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Author/s:

Warren-Myers, G;Cradduck, L

Title:

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Date:

2022-01-18

Citation:

Warren-Myers, G. & Cradduck, L. (2022). Physical and climate change-related risk identification in valuation practice: an Australian perspective. *Journal of Property Investment and Finance*, 40 (1), pp.14-37. <https://doi.org/10.1108/JPIF-10-2020-0114>.

Persistent Link:

<https://hdl.handle.net/11343/305885>

Physical and climate change-related risk identification in valuation practice: An Australian perspective

Purpose

The purpose of the research is to investigate Australian property valuers' identification and consideration of physical risks to properties in valuation practice. The research further explores valuers' considerations of *climate change*-related risks.

Design/methodology/approach

The research approach comprised an online survey of Australian valuers who were members of the Australian Property Institute. The online survey included structured and unstructured questions to explore types and extent of risk investigations in valuation practice.

Findings

The analysis reflects that while valuers easily identified and engaged with physical risks, there is a lack of understanding of, and engagement with, climate change risks. This supports the need for better information sources and guidance to inform valuers of climate change risks *per se*, as well as the development of specific mechanisms for consideration of such risks to be included in valuation processes, practices and reports.

Limitations

The research is limited by the small sample size achieved due to the timing of the survey deployment, which occurred during the first wave of COVID-19 lockdowns in Australia. Thus, the findings are not necessarily representative of the Australian valuation profession, but they *do* provide indications of current approaches to risk identification in practice and the need for more guidance in relation to climate change risks.

Practical implications

This research identifies that more support, guidance, information and tools, as well as awareness-raising, are required to enable valuers to accurately identify all risks affecting a property.

Originality/value

The research provides a snapshot of current understandings of physical risk identification in valuation practice. As investors and other organisations integrate and build up their analysis of climate risks to their portfolios and organisations, this research indicates that valuers also need to be aware of changing market assessment of physical and climate risks associated with property for consideration in valuation.

Keywords

Climate change, Valuation, Risk, Australia

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INTRODUCTION

As the saying goes, it is all about *location, location, location*, or, in the context of water, *views, views, views* (Cradduck, 2016). This affects where we want to live, where we want to work, what we do, and, as is the focus of this article, to what risks we expose ourselves through our choices. As the world's largest island and, thus, one of the largest coastal states, the Australian population is primarily situated along its coastal fringes. This desire to live near water has resulted in considerable residential, commercial and industrial development in these areas. As an inherently dry and hot continent, there is also a strong desire to live in *tree change* areas—that is, building or living among the cool of the trees—or, more remotely, in small bushland communities. In climate change terms, living in either coastal or heavily wooded areas puts those people, properties and businesses directly at risk from a variety of adverse effects due to bushfires, storm events, sea level rise, inundation from riverine flooding, landslides, and subsidence.

Risk identification, and its appropriate consideration, can influence a decision of where to build a home or business, as well as the value of the land on which to build (Cradduck *et al.*, 2020). Risks *per se* — their identification, nature and impact — require professional appraisal by a valuer when valuing any land (Australian Property Institute and Property Institute of New Zealand [APINZ], 2019). A valuer's role is to identify a property's market value, which requires assessing any known threats or risks to that property in perpetuity. Australian valuations are governed by International Valuation Standards (IVS) and Australian and New Zealand Valuation and Property Standards (ANZVS), which require identification and description “of any significant observable visual and/or known defects of hazards, e.g. flooding, landslip, observable or known site contamination, inadequate drainage etc.” (APINZ 2019, sec. 4.11, p. 8). If valuers have concerns “they should make *all* appropriate enquiries” (sec. 4.11, p. 8, emphasis added), refer to expert reports and report back to the client prior to proceeding with a valuation.

Current approaches to risk identification in practice, and the extent of investigation/s undertaken by valuers in order to identify risks, have not been explicitly explored in extant literature. Therefore, investigating current valuation practices, and subsequently exploring valuers' consideration of the risks associated with climate change, is essential. Climate change will contribute to the extant risks to which properties are already exposed; consequently, increases in extreme weather events, sea level rise and storm surges, as well as severe temperature durations increasing heatwave events contributing to bushfire events, will have increasing detrimental and significant effects for property. Limited research has focused on climate change risk identification and its effect on property value. Early indications of climate change affecting property have been observed, for example, in the increasing severity of storm events, storm surges and rising seas, disturbing coastal areas of the United States, as well as in the contribution of heatwaves to wildfires and bushfires, observed in Australia and California in 2020. However, implications for values of climate change risks are not being consistently found, and this is likely because the market is either not aware of the risk, or is not pricing risk in their decision-making.

The rationale for this research is that the identification and specification of climate change risks is an evolving area of concern (Cradduck *et al.*, 2020; Warren-Myers and Hurlimann, 2021; Warren-Myers *et al.*, 2020b). In particular, the issue of what party bears liability for such risks requires direct consideration. This especially concerns whether, or should, liability be shared and with whom, and whether this includes the necessity to consider governments' responsibility for those risks (Bell and Baker-Jones, 2014). Further, given the role of property valuers and their respective advice for

investors and developers, valuers may also bear a direct level of liability if they fail to adequately consider the effects of those risks in their reports. A valuer's role is to reflect what the market would pay for property; however, risk identification is still required as a matter of course, as required in the standards and by lending institutions and clients. The implications on value are reliant on the market pricing those risks into their pricing decisions, which would/should then be reflected in market values by valuers¹.

The aim of this research is to examine the practice of Australian property valuers in the identification and consideration of physical risks that threaten property. In particular, the focus is on examining the approaches of how risk is identified, how it is treated, and how it then affects the valuation process and values. This research endeavours to establish valuers' current approaches to risk identification as part of the valuation process, and to explore the changes required to adapt valuation practice to consider climate change risks in valuations and valuation practice.

The paper commences with existing literature relevant to the identification and consideration of extant risks and how these are identified in practice. It then considers how extant risks may change, evolve or worsen due to climate change in the future, and the implications this may have for property, valuers and valuation practice. The paper utilises an online survey to investigate the current practice of risk identification by Certified Practising Valuers in Australia, and reports on the survey findings. It concludes by providing direction for future research and policy requirements.

While the survey and discussion focus on the Australian perspective, the issues and concerns around climate change are international in scope and should be considered in land valuations globally. Therefore, the results and discussion will be of interest to practitioners, regulators and consumers wherever they are located.

LITERATURE REVIEW

To properly consider how valuers engage with risks, it is first necessary to understand what current guidance is provided to them by their professional bodies and/or academia. Therefore, this literature review engages with both industry standards and existing literature relevant to the identification and consideration of extant risks in valuation practice.

Risk identification as specified in standards

Valuers are guided by multiple levels of standards, legislation and other documents provided at the international, national, state and local authority levels. The hierarchy of valuation-based requirements are shown in Figure 1. The International Valuation Standards (IVS) provide the overarching fundamental principles, which are then adopted by the regional industry bodies. As relevant to this paper, the regional bodies are the Australian Property Institute (API) and the Property Institute of New Zealand. The ANZVS provide additional layers of guidance and instruction through technical information papers (TIPs) and guidance notes/papers. There are also industry-specific instructions such as the Australian Banking and Finance Industry (ABFI), which provide specific valuation standing instructions for commercial and residential properties that are being valued for mortgage purposes. In considering the identification and consideration of physical risks in valuations, it is necessary to start at the international level and work through the layers of the hierarchy.

¹ Market value is defined in the International Valuation Standards (IVS), General Standards – IVS 104 Bases of Value, where: *Market Value is the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion* (IVS, 2020, sec. 30.1, p. 18).

