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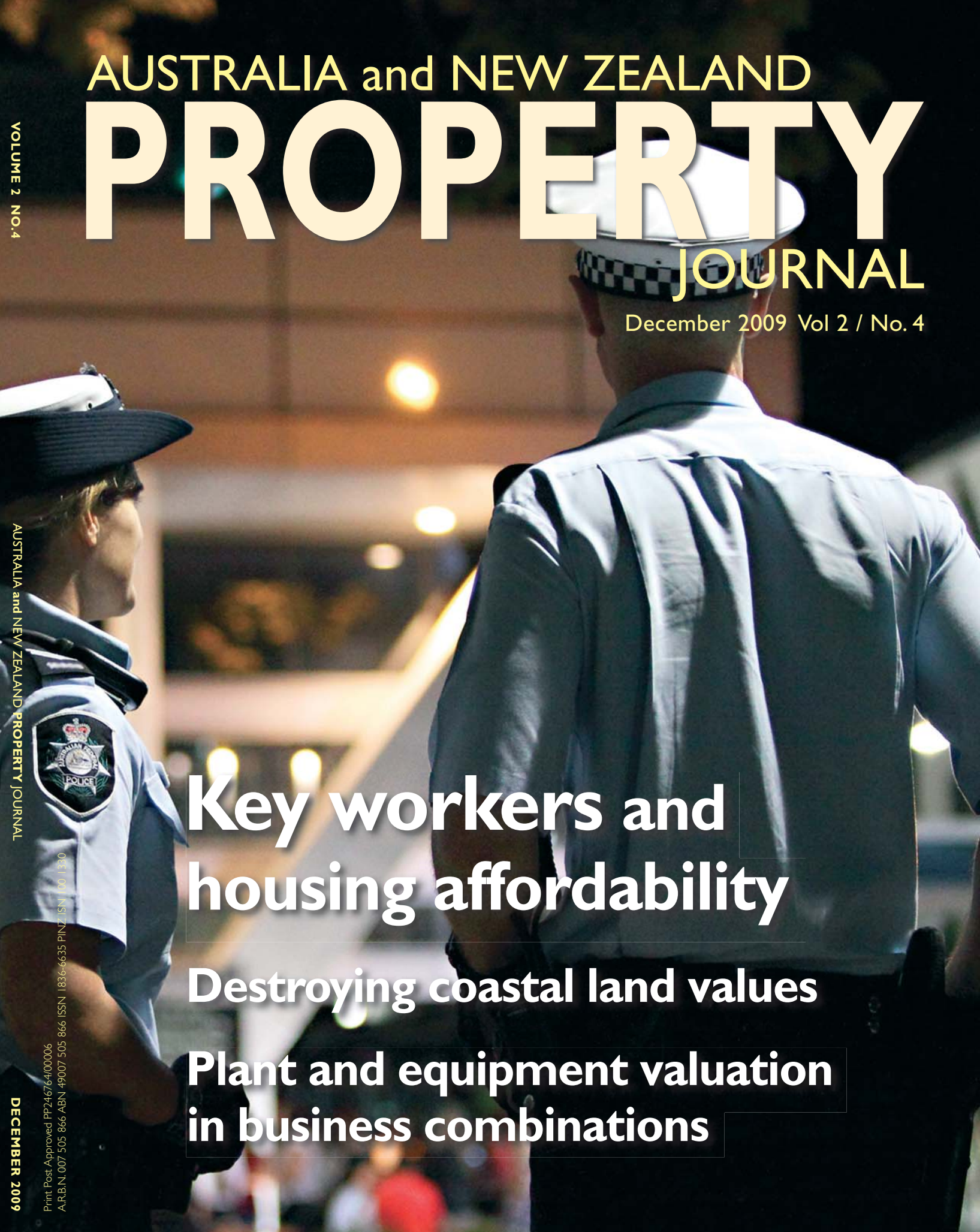

Key workers and housing affordability

Destroying coastal land values

Plant and equipment valuation in business combinations

AUSTRALIA and NEW ZEALAND PROPERTY JOURNAL

DECEMBER 2009

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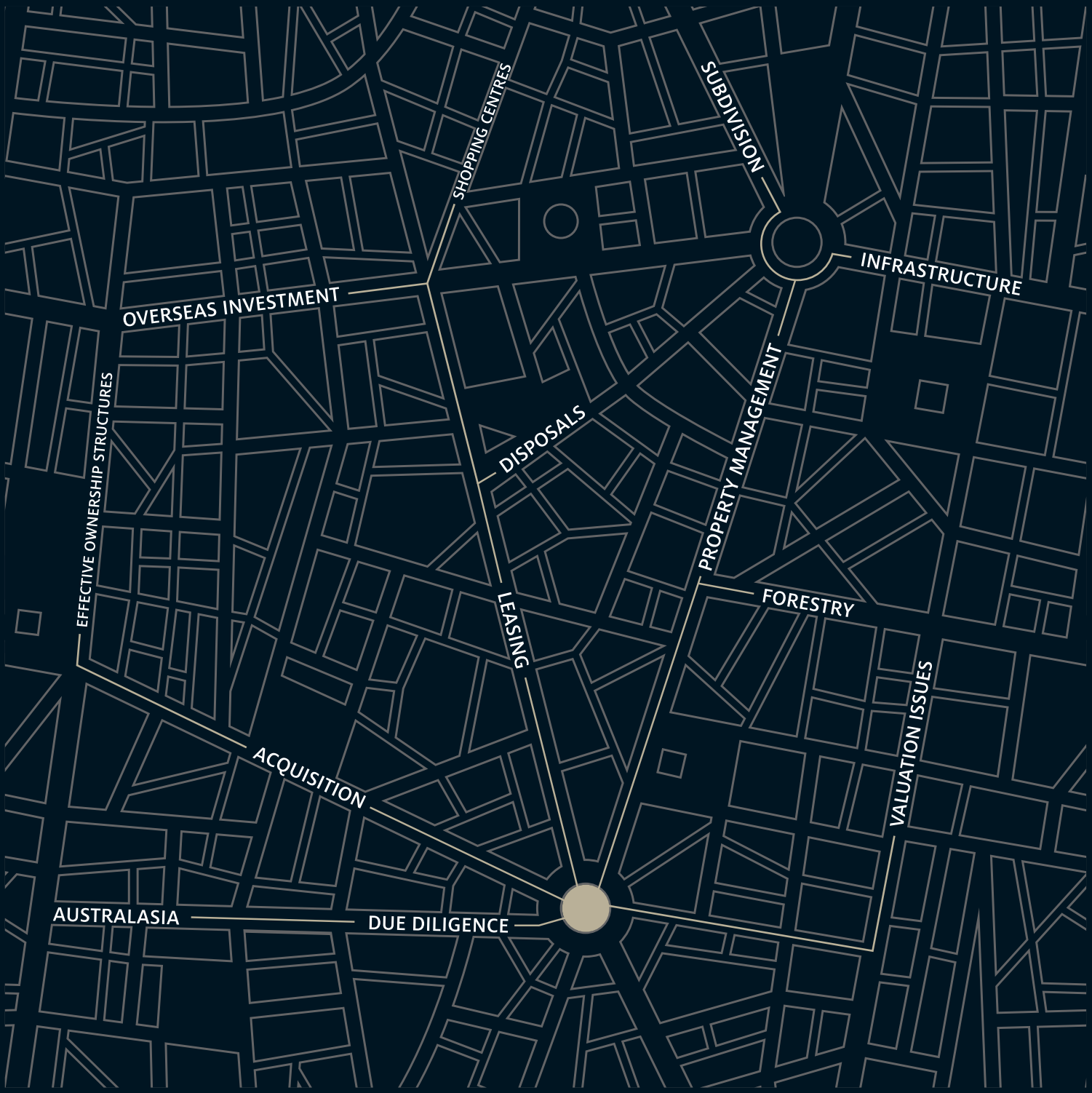

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API NATIONAL PRESIDENT'S REPORT

David Moore
API National President

"The *Spencer* test is an impregnable fortress of judicial wisdom which continues to be applied today because in the 100 years since it was formulated no judge, barrister, academic, valuer or politician has been able to improve upon it. For every valuer, the Spencer test remains as the only complete answer to that most frequently encountered and difficult of questions: *What is the market value of this property?*" (Grant Allan and Paul Walker, *Australia and New Zealand Property Journal*.)

During these unprecedented market conditions, the valuer members of the Institute can stand proud of the professionalism applied to the role they are playing in the nation's economic recovery. In previous pages of the Journal, I have maintained the steadfast belief in the principles of relevant valuation practice by our professional members as stated in the Institute's *Property Standards Manual.*

In my June column I talked about the Institute at the "crossroads of change". National Council's decision to develop new professional Certifications to broaden the depth of the API membership and effectiveness in the wider property profession will take time to fully mature. But Certifications that recognise Plant and Machinery, Funds and Facilities Management, Property Development, Education, Law and Consulting, to name a few, will enable the Institute to concentrate on providing additional support services to these influential fields of practice.

Providing members with opportunities that keep you at the leading edge of the profession is a key objective of National Council and all the state and territory Divisions.

The *International Property Conference* must be a date for your diaries. General Peter Gosgrove AC MC will talk about "Leadership in adversity". Other key topics are "Specialised Parks" including technology and marine parks, listed property trusts, population issues, disaster recovery and property rights. Perth is the host city (April 2010) and I look forward to seeing you there. Further information is at **www.ipc2010.com**

Additional professional opportunities exist in the changes to Continuing Professional Development (CPD). The revised CPD point structure will ensure members obtain a balanced perspective each year of 10 points from structured activities and 10 points from property topics. Details of the changes are available at
www.api.org.au – By-Law 20.4

The Future Professionals Program (FPP) is another National Council initiative that will assist graduates entering the profession. Pilot programs will be rolled out over 2010 with all modules available by 2011. The focus is on "skills" and the practical applications of "professionalism", "valuation" and "property economics". There will be a range of modules in four sections covering professionalism and skills in the areas of effective communications, ethics, professional interviews and report writing. Subjects covered are as diverse as inspections and recording, data interpretation, corporate real estate, written communications, relationship management, tax and GST – all from a practical perspective.

FPP will be compulsory for entry to Associate Membership (AAPI), Associate Membership (CPV) and for joining the Residential Property Valuer (RPV) designation.

I wrote to all members in November on changes to the payment due date for professional fees. This is the first of what will be a continual roll out of some administrative changes to API functions through the introduction of the Australian Property Institute's new Contact Management System. This is one of the most significant operational investments in the history of the Institute. It is both technically and operationally challenging. I must recognise the extraordinary work being done by Tony Gorman (WA), Immediate Past President James Pledge (SA), Grant Warner (National Director) and Division Executive Officers Cathy Sirel (ACT), Andrew Bell (QLD) and Amy Guy (VIC) who, together, lead the Task Force on this complex process of transition.

The CMS will unlock efficiencies and opportunities in the provision of services to members across the administration. Of most significance will be the way in which members interact with the Australian Property Institute – through a single web portal with visibility for national CPD program, events, news, statistics, relative information and a national member search function. Like most good systems, members will be able to pay fees on-line, make purchases, book events on-line and check the status of membership details, including CPD points.

These changes are both exciting and challenging for us all. I seek your patience and support as the new format becomes "live". Members should start to see changes early in 2010 with the new website and entry level for members available in March.

David Moore
President
Australian Property Institute

PINZ PRESIDENT'S REPORT

Ian Campbell
PINZ President

I am pleased to report good progress on a number of initiatives and activities within the Property Institute as we approach the end of the current year and enter with a degree of optimism into the next 12 months.

2009 proved to be one of the more challenging recessionary periods for some time. Despite this, nearly all of the members I have met have managed to maintain their affairs and views of the property market in New Zealand and have continued to steadfastly provide and improve upon offering independent and professional advice to their clients and the general public. Similarly the Property Institute continues to be more active in promoting the benefits of using a trusted property professional, as well as providing core services to our membership and establishing the community gateways for those advancing their professional careers within the property sector.

As I recently reminded delegates at the annual graduate induction day for 2009, it would appear timely for those recent graduates to now enter into the property industry at a time where the worst of the economic adjustments were behind us. Similarly, it would be good to learn from our current membership if the worst was behind most of their clients and that new light can now be seen as we emerge out of the darkest of woods. Most members I meet share similar views.

For our trans-Tasman readers, if you're intending to visit New Zealand over the summer period please feel welcome and at home. When you travel around New Zealand you will see that our property sector has – like other sectors in the New Zealand economy – faced considerable challenges during the past 12 months. Accordingly, the next few years will be viewed as a period of managing risk, consolidation and opportunity.

Investors in both residential and commercial sectors would have experienced far greater tightening in credit lines than before, as well as experiencing a upwards drift in long-term mortgage lending rates. Again, our Reserve Bank has kept the official cash rate (OCR) at 2.5% for a number of economic reasons. However, commercial banks are already planning to see the OCR increase around the second quarter of 2010. For investors contemplating commercial property, access to funds and the cost of credit would be more difficult to find than before. There has also been a gap emerging in the former mezzanine finance market catering to short-term projects, which was once offered by a number of finance firms which have now almost entirely disappeared. Difficulty in accessing credit lines, particularly within the commercial sector, has been influenced on the greater part by our major banks' own exposure and risk in the development sector. Banks caught by failed developers are trying their best to manage themselves out of tricky situations.

As I may have indicated before, the good news is that we are now seeing positive signals given a recent increase in consumer confidence according to the current ANZ-Roy Morgan survey coupled with an increase in construction activity. Real estate firms are reporting an increase in sales volumes. Residential vacancy rates are also falling and rents are becoming more stable, according to a recent report by the First National Group. However, these small gains will be closely monitored by our Reserve Bank if any residential and construction recovery influences higher levels of inflation.

When distilling all the information at hand, there may still appear to be a real gap in market perception that the New Zealand economy will improve. Therefore, I am always mindful that, given a positive outlook, we are still seeing certain sectors of the economy that are in reverse. With the high New Zealand dollar, manufacturers are closing plants, the most recent been the closure of the Bridgestone Tyre Plant in Christchurch. Also, current unemployment is forecast to rise above 6%. More applicable and a factor to watch is the home loan affordability index. The index is now at its lowest level for 12 months, according to a recent BNZ survey. The survey showed that the proportion of after-tax income needed to service an 80% mortgage for a median price house ($350,000 in September 2009) rose to 59.7%, when a prudent sustainable level is far less at around 40%.

For further information on any matter contained in this article, it is recommended that readers obtain independent property or valuation advice through any one of our independent professional members of the Property Institute of New Zealand (Inc) or by visiting the institute's website at **www.property.org.nz**

I would like to take this opportunity to wish all our members and readers of the API/PINZ Journal a safe and enjoyable summer ahead.

Ian Campbell

President
Property Institute of New Zealand

Key workers and housing affordability

Dr Valerie Kupke

Dr Valerie Kupke is a Senior Lecturer at the University of South Australia's Centre for Regulation & Market Analysis. She holds tertiary qualifications in economics, geography, property and education and her research interests are in housing and housing policy.

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This article has been peer reviewed.

Abstract

This paper examines changes in the opportunity for home ownership by first-time buyers who are key workers within Adelaide, Brisbane, Melbourne and Sydney between 2001 and 2006. Key workers are defined as those who deliver essential community services such as health, social services, education, safety and emergency services. Such workers as first-time buyers may be priced out of the housing market across large tracts of a city, with consequences for both employer in worker shortages and employee in long commuting distances. This paper identifies the pressure on key worker households for multiple incomes in order to achieve home ownership. The findings are also placed within a spatial context for Adelaide in terms of where key workers live and work in order to identify the commuting distances which must be accommodated in order for them to afford a home.

Introduction

In Australia over the past decade housing affordability has become a critical issue and there now exists a considerable body of work on the topic in terms of housing policy (Yates et al., 2006, 2007; Maclennan, 2005; Ong et al 2009), metropolitan and regional planning (Gurran, 2008; Costello, 2009), household budgets and housing debt (Karantonis, 2009; Kupke, 2007; Small, 2009) and employment (Yates et al 2006). Home ownership has become especially difficult for those on low or moderate incomes (Berry, 2003; Kupke, 2008). Many of those within these income categories work within the service sector and can be defined as "key workers" in that they deliver essential community services such as health, social services, education, safety and emergency services (ODPM, 2005). Such workers may be priced out of the housing market across large tracts of a city, especially if they represent single-income households, with consequences for both employer in worker shortages and employee in long commuting distances (Yates et al, 2006; Yates, 2006). This paper seeks to add to the existing body of work by examining change in terms of access to home ownership by first-time purchasers who are key workers within Adelaide, Brisbane, Melbourne and Sydney between 2001 and 2006 and attempts to quantify the pressure on these households for multiple incomes in order to achieve home ownership. The findings are also placed within a spatial context for Adelaide in terms of where key workers live and work in order to identify the commuting distances which must be accommodated in order for them to afford a home.

Analysis

In this section the opportunity for house purchase within Adelaide, Brisbane, Melbourne and Sydney for all category of employee is compared for 1996, 2001 and 2006 based on gross median incomes for each city (ABS 2001, 2005). In other words it is considering the opportunity for first-time purchase for

Table 1 First-Home Buyer Affordable Purchase Price v Median House Price

Capital City		Single low income affordable purchase price	Single moderate income affordable purchase price	Median house price -Inner suburbs (0 to 6 kms)	Median house price - Middle suburbs (6 to 25 kms)	Median house price - Outer suburbs (>25 kms)
Adelaide	1996	$64,696	$97,044	$164,000	$120,000	$86,000
	2001	$109,475	$164,212	$258,000	$175,000	$123,900
	2006	$142,808	$214,213	$421,000	$320,000	$230,000
Brisbane	1996	$71,735	$107,603	$185,000	$152,000	$120,000
	2001	$117,861	$176,792	$297,000	$185,000	$125,000
	2006	$170,514	$255,771	$500,000	$365,000	$280,000
Melbourne	1996	$74,281	$111,421	$240,000	$177,000	$115,400
	2001	$126,697	$190,045	$390,000	$297,000	$210,000
	2006	$162,923	$244,385	$540,000	$362,000	$285,000
Sydney	1996	$77,276	$115,914	$430,000	$351,000	$195,000
	2001	$142,122	$213,183	$615,000	$410,000	$265,000
	2006	$188,513	$282,770	$846,000	$621,000	$418,000

Source ABS Cat No 6523.0.55.001 Household Income and Income Distribution deatailed tables Australia REI Median House Prices by Zones Capital Cities

all single-income households on low and moderate incomes, including key workers. A moderate median income is then calculated as 1.2 times the gross median income for each city and a low income as 0.8 (SA Government, 2007). An affordable home purchase price for a low income and a moderate income household has then been determined as 3.6 times these income levels (SA Government, 2007). This multiplier has been gazetted by the SA government as indicating an affordable purchase price for a first-time buyer and it recognised as a more conservative ratio than some which may range up to five times median income (BankWest, 2008, 2009; Burke, np). However in order to be consistent the same ratio has been applied across each city and whatever ratio is used the difference, in relative terms, in the opportunity for purchase between 1996 and 2006 for these income groups is stark. The table above (Table 1) illustrates the first-home purchase opportunities for households in Adelaide, Brisbane, Melbourne and Sydney by comparing an affordable purchase price against median house price for 2001 and 2006 (REI 2007) for different zones in each city. The affordable purchase price is based on a multiple of 3.6 times median income for low and moderate income households on a single wage. The three zones are based on distances of up to 6, 6 to 25 and greater than 25km from the CBD.

Affordable purchase price versus median Income

In Adelaide (Table 1) a moderate income household on a single wage could have afforded to purchase a median priced house in the outer suburbs in 1996 and in 2001. However by 2006 it was impossible even for those households on a moderate single income to purchase a median priced house in the outer suburbs. At no point could a low income household based on a single wage have afforded to purchase a median priced house in Adelaide over the 10-year period.

In Brisbane (Table 1) those households on a moderate single income could have afforded a median priced house in 1996 in the outer suburbs and perhaps in 2001 could have afforded a median priced home in the middle suburbs as well. However by 2006 those households on single moderate income would have been priced out of even the outer suburbs based on median price. At no time could a moderate single income household have purchased a median or above priced house in the inner suburbs. In Brisbane

At no point could a low income household based on a single wage have afforded to purchase a median priced house in Adelaide over the 10-year period.

low income households based on a single wage could not have afforded to purchase a median priced house at any time over the 10-year period even in the outer suburbs.

In Melbourne in 1996 (Table 1) a single income household on a moderate income could only have afforded to purchase a median priced house in the outer suburbs. By 2001 even these dwellings were no longer affordable. A moderate income household on a single salary could not have afforded a median priced home in the middle or inner suburbs at any time while a low income household on a single salary was priced out of the whole market for the complete period.

In Sydney (Table 1) a single wage household, even if based on a moderate income, could not have afforded to purchase a median priced house anywhere in the city over the 10-year period.

This analysis shows the necessity for two wages for those households on moderate and especially low incomes in order to even purchase in the outer suburbs of each city. Most key workers are recognised as moderate income earners who are not eligible for social housing but are faced with a significant reduction in their housing options as affordability drops. To have any opportunity to purchase on single salary most would be priced out to the outer suburbs.

Key workers and housing affordability

In the next section four key worker occupations are singled out for analysis; teachers, social workers, nurses and police. For each occupation a regional single median income which represents the income differential between cities has been calculated for 2001 and 2006 (ABS 2001, 2005). The percentage of suburbs which are affordable to each group has been calculated based on median price for houses and for units and (RP Data 2008) for each city at suburb level for both time periods. The regional salaries have been identified based on occupation codes published by the ABS (ABS 2001, 2005).

