

# **‘Health benefits and associated economic value of parks and park use in Australia – Final Report’**

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## **Introduction**

Increasingly people are living in urban areas. As cities grow, land is prized at a premium and with it come challenges to develop sustainable infrastructure. Parks and green spaces are an often-deferred element in this, as the health and economic benefits of parks are largely under-rated and not well-understood and evidence is mostly local and specific. In times of increasing obesity, cardiovascular disease and mental health disorders, we need to fully understand the benefits of parks so that we optimise the preventative and remedial impacts they have on health and wellbeing.

Parks are freely available in most neighbourhoods in Australia thanks to the foresight of key decision makers which has resulted in quality open space. Without this foresight our cities might look quite different. For example, without Tom Uren’s influence in Sydney, the restoration and re-use of derelict inner city areas such as the Glebe Estate and Woolloomooloo, the reclamation of Duck Creek and the creation of the Chipping Norton Lakes Scheme would not have occurred. Parks offer numerous psychological, physical, social, economic and environmental benefits to residents of all ages (Bedimo-Rung et al 2005) and there is growing international research on park use and its associated health and wellbeing benefits. A Danish survey found a correlation between proximal green spaces (parks) and lower levels of obesity and stress (Nielson & Hanson, 2007). Another Chicago based survey showed “parks spaces are found to directly mitigate stress by fostering social support” (Fan et al 2007, p.1201). There is also growing literature identifying links between availability of neighbourhood parks and enhanced physical activity (Kaczynski & Henderson 2008, Veitch et al. 2016, Veitch et al. 2013; Sallis et al. 2016) and obesity-related health indicators (Lachowycz & Jones 2011, Veitch et al. 2015), and also relationships with perceived general health (Maas et al 2006), mental health (van den Berg et al 2010; Barton & Pretty 2010), morbidity (Maas et al 2009) and mortality (Villeneuve et al 2012).

Furthermore, a study that included pooled data from 14 cities in ten high and low-middle income countries including US, Belgium, Czech Republic, Denmark, Hong Kong, NZ, UK, Brazil, Colombia, and

Mexico found the number of parks located within a 0.5 km buffer from home was positively associated with physical activity (Sallis et al. 2016).

Despite this growing evidence, as Nielsen and Hansen note (2007, p 849), further research is needed, especially Australian research, if the health sector is 'to fully exploit the beneficial effects of access to green areas' and park providers are to continue to provide adequate parks.

The aim of this pilot study was to directly estimate the health and wellbeing benefits attained from parks and the economic value assigned to parks by park users in Victoria. The findings will provide evidence / information to park managers and urban policy makers about the benefits of parks. The study was completed by researchers from Deakin University, in partnership with Parks and Leisure Australia,

## Methods

The research employed a mixed methods approach (survey and interviews) to collect primary data from a selection of park users. Data were collected between July and November 2015 on different days of the week and at various times of the day. Two researchers randomly approached English speaking adult park users inviting them to complete a short written survey, resulting in 140 park user responses: 100 from two metropolitan Melbourne parks and 40 from a park on the urban fringe of Melbourne.

### *Brief description of the three parks:*

1. Metropolitan Park 1 is 55 hectares and consists of: natural bushland (less maintained than Metropolitan Park 2 and the park on the urban fringe), playground (including old trams), BBQ facilities, public toilets, homestead, golf course, football ovals and tennis courts and had a main road as its entry point, car park with a hard surface and gravel paths throughout. This park is located in the eastern suburbs, approx. 19km from Melbourne CBD.
2. Metropolitan Park 2 is 127 hectares and consists of: manicured lawns and natural bushland, large lake, café, three separate playgrounds, public toilets, BBQ facilities (rotunda), sporting facilities on site, asphalt paths (suitable for walkers and cyclists) and parking on site at park (not asphalt). This park is located in the south-eastern suburbs, approx. 32km from Melbourne CBD.
3. Park on urban fringe of Melbourne is 7.5 hectares and consists of: manicured lawns and natural areas (the most maintained), one playground, lake, BBQ facilities (rotunda), public toilets, a combination of asphalt and gravel paths and parking on street (not as part of park). This park is located approx. 60km from Melbourne CBD.

The survey included measures of:

- the level and extent of the user's engagement with the park;
- the attitudes and perceptions of park users about use and enjoyment of parks and the link to improved health outcomes;
- the importance of parks to users;
- the park user's mental health and wellbeing (measured with the Perceived Stress Scale (Cohen et al, 1983) and wellbeing (measured with the Warwick-Edinburgh Mental Well-being Scale (Tennant et al, 2007); and
- the economic value assigned by park users to parks.