[PLACE FIGURE 1 HERE]

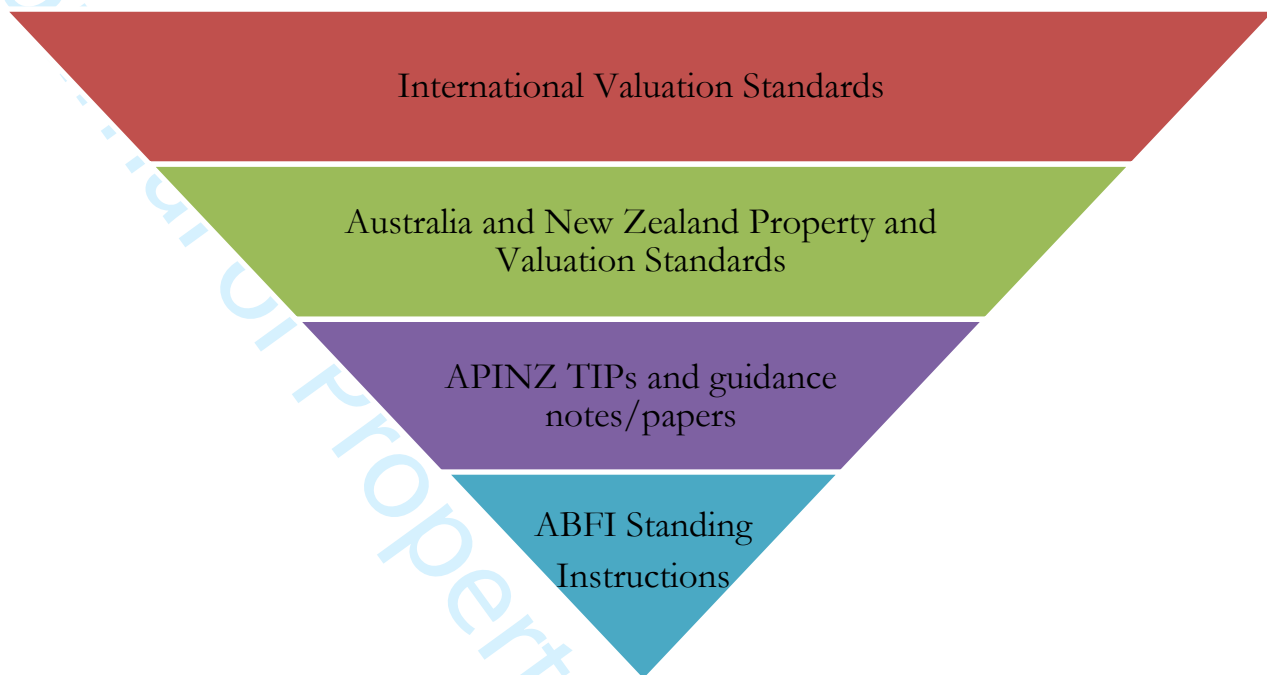


Figure 1. Hierarchy of valuation standards and guidance.

Note: ABFI: Australian Banking and Finance Industry; APINZ: Australian Property Institute and Property Institute of New Zealand; TIP: technical information paper

The IVS Council (2019, sec. 20.6, p. 98) Asset Standards direct valuers:

to state the extent of the investigation and the nature and source of the information relied upon in IVS 101 *Scope of Work*, para 20.3.(j) and IVS 102 *Investigations and Compliance*, the following matters *must* be considered: ...

- (d) responsibility for confirming the specification and condition of any building,
- (e) the extent of investigation into the nature, specification and adequacy of services,
- (f) the existence of any information on ground and foundation conditions,
- (g) responsibility for the identification of actual or potential environmental risks.

However, other physical risks are not specifically referred to, as the IVS focus is on the risk associated with the financial considerations of *income, market and forecasting*. Climate change risks are also not specifically mentioned.

That said, the APINZ (2019) do provide some guidance through the *Valuation Procedures* TIP. Notably, Section 4.11 (p. 8), “Site, Services and Environmental Hazards”, and directs valuers to provide:

a description of the nature of the site, its services and details of any significant observable/visual and/or known defects or hazards, e.g. flooding, landslip, observable or known site contamination, inadequate drainage, etc. In New Zealand the Land Information

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2 Memorandum ... should be sighted and any Hazardous Activities Industry List ... designation
3 should reported.
4

5 If Members are concerned as to the possibility of site contamination at inspection, they should
6 make all appropriate enquiries. This could include enquiries of the relevant statutory authority
7 (local or otherwise) as to the history and previous use of the site. An appropriate qualification
8 as to the result of such investigation should be incorporated within the property report.
9

10
11 APINZ (2020, sec. 5.11, p. 6) TIP 12 *Valuations for Mortgage and Loan Security Purposes* also
12 provides guidance in Section 5.1, "Risk Analysis":
13

14 The main risk issues should be addressed. Reporting may include real and potential market
15 related factors and property related factors, which could include cashflow, asset management,
16 planning, construction, approvals, use, function, location, environmental, market, business.
17 The valuation report should reconcile these risk factors with the specific nature of the
18 property. ... Elements of risk that will assist the lender in making security assessment should
19 be reported. The assessment of the risk levels provides information to the lender relating to
20 probability that risk and indicates the perceived impact of that risk on value and marketability.
21
22

23
24 Other, more specific risk analysis is specified within the ABFI (2019) Residential Valuation Standing
25 Instructions (RVSI). Section 7, "Identifying Adverse Risks", details a list of "adverse risks", which
26 may include (but are not limited to):...
27

28 onerous easements/encroachments, environmental hazards, zoning issues, local
29 authority/planning approval, onerous heritage affection or preservation orders,
30 flood/inundation, landslip or mines subsidence, main road acquisition, pest infestation,
31 essential repairs or building defects, presence of aluminium composite panels (ACP) or
32 expanded polystyrene (EPS) or similar, mobile phone tower, restriction on access to the
33 property, high voltage transmission lines, proximity to industrial properties, railway lines,
34 airports/flight paths, correctional facilities, and excessive noise. (p. 17)
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37 Further, Section 8, "Valuation Risk Alerts" (VRAs), in the RVSI provides directions to valuers to
38 trigger a VRA in certain circumstances, which are detailed in Table 1.
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[PLACE TABLE 1 HERE]

Table 1. VRAs and physical risk identification.

Valuation risk alert (VRA)	Reference to physical risks noted in the Residential Valuation Standing Instructions
VRA 1: Does the subject property comprise a higher risk or a non-residential type?	<p>xiii. The property has known (or is currently under investigation for) contamination.</p> <p>xxvii. Where the valuer is aware, made aware or becomes aware that the subject property is situated in a building/development where non-compliant cladding has been used.</p> <p>xxviii. High voltage transmission lines are within 50 metres from the nearest boundary of the property (or within 50 metres of the main dwelling where the land >4,000 sqm).</p>
VRA 2: Are there any adverse marketability issues that would require an extended selling period of more than six months?	iv. Adverse marketability issues, which may include, but not limited to, proximity to powerlines, main roads, railways, non-residential land uses, contamination, publicly known or visible building defects etc.
VRA 3: Are the existing improvements on the property incomplete, under construction or requiring essential repairs	<p>i. The Valuer has identified Essential Repairs.</p> <p>ii. A building is partially constructed or is undergoing renovation and there are outstanding works.</p> <p>iii. A building has sustained significant damage and requires rectification work (e.g., flood or fire damage).</p>
VRA 4: Is the subject property critically affected by any Heritage, location or environmental issues?	<p>8.4.2 Location: the property has adverse features, which could comprise proximity to railway, main road acquisition, flight paths, high voltage transmission lines or electrical easements, onerous surrounding development, cemeteries, correctional centres, waste management centres, mobile phone towers.</p> <p>8.4.3 Environmental factors include flooding, landslip, bushfire, contamination, cyclone, pest infection and/or electrical (including electrical easement and high voltage transmission lines).</p>

Table adapted from ABFI (2019, pp. 18–22)²

The RVSI also provide direction regarding the recommended documents to be sighted by the valuer, based on valuers distinguishing between whether a risk poses a “critical” or “general” effect on a property—where “general” effects are common to the area or location and do not have an adverse impact on marketability and value, and “critical” denotes a negative effect on marketability and value. Table 2 provides examples of these effects as well as the document type to be viewed, as described for physical risk considerations.

