/> [Accessed October 25 2009].

349 Gustafson, K. and Porter, N., 2006, 'A park above industry', *Lotus International* 126, pp. 92-9.

350 Westergasfabriek, P., 2009, 'Westergasfabriek', Project Westergasfabriek, <http://www.project-westergasfabriek.nl/english> [Accessed October 25 2009].

351 Hinshaw, M., 2004, 'Amsterdam opens a new culture park', *Landscape Architecture* 94, pp. 60.

352 Tate, A., 2001, *Great City Parks,* Spon Press, London.

353 Strohmayer, U., 2006, 'Urban design and civic spaces: nature at the Parc des Buttes-Chaumont in Paris', *Cultural Geographies* 13, pp. 557-76.

354 Jamison, A., 2008, 'Greening the city: urban environmentalism from Mumford to Malmö', in *Urban Machinery: Inside Modern European Cities*, Mikael Hård & Thomas J. Misa (eds), The MIT Press, Cambridge, MA.

355 Chicago Park District, 2009, 'Parks and facilities', Chicago Park District, <http://www.chicagoparkdistrict.com/index.cfm/fuseaction/parks.home.cfm> [Accessed October 25 2009].

356 Byrne, J., Kendrick, M. and Sroaf, D., 2007, 'The park made of oil: towards a political ecology of the Kenneth Hahn State Recreation Area', *Local Environment* 12, pp. 153-81.

357 The River Project, 2010, 'Taylor Yard', The River Project, <http://www.theriverproject.org/tayloryard/index.html> [Accessed March 9 2010].

358 California State Parks, 2005, 'Rio De Los Angeles State Park: Preliminary General Plan and Draft Environmental Impact Report', California State Parks, Los Angeles.

359 Brown, P.L., 'A park offers nature, not just hoops', *The New York Times*, December 28, 2000, p. F9

360 Sorvig, K., 2003, 'The Wilds of South Central', American Society of Landscape Architects, <http://www.asla.org/nonmembers/lam/lamarticles02/april02/southcentral.html> [Accessed March 9 2010].

361 Chavez, D.J., 2005, 'Natural areas and urban populations: communication and environmental education challenges and actions in outdoor recreation', *Journal of Forestry* 103, pp. 407-10.

362 Trzyna, T., 2005, *The Urban Imperative,* California Institute of Public Affairs, Sacramento, Ca.

363 ———, 2001, 'California's urban protected areas: progress despite daunting pressures', *Parks: Cities and Protected Areas* 11, pp. 4-14.

364 Dunn, A.D., 2010, 'Siting green infrastructure: legal and policy solutions to alleviate urban poverty and promote healthy communities', *Pace Law Faculty Publications* 37, pp. 41-66.

365 Lund, H., 2003, 'Testing the claims of new urbanism: local access, pedestrian travel, and neighboring behaviors', *Journal of the American Planning Association* 69, pp. 414-29.

366 ———, 2006, 'Reasons for living in a transit-oriented development, and associated transit use', *Journal of the American Planning Association* 72, pp. 357-66.

367 Bernick, M.S. and Cervero, R.B., 1997, *Transit Villages in the 21st Century,* McGraw-Hill, New York.

Appendices

Appendix 1: Databases consulted and search terms

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Search Term(s)	Databases	Results
Subtropical urban design	CSA	7
Subtropical design	Illumina (CSA) Informit Proquest Geobase Current contents SSCI	159 42 82 0 152 0
Greenspace	CSA Ingenta Connect OVID	2 46 560
Subtropical urban design (SUD) & parks SUD & greenspace SUD & walls SUD & streets SUD & open space	Google Scholar Geobase Google Scholar Google Scholar Google Scholar Geobase Google Scholar Geobase	9,540 0 7,500 1,360 2,380 1 2,930 5
Subtropical design and greenspace	Current Contents	0
Subtropical parks	Geobase	9

Note, many articles were sourced from an existing extensive reference library (over 500 articles, books and book chapters) on parks, open space, physical activity, health, urban design, urban greenspace, urban trails and urban forests.

The method was to search key terms through a variety of databases until the relevant articles had been exhausted (i.e. reappeared in multiple databases). Google Scholar yielded far too many references. Only recent articles were searched (2004 and later) and the search was terminated after scanning the first 200 articles for each keyword.

Appendix 2: List of primary journals consulted

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- American Journal of Health Promotion
- American Journal of Preventative Medicine
- Annals of the Association of American Geographers
- Antipode
- Australian Geographer
- Australian Parks & Recreation
- Australian Planner
- Building and Environment
- Built Environment
- Children's Geographies
- Children Youth and Environments
- Capitalism Nature Socialism
- Cities
- Ecological Economics
- Energy and Buildings
- Environment
- Environment and Behaviour
- Environment and Planning A, B & D
- Environmental Conservation
- Gender, Place and Culture
- Geografiska Annaler B
- GeoForum
- Geographical Research
- Geo Journal
- Health and Place
- International Journal of Climatology
- International Journal of Urban and Regional Research
- Journal of the American Planning Association
- Journal of Environmental Planning and Management
- Journal of Green Building
- Journal of Historical Geography
- Journal of Leisure Research
- Journal of Physical Activity and Health
- Journal of Planning Education and Research
- Journal of Planning History
- Journal of Urban Affairs
- Journal of Urban Design
- Landscape
- Landscape Architecture Magazine
- Landscape and Urban Planning
- Landscape Journal
- Landscape Research
- Leisure Sciences
- Local Environment
- Parks and Recreation

- Places
- Planning Practice and Research
- Progress in Human Geography
- Public Health
- Queensland Planner
- Social Science Quarterly
- The Professional Geographer
- Tijdschrift Voor Economische en Geografie Sociale
- Tourism Geographies
- Transactions of the Institute of British Geographers
- Transportation Research Part D
- Urban Affairs Review
- Urban Design International
- Urban Ecology
- Urban Forestry and Urban Greening
- Urban Geography
- Urban Policy and Research
- Urban Studies

* Denotes three or more articles sourced from the journal.

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