A contingent valuation method was used to estimate the monetary value park users attach to the health benefits derived from parks. The survey used a dichotomous choice with follow up, in which respondents were asked to imagine a hypothetical scenario where an annual levy is collected into a funding pool to maintain and provide access to parks in Victoria. At the same time, respondents were reminded of the vital Fire Services Property Levy that is currently collected. Respondents then made an economic choice whether they were willing to pay (WTP) (yes or no) with follow-up elicitation questions. A follow-up question to a response of ‘no’ aims to understand whether individuals were uninterested in the provision of parks or not (i.e. true zero values or protest responses). Another follow-up question to a response of ‘yes’ invites individuals to decide on the maximum dollar amount they were willing to pay for the provision and access to parks in Victoria. There were ten WTP interval bids (\$0 to \$100) to choose from, including an “other amount” open-ended bid.

Tobit regression (Tobin, 1958) is used to examine the association between the WTP values and the respondents’ demographic and socioeconomic characteristics (see Appendix A for further explanation). Demographic factors, which could predict how WTP varies, were included in the model, such as age, gender, employment and income (Herens et al, 2015; Krupnick et al, 2002). We expected respondents who frequented parks regularly, had children and valued the provision of parks as highly important would exhibit higher WTP values than other respondents. Variables related to these attributes were also included in the Tobit model. Analysis was conducted in STATA/SE 14.0.

Following completion of the survey, respondents were invited to participate in a follow-up semi-structured qualitative interview that lasted approximately 10-15 minutes and allowed them to expand on their responses to some of the survey questions. Seventeen respondents agreed to participate in the interviewed and were asked to describe for example, how they feel about ‘access’ to parks and to describe how they feel about the ‘benefits’ parks may/may not provide them.

Deakin University Human Ethics Advisory Group approved the study (HEAG-H 69\_2015).

## Quantitative Results

### *Demographics*

One hundred and forty individuals across three parks participated in the pilot survey. Selected demographic information of the pilot sample are presented in Table 1 below. The findings indicate that the majority of respondents were female, aged 35-64 years, working full-time, with a weekly income of more than \$1000. They also tended to have children, own a dog and to have ‘very good’ health.

**Table 1 Background characteristics survey sample**

Baseline Characteristics	Summary	
Survey sample, n	140	
Male, n (%)	41	(29%)
Age group, n (%)		
18-34 years	32	(23%)
35-64 years	74	(53%)
65+ years	33	(24%)

<b>Studying, n (%)</b>	21	(15%)
<b>Employment status, n (%)</b>		
Full-time employed	41	(29%)
Part-time employed	35	(25%)
Unpaid work	14	(10%)
Unemployed - seeking work	4	(3%)
Unemployed - not seeking work	6	(4%)
Retired	38	(27%)
<b>Average size of household, (sd)</b>	2.9	(1.2)
<b>Dog ownership, n (%)</b>	50	(36%)
<b>Have children, n (%)</b>	108	(77%)
<b>Have grandchildren, n (%)</b>	32	(23%)
<b>Household income range per week, n (%)</b>		
< \$1000	21	(15%)
\$1000-\$1999	35	(25%)
\$2000+	28	(20%)
<b>General health</b>		
Excellent	35	(25%)
Very good	68	(49%)
Good	32	(23%)
Fair	4	(3%)

### *Mental Wellbeing*

One hundred and thirty nine respondents reported their mental health and wellbeing in the month prior to their park visit using the Perceived Stress Scale (PSS4) and the Warwick-Edinburgh Mental Well-being Scale (SWEMWBS). The resulting score from SWEMWBS ranges from 7 to 35 (Stewart-Brown et al, 2009). The range of the PSS4 score is 0 to 15 (Cohen and Williamson, 1988).

We did a statistical analysis of the mean differences between our means and the community sample/norms and they were significantly different. The mean PSS-4 score reported by park users ( $M = 3.78$ ,  $SD = 2.98$ ) was significantly lower than the mean PSS-4 score ( $M = 6.11$ ,  $SD = 3.14$ ) reported by a general community sample in England (Warttig et al., 2013),  $t(168) = 8.77$ ,  $p < .001$ . In contrast, the mean SWEMWBS reported ( $M = 19.78$ ,  $SD = 2.75$ ) is significantly lower than the mean score ( $M = 23.61$ ,  $SD = 4.36$ ) reported by a general population sample in England (Ng Fat et al, 2015 unpublished),  $t(145) = 16.27$ ,  $p < .001$ .