In terms of detached dwellings (Figure 1) some 35 per cent of suburbs in Adelaide were affordable to a teacher, 11 per cent to a nurse and about 5 per cent to police in 2001. By 2006 this had dropped to less than 4 per cent for both teachers and police. Nurses could no longer afford to buy a detached dwelling on a single income. In Brisbane (Figure 1) in 2001 each occupation group could have afforded to purchase a house in at least 20 per cent of suburbs. By 2006 none of these key worker groups could afford to purchase a detached dwelling in Brisbane based on a single income. In Melbourne in 2001 (Figure 1) some 33 per cent of suburbs were affordable to those in the police force with teachers being able to purchase a detached dwelling in about 5 per cent of suburbs. Again by 2006 this was not possible for any of the

Figure 1: Houses – % of Suburbs Affordable to Key Workers on a Single Income

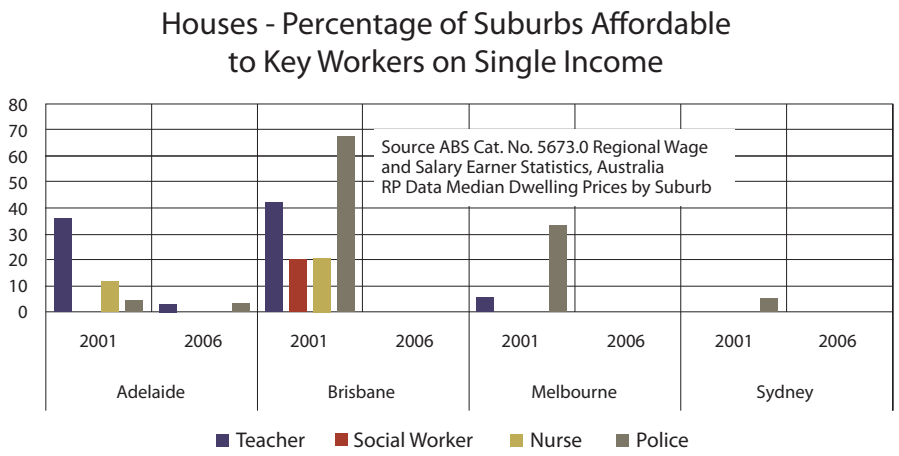


Figure 2: Units – % of Suburbs Affordable to Keyworkers on a Single Income

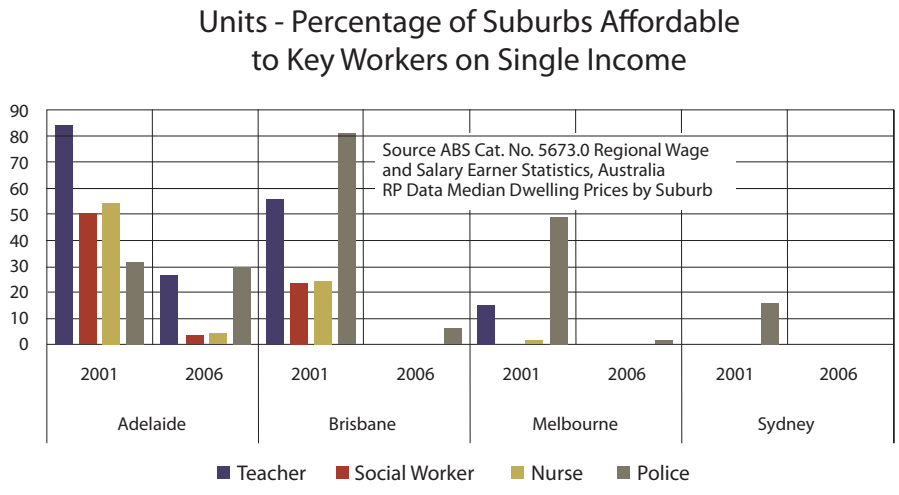
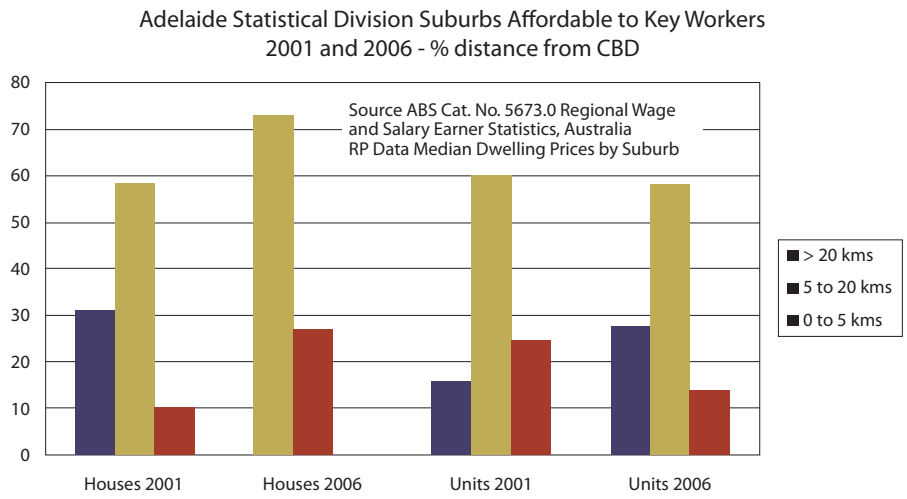


Figure 3: Distance from the CBD of Suburbs Affordable to Key Workers



key workers based on a single salary. In Sydney in 2001 (Figure 1) only those in the police force could afford to purchase on a single salary a detached dwelling in about 5 per cent of suburbs.

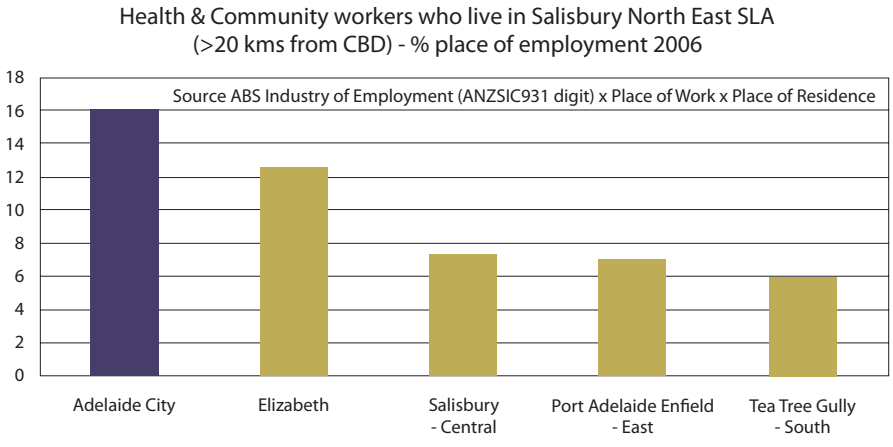
Units offer a more affordable option for each key worker group. In Adelaide even in 2006 (Figure 2) it was still possible for a single income worker in each of the four occupation groups to purchase a median priced unit in at least 4 per cent of suburbs. Teachers could to afford buy a unit in about 26 per cent of suburbs and police in about 30 per cent. However for each key worker this was a significant departure from the affordability that had been offered in 2001. Brisbane too was affordable in 2001 (Figure 2) especially for those in the police force but teachers could also have afforded to purchase a unit in some 55 per cent of suburbs. However by 2006 there had been a marked decline in affordability with only police being able to afford to purchase a median priced unit in about 5 per cent of suburbs. However Melbourne even in 2001 was becoming expensive for those in these key worker occupations (Figure 2). Teachers could afford to buy a unit in about 15 per cent of suburbs and police in almost 50 per cent. By 2006 only police in Melbourne could look to purchase a unit on a single salary in about 2 per cent of suburbs. In Sydney (Figure 2) key worker households on a single salary have been essentially locked out of home purchase since 2001. In 2001 only police could have afforded to purchase a unit in some 15 per cent of suburbs. By 2006 no key worker household in Sydney on a single income could afford to purchase even a unit based on median price.

It must be recognised that affordability in this discussion has been defined in terms of median price and that first-time buyers may be able to purchase homes in one of the lower quartiles and indeed often do so. However these findings overall are consistent with those reported by the APC (2008) who suggest that most key workers on single incomes are continuing to struggle to buy a home. Based on a housing affordability benchmark of 30 per cent of gross income the APC (2008) report showed that none of the single income households modelled in their study could afford to purchase a home or a unit in any capital city. As well key workers were shut out of the market entirely if trying to purchase in Sydney or Melbourne.

Key workers and location of affordable suburbs

A major issue for key worker households are the commuting distances that must be faced in order to purchase a home (Yates 2006; Yates et al 2006) given that only the outer suburbs are affordable to most. In this section those suburbs which are affordable based on median price to the key worker group as a whole are broken down according to distance (Figure 3). This analysis is provided for Adelaide only for houses and for units (RP Data 2008). Three rings are identified within the groups of affordable suburbs, those less than 5km, those 5-20km, and those greater than 50km from the CBD.

Figure 4: Health & Community Workers who live >20 kms from the CBD - place of employment



In Adelaide in 2001 the majority of suburbs which were available to the key worker group for house purchase (almost 60 per cent) were in the middle zone, 5-20km from the city. However 10 per cent of affordable suburbs were in the inner suburbs within a 5km radius of the city. By 2006 almost 75 per cent of suburbs that were available to the group collectively were at least 20km from the city and none was within a 5km radius of the CBD.

In terms of units (Figure 3) the majority of the suburbs that were affordable in 2001 (60 per cent) and 2006 (58 per cent) were found within the middle zone some 5-20km from the city. The balance had shown a shift between 2001 and 2006 in that the second largest group of affordable suburbs had changed from an inner to an outer location, more than 20km from the city. Again this reinforces the problem of commuting distances to the CBD for the key worker groups in terms of affordable locations in which to purchase a home. However this is not such a problem for the key workers if the majority are able to find work locally. It may still pose a major problem for employers and the community at large if key workers show a strong preference to work close to where they can afford to buy. However this particular issue is not addressed here.

Key workers and commuting distance

This section identifies (again only for Adelaide) the main place of employment in 2006 for a sample of key workers living in what were identified earlier as affordable areas of the city such as suburbs in the north east, the south and in the outer hills region of Adelaide. For those health and community (Figure 4) workers who live in the local government area of Salisbury more than 20km away from the CBD, the majority (16 per cent) work in the city. The next largest group (just over 12 per cent) work locally in the next council area Elizabeth.

For the same set of workers who live to the south of Adelaide in the council area of Onkaparinga (Figure 5) the majority work locally but the next largest group, some 10 per cent travel more than 20km to work.

Teachers fare better with most of those who live in the south able to find work locally (Figure 6).

However the majority of teachers who

Figure 5: Health & Community Workers who live >20 kms from the CBD – place of employment

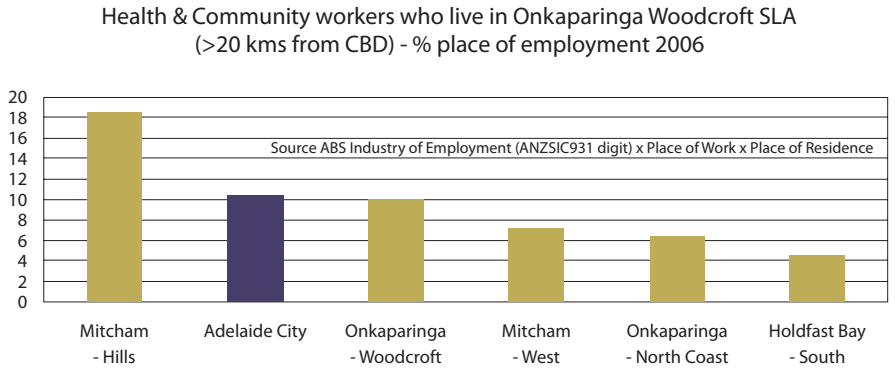


Figure 6: Education Professionals who live >20 kms from the CBD – place of employment

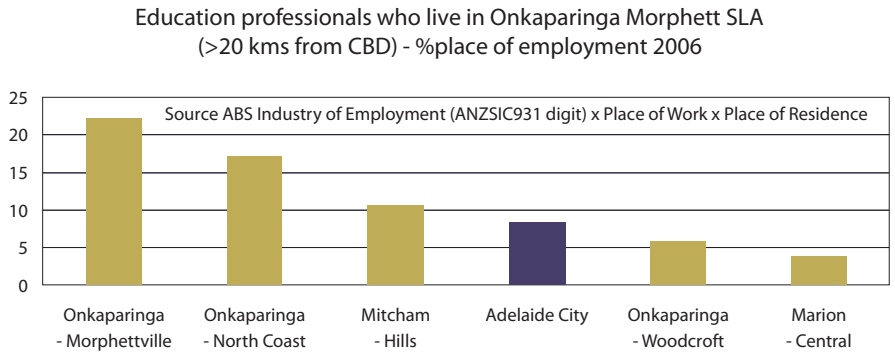
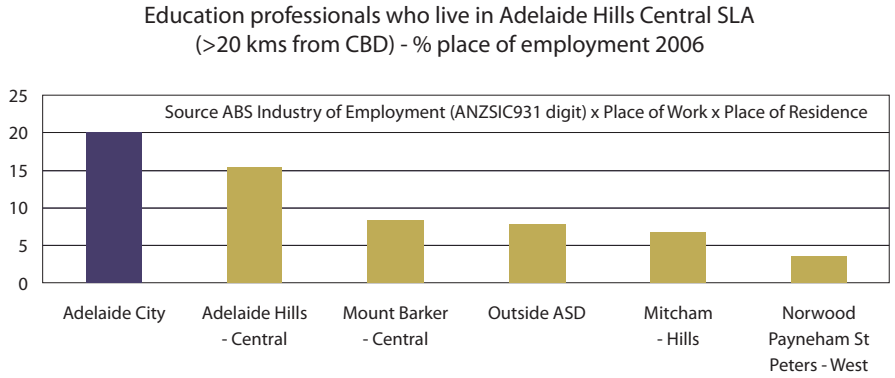


Figure 7: Education Professionals who live >20 kms from the CBD – place of employment



live in the Adelaide Hills (20 per cent) commute more than 20km on a regular basis (Figure 7). This therefore reinforces the long commuting distances that are necessary in order to find an affordable home for key worker households, especially those based on a single salary.

Key workers and mode of transport to work in the CBD

The final table (Table 2) considers the main mode of transport for all workers in general who live in affordable suburbs more than 20km from the CBD but who work in the city. Included in this group will be key workers and a major consideration must be that despite achieving an affordable location in which to live, many are still forced to spend considerable sums on transport, particularly private transport if public transport is not available. The analysis for Adelaide shows that a significant majority of workers who live in the outer suburbs and work in the CBD use the car as the primary means of transport and principally as a driver. For each of four council areas which are affordable to key workers the large majority of employees who work in the CBD travel as a car driver; some 40.3, 52.4, 38.3 and 43.6 per cent respectively. This translates into at least 40km a day in terms of a return trip which must add significant cost to the household budget and make meeting their housing costs more difficult.

... buying a home on a single income is virtually impossible unless they are willing to live quite some distance from the CBD.

Conclusion

In conclusion, while there may be limitations in terms of a conservative multiplier, this study has identified clearly that for single income households, especially those on low and moderate salaries, aspiring to own a home is extremely difficult especially in cities such as Sydney and Melbourne but also more recently in Brisbane and even in Adelaide. And many of these low to moderate income earners fall within the key worker category. For them buying a home on a single income is virtually impossible unless they are willing to live quite some distance from the CBD. For households who work locally this may not be an issue but the analysis in this study shows that in cities such as Adelaide a significant proportion of key workers travel considerable distances every day to work. As such housing affordability has spatial as well as economic implications which heighten the mismatch between where many key workers can afford to live and where they are employed. An affordability index which built in the cost of transport to the main employment districts and/or services would seem a reasonable approach particularly for first-home buyers. There are also significant

Table 2 Workers and Mode of Transport to Work in the CBD

	LGA of Residence (> 20 kms from CBD) - % of workers			
Mode of Transport to the CBD	Salisbury (C) - North-East	Adelaide Hills (DC) - Central	Onkaparinga (C) - Morphett	Onkaparinga (C) - Woodcroft
Train	5.5	0.3	5.0	1.3
Bus	24.4	20.3	27.5	26.2
Tram	0.0	0.0	0.0	0.0
Taxi	0.0	0.0	0.0	0.0
Car, as driver	40.3	52.4	38.3	43.6
Car, as passenger	6.2	5.8	6.3	7.7
Truck	0.0	0.2	0.0	0.0
Motorbike/scooter	0.6	0.6	1.2	0.7
Bicycle	0.5	0.4	0.0	0.6
Multiple methods	9.0	3.9	8.0	5.7
Walked only	0.5	1.3	0.0	0.5

(Source ABS 2006 Census SLA of Usual Residence x Place of Work x Method of Travel)

planning and development issues as the need to move further out in order to find affordable housing also increases the pressure for urban sprawl. As such, urban sprawl could be the price of offering affordable housing to key worker or single income households. Alternatively recent moves in every city to integrate public transport and affordable housing development more effectively may help to alleviate the spatial mismatch between where many key workers live and work.

In this paper Adelaide has been a focus in terms of place of employment and modes of transport but the need for long commuting distances are likely to be repeated for other cities around Australia though they may be better served by public transport. It would also be of interest to consider what planned public transport corridors would have to offer key workers in terms of shorter commuting distances and affordable housing and also to determine how this analysis works in terms of affordable rental accommodation. ■

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Residential Property market performance in a declining market: Christchurch case study

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Abstract

The residential property market in New Zealand has been experiencing a boom and bubble period from 2001 through to mid 2007. Following a number of increases in the Official Cash Rate by the Reserve Bank and a decline in net migration numbers the housing market was perceived to be over-inflated and due for a major correction.

Numerous media, government departments, property experts and economists predicted significant reductions in the median price of residential property throughout New Zealand during 2008, with a turnaround in the market in mid-2009.

This paper will analyse house prices in specific socio-economic locations within Christchurch over the period from 2006 to mid-2009 to determine how significant the current housing decline is compared to the market peak in 2007. This study will review the change in residential property prices from 2006, variations in property listings since April 2008, sale volumes and days on the market across a range of housing sectors to determine the extent and range of any residential property downturn in the NZ recession.

Key words: Residential property, residential house sales, property returns, capital gain, property investment

Introduction

Home ownership in New Zealand has been one of the highest levels in the world, with 70% of the population owning/paying off their own home (NZ Statistics, 2008). In most cases the family home is the major asset of most New Zealand households, with very low participation in managed funds, superannuation or savings compared to other developed countries (Reserve Bank of New Zealand, 2008).

This fixation on home ownership and investment in a second home fueled a significant increase in residential property prices from 1999 through to 2007. During this period the median house price in New Zealand increased from $132,000 to $345,000 (Grimes and Aitken, 2005; Grimes et al, 2003; QV, 2006, 2007, 2008).

However, at the end of 2007 the residential property market in New Zealand slowed and in January 2008 predictions of a slowing property market were forecast based on the problems being faced in the US residential property market.

By March 2008, it was evident that the NZ residential property market had slowed and the median house price had fallen for the first time across most NZ centres compared to the previous period in 2007 (QV, 2006, 2007, 2008).

During the first six months of 2008, a number of second tier financial

institutions collapsed or placed moratoriums on withdrawals. Towards the end of 2008, 22 finance companies in New Zealand had ceased operations (Eves, 2008). This placed further pressure on the residential property markets.

In the second half of 2008, the full extent of the US financial crises further impacted on the NZ economy, with continuing pressure on finance companies, bank lending policies and the availability of credit for residential housing borrowers.

2008 was a watershed year for the New Zealand residential property market. Despite the significant falls in interest rates to levels last seen in December 2003 (RBNZ, 2008) and the subsequent improvement in home affordability, this was not reflected in the residential property market.

The following analysis will track the trends in the Christchurch residential property market over the period of December 2006 to June 2009 and compare this performance to the previous two years, which were the most active residential property sales periods in the last decade. The results of this analysis will then be used to show possible ramifications of this decline in the New Zealand residential property market if the current trends continue throughout 2009.

Research methodology

The data for the paper has been based on 15 residential suburbs in Christchurch. These suburbs were selected on the basis that they represented both a geographic and socio-economic areas within Christchurch city. All sales transactions for these suburbs were collected for the period November 2005 through to June 2009, representing over three years of the Christchurch residential property market. In addition to the sales transaction data, the listings for residential property in these suburbs were also tracked on a weekly basis to determine the average monthly residential property listings for each suburb, for the period April 2008 to June 2009. The listing data was collected on the basis of both freestanding residential property and units/townhouses. The suburbs selected are shown in Table 1.

In most cases the family home is the major asset of most New Zealand households, with very low participation in managed funds, superannuation or savings...

Sales data was based on the Real Estate Institute of New Zealand sales database, with the weekly residential property listings being extracted from the main New Zealand internet sales site **www.realestate.co.nz**

This data was analysed to show changes in monthly listings based on socio-economic criteria, as well as the change in quarterly median and average residential house prices for the three socio-economic representative suburbs in Christchurch.

In addition to the sales transaction data for the selected suburbs, the sales transactions for Christchurch were sorted to extract repeat sales from 2007 and 2009 to determine the impact of the falling property market to individual properties to gain a more accurate assessment of the impact of the current New Zealand recession and world financial crisis on the NZ residential property market. These two years were selected for the repeat sales as they represent the years preceding and during the peak of the market and the initial decline. Repeat sales for the years 2006 and 2008 were also analysed to determine at what previous price levels the current market has moved back to. Real estate agents were also canvassed to provide details of recent sales and the actual net value of sales of houses that sold in both 2006 and 2008.

Based on the results of this analysis, projections have also been made on the potential impact of expected continuing house price falls in New Zealand in 2009, particularly in relation to the significant residential house price reductions in the US.

Results

New Zealand saw record residential property sales in 2006 (106,000 transactions) and although the number of

Table 1: Study Suburbs

Low Socio-Economic	Middle Socio-Economic	High Socio-Economic
Addington	Avonhead	Cashmere Hills
Aranui	Halswell	Fendelton
Bexley	Papanui	Merivale
Hornby	Richmond	Queenspark
Linwood	Somerfield	Sumner

sales in 2007 was slightly lower (92,000 transactions) the median house price for New Zealand had increased significantly during 2007 (REINZ, 2008).

By March 2008 the median house price for NZ residential property had started to decline and this was also reflected in the number of properties being sold and properties being listed for sale (QV, 2008).

Property listings

Figure 1 shows the average monthly listings for residential property in Christchurch from April 2008 to June 2009. From this figure, it can be seen that the total residential property listings declined from an average of 1340 properties in April 2008, to only an average of 629 listings in June 2009.

When the listings are broken down into houses and units/townhouses, it can be seen that the average number of listings for houses in April 2008 was 938. Again the number of house listings declined from April reaching a low of 450 properties in June 2009, a fall of 52% over the 15-month period. Media reports (REINZ, 2008) especially those from real estate firms had hoped that the move into the traditional high sales months of spring and early summer 2008 would improve total listings and sales. However, from Figure 1 and Table 2, it can be seen that listings rose slightly in October and November for houses but again fell in December to a low of 450 properties by the end of June 2009.

This fall in listings was also reflected in the actual number of property sales in the subject suburbs. Table 2 also shows that the anticipated increase in sales in the Spring of 2008 did not eventuate with fourth-quarter sales in 2008 at or below the first three quarters of 2008, which are usually the lowest sales periods in Christchurch.

A similar trend also occurred in the unit/townhouse property market, with 392 units listed for sale in April and this average monthly figure falling to 293 in August. In the following two months the number of units listed for sale increased slightly to 309 in October; however since October 2008, the number of units being listed has again been falling, with only 192 listed for sale in June 2009.