² The authors acknowledge that the current version is 2.2.2, issued September 2020 for adoption in October 2020. However, the Australian Banking and Finance Industry Residential Valuation Standing Instructions (version 2.2.1) issued 23 August 2019 is referred to in this paper, as that was the version current at the time of release of the online survey.

[PLACE TABLE 2 HERE]

Table 2. ABFI RVSI physical risk documentation and effects classification.

Document type	General effect	Critical effect
Flood certificate	The property is in a known flood-affected area; however, this is common to neighbouring properties.	The flood affection is specific to this property and does not commonly affect neighbouring properties.
	The subject is NOT known to have been flood damaged.	There is evidence the property has been damaged in recent times by flood.
Pest and building certificate	The property is under contract and a pest and building report should be obtained by the purchaser as a matter of course.	There is evidence of termite activity.
	The property is in an area surrounded by bush and is susceptible to termites; however, there is no visual indication of termite activity past or present.	There is visible evidence of building defects or structural issues.
Mine subsidence certificate	When a property is located in a designated mine subsidence area.	When a property is located in a designated mine subsidence area and the valuer suspects the improvements have not received appropriate Council approvals.
Contaminated land search	The property is part of a newly approved subdivision on reclaimed land and there is no evidence of contamination.	The valuer suspects the property may be contaminated as a result of the site inspection.
Geotechnical engineer's report	The property is located in a designated landslip area; however, the property shows no sign of any slippage or ground movement.	The property is located in a known landslip area and shows signs of slippage.
Structural engineer's report	The dwelling is of an unusual architectural design and has been constructed from non-standard materials.	The dwelling shows signs of movement to the footings and damage to the cladding.
	However, there are no signs of any structural movement or failures.	The valuer suspects that these visible signs may be caused by structural deficiencies.
Building surveyor's/certifier's report	No observable structural issues are identified.	Observable structural issues are identified.
Cladding assessment report	The building/development does not appear to be clad in accordance with the API Valuation Protocol.	The building/development: <ul style="list-style-type: none"> • appears to be clad • is known to be clad • has non-compliant cladding known to be present.

Table adapted from ABFI (2019, pp. 24–26)

The key risks valuers are being directed to identify and consider in valuation pertain predominately to observable structural or physical issues with improvements (including materials such as flammable cladding), contamination and environmental hazards, physical hazards associated with the land

(landslips, erosion, mine subsidence), and natural hazard risks like flood, bushfire and cyclones. There is also a requirement to consider other adverse physical risks related to a property's location and proximity to such features as railways, main roads, flight paths, high-voltage transmission lines, and mobile phone towers.

Physical risk implications for property values

In examining the effects of physical risks to property and implications for value, there is extensive extant research, much of which focuses on empirical evidence and effects on property values associated with risk, stigma or both. Stigma, environmental risk and property values have been discussed over many decades, with a plethora of, and variations in, the results and value implications. This is due to differences between real and perceived risks, the effect on the property's visibility and aesthetic considerations, disruption and concealability of issue, and influences on health (Mundy, 1992).

The most commonly explored area within the literature pertaining to risks, and the subsequent exploration of the effect on value is contamination, both environmental or human made. For example, investigations that examine property values and the effects of environmental contamination in the form of landfills (Winson-Geideman *et al.*, 2017; Thomas, 2002; Hite *et al.*, 2001; Reichert *et al.*, 1992;), groundwater contamination (Howland, 2000; Page and Rabinowitz, 1993) and oil spills (Epley, 2012; Simons and Saginor, 2006). As noted by Mundy (1992), the effects from these contaminates on value are varied. This is reiterated by many of the aforementioned authors, who have suggested the effects of contamination have much to do with awareness of the market, extent and the perceived understanding of damage (both from a remediation cost requirements perspective, to knowledge of the effects on human health), visual amenity, legal document awareness, and media coverage.

Location or proximity risks have been examined in the context of the disamenity that is often associated from such risks as seen, for example, in the case of major roads or flight paths, and the effect on values associated with noise and congestion (Bishop and Laing, 2020; Cervero *et al.*, 2009; Nelson, 2008). Meanwhile, high-voltage powerlines, mobile phone towers and, more recently, wind turbines are noted to have aesthetic implications; noise, health, and wellbeing considerations; and a relationship with property values (Bond and Ko-Kang Wang, 2005; Bond *et al.*, 2013; Elliott and Wadley, 2002).

Naturally occurring risks, such as flooding (from extreme weather events, cyclones or hurricanes), have received extensive investigation into relationships with property values (see meta-analysis by Beltrán *et al.*, 2018). The severity and occurrence of such events play a large role in ascertaining discounting effects, as often there is amenity associated with living in close proximity to water bodies (be it oceans, bays, rivers, or lakes). When examining markets over time, where flood-prone properties are not affected for several years, values often demonstrate growth (Eves, 2002). However, if there are frequently reoccurring floods this does negatively affect values (Ortega and Taspınar, 2018; Eves, 2004a). As noted by Eves (2004a) only 50% of residents living in a flood-prone area are actually aware of it, suggesting information disclosure has a role to play in value. This is supported by Daniel, Florez and Reitveld *et al.* (2009), who found that as probability, occurrence and the provision of flood-risk information increased, subsequent changes were noted in property prices and willingness to pay. This is also common among investigations into fire (bushfire or wildfire) prone areas, where often premiums are associated due to tree cover and perceived amenities, with little evidence to suggest purchasers are considering the risk of fire in their purchasing decisions (Athukorala *et al.*, 2019; Eves, 2004b). In examining markets before and after a "disaster" event, Athukorala *et al.* (2016) found that an effect was identified immediately after the event had occurred, but this reduced over time. This is supported by an Australian analysis by Loomis (2004), who found evidence of a similar pattern. Apart from actual events affecting market behaviour, the availability of

information and media coverage also influences how the market perceives risks. Donovan *et al.* (2007) found bushfire information affected values immediately after release, yet these effects were noted to diminish over time in the absence of other fire events.

In the context of understanding climate change risks, for many of the extant risks noted, climate change will exacerbate the extent, severity and frequency of event-based risks like floods, storm surges, extreme weather events, droughts, heatwaves and bushfires (see Warren-Myers and Hurlimann, 2021 for a list of property-specific implications). There is some emerging evidence that flooding and storm-surge considerations (due to hurricanes) are manifesting as a sea level rise threat, and the need for protection measures has seen early investigations on property prices (Beck and Lin, 2020; Bernstein *et al.*, 2019; Walsh *et al.*, 2019). However, other research suggests that sea level rise effects are not yet evident due to a lack of disclosure of information (Fuerst and Warren-Myers, 2019); that discounting is only found in neighbourhoods where home owners believe in climate change (Baldauf *et al.*, 2020); where other factors are presently overriding the potential future risk considerations (Eichholtz *et al.*, 2019); or where there is no evidence to suggest the market is yet pricing in sea level rise risk (Filippova *et al.*, 2020).

This brief examination of the extant literature has provided evidence that values are affected by various physical risks, which are dependent on:

- *Location*: the visual impairment of views, or proximity to perceived dangerous elements (such as high-voltage powerlines, water bodies, toxic dumps, etc.)
- *Information*: the provision of information (or lack of it), the local awareness of any issues, and any media discussion of issues
- *Costs*: perceived and actual costs that may comprise economic implications related to the costs of remediation/removal/rectification costs; social costs affecting individual and community health and wellbeing; and environmental costs associated with permanent alternation of land and environments, which may lead to species, flora and fauna extinction.

While event-based risks are also dependent on *location*, *information*, and *costs*, there is an additional layer of influence to consider due to the event-based nature of the risk. Specifically, event-based risks' value implications are also highly dependent on:

- *Type*: nature of the risk
- *Vulnerability*: the severity, occurrence and frequency of the risk/s
- *Environment*: perceived and actual costs directly related to broader—economic, social (health) and environmental affects
- *Belief*: the willingness of individuals to accept, and understand, climate change and the relationship of the event to climate related change;
- *Media*: the role/actions of the media in covering the event.