Collectively, the results suggest that compared with the general population, park users experience lowered stress, yet rate their mental well-being as being poorer. In considering the potential inconsistencies between the two outcome measures, SWEMWBS captures a wider range of factors contributing mental health over the previous two weeks, such as social relationships and view of the future, while PSS-4 primarily assesses stress over the last month.

A possible explanation for the results may be that people who have recently been experiencing lowered mental well-being tend to go to the park to seek physical, mental and spiritual benefits as identified in the qualitative data of this study. This activity may then lower stress. The two constructs may not be related though.

### *Value of parks and park use*

A descriptive analysis of the respondents' use of parks are shown in Table 2. The findings indicate that (39%) of park users visit parks to walk for exercise or to walk their dog (14%). They tend to visit parks with their partner (40%) or children (25%) or with friends (27%). The findings also suggest that participants tend to visit parks for about 30-60 minutes, 2-3 times a week, to participate in light (51%) to moderate (36%) intensity physical activity. Additionally, they would 'very much' miss the park if it was not around.

**Table 2 Description of park visitation**

<b>Use of parks</b>	<b>n</b>	<b>%</b>
<b>Use of parks &amp; facilities</b>	130	93
<b>Main reason for park visit</b>		
Walk	54	39
Walk the dog	20	14
Ride a bike	2	1
Jog/run	7	5
Ball games	2	1
Other exercise	0	0
Supervise children	10	7
Spend time with family/friends	13	9
Picnic/BBQ	16	11
Socialise	1	1
Attend event/celebration	2	1
Visit café	2	1
View nature	2	1
Relax	0	0
Other	8	6
<b>Accompaniment to park</b>		
Alone	28	20
Partner or other family members	56	40
Child(ren)	35	25
Grandchild(ren)	8	6
Friends	38	27
Organised group	15	11
Dog	18	13
Other	2	1
<b>Time spent in park on day of survey</b>		
<30 mins	16	11
30mins - 1hr	58	41
1-2 hrs	53	38
2-3 hrs	11	8
3-4 hrs	2	1
4+ hrs	0	0
<b>Average number of park visits in the past 3 months</b>		

Daily	9	6
2-3 times/week	28	20
once/week	19	14
2-3 times/month	22	16
once/month	15	11
< once/month	12	9
First time to the park	34	24
Other	1	1
<b>Usual physical activity levels in this park in the past 3 months</b>		
Mostly sitting	10	7
Mostly light activities	71	51
Mostly moderate activities	50	36
Mostly vigorous activities	9	6
<b>Would you miss this park if it was not around?</b>		
Very much	107	76
Occasionally miss it	29	21
Never, wouldn't notice if it was not there	2	1

Park users' valuation of parks and the use of parks are summarized in Table 3. Eighty four percent of respondents "strongly agreed" that having access to a park was important and 80% strongly agreed that in the future they might visit parks and its amenities. Most respondents indicated (agreed/strongly agreed) that they used parks for physical activities (89%) and that visiting parks helped them to improve their feelings of wellness (98%). A high proportion also (agreed/strongly agreed) that parks provide an opportunity to value the environment as well as an opportunity to facilitate social interactions.

**Table 3 Value of parks**

<b>Value of parks &amp; park use (%)</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neither</b>	<b>Disagree</b>	<b>Strongly disagree</b>	<b>Don't know</b>
Having access to park is important to me	84	14	1	1	0	0
Having access to park is not important to me	0	0	1	22	75	0
In future, I might visit/use parks & its amenities	80	18	0	0	1	0
In future, parks will become important to me	71	21	2	0	1	4
I use parks for physical activities	68	21	1	7	1	0
Parks provide an opportunity to learn/value environment	36	43	11	6	1	1
Parks provide an opportunity for social interactions	21	44	16	15	1	1
Parks help improve mood	58	40	1	0	0	0
Visiting parks help improve feelings of wellness	64	34	2	0	0	0

### *Willingness to pay*

A total of 139 respondents responded to the WTP valuation. A summary of the follow-up contingent valuation question is described in Table 4. Eighty two percent of respondents were willing to pay some annual dollar amount to keep parks. The highest monetary amount stated was \$200 specified under 'other amounts'. The most frequently reported monetary amount \$100, was also the highest bid level offered (23%). Other popular responses were \$20 (13.7%) and \$50 (20.9%). These bid levels were equivalents to the three highest denominations of the Australian banknotes i.e. \$20, \$50 and \$100. Including those not willing to pay, the overall mean (SD) annual amount park users were willing to pay was \$45.4 (38.4) to maintain and provide access to parks.