Figure 2 represents the average monthly listings based on the socio-economic classifications of the 15 suburbs in the study. From this figure, it can be seen that the trend in listings has not been consistent across the suburbs of Christchurch. This figure shows that the trend in listing numbers was similar for the middle and high socio-economic areas, with a decrease in listings from April through August, at which point the number of listings in the middle socio-economic suburbs started to increase slightly before a slight decrease from November to December 2008, with a continuing decrease in monthly property listings from December 2008 to June 2009. Listings in the high socio-economic suburbs declined form a high in April 2008 to September 2008 at which point the number of average monthly listings has been increasing; however, still below the levels from April to June 2008. However, from January 2009, listings in the higher value suburbs has continued to

Figure 1: Average Monthly Listings: April 2008 to June 2009

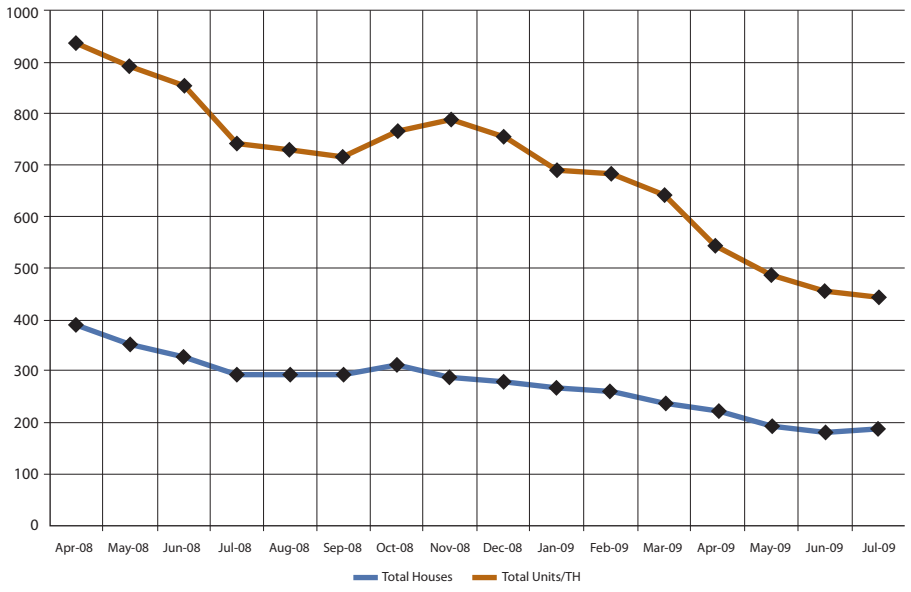


Table 2: Quarterly Sales: Selected Christchurch Suburbs: 2006-2009

	Low Socio	Middle Socio	High Socio	Total
Q4 2005	48	92	70	210
Q1 2006	69	103	77	249
Q2 2006	76	101	73	250
Q3 2006	69	77	67	213
Q4 2006	50	70	64	183
Q1 2007	53	67	44	163
Q2 2007	35	59	31	125
Q3 2007	31	47	24	101
Q4 2007	34	66	27	126
Q1 2008	32	53	28	112
Q2 2008	30	47	21	98
Q3 2008	23	52	21	95
Q4 2008	19	41	39	98
Q1 2009	40	83	36	158
Q2 2009	39	59	42	140

fall, with only an average weekly listing of higher value residential properties of only 201 properties, less than half the number from April 2008.

Although the trends in listings were similar for the middle and high socio-economic suburbs the trend for low socio-economic trends was very different. Figure 3 shows that average monthly listings for these suburbs, have not been as volatile as the higher value areas and the number of listings commenced to increase from May 2009, while the other areas continued to fall over these two months. The relative decline in listings for the lower socio-economic areas has been the least, falling from a weekly average of 348 to 221 residential properties listed.

Figures 3 and 4 represent the break-up of listings across the various socio-economic suburbs in respect to houses and units/townhouses. Again, it can be seen that the trends in listings has been different in respect to the two property types and the socio-economic status of the markets.

Again, the trends for the middle and high socio-economic suburbs for houses have been similar, showing a 55.5% and 55.9% fall in average weekly house listings respectively, but the trend for the low socio-economic areas has been different in relation to total house listing numbers, as well as the months where listings bottomed and recovered. The low socio-economic suburbs saw house listings decrease from 222 in April 2008 to 112 in June 2009, which represents a decrease of 49.5%.

The trends for unit/townhouse listings differ to houses. Figure 4 shows that the trends for the low socio and middle socio suburbs have been very similar from April 2008 to December 2008, but since January 2009 there has been considerable difference in the number of units/townhouses listed for sale across the markets. The decline in listings for the middle and higher value areas has been 65.5% and 64.5% respectively but the fall in listings for the lower value suburbs has been significantly less at 24.6%, indicating that the investment market was under greater sales pressure than the other unit markets.

Property Sales

Total residential sales transactions for Christchurch have been:

2005 10,307 **2006** 10,510

2007 8,759 **2008** 5,485

Figure 2: Total Listings: Socio-Economic Areas: April 2008 to June 2009

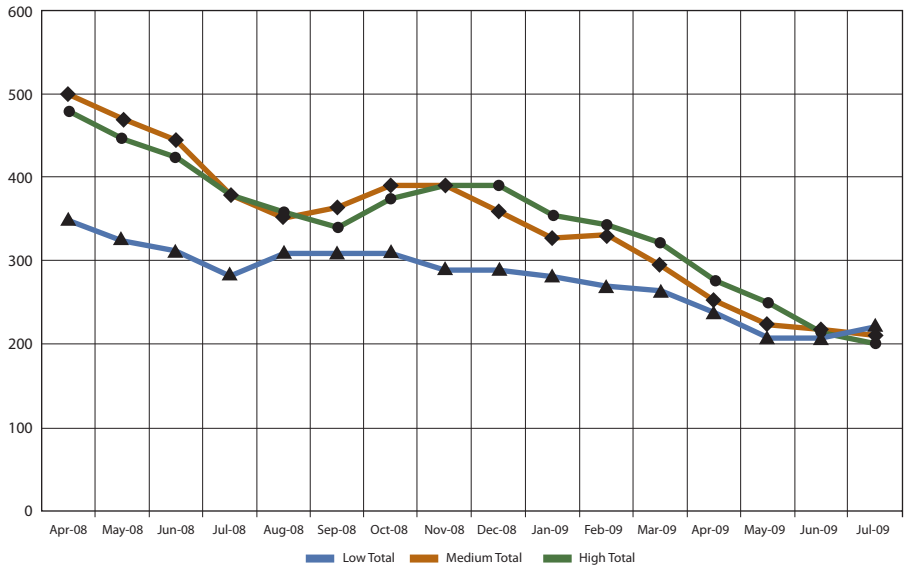
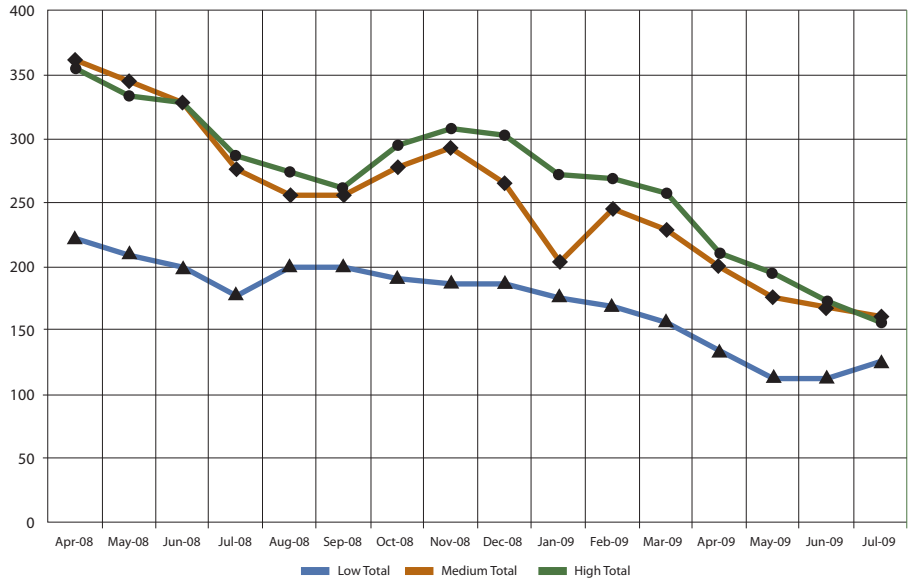


Figure 3: Average Monthly Listings: Houses: April 2008 to June 2009

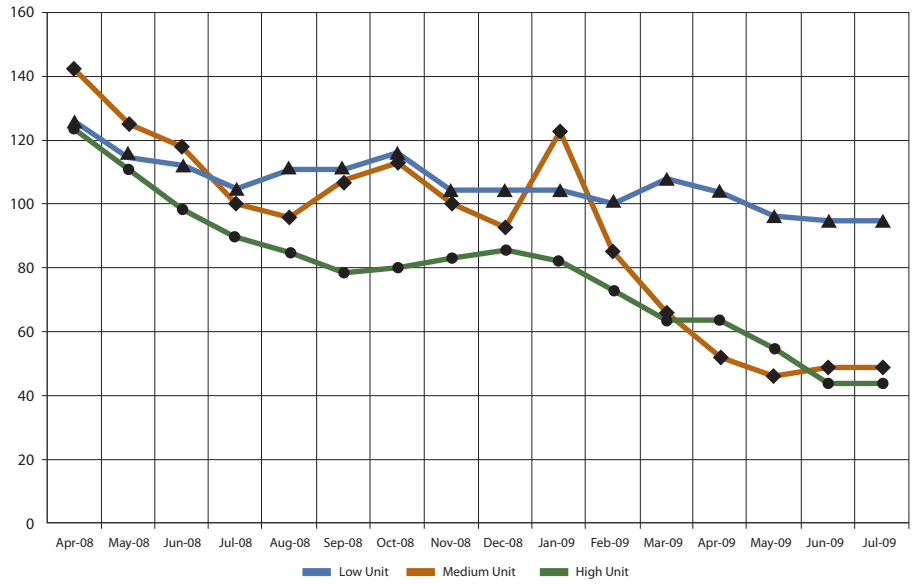


However, the study only includes 15 Christchurch suburbs and their sale details and analysis are as follows.

Figure 5 shows the sales transactions for the suburb classification in the study. This figure shows that in the last three years the majority of sales have been in the middle price range suburbs of Christchurch (44%), with low socio-economic suburbs accounting for 28% of all sales transaction over the period. An important aspect to note with these sales transactions is that approximately 70% of all sales transactions were at or below the Christchurch median house price for the three years.

This figure also shows that the sales transactions have being decreasing over the past three years, with 2008 sales for the subject suburbs being only 33% of the number of sales recorded in 2006. However, house sales numbers have increased over the first two quarters of 2009, particularly in the middle socio-economic suburbs, where quarterly sales figures have again reached mid- to late-2006 levels.

Figure 4: Average Monthly Listings: Units: April 2008 to June 2009



Figures 6 represent the median house prices for the three socio-economic areas of the study. This figure show the continuing increase in house prices from 2006 to 2007, with the subsequent fall in prices during 2008. This figure also shows that in the lower and middle value suburbs of Christchurch there has been a slight increase in the median residential property price in the second quarter 2009. The increase in median price for lower socio-economic suburbs is despite an increase in sales and also in a period where listings are still high in comparison to the other socio-economic markets. This would indicate a strengthening in this market.

The fall in both median and average house prices was greater in the high socio-economic suburbs, showing a decrease of 8.9% and 11.4% for the median and average house price respectively for the years 2007 to 2008. This fall in median house prices has continued into 2009, with the median house price in the higher value suburbs down from $824,000 in fourth quarter 2007 to $547,000 in second quarter 2009.

Figures 7 and 8 provide details in relation to the average time to sell the properties in the various residential property sectors of Christchurch and the average difference between the asking price for the property and the final selling price for each of the past three years. Figure 7 shows that there was a reduction in the time on the market from 2006 to 2007 and this can be explained by the reduced number

of properties for sale in an increasing residential property market. However, in 2008, the average time to sell increased above both the 2006 and 2007 levels for all the residential property sectors, with the longest selling period being for the low socio-economic suburbs, with the average selling period in 2008 being 79 days (difference between the date the property was listed and the contracts going unconditional). Although the selling period for all areas has decreased slightly in the first two quarters of 2009, the time to sell is still higher than 2006 and 2007 levels.

The difference between the average asking price of the property and the average final selling price is shown in Figure 8. It should be noted that this only includes those residential properties sold by private treaty; all properties offered for sale by auction are not included, as the actual listing date was not recorded in the database. In all housing sectors the price difference between the asking and selling price was negative, with a decrease in this difference from 2006 to 2007 (again demonstrating the stronger market in 2007) and the difference increasing in 2008. The greatest average difference (actual amount and percentage) in the asking and selling price from 2007 to 2008 was the residential property in the high socio-economic suburbs. Respectively, for Low, Middle and High socio-economic suburbs the difference from 2007 to 2008 was 67.2%, 114.1% and 155%. The reduced property listings and the increase in monthly sales across all sectors in the first two quarters of 2009 has seen the price difference between the asking and selling prices decreasing, especially in the high value suburbs. This appears to be more a factor of limited supply rather than an overall improvement in the market.

Figure 5: Residential Property sales: Study Area: 2006-June 2009

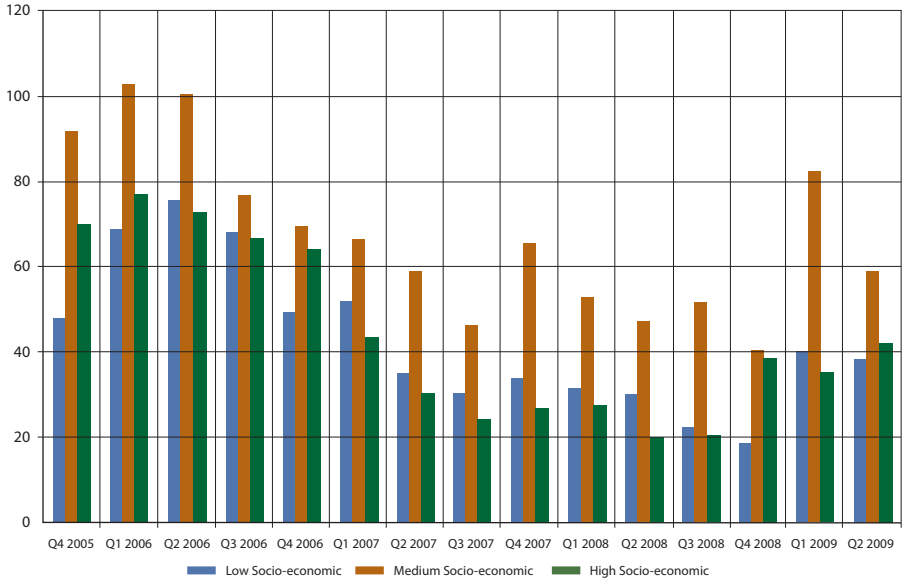
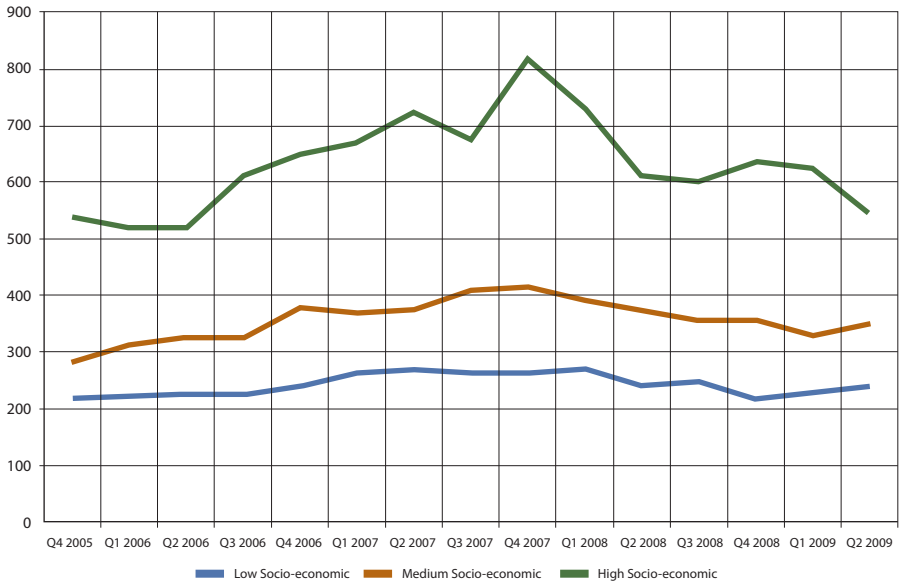


Figure 6 Median House Price: Study Area: 2006-June 2009

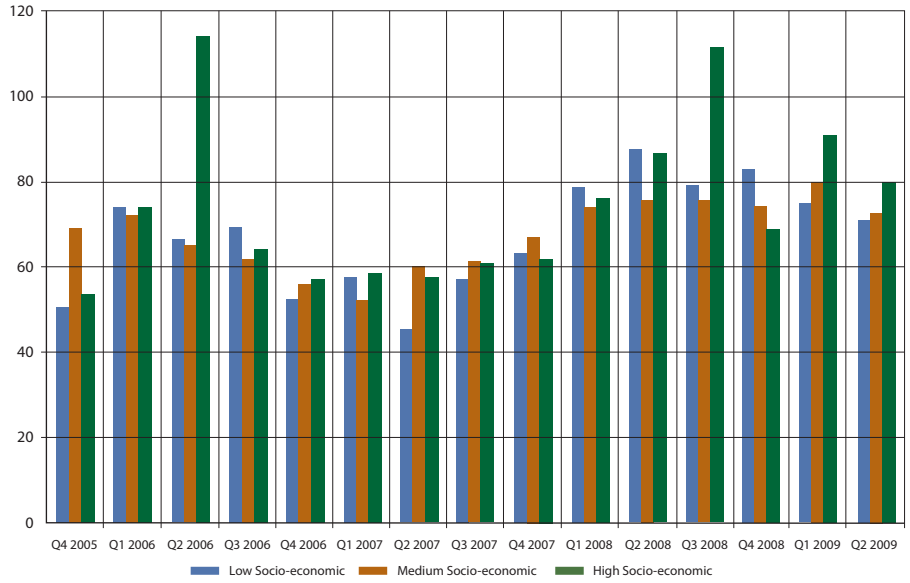


Quarterly sales analysis

Although the annual sales analysis of the subject property markets shows a decline from 2007 to 2008, it does not give a true indication of how each of the markets actually performed during 2008 and when the decline in the price of residential property actually occurred. To present a more accurate picture of the property decline the sales transactions were analysed on a quarterly basis. These results for the average quarterly house price are shown in Figure 6.

Figure 6 shows that in all the Christchurch housing markets the peak in prices occurred in the last quarter of 2007, with all markets recording declines in the quarterly average house price from first quarter 2008 to fourth quarter 2008. The fall in average price in the high socio-

Figure 7 Christchurch Residential Property Average Selling Periods: Q4 2005 to Q2 2009



economic from the 2007 peak to fourth quarter 2008 was $742,000 to $572,000 (22.9%). For the middle socio-economic areas the fall was $433,000 to $361,000 (16.6%) and the low socio-economic suburbs $284,000 to $241,000 (15.1%). This figure also shows that the price for higher value residential properties has continued to decline in 2009, with a 14.1% decline from December quarter 2008 to June quarter 2009. Over the same period the middle socio-economic areas showed a decline of only 1%, but the market in the lower socio-economic areas showed an increase in residential property prices of 9.2%

This figure also shows that the average price for residential property in the high and middle socio-economic suburbs in the last quarter of 2008 were at levels that were last recorded between the third and fourth quarters of 2006. In the low socio-economic suburbs the fourth quarter 2008 average price were at levels last recorded between the first and second quarters of 2007.

Conclusions and future implications

The above analysis indicated average house price declines from 16 to 22% depending on suburb location. A review of the repeat sales in Christchurch for the period January 2007 to November 2008 show that of the properties that were sold twice in this period the decline in price ranged from 7.8% to 32.1%, with the lower end being sales that had occurred early in 2008 and then again in late 2008.

Repeat sales from January 2006 to November 2008 do not show the same decline in price but do support the above research in that Christchurch house prices in late 2008 were at similar levels to the market in mid-2006. If the current price declines in the Christchurch residential property market continue in 2009, then the average price for residential property, based on the 2008 results, will fall to levels equivalent to first quarter 2005 for medium and high socio-economic suburbs and second quarter 2005 for low socio-economic suburbs.

On this prediction the average price for high socio-economic suburbs at the end of 2009 (if current economic trends continue) will be $452,000, a fall in price from the peak of 2007 of 37.7%. For medium socio-economic suburbs the average price at the end of 2009 (if current economic trends continue) will be $310,000, a reduction on peak prices of 28.4%. In the case of low socio-economic suburbs the average price at the end of 2009 (if current economic trends continue) will be $208,000, a reduction of 26.8%.

In the period January 2006 to November 2008 there were 24,784 residential sale transactions in Christchurch. This number of sales represents approximately 16% of the Christchurch housing stock, with these sales being financed at relatively higher interest rates than the previous 5-10 years.

A further factor that has to be taken into account when assessing the loss that a home owner may suffer, in the situation where they have to sell their property in the next 12 months, is the cost of selling the property has to be deducted before their remaining equity can be calculated. When agent's commission, marketing costs and legal fees are combined, this can result in a loss of 5% of the sale price before calculating any profit or loss. This situation actually means that an average reduction in price from 2007 to 2009 of say 30% is actually a reduction to the seller of 33.75% (based on the original sale price).

By the end of 2009 the residential property sales that occurred in 2008 will be valued between 21.3% to 27.3% (on a net basis 25.05% to 31.05%) less than their 2008 price, with property purchased in 2007 being valued between 26.8 and 37.7% (on a net basis 30.55% to 41.45%) less than their 2007 price. In

Christchurch the number of residential property sales in these two years totalled 14,244 (2007, 8,759; 2008, 5485 sales). Any property that was purchased in 2007 and had to be sold in the following 12 months has the potential to achieve a net sale price 41% less than the purchase price. This would result in any seller who purchased at the peak of the boom, with a mortgage greater than 59% of the purchase price, being in a negative equity position. A similar situation would apply for any 2008 purchase being sold in 2009 having the potential to achieve as low as 31% less than the purchase price. Again, any homeowner in this situation with a mortgage greater than 69% of the original purchase price would be in a negative equity position.

This is also before any losses in owners' overall equity based on money that has been put into their property in respect to improvements and repairs. Under this scenario the actual losses to a homeowner selling in the current market can far exceed the loss based on the original buying price and the subsequent selling price.

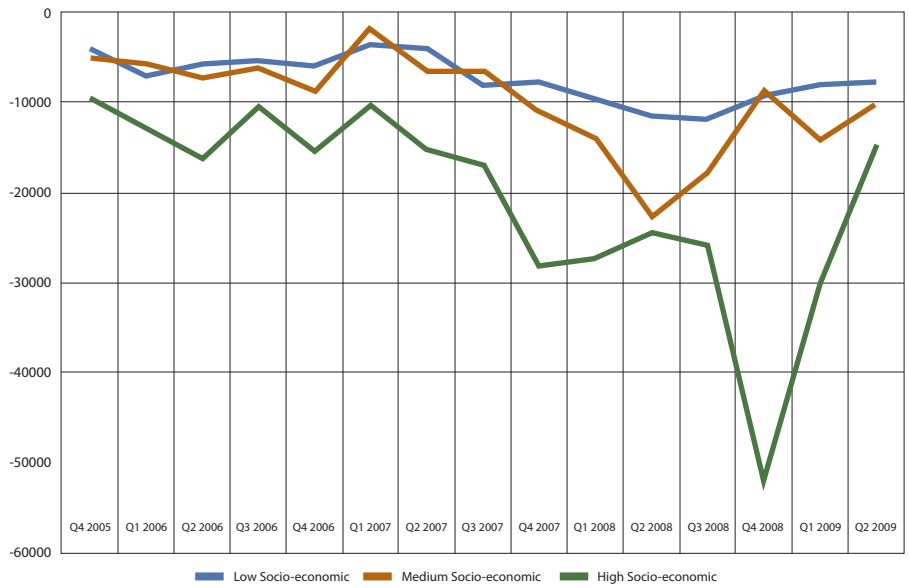
Such scenarios are often ignored when the loss on sale or potential loss of equity is calculated in a falling property market. There are a large number of home owners in Christchurch, who purchased property in 2006, 2007 and 2008 who would have carried out improvement work on the property from funds other than the original mortgage (increased personal debt, savings or credit cards). These costs have to be considered when assessing the impact of a falling property market, not just the gross sale price or official bank mortgage.

approximately 36,000 Christchurch property owners are facing mortgage stress or difficulty

The number of people suffering mortgage stress or difficulty was 265,000 in mid-2007 (Easton, 2007) and according to the NZ Statistics (2008) more than 270,000 households are paying more than $400 per week for their mortgage, with 28% of all New Zealand households paying a mortgage in excess of $500 per week. On these figures approximately 36,000 Christchurch property owners are facing mortgage stress or difficulty and approximately 37,000 property owners are paying in excess of $400 a week in mortgage payments.