Therefore, valuers' consideration of all risks posed to a property necessitates an awareness of, and engagement with, a variety of factors; and whether these are reflected in local market prices.

Risk consideration in valuation practice

A valuers' role is to reflect the market in the assessment of a properties' current market value. This means valuers need to have an in-depth understanding of market transactions, the rationale that sits behind them and the market sentiment. Valuers have often been criticised for their risk considerations and the ability of valuers to reflect the risk in valuations (Adair and Hutchison, 2005).

Consideration of risks—in particular ones that relate to physical or environmental aspects that generate stigma or value discounting for a property—are explored in various ways throughout the literature, including perception (with a focus on willingness to pay and willingness to accept), values

1
2 and costs (comprising comparative and hedonic studies), and more specific research that examines
3 valuation processes. However, much of the physical risk examination has focused on the implications
4 for property values, valuation processes, best practice, and comparison between valuers and market
5 evidence (including perception studies) (e.g., see Bond and Kennedy, 2000; Chalmers and Roehr,
6 1993; Chan, 2000; Richards, 1996; Syms, 1999; Thomas, 2002).

7
8 As directed by the standards, structural implications, damage and risk in relation to
9 improvements are commonly assessed in valuations based on a cost-consideration approach, unless
10 the issue is broad enough that the market prices this in. However, when there are long-term
11 implications—such as those of the leaky building issues in New Zealand, where stigma is
12 associated with monolithic dwellings and not just remediation costs—this has resulted in the market
13 continuing to discount this property type, even when the property has been fixed (Rehm, 2009;
14 Rehm *et al.*, 2020; Shi *et al.*, 2017). That said, other physical elements, like the identification (or
15 lack thereof by valuers) of building fabrics that cause toxic mould, has seen suggestions that
16 appraisers (valuers) could be sued (Aalberts and Hoyt, 2000). A more recent phenomenon in
17 physical material risks is the cladding crisis prevalent in high-rise apartment towers globally—the
18 Grenfell Tower event in 2017 most notably highlighting the severity of the issue. This has resulted
19 in buildings around the world having to undergo extensive rectification works. To date, little
20 research has examined the value implications; although, there are suggestions the ramifications may
21 be severe on housing prices seeing drastic discounting (see Gorrey, 2018; O’Carrol, 2018).
22 Valuation standards such as the ANZVS and the Royal Institution of Chartered Surveyors
23 (RICS) Red Book have specific alerts for valuers in this regard. Cost implications and
24 rectifications are significant for apartment owners and body corporates, with bills anticipated to be
25 in the millions. Due to the individual nature of property, the costs of remediation vary and are
26 often uncertain. This has a subsequent effect on value, from either a remediation perspective
27 or regarding market discounting, but information and evidence are still forthcoming (Lockrey
28 and Moore, 2019).

29
30 So far, the location risks noted are due to proximity to a perceived disamenity like high-
31 voltage overhead powerlines, wind turbines and mobile phone towers, which have received
32 considerable attention in the literature (see Bond *et al.*, 2013; Gallimore and RossJayne, 1999;
33 Sims and Dent, 2005). However, the nature and extent of the effects on values are not consistent
34 with variations noted between home owners, valuers and real estate agents (Wadley *et al.*, 2019).

35
36 Natural hazards and events such as earthquakes, floods, fires and the like have received
37 extensive investigation. From a valuation perspective the standards require risk identification, yet
38 exploration and implications of the risk, its actual eventuality, and market awareness are difficult
39 to ascertain. Lamond *et al.* (2019) conducted an analysis of the flood risk and effects on value from
40 a valuation perspective, surveying valuers and other stakeholders across five countries. Their
41 research found that discounting of market value in practice was inconsistent due to:

- 42 - poor awareness and perception of flood risk;
- 43 - disproportionate reactions to flood events (immediate shock and then the “forget” stage);
- 44 - flood risk not perceived to be as important as other property characteristics overriding their
45 decision-making;
- 46 - lack of information and data (e.g., insurance costs could be good risk signals, but at present
47 not disclosed); and
- 48 - lack of guidelines and information to direct valuers on how to factor flood risk into valuation.

49
50 Event risks, while thoroughly investigated in the literature from a price perspective, have neither
51 received the same amount of attention in terms of *how* flood risk is considered in the valuation
52 context. This may be because of the suggestion that surrounding properties are also likely to be
53 affected, and as such the market has already priced it into the properties. Thus, specific consideration
54 may not be necessary if the right comparables have been chosen. Albeit, there are cases in which

1
2 market prices (and perceptions) and valuers differ in their options, notably Harrison *et al.* (2001),
3 who found statutory valuers over-assessed flood risk properties, while Fuerst and Warren-Myers
4 (2019) found the opposite, observing that the market was pricing flood risk at a greater rate than
5 statutory valuers.
6

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8 As Geltner and de Neufville (2018) consider, albeit in a broader and more practical property-risk
9 context, uncertainty itself affects development decision-making. Climate change effects and
10 predicting when, where and how badly these will affect property are perhaps the greatest uncertainty
11 facing current and future property practitioners. Therefore, risk identification and the proposed
12 management of those risks are matters that must be included in valuation processes and reporting.
13 These include both property-specific physical risks and climate change risks, amongst the other forms
14 of risks that are considered in valuations, like market risk (Fisher and Hanemann, 1993). As Kauko
15 *et al.* (2018, p. 18) note, the “climate change agenda [has] brought us a new reality”.

16
17
18 As recent research has established, climate change events have and will have, detrimental and
19 significant effects for property and property values (Bienert, 2014; Intergovernmental Panel on
20 Climate Change, 2014; Warren-Myers, 2016; Warren-Myers and Hurlimann, 2021). However,
21 climate change risks have received less industry attention (Baldauf *et al.*, 2020), as they are often
22 harder to identify than property-specific risks (Craddock *et al.*, 2020). Warren-Myers *et al.* (2020a)
23 noted an urgent need for better information, data and quality of information for the property sector.
24 In addition to a range of barriers currently preventing the ability of the industry to take broadscale
25 action in response to climate change risks (Warren-Myers *et al.*, 2020b). As Hill *et al.* (2018, p. 182)
26 observed, such risks are “fuzzy” and their effect is harder to quantify, which raises a variety of
27 practical as well as ethical issues for valuation professionals. Further, the introduction of in-depth
28 risk analysis through the Taskforce for Climate Related Financial Disclosures³ has spurred new
29 consideration across property and other industries in the identification and assessment of climate-
30 related risks in Australia (Button and Turnbull, 2020; Governance Institute of Australia, 2020), and
31 only recently (September 2020) mandated in New Zealand (Fernyhough, 2020; Ministry for the
32 Environment, 2020). Thus, as markets start to consider and report on these risks, this suggests that
33 valuers’ obligations are to also identify and consider these types of risks in valuation. Further, as
34 noted by RICS (2018), valuers can play a pivotal role in engaging decision-makers and the sector
35 more broadly through valuations. Quoting Professor Lützkendorf, “if you convince one valuer, they
36 will convince 100 of their clients” (RICS, 2016, pg. 19). Yet, it needs to be noted that a valuer’s role
37 is to reflect in their assessment of market value what the market *would* pay for a property in the
38 current market while demonstrating knowledge of all factors affecting the property (French, 2020).
39 However, valuers also need to be mindful of their position in undertaking the appropriate levels of
40 investigations and reporting on any current or future risks to the property.
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45 At present, APINZ have been silent on climate-risk considerations for property, beyond current
46 physical risks (like floods and fires). While RICS have developed various tools, although these too
47 are still relatively silent on climate change risks. RICS current tools and advice include the building
48 a carbon database, incorporating whole-of-life carbon assessments, and implementing a training
49 toolkit for property valuers to consider sustainability costs in the valuation process. Further, there is
50 a “Value the Planet” campaign, introduced in 2019, which provides sustainable business checklists,
51 a net-zero policy position paper, responsible business reports and a document translating Sustainable
52 Development Goals into built-environment considerations. As such, climate action guidance from
53 RICS (2020) is focused on green buildings, energy efficiency and sustainability agendas; while
54 specific guidance from a valuation perspective is available on sustainability, environmental risks,
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59 ³ The Taskforce for Climate Related Financial Disclosures (TCFD, 2021) is a working group who developed a list of
60 climate risks that were categorised as transitional or physical, for the purposes of creating a consistent reporting to
report risk awareness for the organisation, investors, insurers, lenders and other stakeholders.

renewable energy, whole-life carbon assessments and resource management. Yet, RICS still require, as do the IVS and ANZVS, that due diligence is to be undertaken to identify and comment on any issues or risks that may affect a property.