**Table 4 Reported annual willingness-to-pay (WTP) for the provision and access to parks in Victoria**

<b>WTP bid</b>	<b>n</b>	<b>%</b>
\$ -	25	18.0
\$ 5	5	3.6
\$ 10	5	3.6
\$ 15	6	4.3
\$ 20	19	13.7
\$ 25	1	0.7
\$ 30	9	6.5
\$ 50	29	20.9
\$ 70	7	5.0
\$ 100	32	23.0
\$ 200	1	0.7
<b>Total</b>	<b>139</b>	<b>100.0%</b>

Table 5 represents the summary statistics of the mean WTP and standard deviation (SD) or the spread from the mean by the respondents' demographics characteristics and selected attributes related to attitudes and behaviour towards park use derived from the pilot survey. Variation in responses was fairly large as seen in the standard deviation. Our mean WTP estimates identified men reporting higher mean (SD) WTP at \$62.7 (38.7). Those employed stated higher WTP \$52.0 (40.8) compared to unemployed \$29.2 (29.7), and respondents with higher income levels also stated the highest WTP \$68.9 (39.2). Mean WTP amounts were also much higher in respondents who visited parks daily \$66.1 (35.3) and those who indicated vigorous activity levels during their park visits \$67.8 (34.2). The mean WTP observed were also highest for those who visit parks for physical activities \$49.3 (40.7), then social reasons \$39.4 (34.0) and relaxation and wellbeing \$23.3 (25.2). This is consistent with previous research that has found, physical activity in the park to be of greater importance in predicting WTP than socio-economic or health predictors (Herens et al, 2015).

In addition, a majority of respondents indicated that they would miss the park 'very much' if it was not available and their corresponding WTP were also higher at \$48.3 (39.4) than those who would 'occasionally' or 'never' miss it. In the same way, most respondents considered the provision of parks to be 'most important' or 'just as important' as other local services, and were willing to pay higher amounts to keep parks.

**Table 5 Park users willingness to pay (WTP) by demographic characteristics and survey responses.**

	WTP		
	n	mean	sd
<b>Gender</b>			
Male	41	\$ 62.68	\$ 38.72
Female	98	\$ 38.11	\$ 36.05
<b>Age</b>			
18-24	15	\$ 56.67	\$ 39.22
25-34	17	\$ 25.00	\$ 27.89
35-44	23	\$ 41.30	\$ 32.48
45-54	25	\$ 59.60	\$ 46.68
55-64	26	\$ 47.69	\$ 41.98
65+	33	\$ 40.91	\$ 32.94
<b>Pet dog</b>			
no dog	88	\$ 42.84	\$ 35.66
<b>Employment</b>			
Employed	76	\$ 52.04	\$ 40.82
unpaid work, unemployed	24	\$ 29.17	\$ 29.73
Retired	38	\$ 40.79	\$ 34.77
<b>Income</b>			
<\$1000 pw	21	\$ 37.86	\$ 32.31
\$1000-\$1999 pw	35	\$ 42.71	\$ 35.22
\$2000+ pw	28	\$ 60.89	\$ 39.21
<b>Children</b>			
No children	31	\$ 41.13	\$ 36.67
Children	108	\$ 46.57	\$ 38.96
No grandchildren	89	\$ 45.90	\$ 39.27
Grandchildren	32	\$ 39.84	\$ 36.02
<b>General health</b>			
Excellent	35	\$ 37.71	\$ 38.35
Very good	68	\$ 41.69	\$ 33.94
Good	32	\$ 60.47	\$ 42.91
Fair	4	\$ 53.75	\$ 53.75
<b>Main reason for park visit</b>			
Physical-active (e.g. walk, jog, cycling, games)	85	\$ 49.29	\$ 40.70
Social (e.g. picnic/ BBQ, visit café, event/ celebration)	45	\$ 39.44	\$ 34.03
Emotional-wellbeing	3	\$ 23.33	\$ 25.17
Other-other	5	\$ 54.00	\$ 36.47
<b>Frequency of park visits in the past 3 months</b>			
Daily	9	\$ 66.11	\$ 35.34



Weekly (1-3 times/week)	47	\$ 38.30	\$ 34.83
Monthly (1-3 times/month)	37	\$ 50.54	\$ 36.57
Less than once/month	12	\$ 48.75	\$ 42.22
First time to this park	34	\$ 42.79	\$ 43.47
Usual activity level in the park in the past 3 months			
Mostly sitting	10	\$ 39.00	\$ 38.14
Mostly light	70	\$ 42.29	\$ 34.89
Mostly moderate	50	\$ 46.90	\$ 43.18
Mostly vigorous	9	\$ 67.78	\$ 34.20
Miss park if not around			
Very much	107	\$ 48.27	\$ 39.36
Occasionally	28	\$ 35.71	\$ 35.71
Never	2	\$ 35.00	\$ 21.21
Park importance compared to other services			
Most important	11	\$ 37.27	\$ 37.97
Just as important	113	\$ 47.57	\$ 39.22
Less important	12	\$ 28.33	\$ 28.23
Not sure	3	\$ 60.00	\$ 36.06