With the prospect of house prices continuing to decline in 2009 at similar levels to 2008, there is the potential for 14,244 residential properties in Christchurch to be worth between 26% and 37% less than their purchase price in 2007 and 2008 and with the potential to be facing negative equity if placed in the situation of having to sell the property in the current market. ■

Figure 8 Christchurch Residential Property Average Price Difference: Q4 2005 to Q2 2009



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Is there a relationship between value and architecture?

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Introduction

Although valuation is largely focused on function and architecture is largely centred on form, there is a grey area in-between which is often referred to as the 'form vs. function' argument. In many ways architecture is one of the most public of arts, and at times, one of the more controversial e.g. the Sydney Opera House and Federation Square (Melbourne). While we can choose to avoid most forms of art that we care little for or actively dislike, we cannot avoid buildings or the designs of the streets and spaces around them. Architecture is all around us although it is not accompanied by rules of design or construction like other disciplines (Haldane, 1999). Today that public is increasingly having its say in the shape and design of the buildings in which they live and work – as clients, inhabitants, users, and as citizens concerned with the long-term environmental sustainability of the planet.

Broadly speaking, architecture has a high profile in our society due to its widespread relevance to day-to-day life which is centred on the unique relationship between architecture and the built environment. Architecture is often divided into economic and cultural value, both of which are traditionally considered to be conflicting needs (Klufas 2003). Architecture's cultural value lies in its nature as a public good or externality, affecting positively and negatively those both in and around it. These effects are usually determined by those who commission the building, often through a lack of awareness or care. Change in values however is occurring and architecture is being utilised as a tool to positively influence such diverse interests as sustainability, economic viability, and productivity, and personal well-being. Architecture's true value is its ability to accommodate these interests. Whilst architecture links spaces and structural element together, urban design connects human activity, natural elements and architecture.

While many forms of value exist, it has been argued that different values mean different things to different people, but most importantly they change at varying rates over time (Baier et al. 1969). For example in wider society there has been an increased interest in economic value from a broad media perspective, such as the level of investment in either the built environment or the general economy; at any given point in time this in turn may indirectly convert into future demand for a new building due to underlying financial demand, and hence indirectly increase demand for architecture. Historically there has been little attention given to one of the key drivers behind demand for buildings, namely their economic value both now and in the future. For example over a decade ago Mann (1997, p.31) argued that "one of the less fashionable but crucial issues of the discourse on

architectural theory is about what architectural design contributes to the value of buildings, and how this relates to the economic concerns assumed to dominate decision-making in large segments of the building industry''. Since the publication of this article there have been few if any articles encouraging the discussion about design and economic value.

It is important to raise the profile of the fundamental debate between 'form' and 'function' where the latter is primarily interested in the 'in use' perspective of the building. It is not meant to provide the definitive answer to this debate but rather to initiate a discussion between property professionals on the relevance, if any, of these aspects. In other words many stakeholders are interested in and focus heavily upon the 'value' of the various components in a building, although it is practically impossible to disentangle the synergy created due to the combination of these building attributes into a single bundle. Design is one of the main attributes that is difficult to separate and accurately quantify. This paper examines the perspective of value in design and seeks to increase the awareness about what value actually is and what it means. It is anticipated this paper will raise the profile of the value discussion and provide a useful insight from an architectural viewpoint.

On economic and cultural value – externalities

Often the value of architecture to society is considered to consist of a combination of both economic and cultural value. Economic value comprises any direct use values of the cultural good or service in question (e.g. the income potential to a building owner) plus whatever non-market values it may give rise to (e.g. enhanced corporate social responsibility for an investor). On the other hand cultural value is multi-dimensional, unstable, contested, lacks a common unit of account, and may contain elements that cannot be easily expressed according to any quantitative or qualitative scale (Throsby 2003), sharing many similarities with an externality. In economics an externality is a cost or benefit resulting from an economic transaction that is borne or received by parties not directly involved in the transaction. Externalities can be either positive, when an external benefit is generated, or negative, when an external cost is imposed upon others. It is a form of side effect, though not necessarily an unintended consequence.

Often the underlying tendency in modern societies, such as ours, is to find values that can be quantified reassuring (MacCormac 2005). However when we seek to make everything accountable in this way, subjective values such as aesthetics and beauty appear unmanageable and dangerous. This is predominantly because they cannot be readily quantified or easily measured. The characteristics of cultural goods which give rise to their cultural value might include their aesthetic properties, their spiritual significance, their role as purveyors of symbolic meaning, their historic importance, their significance in influencing artistic trends, their authenticity, their integrity, their uniqueness.

Briefly it is useful to ask how cultural value might be determined. This is a critical question for a number of disciplines interested in art, culture and society. If the mind-set of a neoclassical economist were adopted, we might suggest that the cultural worth of an artistic good could be interpreted as being formed by a negotiated process akin to a simple market exchange. When a cultural good such as a painting or a novel is made available to the public, consumers absorb, interpret and evaluate the ideas contained in the work, discussing and exchanging their assessments with others. In the end if a consensus is reached, the assessed artistic value of the work could be interpreted as something like a cultural price; an exchange value reached by negotiation amongst parties to a market transaction, where the "market" is that for the cultural content of the work (Throsby 2003).

It has been argued that creative artists in fact supply a dual market: (a) a physical market for the good which determines its economic price and (b) a market for ideas which determines the good's cultural value (Throsby 2003). In the good's market there is a single price at any one time because of the private-good nature of the physical work; in the ideas market, there are always multiple valuations as befits the pure public-good properties of artistic ideas. Note that prices in both markets are not independent of each other, moreso they are subject to change over time as reassessments of the work's economic and cultural worth occur.

Of course such a theory provides little joy for the empirical analyst and something more practical will be required if the notion of cultural value is to be made operational so that it can be incorporated into actual decision-making in more than just intuitive terms (Australian Property Institute 2007). The task of assessing value in society is often undertaken for intangible goods, such as the value of naming rights for a building or the value of goodwill. In each scenario it is possible to identify the 'added value' that is added by the intangible good, which could arguably also be used when seeking to identify the added value of good design (Reed and Wilkinson 2007). One possibility is to deconstruct the idea of cultural value into some components and to seek simple scales to represent judgements based on defined criteria (Throsby 2003).

... when we seek to make everything accountable in this way, subjective values such as aesthetics and beauty appear unmanageable and dangerous.

One approach to assessing intangible value is to consider the willingness to pay (WTP) for a non-traded product or good or service (Australian Property Institute 2007); in this approach the measure of economic value is calculated by measuring how much money (including resources used to travel to the location) is willing to be spent by a visitor to access the location. Hence a location such as the Grand Canyon therefore has more economic value than a normal river. This approach could also apply to an architecturally designed building which draws many visitors e.g. the Sydney Opera House. An alternative approach to assessing the value of non-traded goods such as national parks is that they are commonly assessed by identifying the individual intangible attributes or characteristics (e.g. view, social value) and allocating a separate value to each on a ranking system (Reed et al. 2003). The aggregate of the individual attributes would therefore equate to the economic value.

The value concept

There are a many definitions of value throughout the world and although the wording differs, most definitions are similar in concept in that they seek to determine the 'value' or 'worth' at a point in time. However it is the user's objective which ultimately dictates the type or approach to determining value. This can be further complicated from an economic sense if the value concept is not fully understood; since most economic valuations are used by third parties rather than the client alone, the intended use, not the user, of a valuation determines which definition of value is applicable. Figure 1 highlights the differences between tangible property and intangible property, where arguably design may in certain circumstances overlap both categories. For example certain aspects of design and architecture are often related to the architect's reputation (intangible property) although linked to a specific building/location via real property (tangible property). This relationship shows the broad relationship between various attributes of a going concern such as an architecturally designed building.

Individual well-being and productivity

In the past two decades a number of influential architects and planners have returned to the issue of how good design can enhance human values. All have prioritised the human use and experience of buildings and places; the ability of buildings and places to provide heat and coolness, light and shade, companionship and sanctuary, excitement and rest. They appreciated the value and cost-effectiveness of using good design to create more natural micro-climates in buildings, avoiding where possible artificial light, air-conditioning, and central heating. Notably this argument was not based purely on cost but also on grounds of psychological and physical health.

Generally speaking approximately 75% of a typical company's total costs are related directly to staff salaries (Warpole 2000). Practically anything a business can do to make staff more productive and to reduce absenteeism through illness will most likely pay dividends. Staff costs far exceed energy building costs so user contentment is more important to the employer than good environmental design, although the relationship is reciprocal. A healthy and satisfying workplace is invariably a productive one. Continuing with this argument, good architecture and design can have benefits and impacts beyond aesthetics. For example this may be in the form of greater feelings of safety and security, greater legibility and assurance, and in a greater sense of locality, identity, civic pride and belonging. In achieving this, architecture can be a vital part of a wider notion of 'quality of life', therefore directly influencing the productivity levels of a company and in turn its value.

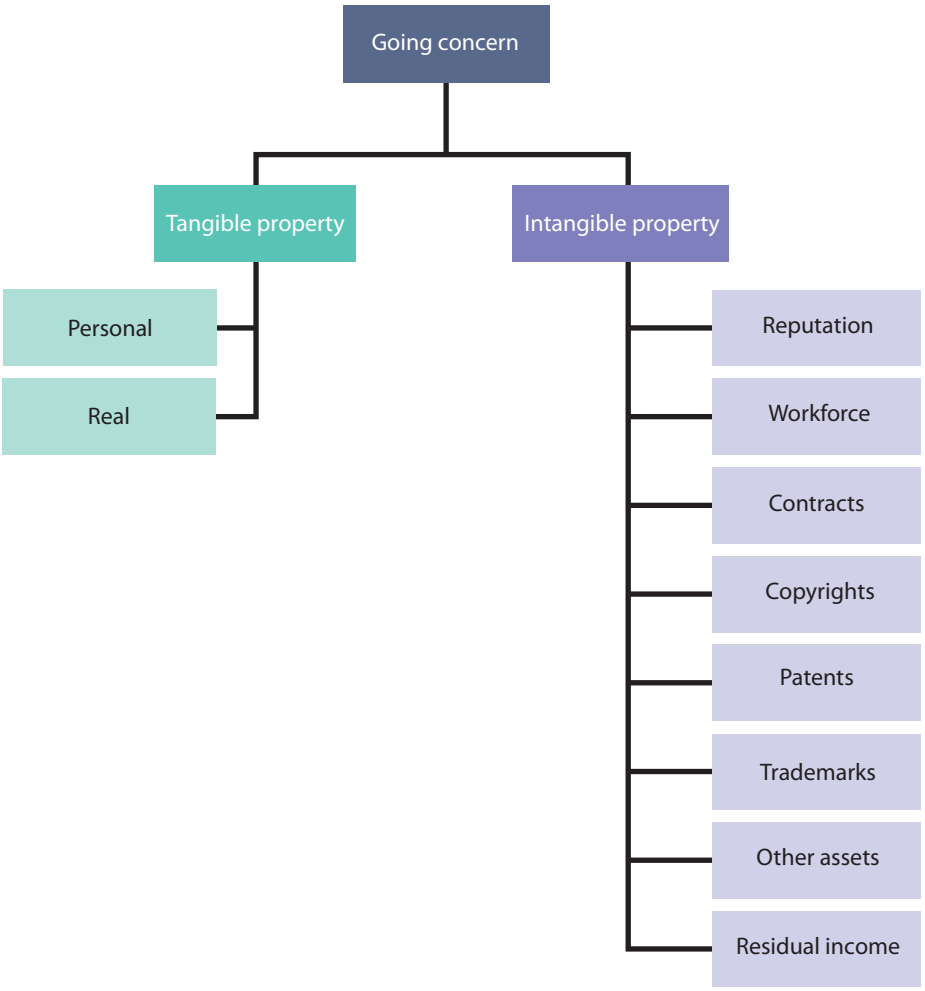
The links between economic value and design have been highlighted by studies into green buildings and sustainability (Myers et al. 2008). It has been demonstrated that a building incorporating actively pursued sustainable design has also enhanced the occupants' perception and use of the building, which in turn has increased its economic value as well as its social sustainability. This argument has also been supported by research into residential housing and design, where houses with sustainable design features have converted into a higher market value (Reed et al. 2008).

Well-being – crime

This element is not environmental determinism in a Darwinian sense, but rather is basic commonsense thinking about how traffic and spatial layout can either enhance or detract from human interaction. Human interaction, and the principle of the natural surveillance of places through high levels of use, can help reduce opportunistic crime. Using spatial design to create more liveable, sociable places is now part of the architectural palette. The economic externalities of good estate design clearly may include lower crime rates, lower demand on health provision, and possibly even better educational attainment in the long term (Warpole 2000).

It is worthy to note the increasing importance which is attached to design as a means of forestalling and preventing crime. The arguments about

Figure 1 – Tangible v. Intangible Property



(Australian Property Institute 2007)

the relationship between housing layout and design and crime became rather contentious in the 1980s because they appeared so deterministic. Nevertheless the fact remains that most police forces in England and Wales today do have an 'architectural liaison officer' who may be called upon to comment on planning applications. Thus architects are becoming much more conscious of the impacts for good and bad which the design of buildings and their configuration can have. It has recently been argued that:

The design-affects-crime debate may well become increasingly important. Indeed, the courts in America are increasingly holding landlords and others liable for failing to take sufficient security precautions to prevent criminal attacks on their tenants and guests. Third parties are being increasingly sued for premises liability, especially if a criminal attack can be partially attributed to poor design (Warpole 2000).

The design of organisational change

One long-standing assumption about architecture, deriving principally from the arts & crafts movement, is that a building is a 'total work of art'; every detail from the garden layout, the detailing of the elevations, to the floor surfaces, doors and even door handles, should effect an integrated vision of the whole experience. However the integration of exterior and interior design becomes more difficult as information technology (IT) and lifestyle changes proceed at a faster rate than building design or adaptation. While cities last for many hundreds of years, and some buildings last for centuries, interiors and interior uses often change every decade or so.

Today one of the key architectural and design skills is the continuing and effective design and redesign of building interiors, particularly office interiors. Successful companies are keen to use design-architecture to complement, and even accelerate, organisational change. In the old fashioned, hierarchical office, design was about the separation of powers and responsibilities; today in the most advanced companies it is about aiding greater workplace informality and communication.

Modern office design recognises that in an era of mobile phones, laptop computers, team working and the increasing value of new ideas, traditional office design often obstructs and confounds good communication. Money saved by cutting out unnecessary desk space, unused board rooms, or redesigning space that is badly used, can be spent on improved workplace facilities, or reinvested. This is a valid example of the added economic value that careful design thought can bring both directly and indirectly to an organisation. Given that office buildings are said to be now the largest capital asset of any developed nation and are where over half the workforce are employed, then the role of architecture and design in creating, efficient, employee-friendly, productive and adaptable settings is of major economic importance in its own right.

Indeed many of the most dynamic companies now want to use design-architecture to accelerate organisational change. At present interior design and architecture are no longer separate from the management ethos or even the day-to-day working practices of the new company, but rather are integrated with the management style. In order to achieve the maximum benefits from design, the architect has to study the working practices of the company. This includes consideration about how its employees use their time and space, how they relate to each other, and how greater interaction and communication can be achieved through new layouts and facilities. Arguably the initial financial investment in customised architecture and design can often be recouped within a few years, after which savings on office rents and greater productivity come into their own.

The flagship effect – regeneration

The economic regeneration occasioned by innovative and successful architecture is no longer regarded as an unexpected bonus; notably the best architects see their work as being integrally involved in the renewed vitality of urban life and culture. One of the clearest examples of how 'flagship' architectural projects can have a clear economic impact on the towns and cities in which they are located is Frank Gehry's spectacular design for the Guggenheim Museum in Bilbao, Spain, in turn regenerating a run-down part of a failing industrial riverside site and already attracting some 3 million visitors a year. The spending power of these visitors not only supports the running of the museum but has helped revive the economy of the city as a whole. There is no doubt that people are coming to see the building as much as the artefacts it contains. Such projects also contribute to what is today described as 'cultural tourism'. This trend has grown out of the enormous demand by people, both nationally and internationally, to visit places of interest including galleries and museums as part of

their use of leisure time. Furthermore this has been evidenced in the proliferation of public art and architectural guides. The concept of the pleasant environment, including amenable and good quality architecture, is clearly central to peoples' perception of what makes a town or city a good place in which to work and live.

Architecture, economics and prime costs

With public and private expenditure soaring during the 1950s and 1960s, it was increasingly evident that simply measuring and valuing work undertaken was an inadequate technique to justify continuing commitment to expenditure. When OPEC increased oil prices fourfold in the early 1970s and again in 1979, higher building costs became of paramount concern. The cost of energy did more to improve the basic design and cost procedures for architecture than most other technical innovations of the time (Warpole 2000).

Architecture and prime cost reduction

Skills and expertise of the architect can provide cost-effective solutions to complex problems, not only saving money, but providing extra benefits in terms of increased space, easier access and more efficient working and living conditions (Carmona et al. 2002). Alternative options, while sometimes ostensibly cheaper, frequently fail to achieve the same benefits and/or savings. Being creative to order, and within very tight physical and financial constraints, is the unique architectural skill (Warpole 2000).

Architects not only have to design buildings that look good and work well, but another of their key skills, often less appreciated by the public, is the ability to fine-tune the design of a building to meet the demands of a very difficult site while still working within fairly major cash constraints. Combining off-site preconstruction with onsite planning and detailing can produce buildings which are both economic and bespoke. Developing imaginative forms of new housing is also a challenge to the architect, for while many builders or developers could 'knock something up' in the form of a standard family house on a flat, greenfield site, shoe-horning a complicated building into a gap left by other buildings and the existing street plan is a real test of the architect's design skills. The skills of fine-tuning a complex building and fitting it into a difficult site are going to be needed more in future, as pressures to build on urban brownfield sites, or adapt existing buildings, continue and increase. In such circumstances standardised forms of construction and formulaic design simply do not work (Warpole 2000).

PFI and the shift to lifecycle costing

Prior to Private Finance Initiatives (PFI), accounting procedures in public utilities and government in the United Kingdom ensured an effective disregard for the crucial aspects of value represented in running and maintenance costs through the life of a building. Capital cost continued to rule supreme, despite the energy cost hikes. It has taken the recent surge of privatisations, and accompanying Private Finance Initiatives to begin to shift this focus in the public sector.

Whilst PFI has not fully lived up to its original intention, a major benefit has come about through its driving of quality (and thus design) standards up as a life cycle approach is taken. With Facility Management firms involved in the risk, design quality is enhanced, with attendant capital cost implications. When this and maintenance is capitalised at NPV, the benefits are apparent (Loe 2000).

It is no longer sufficient to consider the costs and value of construction independent of the manner in which clients look at buildings. Ultimately clients are interested not just in the productivity of the building process but in the occupancy costs in relation to their own economic objectives. Clients are now becoming interested in a new and most important concept: measuring the productivity of building use through time (Loe 2000).

Further lifecycle costing concerns – sustainability

Increasingly the architects are being asked to innovate and think much more creatively in order to achieve greater environmental sustainability. This means taking greater regard for the orientation of the site, local topographical and environmental factors which need to be taken into account, and designing and fine-tuning buildings that take advantage of these factors to minimise energy use – and therefore revenue costs – and provide comfortable and pleasant environments in which to work.

The re-use of old buildings, whilst marginally more expensive, reduces the embodied energy utilised in a building project where embodied energy is referring to the quantity of energy required to manufacture, and supply to the point of use, a product, material or

service (Halliday 2005). Therefore an architect's ability to adapt a brownfield site to take advantage of this pre-existing energy greatly influences a project's ability to achieve sustainability.

Additionally the recycling of waste materials for new purposes, advocating low-energy design and designing buildings that are less costly to operate and adaptable to meet changing future needs, also help to achieve this goal. This may seem to be an optimistic target, but already interesting new buildings are happening which demonstrate that meeting these varied and eminently desirable conditions can be done (Warpole 2000).

Value management

Value management is a function oriented, systematic approach which aims to clarify and satisfy the needs of the customer, whether the customer is the client, the end-user, stakeholder/s or the wider community within which the proposed scheme is to be sited. It is about bringing together a multi-disciplinary team consisting of designers, cost consultants, representatives from client organisations, end-users, stakeholders, and, in some circumstances, members of the wider community in order to identify the purpose of the project itself and the activities it is to accommodate (Loe 2000). This concept is quite different to the commonly accepted 'market value' definition of value which relies directly on the 'willing buyer – willing seller' understanding in an economic sense (API 2007).

Project teams benefit from the clarity, focus and improved communication which value management studies provide, and for the client a holistic solution to their needs emerges.

In operation, value management is a structured, systematic, analytical process which seeks to satisfy customer needs (i.e. functions) by ensuring that all necessary functions are provided at the lowest total cost. Its purpose is to ensure that value for money is achieved; in order to do this it takes into account a project's whole life, from inception through to disposal, and as such is a facilitator of LCC.

At the core of value management lies the technique of value analysis and the relationship between function, cost and worth (Fisher et al. 2004). The analysis of the functions to be provided by a project is of great importance, and involves clearly and succinctly identifying what things actually do i.e. what functions they actually perform. When identifying functions the proposed project is not considered in isolation, but rather in the context of the whole scheme or system. The systematic view of the project accorded by this approach enables those involved in a value management study to view the scheme as a whole and to see how the proposed project fits into that scheme (Loe 2000). While it is no substitute, the technique of value management is one further tool to be used to enhance good design. This holistic view of the construction/procurement process is very useful in integrating an entity's desired goals, facilitating change.

Conclusion

Property professionals should be aware that architecture and design are playing an increasingly important role in the interior planning and refurbishment of industrial and commercial buildings. This is especially so as part of the means by which businesses, and the organisational cultures which they develop, adapt to meet new circumstances and challenges. Growing concerns about environmental sustainability have been quickly responded to architecturally. Notably there already being a number of pioneering examples of sustainable buildings which offer new ways of thinking about how the sophisticated use of new technology, when coupled with innovative design, can achieve more for less with relation to the capital and revenue costs of adapting or designing buildings.