Warren-Myers *et al.* (2020a, 2020b) noted that barriers to broader property engagement with climate change risks and consideration are linked with the availability and robustness of the data and guidance available from industry bodies. This is reminiscent of valuers' examination of environmental contamination risks, which has seen improvement over recent decades due to:

- improved techniques for assessment;
- availability of data and ability to identify number, types and locations of properties that are affected by certain environmental risks;
- cost implications (economic costs for remediation or removal and social costs or risks to health); and
- processes for understanding the effect of these risks on a property (Roddewig, 1996).

Consequently, to consider climate risks in valuation, the right data and information need to be available to valuers. This includes the ability to identify affected properties, allowing the assessment and consideration of risk exposure and vulnerability for the property.

Evidently, the need for detailed and extensive risk identification and assessment remains. The nature of climate change issues introduces challenges for clear risk identification and information, and yet currently there is limited industry guidance to support valuers. To identify the support and information needed to highlight and consider such risks, it is necessary to first understand valuers' current practices, processes and understandings. This is the role of this research.

RESEARCH APPROACH

The research aim is to examine Australian property valuers' practices in the identification and consideration of physical risks that threaten property, as well as the processes undertaken in the investigation and consideration of these risks in practice. It further seeks to investigate whether valuers are at present considering and reporting on climate change-related risks. As such, the research asks the following questions:

1. What are the established valuation practice approaches to identifying and considering physical risks to property?
2. Are climate change risks identified and appropriately considered as part of that process?

The survey design comprised the use of structured and semi-structured questions, which were categorised into the following themes:

- Risk identification and processes undertaken (unstructured questions).
 - Occurrence of investigation of certain risks (structured questions).
 - Consideration of the risk on value (structured and unstructured questions).
- Climate change risk identification and guidance (structured questions).
 - Types of climate change risks investigated and information sources (unstructured questions).
 - Consideration of climate change risks on value (structured and unstructured questions).

The survey questions were developed in online software platform Qualtrics and approved by the University's Ethics Committee. The survey was designed to be delivered to Certified Practising Valuers, as required under API requirements, and the researchers had planned a series of continuing

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2 professional development events with the API, in which the survey would be promoted to
3 eligible participants and data collection would occur. This would be in addition to online
4 promotion and distribution through the API newsletter. However, these events were cancelled
5 due to COVID-19, prompting the API to redistribute the survey link through the online
6 newsletter to recruit further responses. The researchers also promoted the survey using LinkedIn
7 and Twitter.
8

9
10 The data collection period ran from late February to May 2020, with the survey launched at
11 what became the beginning of the national COVID-19 lockdown. Due to COVID-19 and the
12 subsequent lockdown, limited responses were received, as businesses had to dramatically
13 change their approaches and practices when the situation in Australia escalated. There were 51
14 responses received that, after review and removal of those that were incomplete, not Certified
15 Practising Valuers, or not actively employed as a Certified Practising Valuer, reduced the sample
16 to 21 valid responses for analysis. This small sample of Australian valuers (approximately 3% of
17 currently practising valuers in Australia) has implications for the findings of this research,
18 meaning that inferences are not necessarily representative of valuers in Australia but do
19 provide indication of current practices nationwide.
20
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22 The data was analysed using content analysis for qualitative and unstructured responses, and simple
23 statistics, like frequency counts, for structured responses. Some questions allowed for additions
24 to structured responses and unstructured responses. Where these are reported the participants
25 are provided with a code (V1–V21).
26
27

28 ***Limitations***

29 The research is limited by the level of inference that can be achieved from a small sample
30 size, reducing the generalisability of the report on Australian valuers. Further, the results do
31 not, and cannot, provide a general understanding of current practices regarding the consideration of
32 climate change risks in, or incorporation of those risk into, valuation practices. However, the
33 responses do provide an indication of current practices at this point in time. The further
34 reduced number of participants who consider climate change risks in valuation ($n = 6$) suggests
35 that there is an increasing need for further investigation and exploration of valuers' risk
36 awareness, identification and consideration in property valuation, in addition to guidance from
37 governing bodies.
38
39

40 **RESULTS AND DISCUSSION**

41 ***Summary statistics***

42 All respondents in the sample analysed were Certified Practising Valuers. The experience of those
43 who responded was relatively evenly distributed, as shown in Table 3. When examined
44 across locations, there were comparable numbers of valuers from Victoria, New South
45 Wales and Queensland (from both metropolitan and regional areas), and responses from
46 metropolitan valuers in South Australia (1) and Western Australia (1), as shown in Table 4. This
47 distribution approximately mirrors broader population numbers of valuers across states. No
48 responses were received from Tasmania, the Northern Territory, or the Australian Capital
49 Territory.
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[PLACE TABLE 3 HERE]

Table 3. Summary statistics of valuer sample.

Length of time as a valuer		Predominant property type valued	
5–10 years	14%	Residential	19%
11–20 years	19%	Commercial	38%
21–30 years	10%	Specialist	19%
31–40 years	19%	Agriculture	10%
Greater than 40	24%	Cover multiple types	14%
Not disclosed	14%		
Position		Gender	
Valuer/Senior Valuer	43%	Male	57%
Director/Managing Director	33%	Female	24%
Self-employed	10%	Not disclosed	19%
CPV working elsewhere	10%		
Not disclosed	4%		

Note: $n = 21$

CPV: Certified Practising Valuer

[PLACE TABLE 4 HERE]

Table 4. Location of Certified Practising Valuers.

Location		Location	
Victoria	24%	Metropolitan area	38%
New South Wales	29%	Regional city/Town	38%
Queensland	24%	Rural	10%
South Australia	5%	Not disclosed	14%
Western Australia	5%		
Not disclosed	13%		

Note: $n = 21$

Physical risk identification and approaches

The first two questions asked what physical risks were investigated and how this investigation was conducted. Importantly, this question was a free-text response. The results were subsequently content analysed and categorised to provide the findings shown in Figures 2 and 3. Figure 2 depicts the risks identified and investigated during the valuation process, and Figure 3 identifies what processes were used in ascertaining physical risks. The risks identified align with the guidance and instructions to valuers about the types of risks that need to be identified, assessed and considered. In particular, see Section 4.11 (APINZ, 2019) and Sections 7 and 8 of the RVSI (ABFI, 2019).

The approaches taken to investigate physical risks were multi-level in nature, as shown in Figure 3. Visual inspection was prominently favoured by the majority as a first step (76%), which aligns with guidance provided in the Valuation Practice Standards (APINZ, 2019) requiring a visual assessment of a property to identify defects, noncompliance, and to form an opinion of the condition of the property and note any potential risks. The advice provided by the API (2020b) suggests that the ANZVS are consistent with the Australian Standard for Inspection of Buildings (AS 4349.1-2007) (Standards Australia, 2007), which provides further direction and guidance for aspects of note when conducting a property inspection. Valuers in their response then relied on local authority mapping and data (52%) and other information obtained through online data sources (29%). The reliance on third-party information is an important consideration, as valuers depend on publicly available information accessible from the local authority or online data sources to consider the risks posed to a property. In fact, most of these sites have disclaimers that the information they provide is *not* guaranteed to be accurate (Cradduck, 2016). Further, in most instances climate risks are not yet disclosed in local authority searches, and extant flood mapping and bushfire hazard maps are already considered to be out of date.