The results from the Tobit regression are shown in Table 6. Demographic factors showed mixed effect on WTP. As expected, low income was negatively related to WTP, and being employed was positively related to WTP, however these results were only marginally significant. Contrary to initial predictions, age showed mixed effect on WTP. People aged between 25 and 65 years were less willing to pay to keep parks than people over 65 years of age.

Furthermore, estimates from the Tobit model showed that the frequency of visits to the park and having children does not significantly influence park users' WTP amounts for keeping parks. However respondents' WTP as valued by provision of parks as 'most important' or 'less important' compared to other local services were significant at 1% level.

**Table 6 Tobit regression results**

<b>Variables</b>	<b>coefficient</b>	<b>Standard error</b>	<b>p-value</b>
<b>Gender</b>			
Female	-4.29	8.93	0.63
<b>Age</b>			
18-24	0.07	20.91	1.00
25-34	-57.41	20.09	0.01
35-44	-31.99	20.03	0.12
45-54	-41.42	21.41	0.06
55-64	-35.85	17.49	0.04
<b>Employment</b>			
Employed	32.44	18.32	0.08
unpaid work, unemployed	7.27	18.46	0.70
<b>Income</b>			
<\$1000 pw	-23.20	12.58	0.07
\$1000-\$1999 pw	-11.86	9.79	0.23
Children	16.32	11.50	0.16
<b>How often visited park in the past 3m</b>			
Daily	46.33	35.73	0.20
Weekly (1-3 times/wk)	16.73	10.54	0.12
Monthly (1-3 times/mth)	3.77	11.85	0.75
<once/mth	14.69	14.25	0.31
<b>Park importance to other services</b>			
Most important	-83.13	32.95	0.01
Just as important	-30.83	27.23	0.26
Less important	-83.32	30.81	0.01
Constant	81.43	37.44	0.03
<b>N</b>	83		
<b>Pseudo-R2</b>	0.051		
<b>Log likelihood</b>	-352.7		
<b>Prob &gt; chi2</b>	0.004		
<b>Mean WTP</b>	\$43.47		
<b>95% CI</b>	(\$36.14 , \$50.80)		

## Qualitative Results

Five key themes emerged from the qualitative interview findings. The themes related to the health benefits derived from visiting parks and the factors influencing park visitation including: 1) health benefits, 2) access, 3) urban density, 4) children and 5) safety. The following sections utilise participant quotes (denoted by P1-P17) to illustrate each of the key themes. The majority of the interview participants visited Metropolitan Park 1 (11), followed by Metropolitan Park 2 (4) and the park on the urban fringe (2). They were predominantly of retirement age (7) and female (9).

### *Key theme 1: Health benefits*

This theme related to a range of health benefits that respondents associated with visiting parks: physical, mental/spiritual and social. Much like the literature on parks and health (refer Townsend et al. 2015, Veitch et al 2013), respondents tended to associate their use of parks with various physical health benefits, some mental/spiritual benefits and a few social health benefits.

#### Physical

The majority of respondents spoke of the physical health benefits derived from visiting parks in their neighbourhood. Many talked about the fact that they enjoyed walking in parks and being out in fresh air as they felt that this helped their mobility (especially the older adult participants) and kept them fit. For example, P9 mentioned the benefits of walking in parks as follows:

*Walking is a great benefit for health, well we believe it is, and parks are a really nice place to walk*

and P2 suggested:

*Well I think they help mobility, having just had a knee replacement two years ago and now I have just had a hip replacement, and I find walking regularly certainly helps with mobility, bring all my mobility back*

Another respondent, P3, also acknowledged the link between exercising in parks and physical health:

*One [benefit] is the health exercise, walking, the other is getting out in the fresh air and interacting with nature, birds trees*

Not surprisingly, and consistent with the literature (Westgarth, Christley & Christian 2014), owning a dog was found to be a good conduit for walking in parks. Several respondents acknowledged that they tended to visit their local park to exercise their pet. For instance, P7 commented: *“I come to walk the dog ... when you’ve got a dog, especially a kelpie, dog’s need exercise and you’ve just got to go out, whether you want to or not”*.