The role that architecture and design are today playing in the regeneration of towns and cities, and in contributing to the greater sustainability of changing patterns of work, domestic life and leisure, is significant. Good design is helping restore ex-industrial buildings to new uses. Given that more and more housing is going to be developed on urban brownfield sites, the skills of architects and designers in adapting old buildings, or in creating new developments on difficult 'infill' sites, are likely to be needed even more than ever before. In addition greater thought needs to be given to the planning of urban spaces and functions to bring about sustainable long-term benefits.

From a property perspective it should be appreciated that good design need not be more expensive, whether in capital or revenue terms, and can bring about other benefits to users and the wider public; both of whom have to live with the buildings and settings that result. Architecture is one of the most public of arts and clearly good design can add enormously to the quality and vitality of the urban or rural setting. Indifferent design, or endless rows of standardised buildings and ill-fitting developments can, cumulatively contribute to a form of urban entropy, a general deadening of the visual and even spiritual qualities of the places in which we live and work, leading 'the long term winding down of the system as a whole, in terms of aspiration and the quality of life.' Good design has

the capacity to make everything work better, economically and socially, and bring benefits to all.

The techniques for capturing economic value within the context of market forces are well represented and skilful. The industry is adept at exchange value but have still to weld to this technique the means of measuring the benefits that well designed buildings bring to the social, political, urban, and image values. This is possibly the construction industry's next and greatest challenge. ■

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Market Comparison – The Objective Approach Part II

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A model is an hypothesis that relates the data to the question in some useful way, but the theory and data must interact to provide useable results. Useful theoretical relationships are limited by the availability of data, and masses of data are limited in their application until possible relationships can be established to convert current fact to future prediction.

James A. Graaskamp

Introduction

Part I of this article dealt with two key objective valuation issues. Firstly, an outline of the content of a valuation report through to the adoption of the valuation technique and model. Secondly, an introduction to initial objective techniques in the market inference approach that seeks to move away from older, more intuitive-generated valuation predictions.

The introduction to objective techniques covered some basic statistical concepts and then focused those on examining relationships of relevance for the valuer with particular regard to determining the most appropriate Unit of Comparison and then Unit of Value. It was suggested that given current levels of computer technology, the objective examination of the relationships between the chosen variables should be routine, using graphs of plots and the statistics, Coefficients of Correlation (r) and the Coefficient of Determination (r^2).

Part II will now build on the initial analysis of determining an appropriate Unit of Value by examining three valuation model types and then completing the valuation report content. A strong, pragmatic, ethic provides the basis for the methodologies examined – "does it work?" Importantly, this includes the requirement to demonstrate relevance by rigorous testing and, being mindful of the outcome and any limitation, not solely focused on the scientific elegance of the model.

Valuation modelling

As there are many variables which might be relevant to the valuation outcome, it is usually necessary to simplify the critical relationships and so structure the data to focus the resultant information on the valuation issue. A model is used to simplify the critical relationships and to structure and organize the data.

A decision model has three basic inputs and three constraints. **Firstly**, there must be a question to be answered – this might be the definition of value or price. **Secondly**, data – which could be that gleaned from the market and often constrained by its quantity and quality. **Thirdly**, a theory or an hypothesis that allows for the editing and focusing of the available data on the question.

Examples of basic valuation models include;

a. Market Inference or Market Sales

approach, commonly called Direct Comparison Approach:

Value or price = comparable sale price +/-adjustment to subject.

b. Income capitalisation approach:

Value or price = rent or income/cap. rate, or, income multiplier or years purchase.

The simple model is to use a Gross Income Multiplier. However, if expense data is available in sufficient quantity and quality then a Net Income Multiplier can be considered.

The three constraints to the application of valuation models are **firstly**, the level of knowledge of techniques and data management together with the skill of the valuer; **secondly**, the level of understanding and acceptability by the client of the valuation process used; and **thirdly**, the cost effectiveness of the valuation process used to answer the question posed.

Part I of this article described the three general approaches to valuations being:

Market Inference, Simulation and Normative, which can be successively considered if necessary. The rest of the article then examined the initial steps that can be considered in objectively identifying the prime Unit of Comparison.

In all approaches it is probably best to first make adjustments for sales terms and conditions to that stated in the value or price definition. If applicable, adjustments for time might then be made. This should leave only the market and property variables to be modelled.

This article now builds on that initial analysis by offering the basics of four objective models.

In the materials that follow, the exhibits are taken from the Excel spreadsheet used in the valuation. In some tables the numbers are rounded to fit the page size. Further, it is not intended to refer to all of the statistical output.

1. No adjustments

There are few instances where virtually no adjustment/s to sales prices is/are available or necessary. This might occur with vacant lot sales where all or most areas are the same and there are perhaps small differences in prices where no rational reason/s for these price differences can be identified.

In such cases, some sort of average can be considered. Readers are referred to Rost & Collins, *Land Valuation and Compensation in Australia* Chapt. 4 (page 100, 3rd edition) for legal comment on this approach.

Unless the sales prices are identical, then basic statistical analysis on the now single variable sale price is recommended.

There are many statistical software programs available, in addition to the analysis options provided by Microsoft Excel. Higher levels of analysis, together with much greater ease and speed are often available for at least 'in-house' analysis from software such as Minitab and SPSS. Most computer software will 'describe' a variable and include Number (of cases), Mean, Standard Error of the Mean, Median, Minimum, Maximum, and Standard Deviation. Some programs provide more information. A visual picture of a single variable can be obtained by constructing a histogram or for two variables a simple graph of sale prices versus lot area. It is good objective practice to examine the above properties in any variable being considered in real estate analysis.

In addition to the three basic measures of central tendency, the mean, median and mode, consideration of a 'trimmed mean' might be appropriate for use and where, in the case of Minitab, 5% of the smallest and 5% of the largest numbers are automatically trimmed and the remaining 90% are averaged to produce this statistic. For example, in order to retain the qualities of the mean, this procedure helps remove possible distortions or 'outliers', if present, at both ends of the range.

The valuer should now consider the descriptive statistics and histogram in order to choose the central tendency of the prices. Further, the range as described by the maximum and minimum values may be modified by reference to the Standard Deviation and perhaps the Standard Error of the Mean, which is technically more appropriate.

2. Regression analysis – two-variable or simple

Where the analysis reveals a strong r^2 between price and one other variable, often based on area but not exclusively, and the valuer believes that no further adjustment variables can be identified, then the quantity of the subject's unit of comparison is applied to the unit of value adopted from the sales. This could be done by examination of the graph used in the identification of the unit of comparison. However, a more objective approach would be to consider using simple (two-variable) regression analysis to generate a regression equation to use as the predictive tool.

Regression analysis is considered the most widely used predictive technique in statistics. As with the testing of different units against price in Part I, the computer allows quick and easy access to regression, the generation of a predicting equation and other useful statistics dealing with quality issues.

The form of the two-variable regression

equation is usually shown as:

y = a + bx, where, in this case,

y = the dependent variable or price

a = is a 'constant' (coefficient). Its value is where the regression line intersects the y axis on a graph,

b = another coefficient which describes the slope of the regression line based on the incremental value increase (or decrease if the slope is downward sloping) based on the value of each unit of the independent variable, and

x = the value of the independent variable or unit of comparison, or where relevant, the unit of value.

If you were hand drawing the line of best fit (or the regression line) on a scatter plot of the properties then the line (linear) is drawn joining the value of the 'constant' and point where the means of the x and y variables intersect.

Generally, the line should not be extrapolated beyond the plotted values as there is no evidence to indicate where the relation is outside of the known data. For example, given the sales shown in Exhibit 1, it would be dangerous to assume you could make value predictions for properties with areas of more than 32,942 m^2 or less than 5,074 m^2, as they would lie outside the data range, as illustrated in Exhibit 2.

In valuations, the regression equation provides the answer to the pattern of prices of the sales and its strength, given the values of the unit of comparison (the 'x' values) and sale price (the 'y' values) of each of the comparable sales. As valuations are largely about discovering a pattern in the sales, regression can be a very valuable tool for the valuer.

The following example of sales of vacant, inner-city industrial sites illustrates the use of the simple regression model.

Exhibit 1: Inner-city Industrial Site Sales

Sale No.	Area	Zoning	Price	Date	$/m2
6	7,624	Ind 1	$4,100,000	Jul-07	$538
9	15,515	Ind 1	$9,700,000	Oct-07	$625
13	5,074	Bus 3	$3,171,250	Dec-07	$625
14	8,671	Bus 3	$5,514,143	Dec-07	$636
15	32,942	Ind 1	$22,000,000	Feb-08	$668

Exhibit 2: Graph of City Industrial Site Sale Prices and Areas

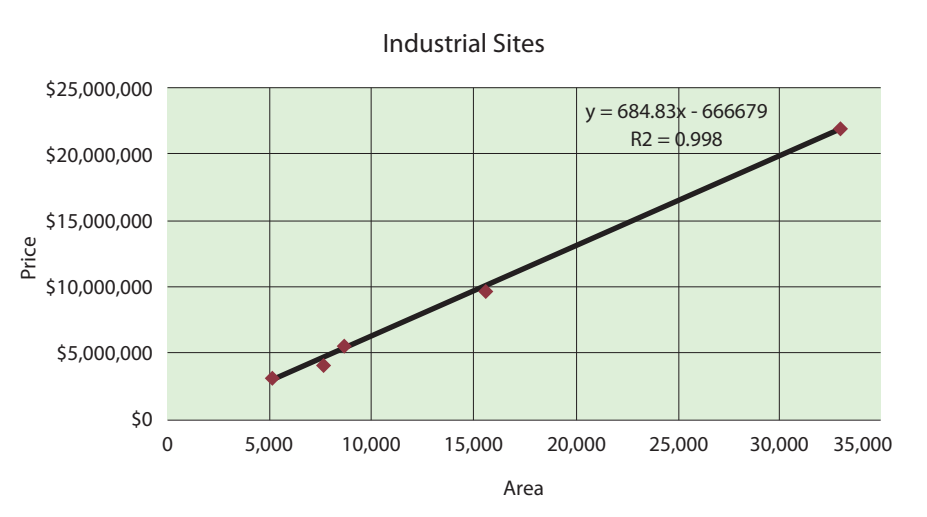


Exhibit 1 sets out the raw data as obtained for the valuation of a comparable site with an area of 13,820 m^2.

The next step was to test the strength of the relationship with possible units of comparison using both a graph and r^2. Using Excel, and for convenience, the chart or graph can provide the 'line of best fit', r^2 and the value of the regression coefficients.

Note that the Excel chart below reverses the generally accepted order of the coefficients in the regression equation. Generally this equation would be written as y = -666,679 + 684.83b.

The valuer regarded this as "an exceptional r^2" (0.998), and, feeling that it would not be necessary to make any other adjustments to the comparable sales, decided to complete the regression analysis.

Exhibit 3 shows the Excel output.

Note: the Standard Error of the Estimate (like the Standard Deviation) shown as $398127.8 is an absolute measure of variability or dispersion, whereas r^2 is a proportional measure of the observed variation in y or the prices that is explained by the x variable. As a general proposition they will be negatively correlated, or, 1-r^2 and the Standard Error will increase or decline in value together.

An examination of this output confirms the close relationship, as expected, between price and area. In this case, the important checks of r^2, the standard error (of the estimate), and the t statistic of the b coefficient (38.84) suggest that this data, limited as is often the case with land

valuations to only five sales, provides a reasonably robust equation for use by the valuer.

The valuer then proceeded to further test his model by using the equation to predict the value of each of the sales and examining how accurate the model is. This is often referred to as Residuals Analysis.

This is a critical test. If the model does not reasonably predict the prices of the set of sale properties from which the valuer intends to make his prediction, it clearly is not worthy of use. If it does, it confirms that the model works on the sales and, as the valuer has chosen this subset of properties as one which can include the subject, then the valuer can proceed with confidence.

Exhibit 3
Industrial Sales –Regression Analysis

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.999007
R Square	0.998015
Adjusted R Square	0.997354
Standard Error	398127.8
Observations	5

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.39097E+14	2.39097E+14	1508.444	3.76E-05
Residual	3	4.75517E+11	1.58506E+11		
Total	4	2.39573E+14			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	-666679	303869.6729	-2.1939624 1	0.115824	-1633728	300370.3	-1633728	300370.3
X Variable 1	684.8278	17.6326174	38.83869239	3.76E-05	628.7129	740.9427	628.7129	740.9427

Exhibit 4
Residuals Analysis

Sale #	*Area*	*Price*	*Predicted*	*Residuals*	*Var. %*
6	7,624	$4,100,000	$4,554,449	-$454,449	-11.08%
9	15,515	$9,700,000	$9,958,425	-$258,425	-2.66%
13	5,074	$3,171,250	$2,808,138	$363,112	11.45%
14	8,671	$5,514,143	$5,271,463	$242,680	4.40%
15	32,942	$22,000,000	$21,892,919	$107,081	0.49%

The predictions are easily calculated by either using the Excel Inset Function of 'FORECAST'' or by constructing the equation, as shown in Exhibit 4.

In this case the valuer proceeded to make his value or price prediction using the regression equation, thus:

Subject price = -666,679 + 684.8278 x 13,820 = **$8,797,642**.
This is @ $637 per m^2.

The valuer also reported a range of from $8,399,514 to $9,195,769 based on the Standard Error. This is $608 to $665 per m^2 and represents a range of +/- 4.5%.

In this case, the valuer adopted his method primarily on the unusually strong value of the r^2 (0.998) calculated with area. Nevertheless, he also had regard to the other possible important variable, zoning (but found it seemed to have no material impact), the quality of the model when tested on the sales and the location of the subject area's value in the sales set. Although two of the residuals seem high, they are offset by the strong performance of the other three. As he was then satisfied, the value conclusion was reached.

3. Regression Analysis – three or more variables or Multiple Regression Analysis (MRA).

Most problems in real estate analysis require the consideration of more than one dimension; that is, more than one dependent variable has a measurable impact on valuations or price. MRA is

an extension of simple, or two variable, regression and takes the form of:

$Y = a + b_1x_1 + c_2x_2 + d_3x_3 \ldots\ldots$

Thus MRA allows for the simultaneous consideration of more than one independent variable or real estate/sale characteristic for which adjustments need to be made. While the form of the equation seems simple and easy to construct once the valuer has determined the variables which need adjusting for, MRA can become very complex. Its use in mass valuations has been explored for many decades in much detail with mixed results.

This article, however, is focused on the valuation of a single or small group of properties and seeks a pragmatic solution using the assistance of MRA when appropriate. The valuer draws on knowledge from many disciplines and his ultimate expression is in the form of a number, after the analysis of other numbers in seeking a pattern. Clearly, reasonably strong elements of mathematical and statistical skills must form part of his armoury.

Real estate data violates four important regression assumptions or rules.

(1) MRA assumes that the independent variables are (reasonably) independent of each other.

In real estate many variables are closely associated. For example, size of house, number of rooms, number of bedrooms and living area can all be expected to be closely correlated, or are collinear. This condition is called multicollinearity. The strong presence of this factor often gives rise to apparently nonsensical and 'weak' coefficients of the independent variables. Further, there is the practical problem of dealing with a larger-than-needed number of variables, including their collection and screening if others are a proxy for their values.

Multicollinearity can be reduced. For example, in the initial screening of all the variables in a correlation matrix; in those cases where there are strong correlations between two of the independent variables, the weaker variable (lower r value to the dependent variable) can be discarded. There are other techniques available such as the use of 'Stepwise Regression' and Factor Analysis, but these are beyond the scope of this article.

(2) Regression assumes a linear relationship.

Real estate typically illustrates economies and diseconomies of scale and such 'curvilinear' relationships can be easily explored and described as the 'Trendline' options in an Excel graph regression equation show. However, the valuer is generally operating with a small subset of properties where the magnitude of the critical variables is "acceptably" small. Part 1 of this article looked at this issue with the "Brunswick Warehouses".

(3) Autocorrelation or patterns in the residuals, i.e., a pattern in the differences between the actual sales prices and the predicted sales prices in the analysis.

The residual error should be randomly distributed. In real estate, where there is a pattern to the residuals, it is probably indicating that there is an attribute or independent variable left out of the analysis that's interacting in a way that is unexplained by the variables which have been identified.

(4) Need for large numbers.

Ideally the number of cases or sales should be equal to the number of variables plus a minimum of 30. (You can expect to have a higher level of confidence in a value outcome where you have 40 comparable sales rather than the same inference from only four sales). For most valuations the valuer almost never works with such numbers.

Nevertheless, valuations using regression often work reasonably well and its use as a check, if not as a primary method of valuation, should remain under consideration.

The following case illustrates the valuation use of MRA.

The issue was to value or price more than 30 residential properties that had been used for temporary accommodation and were now being renovated prior to marketing and sale. During earlier construction and the temporary occupancy, pre-selling had produced in excess of 100 sales over two to three years out of a total of 140+ properties. All properties had recommended asking prices made by the selling agent and the 'reasonableness' of these needed to be determined.

Sales analysis revealed that the prices achieved ranged from $700,000 to just over $1,000,000 and that the following factors or 'value drivers' had influenced price, viz

- Allotment size,
- Dwelling size, primarily based on number of bedrooms
- Dwelling type,
- Studio spaces (as an addition),
- Location, with five elements mainly based on outlook or exposure, and
- Date of transaction.

The report, under "Valuation

Methodology", then stated that the properties (both sales and subjects) were reasonably homogeneous, with sales and subject properties confined to the one project and that in general the properties provided large dwellings in excess of 200m^2 on broadly similar allotment sizes. Further that "a direct comparison approach has been utilised via multiple regression analysis".

Such conditions are often considered suitable for regression-based predictions and this was then performed on the sales data. After further consideration, four quantitative variables with known exact features were ultimately adopted.

The equation had the form of:

$Y = a + b_1x_1 + c_2x_2 + d_3x_3 + e_4x_4 + f_5x_5$, where:

x_1 = lot area, based on m^2,

x_2 = dwelling area based on m^2,

x_3 = presence or absence of studio, a 'dummy variable' was constructed where yes = 1 and no = 0,

x_4 = date of sale, based on monthly intervals

x_5 = a composite qualitative variable of subjective features such as location, private open space and dwelling type. A scoring schema ranked the properties for this variable being from 0.7 for property perceived to possess the worst overall ranking through to 1.15 for the property viewed as having the best overall attributes in this group

r^2 = 94.3% and the report said "That is, 94.4% of the variation in sales prices is explained by the regression".

The Standard Error of the Estimate was shown as $16,679 and from this a generalised statement of the range of any forecasts based on assuming a reasonable normal scatter of predictions along the regression line was stated.

The valuer then produced a table of the ten predictions that varied the most from their actual sales prices. These ranged from 3.07% to 5.99 %.

This seemed to confirm that a useful prediction equation had been constructed and the equation was then applied to the subject properties.

The results of the analysis were then tabled beside the agent's suggested pricings together with the differences between the two, both in absolutes and relative terms. Four properties had a variation over 5% and only one above 10% being 11.4%. Where appropriate, notes were provided offering reasons why some particular differences could be expected from the 'norm' and in a small number of cases, adjustments for significant property presentation differences made. Note that these adjustments were for a factor not included in the basic model.

The overall difference based on the aggregates of the two prices was 2.39%.

The 'reasonableness' of the agent's pricing was ultimately accepted.

4. Market Inference using the Quality Points (QP) model.

Most properties exhibit more than one dimension of value attribute. MRA can become complex and presents particular difficulties in the conventional single property valuation where in most instances only a relatively small number of cases or comparable sales are available for analysis.

In 1972 Richard Ratcliff adapted a scoring of weighted property attributes that enables a single score value to be given to each case or property including the subject. James Graaskamp demonstrated this process, to become known as the QP valuation model, in his monograph "The Appraisal of 25 North Pinckney" (1977). During the 1980s, Gene Dilmore, a highly skilled practitioner, expanded and refined the model after extensive use and harnessing the power of the computer. The concept was introduced to Australian and New Zealand universities and to practitioners in the 1980s, particularly during the series of seminars presented by Graaskamp in 1984. In 1995 Professor Tom Whipple from Curtin University provided a detailed discussion and explanation in his text, *Property Valuation and Analysis*, with an update in 2006.

George Canning, a Canadian appraiser and John Marshall, a Melbourne property analyst, have adapted the QP model to an Excel spreadsheet and have demonstrated that these techniques can be of great assistance in providing a cost-effective way of delivering objective assessments with greater confidence in the valuation conclusions that are reached.

The basic steps using the QP model are:

1. Define, whenever possible by objective analysis, the prime unit of comparison.
2. Where it is apparent that other property attributes need to be adjusted for, then set up a scale of these other variables of importance to the most probable buyer. Examples may include Linkages, Zoning, Site, Building Condition, and Exposure Characteristics.

A way of looking for the reason for developing this model beyond Step 1 is that there is the need to move the prime unit's r2 with price as close to 1.00 as possible.

3. Apply weights to each of the attributes.

These should reflect the importance of each attribute in the buyers' mind. The weights should add to 100%. Set up a scoring schema for each of the attributes.

It is suggested that the initial scores be based on, 'better' or 'more than', 'typical', 'worse' or' less than', using 1 - 2 - 3 or 1 - 3 - 5. Wherever possible the score descriptions should be unambiguous.

Such a simple scheme is easily understood and reduces the likelihood of argument about varying degrees of better or worse. However, users of this technique, both in the USA and Australia report that finer gradings which are more subtle in describing differences sometimes give better results.

Examples:

a. Renovation required on Purchase (25%) (weight)

   5 = No major improvements needed
   3 = Some work needed for occupancy
   1 = Extensive renovation necessary

b. Linkage (35%)

   5 = Within 1km of shopping centre
   3 = Within 2km of shopping centre
   1 = Greater than 2km from shopping centre

   When the subject property has an attribute or a score not covered by the sales scoring schema then any adjustment should be made outside the model.

4. a. Score each attribute of each comparable and the subject.
   b. Multiply each score by the attribute weight.
   c. Add the weighted scores for each property and the subject to obtain a weighted score for each property

The valuer now has the following data:

- price per unit of comparison for each comparable sale.
- weighted point score for each sale property
- weighted point score for the subject property

Notice that the scores for each property should **now reflect, by adjustment, the relative overall differences remaining between them** after accounting for the prime difference in the chosen unit of comparison. The only remaining space in a matrix of these two variables is for the value of the unit of comparison applicable to the subject property.

5. Two alternative methodologies can then be applied to the sales data:
   a. Simple Linear Regression.
   b. Mean Points Score.

a. Simple Linear Regression

1. Undertake two-variable or simple regression analysis where:

   The x variables are the sale properties' point scores.

   The y variables are the sale properties' price per unit of comparison

2. Apply the subject property point score to the x in the equation $y = a + bx$.

   This provides the price/unit for the subject.

3. Apply the price/unit to the subjects' number of units to produce the value prediction.

4. Quality measures

a. Examine the Standard Error of the Estimate (SE), and use this to construct a preliminary

   range based on one Standard Error each side of the predicted value.

b. Calculate a Coefficient of Variation (COV) where COV= SE / subject's price per unit, or Coefficient of Deviation (or Dispersion) – see below.

c. Carry out variance or residuals analysis, by applying the regression equation to the sale properties.

d. Examine the residuals for magnitude in both absolute and % terms, and calculate a Mean Absolute Deviation.

e. Examine the residuals for a pattern. The residuals should be randomly distributed. Should there be a distinct pattern then that suggests that an important attribute variable has not been accounted for in the current model.