[PLACE FIGURE 2 HERE]

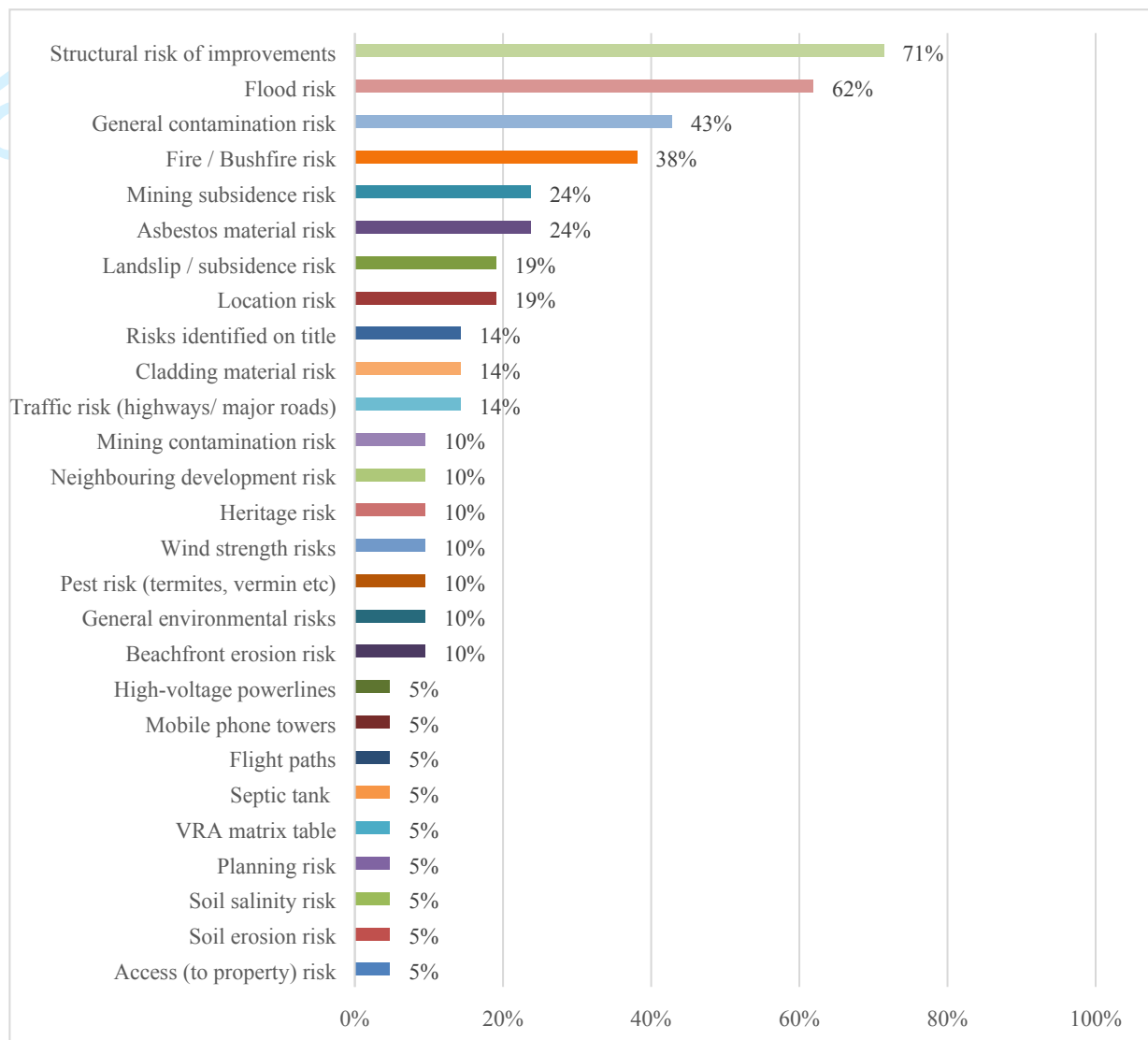


Figure 2. Valuers' identification of risks.

[PLACE FIGURE 3 HERE]

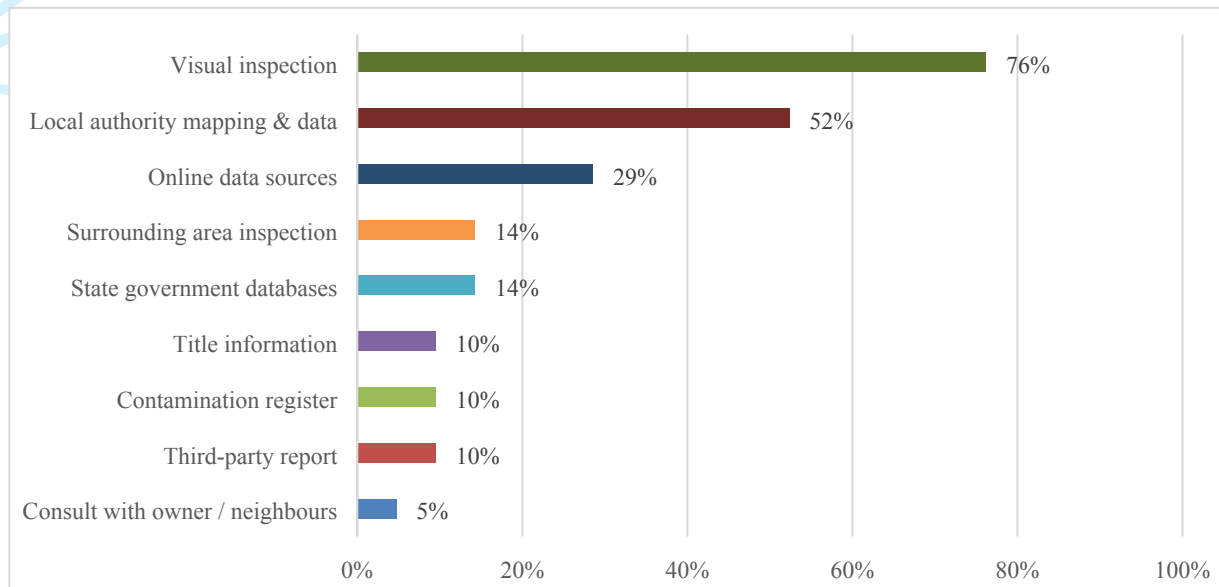


Figure 3. Valuers' typical risk-identification process.

Subsequent questions were posed with a structured response required, presenting a range of risks for investigation (which were developed from the ANZVS TIP 11). Valuers were also asked to note how often they investigated these risks and their subsequent consideration during valuation. In examining the occurrence of how often valuers investigated certain risks, respondents were provided a list of known risks based on ones that valuers are directed to investigate in the API standards. As shown in Figure 4, contamination and flooding had the highest occurrence of investigation, followed by building materials and hazardous cladding. Meanwhile bushfire, landslips, structural integrity of the building and drainage considerations were only investigated around half the time; however, this would likely be influenced by the setting and context of the type of property being valued.

There was also an "other" option in which valuers could add additional risks in free text. The following additional risks were noted to be investigated: building compliance (noted by five valuers), mining underground/subsidence (two valuers), high-voltage powerlines (two valuers), zoning compliance (two valuers), asbestos (one valuer), sea erosion (one valuer), management (one valuer), noise (one valuer), heritage (one valuer), title (one valuer), potentially disturbing neighbours/noise (quarries, hazardous uses, etc.) (one valuer), contamination (one valuer), and termites (one valuer). These additional risks suggest and align with the ANZVS and the guidance notes and standing instructions.