Another respondent, P13, commented that she spent time in parks to exercise her dog but also enjoyed the open space which was more preferable than exercising in an enclosed gym:

*Oh just the exercise and the feeling of wellness you get when you’re out there in the fresh air... Mainly walking my dog, ... yeah just walks... it’s a nice place to exercise instead of standing in a gym, huffing and puffing and smelling all those sweaty people*

Interestingly, some respondents suggested that they also benefited mentally from time spent exercising in parks. For example, P1 stated:

*I’m moving for both physical movement sake but also for head space, head and heart space and similarly, P5 commented: *The physical benefits, like the exercise, is the benefit for everything, you walk, it starts from the bottom to head.**

Furthermore, P11 recognised the connections and suggested:

*The getting out, exercise, fresh air, getting around all that sort of thing... I think with a busy lifestyle visiting a park is a good thing to do exercise so I think exercise, for me, is quite important, you know, for my own sort of health but also, particularly, exercise is good for mental health as well*

## Mental/spiritual

Whilst some respondents identified mental health benefits as an additional benefit to their physical activity derived from exercising in parks, other respondents indicated that mental health benefits were gained from just simply spending time in parks. For instance, P9 suggested:

*Even if you don't go there to walk, if you just take a picnic and it's just peaceful, helps everybody relax... We certainly do appreciate the trees and the bushland and the native flowers but I think that's all part of the mental wellbeing thing, yeah*

In congruence with the literature (Townsend et al. 2015), most respondents felt that parks provided them with a relaxing environment and a mechanism for stress relief. This was particularly important for those respondents who lead busy lifestyles and work long hours. For example, P14 commented:

*I suppose it enables you to de-stress, put aside your own work or other stresses you might have in life so the benefit of going to a park is that a lot of those things are, not gone completely but are pushed back in your mind*

Similarly, P8 eloquently highlighted the mental health benefits associated with visiting parks:

*I think just getting out in a park just refreshes people and gives people another perspective, whoever we are, if we're just contained within four walls all of the time and we can get so desk-bound and so caught up with technology... Yeah, it gives you perspective and puts problems in perspective and yeah just helps just lifting depression a little bit too, anxiety, I think because less evils in our lives when we just get out into a park, for sure*

Whilst not as commonly reported as mental health benefits, two respondents recognised the associated spiritual health benefits resulting from their time spent in parks. P1 commented:

*Well, so I come from a faith background, so I'm a Christian, so I find being able to engage with the physical aspect of what I see around me takes away that sense of stuff in my head and just allows me to focus on God and creation and it's just a pleasant place to be, just recharges my batteries*

and P4 remarked: *I think it's just the peacefulness of it, yeah I love the peacefulness of it, you know I like the kids running around so it does, spiritually, if you'd like to say.*

The spiritual benefits derived from spending time in parks are generally not as well recognised as the mental (or physical) health benefits (Townsend et al. 2015). Therefore, these findings suggest this is an area that warrants further investigation.

## Social

Although not as commonly reported as physical or mental health benefits, social health benefits were identified by some of the respondents. In particular, one respondent who had recently migrated to Australia, indicated that they visited the park to meet people and another participant, P10, suggested that when they had a pet dog there were more likely to gain social health benefits:

*I used to go on my own a lot with the dog, we used to have a dog, and then I would make lots of new friends then, well new acquaintances".*

Another respondent, P17, argued that parks are important for providing social health opportunities for families:

*Yeah definitely and to, ahh especially living in somewhat of a city area, being part of the community so maybe meeting people and like bringing kids and they meet people is good*

*because I'm from the country where you know community, to be involved in the community seems to be easier in the country, you know, whereas here you've got to work a little bit harder at that and parks are good for that, yeah.*

On the other hand, several respondents suggested that they did not associate spending time in parks with social health benefits. For example, P14 stated:

*I don't go to the park to socialise as such, there may be benefits for others but not myself*  
Similarly, P1 remarked:

*I don't think the social aspect of it really, when the children were smaller, for sure, we used to hang out at the playground and you'd meet other people... I don't need to meet people but that's not true for everyone, obviously*

These findings are consistent with the literature (Townsend et al 2015) and indicate that social health benefits are generally not as well recognised as the mental (or physical) health benefits. Therefore, these findings suggest this is another area that warrants further investigation. However, we recognise that it would be difficult to quantify the social benefits in ways that may help parks managers justify retention and development of parks.