Case Study using Excel

Excel or similar spreadsheets allows for the construction of a basic model. While the benefits from the automated calculations by computer spreadsheets should be well known to most valuers, they also provide the use of the SOLVER function which is an optimising function that can remove the subjective nature of some of the inputs.

The purpose of the valuation was to value or price an in globo parcel of land ready for residential subdivision into 80 lots.

Before entering the valuation model, the valuer determined (in this case):

- That no adjustments for terms & condition of sale was warranted
- That no adjustment for time was required
- That in testing for both area and lot yield for determining the prime unit of comparison, that area with price had an r^2 of 0.138, and lot yield 0.567. Number of lots became the prime unit of comparison.

Exhibit 5 sets out the comparable sales and subject data, together with the weights and scores for each of these properties, culminating in the weighted score for each property.

Exhibit 5

Date of analysis	Mar 07											
Number of comparable sales	8 Must be between 3 and 10 sales											
Est. Monthly market Mov T	0.00% Per month											
Initial r^2	56.73%											
Between price & lot yield												
Sale #	Weights	1	2	3	4	5	6	7	8	9	10	
Property address												**Subject**
Sale price		2300000	3285000	2650000	2440000	4100000	4400000	3050000	3E+06			
Adjs for Terms & Conds of Sale												
Sale Price Adj for T & C of Sale		2300000	3285000	2650000	2440000	4100000	4400000	3050000	3E+06			
Time Adjustment		0	0	0	0	0	0	0	0			
Time Adjusted Price		2300000	3285000	2650000	2440000	4100000	4400000	3050000	3E+06			
Date		38991	38869	38808	38930	38869	39142	38838	38838			Mar-07
Number of lots		32	54	26	56	54	83	52	40			80
Adjusted Sale Price		2300000	3285000	2650000	2440000	4100000	4400000	3050000	3E+06			
Cost price per lot		71875	60833.3	101923.1	43571.4	75925.93	53012.05	58653.85	75000			
Quality Attributes												
Lot Prices (est. Gross revenue/lot)*	50.32%	3	3	5	1	4	2	2	3			1
Efficiency	1.78%	4	4	3	1	1	4	5	3			4
Location	15.81%	1	1	5	1	3	3	1	3			3
Scale	21.86%	4	2	5	2	2	1	2	3			1
Market Resistance to Product	10.23%	3	3	5	2	2	1	4	4			1
	100.00%											
Total points score		2.92	2.48	4.96	1.32	3.15	1.87	2.10	3.10			1.37

** Note: the 'Estimated gross revenue/lot' figures are not shown on this spreadsheet extract.*

The weights, as shown, after they have been optimised by SOLVER, are discussed below. The initial entry in this case of five attributes might be 20% in each case, or those as judged by the valuer.

Exhibit 6 shows the Excel printout scoring schema adopted by the valuer after market analysis. The descriptions should be unambiguous and specific rather than general.

In the original spreadsheet, the scores (Exhibit 6) lay to the right of the printout opposite the respective 'Quality Attribute'.

For example, row one shows the scores and each description for 'Lot prices' which is (now) shown (in Exhibit 5) as being weighted at 50.32%. In the case of Sale 1, Lot Pricing is scored as a 3 (Sale 1's estimated gross revenue per lot when sold was $120,000 and therefore within the range of $116,667 – $133,332 – see Exhibit 6), then the score was weighted. This procedure was followed for all five attributes and the weighted score totalled to 2.92. This calculation was finally performed on the Subject.

Exhibit 7 sets out the result of the regression analysis, including the Residuals Analysis and a graph of the relationship.

The predicted value of the subject property is shown as $3,641,180 with a preliminary range of $3,494,178 to $3,788.182 based on the Standard Error of the Estimate established.

This is followed by the measures of quality of the model, r, r^2, residual or

Exhibit 6: Scoring Schema

(5=>$150,000, 4=$133,333 to $149,999, 3 = $116,667 to $133,332, 2 = $100,000 to $116,666, 1 = < $100,000)

(5 = > 85% saleable area, 4 = 80 to 85% saleable area, 3 = 75 to 80% saleable, 2 = 70 to 75% saleable, 1 = < 75% saleable)

(5= 2nd/3rd Homebuyer Location, 3=Upgrade Location, 1=1st Homebuyer)

(5= < 30 lots, 4 = < 40 lots, 3 = 40-50 lots, 2 = 50 to 60 lots, 1 = > 60 lots)

(5 = Lot sizes 650 m2 & above, 4 = Lot sizes 600 to 649 m2, 3 = 550 to 599 m2, 2 = 450 to 549 m2,1= Lot sizes < 450 m2,

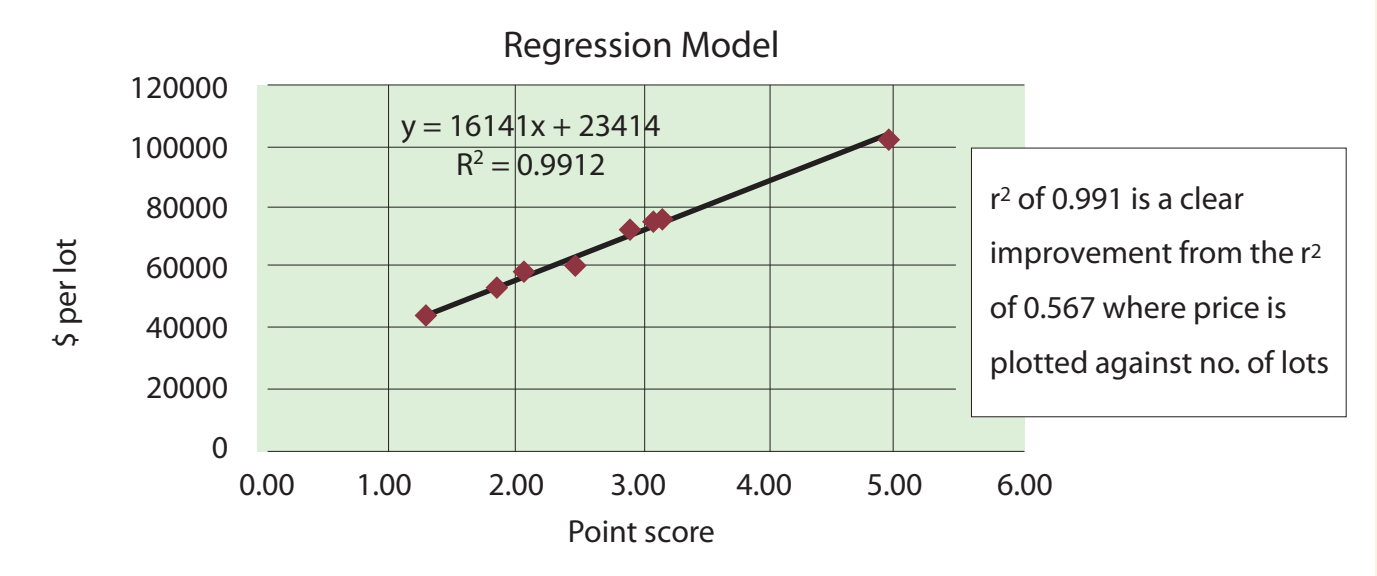
Exhibit 7: Regression Analysis

Sale #	1	2	3	4	5	6	7	8	9	10	Total
Y (Price Per Lot)	$71,875	$60,833	$101,923	$43,571	$75,926	$53,012	$58,654	$75,000	N.A.	N.A.	540794.66
X (Points Score)	2.92	2.48	4.96	1.32	3.15	1.87	2.10	3.10	N.A.	N.A.	21.91
y (Y - Mean Y)	4275.67	-6766.00	34323.74	-24027.90	8326.59	-14587.28	-8945.49	7400.67	N.A.	N.A.	0.00
x (X - Mean X)	0.18	-0.26	2.23	-1.42	0.41	-0.87	-0.64	0.36	N.A.	N.A.	0.00
y2	18,281,334	45,778,743	1,178,119,439	577,340,162	69,332,160	212,788,860	80,021,724	54,769,881	N.A.	N.A.	2,236,432,303
x2	0.03	0.07	4.95	2.01	0.17	0.75	0.41	0.13	N.A.	N.A.	8.52
xy	776	1,730	76,389	34,069	3,396	12,632	5,714	2,690	N.A.	N.A.	137,397.34

Mean Y	$67,599				
Mean X	2.74				
b = sum(xy)/sum(x2)	16129.67				
a = Mean Y - b* (Mean X)	23,423.40				
Equation (Y = a + bX)	Y =	23,423.40	+	16,129.67	*X
Subject Property X-value	1.37				
Predicted Value Per Lot	$45,514.75				
Number of Lots	80				
PREDICTED VALUE	3,641,180				
Minimum	$3,494,178	(One standard error)			
Maximum	$3,788,182	(One standard error)			

Coefficient of Correlation	0.9955				
r = sum (xy)/ SQRT (x^2*y^2)					
Coefficient of Determination (r^2)	0.9909				

Residuals Analysis												
Sale #		1	2	3	4	5	6	7	8	9	10	Total
X - (Points Score)		2.92	2.48	4.96	1.32	3.15	1.87	2.10	3.10	NA	NA	
Y - Actual Price Per Lot		71875.00	60833.33	101923.08	43571.43	75925.93	53012.05	58653.85	75000.00	NA	NA	
Y - Predicted		70527.01	63474.78	103496.65	44729.07	74177.92	53631.35	57295.60	73462.28	NA	NA	
d - Difference (Residuals)		1347.99	-2641.44	-1573.57	-1157.64	1748.00	-619.30	1358.25	1537.72	NA	NA	
d2		1817082	6977224	2476136	1340125	3055516	383535	1844833	2364570	NA	NA	20,259,024
% Variance (from Actual)		1.88%	-4.34%	-1.54%	-2.66%	2.30%	-1.17%	2.32%	2.05%	NA	NA	
Standard Error of Estimate S = SQRT(sum(d2)/(N-2))	1837.53 per lot											
Coefficient of Variation	**4.04%**											



variance analysis with particular reference to the '% variance', the Standard Error of the Estimate and the COV.

This analysis was performed where SOLVER was asked to minimise the value of the COV, by varying the attribute weightings. To do this the computer has generated different combinations (by iteration @ 30,000 equations per minute) of the weights based on the scores and hence found the combination of weights that provides the smallest COV.

The valuer could now reach a valuation conclusion; however, one of the limitations of regression is the need for a large number of cases (n) of comparable sale properties.

Consider the standard measures of dispersion. In the case of a single variable (k), the divisor in the Standard Deviation equation is n-1 (n = number of cases or comparable sales), and that where there are two or more variables such as in this analysis, the Standard Error of the estimate using n-k, the divisor is n-2 = 6 in this case of eight sale properties. In Statistics this adjustment by 'k' calculates the 'degrees of freedom'.

If we can use a single variable and still retain all of the information then such an approach should be considered. We can use the Standard Deviation and the divisor will be n-1,in this case = 7. Consider if you have only four or five sales. Regression works best when there are a large number of comparables.

This leads us to consider the Mean Points Score model.

b. Mean Points Score

1. Divide the $ unit of comparison value for each sale property by the point score for that property.

   This produces a **$ value or price per unit per point**.

2. Calculate the mean and the standard deviation of this new variable
3. Multiply the point score for the subject by the mean of the $/unit/point
4. Multiply the subject property $ unit of comparison by the subject's number of units of comparison to give the value or price prediction.
5. Quality measures
   a. Calculate the Standard Deviation of the full prices (SD), and use this to construct a preliminary range based on one SD each side of the predicted value.
   b. Calculate a Coefficient of Variance (COV) where COV= SD / subject's price per unit, or Coefficient of Deviation (or Dispersion) – see below.
   c. Carry out variance or residuals

Exhibit 8: Mean Quality Points analysis

Mean quality points method												
	Sale #	1	2	3	4	5	6	7	8	9	10	Subject
Total Points Score		2.87	2.25	4.87	1.45	2.66	1.94	2.22	3.14	0	0	1.70
Price per m^2 per point		25,067.01	27,043.40	20,932.87	30,140.24	28,556.72	27,341.65	26,464.83	23,910.47	0	0	?
Average Price per lot per point	$26,182.15											
Standard Deviation	$2,864.31											
Coefficient of Variation	**10.94%**											
(Standard Deviation/Mean)												
Subject Valn Calc.												
Average Price Per m^2 per point	$26,182.15											
Point Score	1.70											
Predicted Value Per Lot	$44,601.80											
Number of Lots	80											
Predicted Value	**$3,568,144**											
Minimum	$3,177,791	(One standard deviation)										
Maximum	$3,958,497	(One standard deviation)										
Variance Analysis												
Sale #		1	2	3	4	5	6	7	8	9	10	
Points Score		2.87	2.25	4.87	1.45	2.66	1.94	2.22	3.14			
Number of Lots		32	54	26	56	54	83	52	40			
Predicted Value Per Lot		75072	58895	127482	37849	69612	50763	58027	82125			
Predicted Value		2402318.	3180382.	3314532.	2119573.	3759073.	4213405.	3017421.	3285023.			
Actual Sale Price		2300000.	3285000.	2650000.	2440000.	4100000.	4400000.	3050000.	3000000.			
Variance or Residual		102318	-104617	664532	-320426	-340926	-186594	-32578	285023			
%		4.4%	-3.2%	25.1%	-13.1%	-8.3%	-4.2%	-1.1%	9.5%			

Exhibit 9: Comparison between Regression and Mean Quality Points Models

Comparison		
	Mean Quality Points	Regression
Minimum Value	$3,177,791	$3,494,178
Predicted Value	$3,568,144	$3,641,180
Maximum Value	$3,958,497	$3,788,182
Range (Maximum to Minimum)	$780,707	$294,004
Range as % of Assessment	21.88%	8.07%
Coefficient of Variation	10.94%	4.04%
BASED ON THE ABOVE, REGRESSION IS PREFERRED METHODOLOGY		

analysis, by applying steps 3 & 4 to the sale properties.

d. Examine the residuals for magnitude in both absolute and % terms and calculate a Mean Absolute Deviation.

e. Examine the residuals for a pattern as before.

Case study con't.

Exhibit 1 & 2 requires no change.

However SOLVER is now set to **minimise the value of the COV** for this new model using $/unit/point.

Exhibit 8 sets out the results where the mean quality points are optimised.

This shows the predicted value to be $3,568,144. The preliminary range is based on a Standard Deviation of $389546 (rounded).

The quality statistics are then presented.

The next major step is to determine which of the two models is the best.

Exhibit 9 provides a comparison table of the key results taken from each of the two calculations based on the method being optimized.

After reviewing both model outputs, and ultimately on the basis of the much lower COV of the regression optimised model, the valuer adopted the central tendency as his prediction, $ 3,641,180.

Note that while the r^2 is very high, the residuals are significant in two cases. However, the valuer felt that a conclusion could now be reached and a range based the Standard Error of the Estimate (in this case as the two variable regression model has been adopted) reported with the 'predicted value' being the central tendency of that range.

The Mean Absolute Deviation, not shown in this spreadsheet, for the optimised regression was $1,497 and for the optimised mean quality points $2,482.

There are two other statistics worthy of brief comment here.

1. Coefficient of Variation (COV) and Coefficient of Dispersion (COD). Where, in valuation:

COV = Standard Deviation (or Standard Error of the Estimate) / Mean (Subject's predicted sale price).

COD = Mean Absolute Deviation (or Dispersion) / Mean, Median or Mode (Subject's predicted sale price).

Both these measures convert an absolute measure to a relative one for ease of comparison between different outcomes. The COD is more suited to situations where there are fewer than, say 25 cases or comparable sales, and is a simpler statistic using whichever central tendency measure is chosen. However, COV is generally considered adequate overall. Given the ease of computation it is the author's view that more statistics in the output is better than less. The important issue is to have an understanding of the information that each is offering in the evaluation of the models.

2. Standard Error of the Prediction

The Standard Error of the Estimate, like the Standard Deviation, is a sort of average measure overall.

Depending where the subject property lies, say in the case of simple regression, along the line-of-best-fit, so will the impact of drawing a statement of variance or a range be influenced – the Standard Error has the same value at both ends of the value range.

The Standard Error of the Prediction in regression, like the Standard Error of the Mean, refers to the variance around a specific figure, in this case the predicted value or price. This is technically more correct. Hence the term "preliminary estimate" of the range is, in this article, where the Standard Error of the Estimate is used to produce a range around the predicted value.

The Case for the Quality Point approach

This is one way of looking at Market Comparison. The price/unit/point method is a way of equating a variety of different attributes where, on any one element, the valuer could not find any or sufficient market support for adjusting at $/lot, $/area or $/building area.

The objective of most valuations is to answer the question "What will somebody pay for the subject?"

The ultimate test is to minimise the dispersion between the estimated sales

prices and the actual sales prices for each of the comparables.

If the model reasonably predicts the price at which any one of the comparables would sell, then the inference is that it should reasonably predict the price at which the subject itself would sell.

Most valuers probably do not go back and say "if the same logic is used on the actual sales then we would have predicted the following price" – but this is the ultimate test of the model.

It is not whether buyers really do assign a weight of 25% to that factor; it is not whether buyers really do have a 1 – 3 – 5 score in mind for each attribute, nor that the most probable buyers will all have the same attributes in mind. The whole objective of inference is whether, in fact, the predicted price is very close to the actual transaction, and so a system is needed that not only looks forward to the subject property, but also one that must allow the valuer to repeat the same logic process on the properties that have sold in order to see how reliable it was in those cases.

While the arithmetic has to be correct, it is not that which is significant. Ultimately it is the conclusion that is significant.

The same test applies to both models. It is interesting that some statistical packages such as Minitab automatically test back on the original Y values, and may also highlight those that have relatively large variances, say more than two standard errors.

None of the coefficients in regression (except perhaps for the first variable in Stepwise) have any real direct relation to how the buyer is thinking. It just works out that the sum of the computerisation in regression produces an answer that has the least-squares difference with what in fact is the real transaction price.

This means that when using any inference of buyer behaviour we can use any model, but the objective is "does it reliably explain what happened in the past; because if it does, then we will assume it will reliably explain what will happen next".

The critical test about a market comparison system is not only about the subject, but what it says the comparables would have sold for applying the same system.

Most valuers probably do not go back and say "if the same logic is used on the actual sales then we would have predicted the following price" – but this is the ultimate test of the model.

The concern is about the dispersion of the predictions about each of the comparables before making a prediction about the subject.

There are other objective ways available to the valuer, particularly for the rating or mass valuer using automated systems and direct comparison such as the MKT COMP method also described by James Graaskamp during his 1984 Seminar tour. The Mkt Comp model is a direct comparison approach, where the valuer operates interactively with the computer model and relies on the application of Euclidian distance between the sale properties and each subject in a multi-dimension form. Like the higher levels of MRA it is not intended to explore this any further here.

Completing the report

Having completed the analysis using the technique or model chosen, any adjustments that need to be made to the predicted value of price outcome due to any externalities should now be made. These might be made due to specific terms and condition, likely impact of any known bargaining positions, particular or likely political considerations and the like.

The next step is to test the model using another approach and to probably demonstrate, particularly in the investment case that the predicted price or value is rational. For example, in the case of an income property then the expected cash-flows need to be examined to at least determine solvency and the reasonableness of expected returns, i.e., will it work? Are they in line with market terms and conditions?

Finally, the value prediction is arrived at. This might often be on the basis of the central tendency of the output range, and the range and the terms of sale to be assumed. The range should be based on objective considerations such as differences in the terms and conditions of sale, the reliability of the data used and associated issues and not based solely on the preliminary and statistical range.

Conclusion

The report is the main medium of communication with the client and needs to be an appropriate answer to the question which has been asked, as well as the needs of the client in relation to their business decision.

This two-part article has described the contents of a well structured report with

a logical flow of relevant information leading to the adoption and application of an appropriate model specification and its application to the available data to solve the valuation question.

The valuation models examined are objective in approach and pragmatic in the use of the mathematical and statistical tools. These models can be tested for quality in prediction and are defensible. An understanding of the use of residual analysis enables the valuer to have a robust measure of the quality of his work. The ultimate key is to use the method, which under the given circumstance, consistently produces the best results. The models examined here are modern, using modern thinking and modern technologies.

It is intended to conclude this series of articles by providing a further example of the Quality Points method, further discussion of the construction of the scoring schema, issues to be considered in reporting a range of values and a model report outline. It is also intended to provide comment on the references used in this series which can of assistance to the valuer using the techniques covered by this two-part article, computer access to a library of highly regarded valuation reports, and to acknowledge those colleagues who assisted in the production of this series. ■

Destroying Coastal Land Values

This paper was presented to the Joint Australian Property Institute (Victorian Division) and Spatial Industries Business Association Seminar "Destroying Coastal Land Values", 18 August 2009.

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Introduction

The predicted rise in sea level and associated increasing storm action over the next half century is colliding with settled property law for tidal properties, much of which is held on the eastern Australian coast by either local councils or in private ownership. Callaghan and Helman of the Centre for Coastal Management at Griffith University have examined severe storms events along the east coast since European contact in 1770, and concluded there will be not only damage or destruction to beachfront properties, but the coastline will also be "changed forever".[1]

While severe storms are cyclical, the duration of the cycle is extremely difficult to predict due to the "many factors involved", according to Callaghan and Helman.[2] Over the past 30 years they also observed that there have been "a relatively low number of storms"[3] and that the worst storm period was in the 1860s and 1870s causing permanent alteration to the coastline.