[PLACE FIGURE 4 HERE]

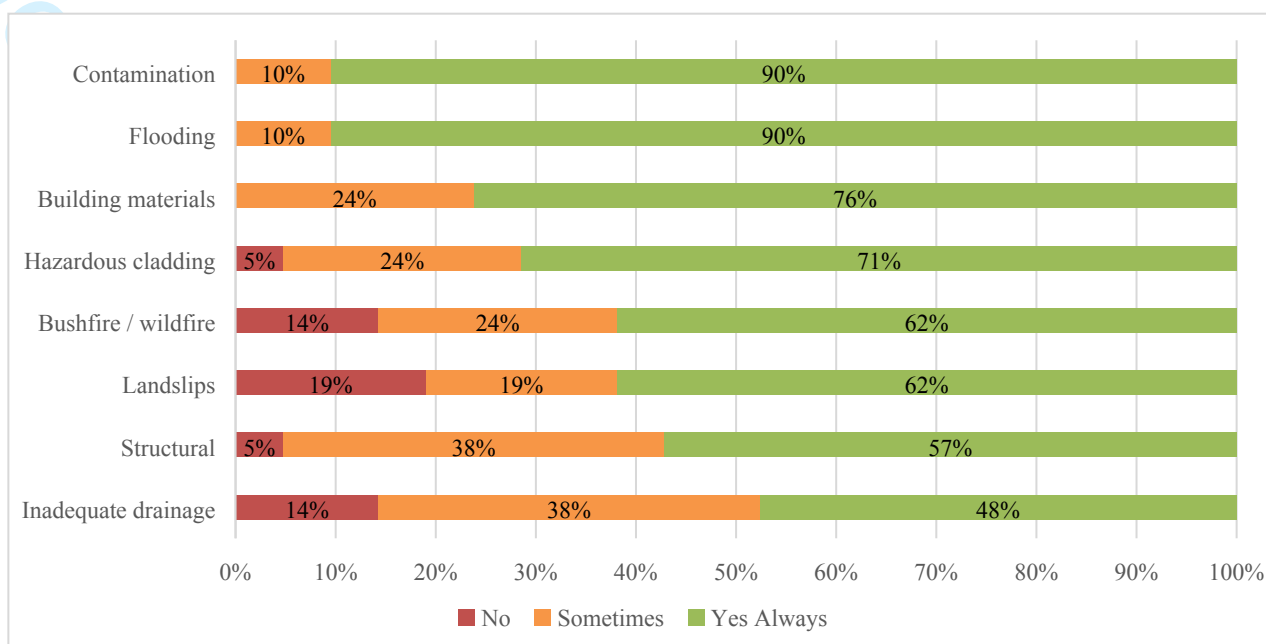


Figure 4. Occurrence of investigation.

When considering a range of risks more broadly, physical risks still had a significant role in being considered to affect property value, notably flooding and contamination, as shown in Figure 5. Bushfire, building materials and structural risks also received similarly high consideration regarding effects on value. Other risks valuers suggested included planning (noted by four valuers); construction/building (three valuers); economic, structural and physical obsolescence (one valuer); and high-voltage powerlines (one valuer).

[PLACE FIGURE 5 HERE]

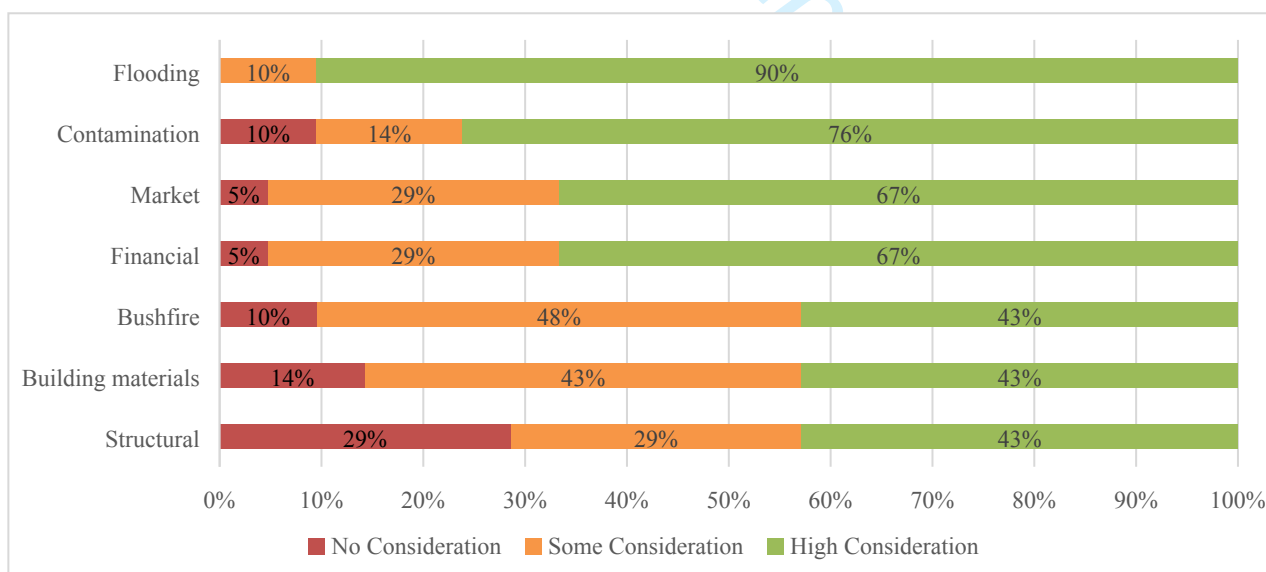


Figure 5. Consideration of risk in assessing property value.

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2 Valuers were able to expand on their responses in a free-text comment. As discovered, four indicated
3 that the effect of a risk would vary, depending on the “nature and extent of the risk” (V3, V9), “the
4 property type” (V6) and the “cost to rectify or de-risk the physical risk” (V13).

5
6 Participant V2 provided a clear synopsis:

7
8 You can only consider the known risks and highlight suspected risks. The assessment of value
9 should still be market based (unless there are costs for remediation to discount, as an
10 example). It should be clearly stated in the report what HAS been considered and limitations
11 on the valuers’ assessment/site inspection.
12
13

14 Conversely, seven valuers indicated that the risks would likely be considered through a comparative
15 analysis using market evidence. Therefore, “most of the time the market has accounted for the risk,
16 provided the evidence is comparable”, unless “there are costs for remediation to discount” (V16).
17
18

19 A detailed comment made by one valuer summarises the key considerations and limitations:

20
21 In theory the market should discount this risk, so it is more about identifying the right
22 comparable sales to justify your value. When determining the value of an asset, the market
23 should, over time, take into consideration such risk; therefore, using comparable sales of
24 properties with similar risk attributes is what’s most important. I think the current approach
25 by valuers to identify specific physical risks attached to properties is rather comprehensive;
26 however, it is the lack of comprehensive analysis on comparable sales to relate this risk into
27 value that is the concern. As consumers get access to more and more detailed asset data related
28 to property (such as physical risks), they will become more informed, leading to a more
29 accurate reading of the market, and an adjustment of values will follow. At present, risk is
30 being identified by valuers; however, the process of translating that risk into appropriate
31 values is lacking. Time and low fees do not warrant the valuer investigating this properly.
32 (V7)
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36 The perspectives provided by valuers indicate that they are in fact identifying physical risks that may
37 affect a property, as required in the IVS, ANZVS and RVS. The extent that these risks may affect
38 the consideration of value were discussed at length with valuers, who believed, foremost, that the
39 market would likely be aware of the risk and the market evidence would reflect this, which would
40 require appropriate selection of comparable properties on which to rely (unless there were
41 remediation costs that needed to be considered). These perspectives align with the underpinning
42 definition of market value (IVS, 2020) and the expectation that valuers reflect the market in their
43 assessment of market values, rather than creating it (French, 2020).
44
45

46 Finally, valuers were asked whether the consideration of current risk-assessment practices were
47 enough. Overall, 40% of valuers agreed with this statement, 35% mostly agreed, and 25% disagreed.
48 One valuer observed that “there is no formal training about identifying physical risks” (V3), despite
49 there being specific instruction and guidance within the standards and additional modules provided
50 in the API (2020a) continuing professional development program. This suggests that:

- 51
52
53 - existing and future educational content relating to physical risks need to be better
54 emphasised in communications and educational offerings to members;
55 - further research is required into why and what particular aspects and elements need
56 further exploration; and
57 - how this can be integrated into professional development and current practice.
58
59
60

Climate change risk identification

Valuers were asked whether they are investigating climate risks in the valuation process (71% [$n = 15$] indicated they did not; 29% [$n = 6$] indicated they did). Participants were also asked whether they were aware of any guidance on climate change issues, with 90% (19 valuers) expressing no awareness of any guidance in this regard, leaving only 10% (two valuers) being properly informed. Importantly, though, that information was obtained from planning schemes and discussions with architectural colleagues.