#### *Key theme 2: Access*

This theme relates to the respondents access to parks which was considered to be 'very good' across Melbourne (they could visit a combination of larger parks and smaller neighbourhood pocket-parks). Predominantly, respondents remarked that they lived within walking distance of a park and they highlighted how this proximity was beneficial. For example, P1 commented:

*I think we've got great access to parks in this area... having the ability just to be able to walk here is good*

Similarly, P3 remarked: *We have got this park close to home so that's that is good and it's a short drive to other parks*

and P15 reported: *Well, I think here I'm very lucky, compared to a lot of areas in the city, I've got quite large areas of parkland quite conveniently located nearby*

Many of the respondents suggested that proximity is critical to their park visitation, as commented by P14:

*In the case of Jells Park I can walk to it so proximity means it's very accessible... Well I suppose proximity is the most important thing, if I had to drive somewhere I'd think twice about it, given I've got it right on my doorstep it's not an issue*

and P6 argued:

*They need to be within a reasonable distance too, sometimes you feel like going but you don't want to spend half an hour getting there... I think it's nice to have the availability to walk to a park, yeah, that's probably important, a lot of families should have that, yeah, wherever they live*

These findings are consistent with the literature which suggests that parks need to be within a short walk or drive from people's homes in order for them to be regularly visited (Townsend et al. 2015, Veitch et al 2016). Furthermore, good access to parks is vital for people to reap the range of health benefits they can provide, especially the mental health benefits (Sturm & Cohen 2014).

### *Key theme 3: Urban density*

This theme relates to the increasing urban density that many respondents identified is encroaching on open space in their community. A number of respondents, particularly those who lived near Metropolitan Park 1, identified the importance of available parks as housing density increases in their neighbourhood. For example, P1 commented:

*If we think that parks contribute to people's mental and state of wellbeing then we should be investing in them and keeping these green spaces, especially as population and housing density, like increases along Burwood Highway and those other thoroughfares they need to keep parkland, people have to have somewhere to go, if they don't have backyards, they've got to have somewhere to go*

And similarly, P3 mentioned:

*I think as the city gets more densely built up parks are much more important for the fresh air, for the exercise and for you know getting your feet on the ground*

Other respondents similarly highlighted the importance of parks in the inner city environment, suggesting that they are vital to the health and wellbeing of people. For instance, P8 proposed:

*I just think they're a really great asset that won't always be there and the more we become urbanised the more we need green areas I think, they're just so important for our mental health and wellbeing*

and P7 commented:

*I just think they're, you have to keep having parks, you can't keep selling off the land and putting houses on it, you've got to have big green spaces, there's got to be enough room for the trees to put more oxygen*

These findings are consistent with the literature and emphasise that people strongly value the existence of parks in urban environments as they recognise the health and wellbeing benefits they provide (Konijnendijk et al. 2013). This recognition is critical for planners and park managers to consider as part of managing open spaces and also for communities wanting to maintain their access to parks.

### *Key theme 4: Children*

This theme relates to 'children' - in terms of them providing a reason for park visitation and in relation to whether parks adequately provide child friendly facilities. Some respondents mentioned that they were more likely to visit their local parks to participate in physical exercise and play activities when they had young children. For example, P4 commented:

*when my daughter was young and we had sort of, you know, a few parties and all that sort of thing and they'd play on the swings or whatever, on the adventure playground, so I think it was probably more important then*

And P1 mentioned:

*we used to come here a lot when our kids were small, now it's often just me but on a good day, a few of us will come up, throw a Frisbee*

Other respondents spoke of the benefits parks provided their children with a few respondents identifying the developmental benefits of children spending time in parks. For instance, P11 commented:

*it provides good engagement with children, that sort of park environment, it's also quite good for their learning as well, you know learning how to do new things and explore their imagination so that's probably quite a big and important thing for why I, or we, go to parks... interacting with other children but I suppose their development in terms of sometimes problem solving if the parks are difficult but all those, I suppose important things about, you know, that they get from going to a park, learning new things, engaging with different children, sharing etc.*

Some respondents discussed how they visited parks if they provided facilities that were appropriate for children such as, large areas for kite flying or ball throwing and safe bike tracks. One respondent, P9, mentioned that he has found that as his children have grown:

*we're finding they progress to different things in the park so it's good that they have different things for a range of different children, you know, because you might have children and grandchildren of different ages go to the park, it's no good if all of the stuff's not suitable for one of them*

Similarly, P10 commented that his use of parks has changed as he has acquired grandchildren:

*I've got the grandchildren here a lot, sometimes we're using the parks to take them to so it's just changing, my use of parks is changing I suppose...I'm changing the types of parks I'm using, we're looking for more playgrounds than we had been, yeah... The type of equipment, I need it for the under-5s at the moment, but I, I'm also noticing that there are parks for older children that will come in handy later so it's, it's what I need at the time, are the ones for very small children*

These findings suggest that the presence of children creates opportunities for park visitation, provided the accessible parks contain adequate facilities for children of varying ages. These findings support the literature that identifies a number of health, educational and developmental benefits of nature contact for children (Parker & Strickland 2014).