As a result, land use planners are already attempting to assess the effects of sea level rise and storm events on land potentially threatened. Vulnerability mapping is a critical tool in the development control process, and Harty observes that:

> *…where existing land uses and development are identified as being at risk, new zones and development controls should be developed and applied to implement management actions to avoid and minimise impacts through strategies that protect or remove the risks from sea level rise.*[4]

In mid 2009, the Australian Department of Climate Change released a report by Professor Will Steffen of the ANU Climate Change Institute which reported that faster change to the climate was occurring with more serious risk than anticipated:

> *The climate system appears to be changing faster than earlier thought likely. Key manifestations of this include the rate of accumulation of carbon dioxide in the atmosphere, trends in global ocean temperature and sea level, and loss of Arctic sea ice.*[5]

Importantly, Steffen notes that faster climatic change has implications for sea level rise now expected at the upper end of projections by the Intergovernmental Panel on Climate Change (IPCC) of around 0.8m by 2100.[6] However, he points out that sea level rises larger than the range of 0.5-1m, perhaps 1.5m "cannot be ruled out".[7] Even a modest rise of 0.5m which lies around the centre of IPCC projections may result in impacts which are quite remarkable:

> *… the consequences can be surprisingly severe. Enhanced vulnerability to inundation of low-lying islands is a prominent example, but many coastlines*

around the world, especially sandy coastlines, will be subject to increased erosion and will retreat landwards. One of the more dramatic consequences of modest increases in sea level is the disproportionately large increase in the frequency of extreme sea-level events associated with high tides and storm surges. A 0.5m rise in mean sea-level could cause such extreme events to occur hundreds of times more frequently by the end of the century … an event that now happens once every 100 years would be likely to occur two or three times per year.[8]

As regards storms and extreme events, Steffen does point out that it is difficult to ascertain whether these occurrences "have been increasing over the past several decades"[9] due to quality and limited time sets. Nevertheless, the IPCC has found that even the lowest targets to reduce global greenhouse gas emissions by 50-85% below 2000 levels by mid-century would still lead to sea level rises significant enough "to cover low lying island states".[10] Rajendra Pachauri, IPCC Chair, has raised the question whether "much greater regional detail on the impacts of climate change"[11] should have been included in the IPCC research, other commentators such as Gwynne Dyer stating that:

... [s]ome scientists now believe that sea levels appear to be rising almost twice as fast as the [IPCC] report predicts.[12]

Recently 15 Australian climate researchers wrote in a joint article about the increasing evidence of climate change stating that sea level temperature rises of 2-3 degrees Celsius (or greater) could see the Greenland ice sheet irreversibly decaying which from this one event could lead:

… to a sea level rise of up to about seven metres[13]

In response to the threat of sea level rise, the Australian states have attempted to provide information to local government and development aspirants regarding adaptation to rising sea levels. However, unsurprisingly, there are cross-jurisdictional differences in sea level benchmarks which is of concern to property developers and owners dealing with insurance matters in particular:

If property owners are made liable for the cost of sea level rise it is highly unlikely that insurance groups will continue to take on the risk. And if a real estate investment trust cannot insure its buildings, then the market value of the buildings is likely to fall significantly.[14]

Jane Hamilton, Professor of Accounting at La Trobe University, is currently researching the impact of climate adaptation on large ASX listed companies and has already reported that environmental sustainability issues are increasingly being incorporated into risk-management procedures. Importantly she observes in respect of coastal lands as follows:

… [a] less common example, although not outlandish, would be businesses with property situated in low-lying areas. "With a risk of the sea level rising, they have to take into account relocation costs."[15]

Also, Hamilton concludes that such companies will need to change the standard of reporting which is currently "variable"[16] obviously to meet the continuous reporting requirements of the ASX in particular.

In 2008 the Victorian Coastal Council published the *Victorian Coastal Strategy 2008* which attempts to address prospective sea level rises of between 0.4m and 0.8m by 2100, and the impact upon future development.[17] Subsequently, in July 2009 the *Victorian Climate Change Green Paper*[18] was released as the first step leading to the proposed release of a White Paper on climate change in late 2009 and a draft *Climate Change Bill.* The state's planning system is a major tool for climate adaptation, with the *Green Paper* identifying sea level rises and storm events in particular for "potential action", stating:

> *Victoria's planning system determines what land is suitable for particular uses and could act as a trigger to consider the climate change risks associated with new developments. To do this, planning provisions must be based on accurate and relevant information, clear policies and robust standards in areas such as sea level rises, flooding ….*[19]

Victoria's natural ecosystems which are already stressed are at risk from the additional impact of climate change, and as regards coastal areas the *Green Paper* observes that:

> *... [c]limate change poses significant risks to the Victorian coast and managing these risks presents considerable challenges for the Victorian Government and local governments (which share responsibility for planning and managing natural and built assets on the coast) and for residents, businesses and communities. To make good decisions about the future of the coast, we need to better understand the potential impacts of climate change on key coastal and marine assets, water patterns biodiversity and ecosystems. We then need to translate this research into policy and planning approaches that address sea level rises and climate change risks, and into new approaches to managing key coastal and marine assets, water patterns biodiversity and ecosystems.*[20]

In a similar vein, the NSW Department of Environment and Climate Change published in February 2009 a *Draft Sea Level Rise Policy Statement*[21] setting benchmarks for sea levels in 2050 at 40cm above 1990 mean sea levels and in 2100 at 90cm above 1990 mean sea levels.[22] The *Statement* has been issued in part to guide local Government in assessing development applications, and states that:

> *The Department of Planning will be preparing guidelines on how sea level rise should be considered in land use planning and development approval decisions by councils. This will also provide guidance to landowners, infrastructure providers and developers.*[23]

However, NSW Deputy Premier Carmel Tebbutt has stated that "there will be no regulatory or statutory requirements to comply with the benchmarks".[24]

If there's no support from the government, it leaves us damned if we do and damned if we don't

Coastal local government which bears the responsibility for assessing most development applications apparently regards the *Statement* as inadequate, with Mayor David James of metropolitan coastal Pittwater Council stating on 24 February 2009:

> *If there's no support from the government, it leaves us damned if we do and damned if we don't … if we approve something within the 40cm limit, we could be subject to damages if it subsequently floods or is eroded, but if we refuse it we can get carted off to the Land and Environment Court.*[25]

Subsequently, on 18 July Mayor James issued a sobering assessment of the impact of sea level rises on the local Government area of Pittwater stating:

> *[t]he impact of climate change on Pittwater is potentially significant, given the nature of our coastline with its many kilometers of soft shoreline. Current measurements from the National Tidal Centre show that Pittwater will be subject to sea level rise at the rate of 1cm every three years.*[26]

Unsurprisingly, the Australian Council of Local Government is pressing for "national legislation on planning and risk controls for local councils to address climate change".[27] The absence of mandatory compliance with the NSW Statement on sea level rise has resulted in pressure being placed by the Sydney Coastal Councils Group on the State Government for a *State Environmental Planning Policy* to provide certainty and in particular to provide:

> *… clear guidance on how sea level rise benchmarks, as well as other climate change considerations, are to be implemented by councils in their planning and development assessment process.*[28]

Sadly, the response of state and local governments to prospective sea level rise and storm events remains inadequate, explained in part by concern that much existing development along the Australian coast is of very high value. If future 'green field' development or redevelopment of existing properties is constrained or even denied, claims for compensation and subsequent litigation are an obvious concern for government. Nevertheless, the NSW *Statement* attempts to offset any such claims through the following disclaimer:

> *Coastal hazards and flooding are natural processes and the Government considers that the risks to properties from these processes appropriately rest with the property owners, whether they be public or private. This will continue where these risks are increased by sea level rise. Under both statue and common law, the Government does not have nor does it accept specific future obligations to*

reduce the impacts of coastal hazards and flooding caused by sea level rise on private property.[29]

Conversely, recent doctoral research by Michael Hiatt[30] at the Duke University School of Law suggests that long settled property law particularly the common law doctrine of erosion and accretion will need to be revised to accommodate the impending collision between climate change and tidal private property. Hiatt points out the anticipated sea level rise will present hitherto unknown challenges to property law, especially where:

> *… vast amounts of private lands that are submerged by the ocean … have become tidal lands and waters subject to a public trust …*[31]

Hiatt also notes there is an urgent need to address outdated concepts of property law given that a 1m increase in sea level would result in approximately 25,000 square miles (64,750sq.km.) of the lower 48 US states being submerged in the next century. However, he observes that population, property investment and values in coastal areas have continued to rise rapidly regardless of the sea level threat.[32]

Finally, Hiatt observes that the *Fifth Amendment* of the American *Constitution* which requires just compensation to be paid when private property rights are extinguished never contemplated the effect of climate change.[33] The Australian *Constitution* at *s.51(xxxi)* sets out similar guarantees of compensation when private property rights are commuted, but the colonial drafters of the 1890s would similarly never have envisaged climate effects. Hiatt raises the tantalising prospect of whether increasing inundation of tidal private property could be construed as a Government taking invoking the payment of compensation.

The notion of climate related compensation will doubtless arise in some future litigation in Australia. The issue to be decided will be whether there is a passive acquisition of private property rights over time as envisaged in the common law principle of erosion, or whether state and/or local government has acted in a manner which has at least partially caused climate change and hence erosion.

… vast amounts of private lands that are submerged by the ocean … have become tidal lands and waters subject to a public trust …

Arguably, owners of private property along the Australian coast must have already garnered an anticipation that some or all of their land may become submerged over time through sea level rise and increased storm events. If so, the potential inundation of these lands is merely a reasonable expectation and risk of ownership of such lands, and hence compensation may be unavailable. Conversely, the increasing intersection between climate change and property law may result in innovative jurisprudence to ameliorate unanticipated impacts on private property rights and hence values.

Interestingly, the *Victorian Climate Change Green Paper* recognises the role of the private sector in climate adaptation and identifies insurance and "the protection of private property" are areas where the private sector:

> *… is generally best placed to manage climate change risks.*[34] ■

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[8] *Steffen, 12.*

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[30] *Hiatt, Michael (2008) "Come Hell or High Water: Re-examining the Takings Clause in a Climate Changed Future",* Duke Environmental Law & Policy Forum, *18 (Spring) 371 – 397.*

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Plant and equipment valuation in business combinations

Summary

Much of the work undertaken by the professional plant & equipment valuer with an accounting focus is in the area of business combinations. Central to corporate development globally is the accuracy of financial results and the value of a company's core business assets. Valuations are required for a variety of purposes including purchase price allocations for acquisition accounting, tax consolidation and stamp duty. Valuation disciplines involved with the above include business, intangible, brand, real estate as well as plant & equipment.

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Stephen has more than six years' experience in asset valuation, combined with six years of estimating experience with engineering consultancies. He has undertaken valuations throughout Australia, Asia, Africa and South America assisting clients with independent valuations to support their positions on purchase price allocation, stamp duties, international accounting regulations and other tax and financial related issues.

Requirements under Australian Accounting Standard AASB 3 – Business Combinations

AASB3 Business Combinations was developed in July 2004 as the equivalent to International Financial Reporting Standard 3. It is applied to all business combinations occurring in reporting periods after 1 January 2005.

The objective of AASB3 is to ensure the reliability and comparability of information provided by a reporting entity in its financial statements about a business combination. Where a business acquires or is merged with another business, the acquirer has to account for the assets and liabilities of the acquiree at their fair value[1] as of the acquisition date and the total purchase price paid allocated to the underlying assets and liabilities in a manner that reflects their fair value. AASB 3 specifies the financial reporting by an entity when it undertakes a business combination. A business combination is defined in AASB as a *"transaction or other event in which an acquirer obtains control of one or more businesses".*[2] AASB 3 specifies that all business combinations should be accounted for by applying the acquisition method.

Applying the acquisition method involves the following steps:

- Identifying an acquirer;
- Determining the acquisition date;
- Measuring the purchase price;
- Recognising and measuring the identifiable assets acquired, the liabilities assumed and any non-controlling interest in the acquiree; and
- Recognising and measuring goodwill or a gain from a bargain purchase.

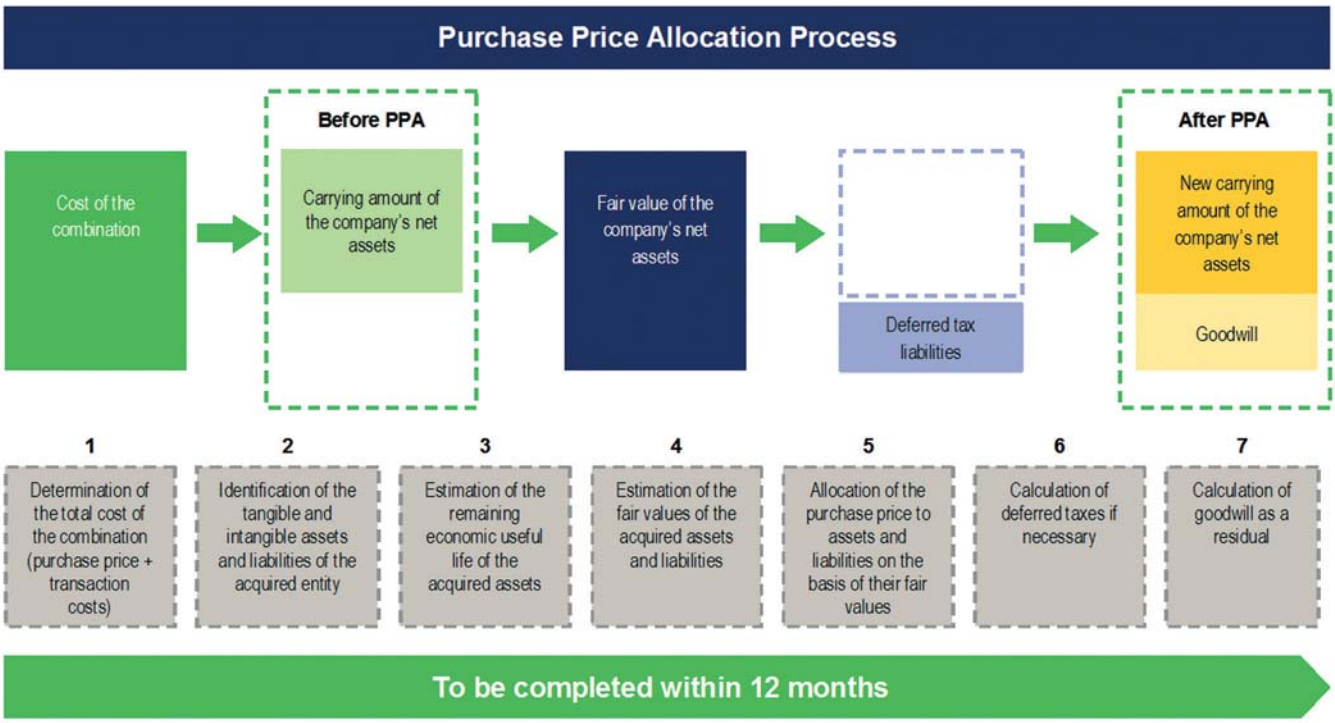
The steps of the acquisition method are provided below.

Understand the transaction

- Identify the acquirer
- Measure the purchase price

The acquirer is defined in AASB3 as *"the entity that obtains control of the*

Figure 1



acquiree".[3] Usually, the acquirer can be identified due to the level of control it has to govern the financial and operating polices of the other entity, or if it acquires more than one half of the voting rights of the other entity. Sometimes however, it may be more difficult to identify the acquirer. In these cases, the acquirer may be the entity which has a greater fair value in the combination, or if the management of one of the combining entities dominates the new management team of the combined entity. AASB127 – Consolidated and Financial Statements can be used to provide guidance in the identification of the acquirer.

AASB3 states that the purchase price of the business combination is the aggregate of the fair values, at the date of exchange of assets given, liabilities incurred or assumed, and equity instruments issued by the acquirer, in exchange for control of the acquiree; plus any costs directly attributable to the business combination.

The purchase price allocation process – allocating cost of business combination to the assets acquired and the liabilities and contingent liabilities assumed

- Identification of assets and liabilities
- Valuation
- Assessment of remaining useful lives

The purchase price allocation (PPA) process is shown in Figure 1.

As at the date of acquisition, the acquirer has to allocate the cost of the business combination by recognising the acquiree's identifiable assets, liabilities and contingent liabilities at their fair value. Historically, acquirers have commonly adopted the acquiree's net book value as their opening values or acquisition cost, however the acquisition method involves the recognition of all assets and liabilities at their *fair value* as at the acquisition date as net book value is unlikely to meet the measurement requirements of cost and fair value.

Fair value is defined by the International Financial Reporting Standards as: "*The amount for which an asset could be exchanged or a liability settled between knowledgeable willing parties in an arm's length transaction.*" [4]

AASB 116 Property, Plant and Equipment provides some guidance as to how fair value for tangible assets should be measured. It states the following:

"The fair value of land and buildings is usually determined from market-based evidence by appraisal"[5] and

"The fair value of items of plant and equipment is usually their market value determined by appraisal." and *"If there is no market-based evidence of fair value because of the specialised nature of the item of property, plant and equipment and the item is rarely sold, except as part of a continuing business, an entity may need to estimate fair value using the income or a depreciated replacement cost approach."*[6]

Whilst not a requirement of accounting

standards, valuations that are required to establish the fair value of tangible assets for allocation should preferably be undertaken by qualified valuers, specialised in either plant and equipment or real estate. The valuers should ideally be accredited by an industry specific body, such as the Australian Property Institute, the American Society of Appraisers or the Royal Institute of Chartered Surveyors in the United Kingdom.

Valuation methodologies – plant & equipment

Tangible assets should be valued based on the appropriate application of the income, market, and cost approaches. Although all three approaches should be considered in a valuation analysis, the fact pattern surrounding the acquisition, the nature of the assets, and the availability of data will dictate which approach, or approaches, are ultimately utilised to calculate the value of the tangible asset. The three approaches are detailed below.

Market approach

The market approach measures value based on what other purchasers in the market have paid for assets that can be considered reasonably similar to those being valued. When the market approach is utilised, data is collected on the prices paid for reasonably comparable assets. Adjustments are made to the comparable assets to compensate for differences between those assets and the asset being valued. The application of the market approach results in an estimate of the price reasonably expected to be realised from the sale of the asset.

In practice, sales prices, especially for intangible assets and specialised tangible assets, are rarely available since these are typically transferred as part of the sale of a business, not in piecemeal transactions.

Example of market approach valuation

In this example, we have a hypothetical subject asset of a D9 dozer.

Subject Asset – 2006 Caterpillar D9T with 1,400 hrs in very good condition.

Comparable Assets

Sale	Date of Sale	Model	Manufacture Year	Hours	Condition	Sale Price
1	4/08	Cat D9T	2007	800	Very good	$1,100,000
2	3/08	Cat D9T	2006	1,200	Very good	$950,000
3	4/08	Cat D9T	2006	1,400	Good	$870,000
4	4/08	Cat D9T	2006	2,000	Poor	$750,000
5	3/08	Cat D9T	2005	1,800	Good	$790,000

Furthermore, because many assets are often unique to a particular enterprise, a comparison between enterprises is difficult.

For these reasons, it is often problematic to apply the market approach for the valuation of intangible assets and many specialised tangible assets. It is however typically used for assets that are commonly traded in the market such as certain real property assets, general plant and equipment, motor vehicles, etc.

After analysing the comparable sales, it can be seen that sale numbers 2 and 3 most closely match our subject asset. The next step is then to compare those sales to the subject asset for example, in terms of condition, location and market conditions at the time of sale, and accessories purchased with the subject asset. Adjustments then have to be made to the sale prices of sales 2 and 3, e.g. for sale 2, the price would have to be adjusted downwards as the unit has only done 1,200 hours compared to our subject's 1,400 hours, while the sale price of unit 3 would have to be adjusted upwards to compensate for the difference in condition between the subject asset and the comparable sale. This would give us a hypothetical value of approximately $900,000 for our subject asset. The valuer should also consider value adjustments necessary on the comparable sale resulting from the cost of acquiring the asset. These could include the cost of capital (which varies over time depending on the condition of the debt and equity markets), freight considerations, and in some circumstances, installation costs. Whilst the adjustments of the sales prices are subjective (and in this case theoretical), the valuer can demonstrate that he/she has investigated relevant market transactions.

Income approach

The income approach focuses on the income-producing capability of the identified asset. The underlying premise of

this approach is that the value of an asset can be measured by the present worth of the net economic benefit (cash receipts less cash outlays) to be received over the life of the asset. The steps followed in applying this approach include estimating the expected after-tax cash flows attributable to the asset over its life and converting these after-tax cash flows to present value through "discounting". The discounting process uses a rate of return that accounts for both the time value of money and investment risk factors. Finally, the present values of the after-tax cash flows over the life of the asset are totalled to arrive at an indication of fair value.

Discounted cash flow and capitalisation approaches are commonly used to determine the fair value of intangible assets and of income producing real property assets such as commercial office buildings, etc.

The income approach is generally not considered to be appropriate to determine values for plant & equipment assets because it is not usually feasible to attribute income to an individual property unit or the units of equipment that constitute an operating entity, since the assets contribute to earnings only in concert with all other economic factors of the business.

Cost approach

In valuing tangible assets, the cost approach relies on the principle of substitution and recognises that a prudent investor will pay no more for an asset than the cost to replace it new with an identical or similar unit of equivalent utility. Under this approach, the fair value of an asset is determined by reference to the reproduction or replacement cost new of modern equivalent assets, optimised for over-design, over-capacity and redundant assets, and adjusted to reflect losses in value attributable to physical depreciation and obsolescence.

It is important that the valuer understands the difference between replacement cost and reproduction cost. The replacement cost is the current cost of a similar asset having the nearest equivalent utility as the asset being appraised. Replacement costs are calculated by obtaining the new cost of the asset from suppliers with additional direct and indirect costs being added. Examples of direct costs include material costs such as foundations, the asset itself, the labour costs associated with the installation of the asset, and also additional costs such as freight and handling. Added to this are the indirect costs, such as engineering design, procurement, construction insurance, finance costs and other professional fees as applicable.

Reproduction cost is the current cost of reproducing a new replica of the asset being appraised using the same, or closely similar materials. They can be found using the above method, but can also be found by using trending techniques which reflect the movement of price over time applied to the asset's historical cost and cost to capacity calculations.

In order to reflect the loss in value attributable to physical deterioration and obsolescence in the assets valuers adopt various depreciation profiles. The depreciation methods considered typically include straight-line, diminishing value and direct market comparison profiles.

Straight-line depreciation is typically used for structural and infrastructure type assets, where only physical obsolescence is considered to have an impact on value.

The diminishing value depreciation profile is typically used for assets that diminish in value due to two or more obsolescence factors. Valuers also endeavour to adopt depreciation profiles that reflect typical market behaviour having regard to the appropriate life and residual value. The forms of obsolescence that should be considered are:

- Physical obsolescence measures the service potential consumed compared to the service potential remaining in the asset as a whole.
- Technological obsolescence results from changes in the design and materials of construction of currently available assets. As manufacturing and construction techniques improve and lower cost materials become available, it becomes possible to construct assets with equivalent or improved output at lower cost levels. This form of obsolescence is particularly apparent in new or emerging technologies and is reflected in the calculation of the replacement cost new having regard to the lowest cost modern equivalent assets.
- Functional obsolescence also results from changes in the design and materials of construction of currently available assets; however the impact on value is measured by reference to changes in operating costs rather than reductions in capital costs.
- Economic obsolescence results from external economic factors. It is defined as the impairment of desirability or useful life arising from economic forces, such as changes in optimum use, legislative enactments that restrict and impair the right to use the assets for their intended use, and changes in supply and demand relationships.

Although the standard declining and double declining balance profiles are the mathematical curves often used by valuers (as they are offered as a work function in Mirosoft Excel), they are not the only declining balance curves available

and should not be used exclusively as they may not reflect the market profile of the asset. The valuer needs to research the market in which the subject asset sits and analyse the forms of obsolescence affecting the asset and adopt a curve depreciation profile which is a best fit for the market. Depending on the aggressiveness of depreciation in the subject market, (which takes into consideration all forms of obsolescence) the appropriate curve may well be a variance to the "standard" declining or double declining profiles. For example, the profile which is a best fit for the market may well be 0.5, 1.5 or 5 times declining balance.

In order to highlight the various declining balance profiles available, we will value the same D9 dozer used in the market approach example provided above and apply various depreciation profiles.

Subject Asset – 2006 Caterpillar D9T

Current (2009)

Replacement Cost $1,225,000

Estimated Economic Life ..... 15 years

Age ..... 3 years

Remaining life ..... 12 years

Residual Value ..... adopt 5%

Using the variables above, several depreciation curves can be plotted (Figure 2) in order to assist with valuing the asset using the DRC basis.