The following discussion examines only valuer responses that consider climate change risks in valuation ($n = 6$: V1, V2, V4, V10, V14 and V19). Valuers identified climate change risk aspects including sea level rise (three valuers), flooding (two valuers), bushfires (two valuers), rainfall reliability and changes (one valuer), temperatures (one valuer), erosion (one valuer) and construction of the building to respond to climate issues (one valuer). When asked how these risks were being investigated it was acknowledged that a large reliance was on local authorities being the source of climate change information, and some through the valuers' own awareness. Other sources included geo-information services, other webpages (including Google), Department of Primary Industries climate models (for drought and flooding risk) and examination of other areas with similar issues. It would then be reported through risk ratings and comments in the valuation. However, one valuer explained that "there is no evidence of the market pricing in climate change risk in sales" (V1), and another that "most valuers would not know where to start or don't have the time, due to the low fee for the job" (V4).

Valuers' assessment of climate change risks was in the identification of risk (with limited resources) and highlighting said risk, either to the relevant party in the valuation report or verbally, noting that further research and investigation are required. This aligns with suggestions by Warren-Myers *et al.* (2020a; 2020b) that due to information and awareness barriers in the broader property industry, there is a need for better information, data and identification capabilities to highlight apparent future risks of climate change, necessary for both market stakeholders' decision-making and valuers' analysis and consideration. Further, as suggested by Fuerst and Warren-Myers (2019), better information disclosure is needed to increase market and valuer awareness of the potential effects of climate change risks.

The implications of climate-related risks on value received a breadth of responses in the study, with two valuers (V1 and V14) indicating that it *would* affect value. One noting "although there is no market sale evidence of climate change affecting sales, I predict there will be soon, as more valuers are reporting (these) risks" (V1).

Meanwhile, three valuers (V4, V10 and V19) merely suggested that climate *might* affect property value, noting that:

- "all things need to be considered" (V10)
- "assumptions are made and declared" (V19)
- "it depends on the evidence. No good slamming a value if the market doesn't think it's a problem. For example, urban floodway zone[s] in [Victoria] use sales with [the] same issue, no problem, as valuation is current on day of valuation and for 90 days. It is assumed the market has already considered the risk" (V4).

Finally, only one valuer indicated that climate-related risks have *no* affect on value, "because the market determines the value of an asset. Valuers only assess what the market is willing to pay for the property in the environment/marketplace" (V2).

The findings of valuers' perspective on value and their responses are not so different from other studies that have examined various risks and uncertainty issues in valuation practice. This research

draws parallels with Lamond *et al.* (2019), Chan (2000), and Bond and Kennedy (2000) in the need for information and evidence for ascertaining and identifying risk, its extent, and the sources of comparable evidence for consideration. It also includes disclaimers in reports to avoid potential litigation or the need to ascertain and consider risk in a valuation.

CONCLUSION

How the natural environment is used and what we build on it can have a “long-lasting impact on the physical and social world, for better or worse” (Geltner and de Neufville, 2018, p. 74). Conversely, what is built can be adversely affected by the natural world if it is built in an “at-risk” area. Evidently, the utilisation of property and the risks associated with that property, from its use and otherwise, will affect its value. A primary requirement of the IVS and ANZVS is that all risks, current and future, must be identified and reported by a valuer. However, the subsequent effect on *market value* is at present still determined through a valuer’s analysis of comparable evidence and cost information (where relevant), which aligns with standards, guidelines and practice considerations explored in extant research. Although the sample size in this study limits the statistical inferences that can be drawn from the results, the research provides meaningful insight into current valuation practices, albeit not necessarily representative of all valuers’ practice in Australia. Nonetheless, the results of this study do provide an indication of current practices, along with clear pathways for future research and industry action.

Valuers in this study were found to identify and consider a range of risks in valuation practice, drawing on prescribed risk-identification methods as directed through standards, guidance and instructions. While not all undertook extensive investigations of every risk, there is a commonality of approach in that certain risks are always considered and investigated, and those investigations are undertaken in a structured manner, whether through physical inspections, engaging with local government planning maps and databases, and/or other searches. The most commonly investigated risks included structural risk to improvements, flooding, general contamination risk, and bushfires. This was consistent with the responses to structured questions, which noted the occurrence of investigations of contamination and flooding, building material and hazardous cladding.

Value considerations and effect on value appear to be readily considered in regard to physical risks. However, the responses reflect a strong indication that a range of factors affects how the risks are contemplated, in particular market considerations and the appropriate selection of comparable evidence. One participant suggested that valuers often do not have specific training in risk identification, while 60% indicated that current approaches to risk assessment are insufficient. Separately, valuers identified that the (often-extensive) risk investigations that are properly called for in the standards, guidance and instructions are beyond the scope of the valuation, noting concerns with regard to time constraints and low fees that inhibit a more thorough risk analysis.

Finally, the limited responses reflect that climate change risks *per se* are not being adequately identified and remain neither reported nor considered in the valuation process. Reasons for this deficit include a lack of guidance of what those risks are, and/or what is required to identify such risks. Further, a number of responses noted that the information sources for identification of these risks, and the means to validate these sources, is lacking. Likewise, where information is being sought from the local government authority, many do not have updated information or the mapping provided may be in itself flawed. This aligns with Warren-Myers *et al.* (2020a, 2020b), who analysed property stakeholders in Australia, highlighting insufficient access to information, data and the ability to consider the ramifications of climate-related risks for their properties. There is increasing need to enhance valuers’ and the overall property industry’s awareness and understanding of climate change and the risks this will pose to property now and into the future. Development in financial disclosure requirements require reporting of climate-related risks, and it is likely that this will flow down into

1
2 the property industry, its assets, stakeholders and practitioners (Button and Turnbull, 2020;
3 Governance Institute of Australia, 2020).
4

5 The research conducted, while limited, suggests the need for further work to achieve a larger
6 sample from which statistically significant inferences can be drawn, as well as further
7 exploration of the mechanisms with which valuers engage in assessing physical risks and climate
8 change-related risks. Part of this effort is required to confirm the true extent of valuers' climate
9 change risk understanding, as this study suggests that such risks are not being adequately
10 considered in Australia.
11
12

13 As others have observed, climate change raises real risks to land use and land users (Goodell, 2017;
14 Warren-Myers and Hurlimann, 2021; Xie *et al.*, 2019). This research has highlighted that those
15 risks are not appropriately considered to enable proper attention in the valuation process. This
16 deficit appears to arise from both a lack of education about relevant issues, and a lack of guidance
17 in relevant standards. Rectifying this deficit will require support and input from the profession,
18 industry and government alike. In future research, the researchers intend to consider and
19 develop, through a consultative process with valuers, industry professionals and climate change
20 experts, a framework to assist valuers in climate risk identification and understanding potential
21 value implications, with further resources developed alongside education programs. This further
22 research will seek to engage with the climate change specific risk criterion identified in this
23 research, being: *location, information, costs, type, vulnerability, environment, beliefs, and media*.
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