#### *Key theme 6: Safety*

The final key theme derived from the qualitative findings was that of safety. The majority of respondents felt safe in the parks they visited but this was dependent on the time of day they visited, with some commenting that they would avoid visiting their nearby parks during the evening. For example, P13 mentioned:

*the only park that we don't access, like later in the day, is the Gardiner's Creek one because it's not lit, it's very dark and very eerie... anything could happen in those trees or bushes down there, you know it's down, it's in the middle of nowhere . During the day it's all really safe*

And P15 commented:

*I think that's determined by when you go, I mean people do silly things... because I was coming back and it was dusk and I saw some people that I wasn't too sure about so I went around but I mean that's just being sensible, which everybody isn't... I walked back through the park and it was pitch black and I felt a bit anxious, hmm, so I didn't do that again*

Some respondents also discussed how they felt safe in their local park if other people were around them. For instance, P2 suggested:

*I think you just feel safer if you have got someone nearby you know. If you have a trip over you want someone there to pick you up.” Similarly, P8 stated: “I think people are never too far away in a park like this so safety’s pretty good, it’s got a pretty decent record, it’s a good area*

These findings are consistent with the literature which indicates that visitation of parks is related to how safe people feel accessing them. For example, research by Koohsari, Karakiewicz & Kaczynski (2013) found that factors such as perceptions of safety may influence the extent of walking in public open spaces.

## Conclusion

Land is a finite resource and the pressures of land development on the retention of parks is ever-increasing. In this environment, the public and political perception of parks vacillates between “valuable land being wasted” to “an essential resource for releasing the stresses of modern living”. Parks, once gone, can never be returned. This pilot study represents an attempt to research the nature and extent to which parks can be publicly acknowledged as having very real and justifiable claims to being essential to health and wellbeing and that these claims can be justified in economic terms. A vital and central feature of the study is that it has focused on people from different sections of the community who use parks and to gain some assessable insight into their views on the need for and economic value of parks.

Our findings suggest that park users derive a range of physical, mental/spiritual and social health benefits. Park use was predominantly associated with physical health benefits as highlighted in Table 3 where 62% of respondents mentioned visiting parks for reasons related to physical activity. Additionally, 89% of respondents strongly agreed/agreed that parks are valued for their opportunities to participate in physical activity. Other findings showed that 33% of respondents highlighted gaining social benefits from park visitation and only 6% mentioned gaining wellbeing and other mental benefits. However, respondents do ‘highly value’ parks to improve mood (98%) and feelings of wellness (98%). The qualitative findings further supported those of the survey and acknowledged that park users associated visiting parks more commonly with physical health benefits followed by mental/spiritual and social benefits.

Some caution needs to be taken when interpreting our findings as they are from a relatively small pilot sample of parks users and therefore the results could be somewhat biased towards park visitation. Our results are also limited by the fact that data was only collected from three parks which offered a diverse range of facilities and attributes (i.e. sporting facilities and playgrounds) so it is possible that they provided more opportunities for physical activity than parks in other neighbourhoods. In addition, our sample did not include participants from different cultural groups or people from various socio-economic statuses so our results are not representative of the general population. Furthermore, given the lack of published Australian norms and the meaning of differences in the mental health score, the magnitude of the scale scores on PSS4 and SWEMWBS should be interpreted with caution.

However, overall our pilot study findings suggest that park users are willing to pay for parks as they highly value them as places for exercising, socialising, and relaxing. Importantly, most people would miss parks if they did not exist, as evident from both the quantitative findings (where 76% of respondents mentioned that they would ‘very much’ miss a park if it was not around) and the qualitative findings. We intend to further investigate the economic value associated with parks and



park use by conducting an online survey, with a separate sample of the Australian general population.

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## Appendix A: Tobit regression

The Tobit model assumes that the dependent variable has a number of its values clustered at a limiting value, usually zero (McDonald and Moffitt 1980). The advantage of Tobit regression is that it is able to estimate the relationship between the explanatory variable and some dependent variables to estimate the probability of a dependent variable being at or below (above) a limit. The Tobit regression analysis examines the association between the stated WTP values and the participants' demographic and socioeconomic characteristics. The independent variables are selected based on demographic factors found in the literature to influence WTP.