The following depreciated replacement cost values are calculated for the three-year-old asset using four different depreciation profiles.

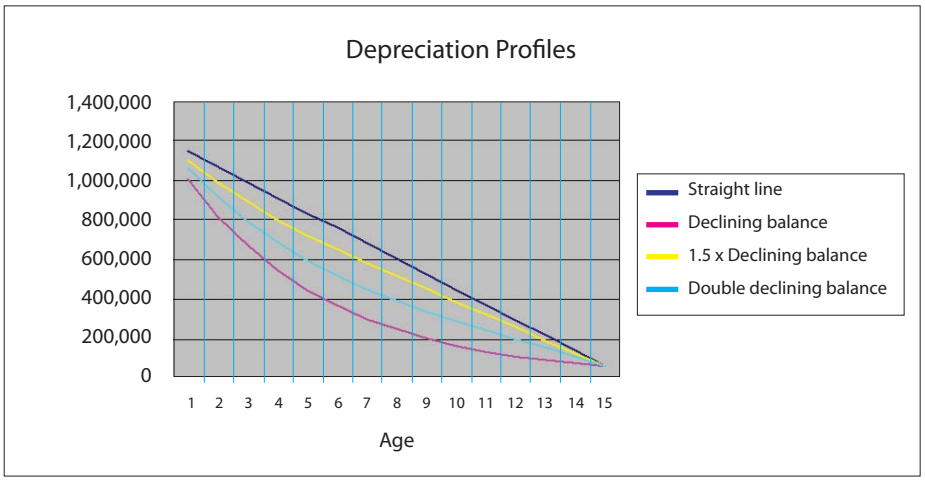
Straight line $995,000

Declining balance $675,000

Double declining balance $800,000

Varying balance (1.5x declining balance) $890,000

Figure 2



The valuer needs to undertake research into the market and review sales evidence in order to assess the depreciation profile which most closely matches the actual depreciation profile of the market. In the example above, if research indicated that previous sales for a similar asset included a seven-year-old D9 dozer for $600,000, a nine-year-old for $410,000 and an 11-year-old model for $315,000, the valuer would then plot those values and use their judgement to establish a profile which most closely fits the sales. The more sales evidence available, the higher the chance that a close fit can be established between the market and a curve derived by the valuer. In this example, based on the sales evidence, the 1.5 x declining balance profile most closely matches the market for D9 dozers. Therefore, in the absence of comparable sales evidence for a three-year-old D9, the valuer could adopt a value of approximately $890,000.

When using the cost approach we note that International Valuation Standards require that:

> *"In reporting the value the valuer shall identify the valuation method as depreciated replacement cost noting that the value can only be adopted in the accounts of the entity if the relevant test of either adequate profitability or service potential is applied and met. (IVS GN8 clause 5.12.2)"*[7]

The test of adequate profitability is the final step in the application of the cost approach and is required to identify and measure economic obsolescence. Economic obsolescence is defined as the loss in value or usefulness of a property caused by factors external to the asset. Because economic obsolescence is usually a function of outside influences that affect an entire business, it can best be measured using the income approach or by comparing the value of the enterprise or cash generating unit ("CGU") as a whole with the values allocated to the assets and liabilities used by that enterprise or CGU to generate cash flows.

Other methods of depreciation that may be considered by valuers include units-of-production based methods, sum-of-the-years-digits depreciation and Iowa survivor curves.

The units-of-production depreciation method is based on a production unit or hours used. For example, if an asset has a life of 10,000 hours with an acquisition cost of $50,000 and a 5% residual value

(thereby making the depreciable amount $47,500), the depreciation cost per unit is $47,500/10,000 which equates to $4.75 per unit. The depreciation of an asset may vary in each accounting period, depending on the amount of units produced or hours that the asset was utilised in any given period.

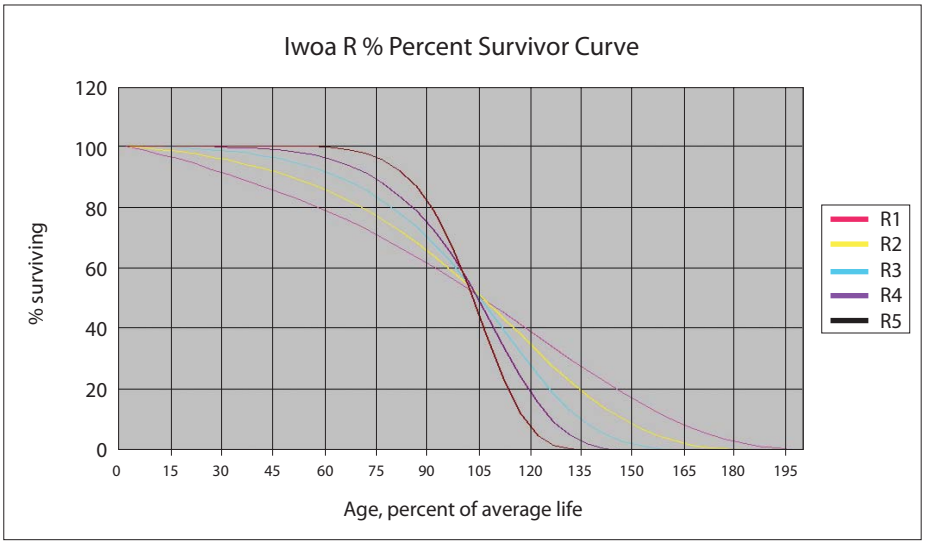
When using the sum-of-the-years digits method, annual depreciation is calculated by multiplying the depreciable cost by a schedule of fractions. For example, if an asset cost $50,000 with a residual value of 5% and a life of five years, you firstly calculate the sum-of-the-years digits, i.e. 15 (5+4+3+2+1). Depreciation rates are then calculated as 5/15 x $47,500 for the first year, 4/15 x $47,500 for the second year, and so on, to 1/15 x $47,500 for the final year. Sum-of-the-years digits depreciation is a methods used in accounting depreciation.

In other markets (generally North America), some valuers adopt "Iowa" depreciation profiles. These depreciation profiles were developed at the Iowa State College through a process of observations and classifications of the ages at which industrial assets were retired. Depreciation rates of an asset are calculated depending on the percentage of assets surviving at a given retirement age. There are many different types of Iowa curve available for use. The type of curve most appropriate to use depends on when the greatest frequency of retirements is expected to occur for a given class of assets.

The Iowa depreciation curves are classified as follows:

- Left modal – where most retirements occur at age less than the normal useful life;
- Symmetrical modal – where most retirements occur at ages equal to normal useful life; and
- Right modal – where most retirements occur at an age greater than the normal useful life.

Figure 3: Iowa Right Modal survivor curves[8]



Furthermore, each of the modal curves in Figure 3 are split further into a number of more defined curves. For example, within the right modal family, there are five curves (R1 to R5) with depreciation profiles as shown in the chart below.

Unlike the diminishing value method, a residual value (value expected for an asset at its retirement) is not ascribed. The R3 curve is the most common curve adopted, as it is statistically in the middle of the five right modal curves. When selecting the curve to adopt, the nature of the assets needs to be considered. For example, with capital intensive, low technology manufacturing assets, a reasonable proportion of assets may remain in service beyond the normal useful life, thus a right modal curve would be selected. The R3 curve assigns a longer life than the R2 curve, and thus assigns a greater value to newer assets, whilst assigning less remaining life to older assets.

The decision of which of the above depreciation profiles to apply should ideally be made by the valuer during the scope of work discussion. The method, or methods, chosen will depend on the type of assets being valued and the information that is available.

Assessment of remaining useful lives

One of the factors impacting on the accuracy of a valuation is the effective life adopted for a particular asset or asset class. The effective useful life of an asset is the estimated life of the asset, assuming continued use in its present function, as part of a continuing and ongoing profitable business. It is considered to be at the end of its useful life when operating and maintenance costs exceed its actual profitability.

The standard and frequency of maintenance is a significant factor in the determination of the effective lives of assets. Generally, a regularly maintained asset will have a greater effective life than an identical asset that is inadequately maintained.

The normal useful life of an asset used for calculating fair value may (will likely) be different to the tax or accounting lives used to calculate tax or written down

values. Normal useful life used by valuers is the estimated number of years that an asset will actually be used before it is retired from service. An asset's normal useful life may be longer than its tax or accounting life.

Consistent with commonly accepted valuation practice, remaining lives of certain asset classes located on leasehold premises should be limited by the remaining lease term. For example, life of mine operations will have an effect on the remaining useful life of an asset, and hence its fair value.

Goodwill calculations

- Calculation of deferred tax liabilities/ assets on fair value adjustments
- Calculation and allocation of remaining goodwill
- Allocation of purchase prices to Cash Generating Units

It is important for there to be interaction between the experts responsible for the tangible and intangible asset valuations as their combined values must fit within the enterprise value of the combined entity.

Any excess between the cost of the business combination and the acquirer's interest in the net fair value of the identifiable assets, liabilities and contingent liabilities should generally be treated as goodwill.

Conclusion

When allocating the cost of a business combination, it is a requirement to establish the fair value of the tangible assets. As net book value does not always equate to fair value, a tangible asset valuation should be undertaken by qualified professionals with the values being allocated over assets in the fixed asset register.

Adopting net book value as a proxy for fair value instead of undertaking tangible asset valuations can significantly under- or overstate the value of a business enterprise.

Further, where values are also required for the purpose of establishing a tax cost base for the acquirer, valuable tax depreciation benefits may be foregone by the acquirer where values are not determined appropriately. ■

Notes

[1] *Fair value definition – "the amount for which an asset could be exchanged between knowledgeable, willing parties in an arm's length transaction" – Australian Accounting Standards Board AASB 116 Property, Plant and Equipment July 2008, Definitions*

[2] *Australian Accounting Standards Board AASB 3 Business Combinations March 2008, Appendix A Defined Terms*

[3] *Australian Accounting Standards Board AASB 3 Business Combinations March 2008, Appendix A Defined Terms*

[4] *Australian Accounting Standards Board AASB 3 Business Combinations March 2008, Appendix A Defined Terms*

[5] *Australian Accounting Standards Board AASB 116 Property, Plant and Equipment July 2008, Definitions*

[6] *Australian Accounting Standards Board AASB 116 Property, Plant and Equipment July 2008, paragraphs 32, 33*

[7] *International Valuation Standards Eighth Edition 2007 - International Valuation Standards Committee*

[8] *Condition-Percent Tables for Depreciation of Unit and Group Properties. Robley Winfrey, Iowa State College, Engineering Experiment Station 1942*

A whole life in real estate

This year's New Year Honours list brought recognition for Graeme Horsley's lifetime in and around the valuation and real estate professions when he was appointed a Member of the New Zealand Order of Merit. Now living in the Bay of Plenty, he continues his business life as an independent property consultant and professional director. He spoke to Peter Hamling.

It was probably inevitable that Graeme Horsley would spend his professional life associated with real estate of one sort or another. After all, his father was among the first in the business in Auckland's eastern suburbs, and while still at secondary school the young Horsley was already helping out by showing clients around properties.

That, he says, is where his love – or interest – in property came from. He went on to qualify as a valuer in 1965; then followed 24 years in public practice with the Northern Building Society, Harcourts, and the formation of Simpson Horsley Nyberg in the late 1970s before joining with Neil Darroch.

It was a conference in Melbourne in the early 1970s that proved something of a turning point for Graeme Horsley. "I came home from that after being indoctrinated into the world of global valuations," he said. "Suddenly the world would open and all sorts of assets would need to be valued."

One of his own milestones was the valuation of Lion Breweries – which he said was the first time a fee for valuation had gone past $1 million in New Zealand. "The whole office worked on it," he recalled.

He then spent a period of 14 years through to 2004 as a partner in Ernst & Young New Zealand as national director of real estate within Ernst Young Corporate Finance Ltd. "I had become interested in far more than just valuation of assets," he said. It was period he clearly enjoyed – working on major corporate and public sector issues – and that he now looks back on with considerable affection.

> ***Suddenly the world would open and all sorts of assets would need to be valued.***

There's certainly not been any lessening of his workload in the last five years – including as it does such intriguing and diverse assignments as the valuation of 23 historic lighthouses around the New Zealand coast, appraising specialised property such as power stations, energy distribution systems, TVNZ's Avalon studios and even the New Zealand Police College.

He's also built-up a huge knowledge of airports that has seen him advise on valuations and property strategies at several major New Zealand airports and others throughout Australia and as far afield as Malaysia.

Then there's been valuation and consulting assignments in the tourism and leisure sectors ranging from golf courses and ski fields to 5-star hotel properties in New Zealand and around the Pacific Rim; providing expert opinion to support litigation on valuation matters; providing his services as an arbitrator; and his current appointment as an additional member of the High Court on land valuation proceedings.

Somewhat modestly he observed in the interview for this article that "I do seem to be in demand for expert opinion work".

For much of his career Graeme has also been a prolific author on valuation and related matters, and he's presented papers at industry conferences in many parts of the world.

He's certainly far from slowing down and also has several current government appointments and directorships that demand his time. Among these are his roles as deputy chairman of the Bay of Plenty District Health Board, chairman of Ngati Whatua o Orakei Corporation and directorships of the AMP New Zealand Office Trust management company, ING Medical Properties Trust and Trust Investments Management Ltd.

Then of course there's been his long-standing and continuing interest in the New Zealand Institute of Valuers, and more recently the Property Institute. He was president of NZIV in 1985-1987 and for 12 years was the institute's representative of the International Valuation Standards Committee and its chairman between 1989 and 1993. His work for the institute led to him being made a Life Fellow in 1998. ■

Peter Hamling is the editor of *Commercial Property New Zealand*

Legal Notebook

Recent cases, headline issues and new legislation

Dr John Keogh
Barrister at Law

Dr Keogh commenced practice at the NSW Bar in 1990 with a focus on property, planning, building and construction law and commercial matters and was awarded a law doctorate from UTS in 2000.

Beatle's island paradise remembered in sub-lease litigation

~ SUPREME COURT OF QUEENSLAND – COURT OF APPEAL ~

Hamilton Island Enterprises Ltd v Boss & Ors (2009) QCA 229 (11 August 2009)

The main issue in this case was whether the trial judge erred in concluding that Hamilton Island Enterprises Ltd ("HIE") acted unreasonably in withdrawing consent to the Respondents' assignment of the subject lease. The Court of Appeal, constituted by Fraser and Chesterman JJA and Wilson J, found that the trial judge had not erred.

The facts

HIE as sub-lessor holds a Perpetual Country Lease over the whole of Hamilton Island, which is the second largest inhabited island of the Whitsunday Islands situated close to the east coast of Queensland. In 1984 HIE granted a sub-lease over an area of 2.26 hectares of the island to former member of the Beatles, Mr George Harrison. The sub-lease was for 94 years with a 99-year option and Mr Harrison built an exclusive waterfront house on the property called "*Letsbeavenue*".

Mr Harrison passed away in 2001 and the sub-lease was assigned to the Trustees of the Estate ("the Trustees"). The sub-lease was replaced by a new sub-lease in 2007, which was substantially on the same terms but with a slight adjustment to the boundaries. The new sub-lease runs for approximately 70 years with an option to extend the sub-lease for a further 99 years (12 September 2007 to 31 March 2078) and includes a clause that the Trustees cannot assign the sub-lease without the written consent of the Minister and the sub-lessor. HIE cannot, however, "arbitrarily or capriciously" withhold consent.

Clause 1.1(g)

"The Sub-Lessee hereby covenants and agrees with the Sub-Lessor:

...

(g)(i) not to assign this Sub-Lease to any person or corporation whatever without first obtaining the written consents of both the Minister administering the *Land Act 1994* and the Sub-Lessor

PROVIDED THAT the Sub-Lessor's ***approval shall not be arbitrarily or capriciously withheld*** in the case of an assignment to a person or persons or corporation who is or are acceptable to the Minister administering the Land Act 1994 and entitled to hold the Sub-Lease and who is or are financially sound and respectable (the onus of providing which shall be upon the Sub-Lessee) and who shall execute a Power of Attorney in the terms of Clause 7 hereof and a covenant to be prepared by the Sub-Lessor's Solicitors to be bound by the terms of this Sub-lease as if he were the Sub-Lessee herein named but no premium or fine shall be payable in respect of any such assignment. [my emphasis]

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On 11 January 2008, the Trustees entered into a contract for sale of their property with Northaust for $8.5 million. HIE consented to the assignment upon the condition that Northaust would execute a Deed which would bind it to comply with an extensive set of regulations promulgated by HIE to govern the conduct of residents and others present on the island ("the HIE regulations"). Many property owners on the island had covenanted to comply with the HIE regulations but Mr Harrison and the Trustees had not. Northaust was not willing to bind itself to comply with the regulations, resulting in HIE withholding its consent to the assignment.

The trial judge's finding

The trial judge held that HIE's refusal to consent to the assignment was unreasonable pursuant to s121(1) of the *Property Law Act 1974* (Qld) and that the Trustees were entitled to assign the sub-lease to Northaust without HIE's consent. The Trustees subsequently assigned the sub-lease to Northaust, were given the Minister's consent to transfer, and registered the assignment pursuant to the *Land Act 1994* (Qld). HIE appealed the trial judge's decision, seeking an order that Northaust reconvey the sub-lease to the Trustees.

The Court of Appeal findings

The Court of Appeal resolved the issue in this case by analysing the effect of HIE's regulations as compared with the terms of the sub-lease and a consideration of HIE's reasons in withholding consent to the assignment unless Northaust bound itself to observe those regulations. The Court of Appeal held that, in resolving the current issue, it is not necessary to decide whether HIE's refusal of consent was 'arbitrary and capricious' pursuant to clause 1.1(g) of the sub-lease. Rather, the issue was solved by applying s121 of the *Property Law Act 1974* (Qld). The section contains a deeming provision that ensures consent is not unreasonably withheld.

Relevant legislation

Property Law Act 1974 (Qld)

Section 121 - Provisions as to covenants not to assign etc. without licence or consent

HIE sought to obtain a substantially more advantageous contractual position than that upon which it had insisted at the time of the grant

(1) ***In all leases*** whether made before or after the commencement of this Act, containing a covenant, condition, or agreement against assigning, underletting, charging or parting with the possession of premises leased or any part of the premises, without licence or consent, such covenant, condition, or agreement shall

(a) despite any express provision to the contrary, be deemed to be subject

(i) to a proviso to the effect that the licence or ***consent is not to be unreasonably withheld***, but this proviso does not preclude the right of the lessor to require payment of a reasonable sum in respect of any legal or other expenses incurred in connection with the licence or consent ... [my emphasis]

HIE's arguments

HIE argued that the initial 1984 sub-lease affects the construction of the sub-lease assigned to Northaust, the Court of Appeal did however reject this argument as:

> *[64] ...on the necessary objective analysis of the language of the sub-lease read in light of the context in which it was granted, the parties did not intend that the construction of the provisions of the sub-lease should be influenced by the contract for the grant of the lease.*
>
> *[65] The parties contracted for the grant of a sub-lease which was to be assignable by both parties. In view of the substantial length of the term of the sub-lease and the option, it was likely that at least the sub-lessee would in fact seek to assign the sub-lease. It was also likely that persons becoming sub-lessees or sub-lessors by assignment decades after the original grant of the sub-lease would have no knowledge, or at best an imperfect knowledge, of terms of the 1984 agreement and the commercial object of those terms. Although the parties to that agreement must be taken to have known its terms and the relevant background, reasonable parties in their position must surely also be taken to have intended that the legal effect of the sub-lease would remain constant, regardless of the very long passage of time during the term of the sub-lease and regardless of any assignment of the sub-lease or the reversion. It seems objectively unlikely in those circumstances that the parties to the agreement contemplated that an assessment of the legal rights of subsequent assignees under the sub-lease might be significantly*

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influenced by the antecedent agreement."

The Court of Appeal referred at [67] to the analogous considerations of Gleeson CJ, Gummow, Kirby, Hayne and Heydon JJ in *Westfield Management Limited v Perpetual Trustee Company Limited* [2007] HCA 45; (2007) 233 CLR 528 at 539 [39] a case which concerned the construction of an easement over Torrens System Land.

HIE argued that the application of its regulations on Northaust merely represented the status quo; that all residents on the island, including Mr Harrison, had in fact accepted and observed the regulations by complying with them. HIE produced evidence that many sub-lessors on the island would favour the imposition of many of the regulations. The Court of Appeal rejected this argument primarily on the basis that it does not prove that it was reasonable for HIE to withhold its consent to the assignment.

HIE submitted that the person in control of Northaus undertook building work on the property without obtaining the necessary approvals under Queensland law, and that this should be taken into consideration when assessing the reasonableness of HIE's withholding of consent to the assignment as it goes to Northaust's 'respectability'. There was, however, a powerful body of evidence suggesting that the real reason that HIE refused consent was due to its inflexible policy that anyone who wanted to take an assignment must subscribe to HIE's regulations.

HIE argued that Mason J's decision in *Secured Income Real Estate (Australia) Ltd v St Martins Investments Pty Ltd* (1979) 144 CLR 596 supported the view that a landlord is entitled to justify refusal of consent to assignment by reliance upon a ground not taken at or about the time of refusal. However, HIE conceded at trial that if Northaust signed the Deed, HIE would consent to the assignment, which shows that HIE did not base its refusal to consent upon any concern about the personal characteristics of Northaust.

Burdens additional to those imposed by the sub-lease

The Court of Appeal found that the HIE regulations would impose burdens additional to those imposed by the sub-lease, as the sub-lease entitles the sub-lessee (and to some extent its invitees) to:

- Quiet enjoyment of the property
- Be present on other parts of the island
- Use roads on the island
- Use resort facilities on the island
- Repair, maintain, restore or improve the existing house or construct additional buildings, provided in each case that the work is consistent with the use of the demised land for the purpose of a single private residence.

... while the HIE regulations give HIE a right to, for example:

- Exclude any person (sub-lessee or other) from the island who breach the HIE regulations.
- Restrict the use of motor vehicles on the island and permanently suspend a person's right to drive.
- Prohibit any construction or operation of a development on the island and building plans must be approved by HIE in addition to Council approval.
- Prohibit damage or removal of vegetation, with tree removal being considered a 'last resort option'.

... furthermore, the regulations vest 'absolute control' over the island in HIE and the right of any person to reside on the island is, according to the regulations, a 'privilege' granted by HIE which can be rescinded by HIE for whatever reason it sees fit.

HIE's withholding of consent was unreasonable

In conclusion, HIE's refusal to consent to the assignment was unreasonable as:

> *"[147] ... HIE sought to obtain a substantially more advantageous contractual position than that upon which it had insisted at the time of the grant ... HIE withheld its consent to the proposed assignment to Northaust by insisting upon the imposition of new terms which would substantially erode the rights conferred by the sub-lease; and HIE imposed the condition not because of any characteristic of Northaust but because HIE believed that it was in its own interests to impose the condition in all cases and regardless of any assignee's personal characteristics.*

Further reading

A short expose on George Harrison's Australian island haven can be found in the online magazine *Architectural Digest* at **http://www.architecturaldigest.com/homes/features/2007/08/harrison_article_082007** ■

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