Earthquake Commission

16 August 2019

Insurance Liability Valuation as at 30 June 2019

Final Report

MELVILLE JESSUP WEAVER

Willis Towers Watson Alliance Partner

Contents

Appendices

1 Executive Summary

1.1 Valuation results

1.1.1 Canterbury earthquake claims

The gross estimated ultimate claims costs from the Canterbury earthquake events are $11,407 million. This is an increase of $234 million since 31 December 2018.

Canterbury earthquakes only
Estimated ultimate claims costs (undiscounted) - 30 June 2019 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Claims costs paid to date *	9(2)(j)					
Land						512
Building						7,998
Contents						477
CHE						1,596
Total						10,584
Estimated future						
Land						88
Building						601
Contents						0
CHE						134
Total						823
Gross ultimate incurred claims cost - central estimate						
Land	69	468	58	4	1	600
Building	3,013	4,945	342	105	195	8,599
Contents	126	303	29	12	7	478
CHE	560	934	140	42	54	1,730
Total	3,768	6,651	568	164	258	11,407
31 December 2018 comparative						
Gross ult inc claims cost - cent est	3,534	6,730	494	153	262	11,173

*Includes Fletcher PMO direct costs of repair (excludes margin and infrastructure costs)

For a description of the EQ1 – EQ4 and AS events, please refer to Section 9.10.1.

The majority of Canterbury earthquake claims have been resolved. There is, however, considerable uncertainty in regard to those which are yet to be resolved or are in dispute.

9(2)(j)

1.1.2 *Kaikoura earthquake claims*

The gross estimated ultimate claims costs from the Kaikoura earthquake event are $648 million. This has increased from our previous estimate ($631 million) due mostly to increased estimates for insurer-managed non-MUB building claims (see Section 1.3.6 for a discussion of the drivers of this change).

Kaikoura earthquake only
Estimated ultimate claims costs (undiscounted) as at 30 June 2019

	Jun-19 $m	c.f. Dec-18 $m
Claims costs paid to date		
Land	10	10
Building	474	461
Contents	16	13
CHE	105	103
Total	604	586
Estimated future		
Land	-	0
Building	39	37
Contents	1	1
CHE	5	7
Total	45	45
Gross ultimate incurred claims cost - central estimate		
Land	10	10
Building	512	498
Contents	16	13
CHE	110	110
Total	648	631

The approximately $3 million in claims payments over the period for contents relates mostly to a change in the way that reconciliation adjustments are allocated between building and contents rather than genuine development of contents claims.

1.1.3 *All EQC claims*

The table below shows the gross ultimate claims costs (Canterbury earthquakes and Kaikoura earthquake) and how the net outstanding claims liabilities (all EQC claims) are derived.

All EQC claims
Gross ultimate claims costs to net outstanding claims liabilities - 30 June 2019 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	BAU $m	KEQ $m	Total $m
Gross ultimate claims excl CHE, undisc - central es	3,208	5,717	428	121	203		538	10,215
Claims handling expenses (CHE)	560	934	140	42	54		110	1,841
Gross ult claims incl CHE, undisc - central est	3,768	6,651	568	164	258	n.a.	648	12,056
Reinsurance recoveries, undiscounted - central est	(2,153)	(2,478)	0	0	0	-	0	(4,631)
Net ult inc claims incl CHE, undisc - central est	1,614	4,174	568	164	258	n.a.	648	7,425
Net claims costs paid to date	9(2)(j)						(499)	(5,448)
CHE paid to date							(105)	(1,701)
Discounting							(0)	(3)
Net OS including CHE, disc - central est							44	282
Net risk margin, diversified, 85% PoA							17	242
Net OS including CHE, disc - 85% PoA							62	524

The diversified net risk margin (85% PoA) is $242 million, which is $23 million lower than the previous valuation. The movement in the net risk margin has been materially affected by:

- The increasing uncertainty surrounding the reopening building claims which has increased the net risk margin, and
- the changes to the Insurer Finalisation provision, 9(2)(i)

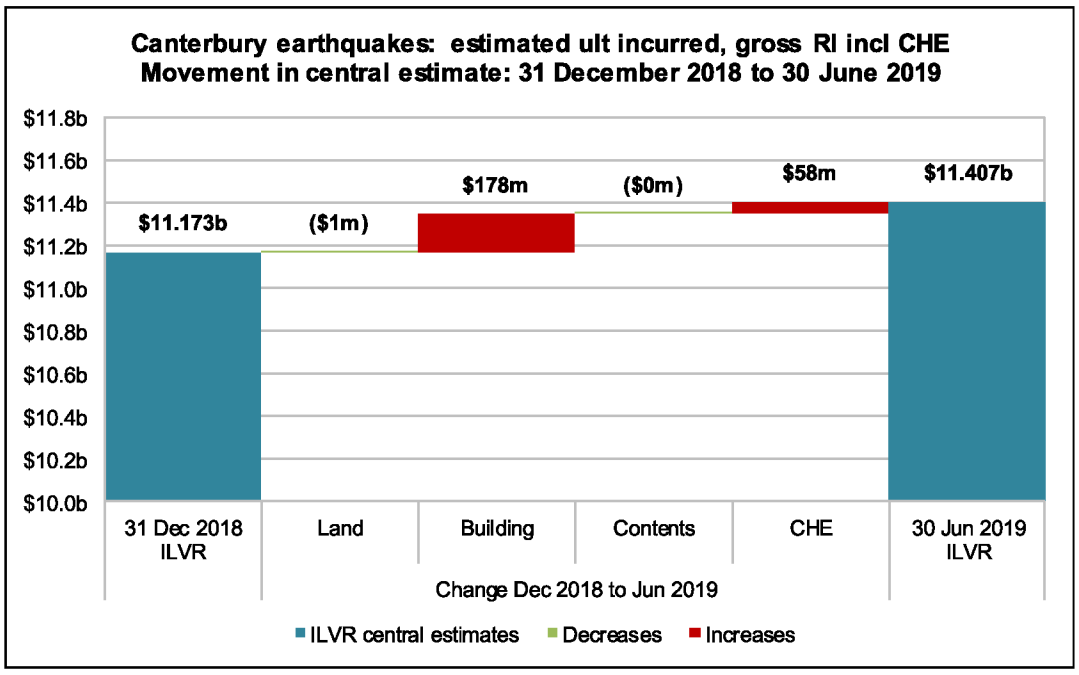
In respect of EQ1, the gross central estimate claims costs are now $3,768 million. This is the average of 10,000 simulated outcomes. EQC has reinsurance cover for this event to $4bn. Within the stochastic modelling that is carried out, there are a number of outcomes where the gross ultimate claims costs exceed the reinsurance cover. There are therefore a number of outcomes where the net claims costs are not zero. This has led to the net central OS liabilities being $75 million with a net risk margin of $113 million.

Refer Section 2.1.1 for details.

1.2 Movement in results

1.2.1 Estimated ultimate claims costs – movement since 31 December 2018 - Canterbury only

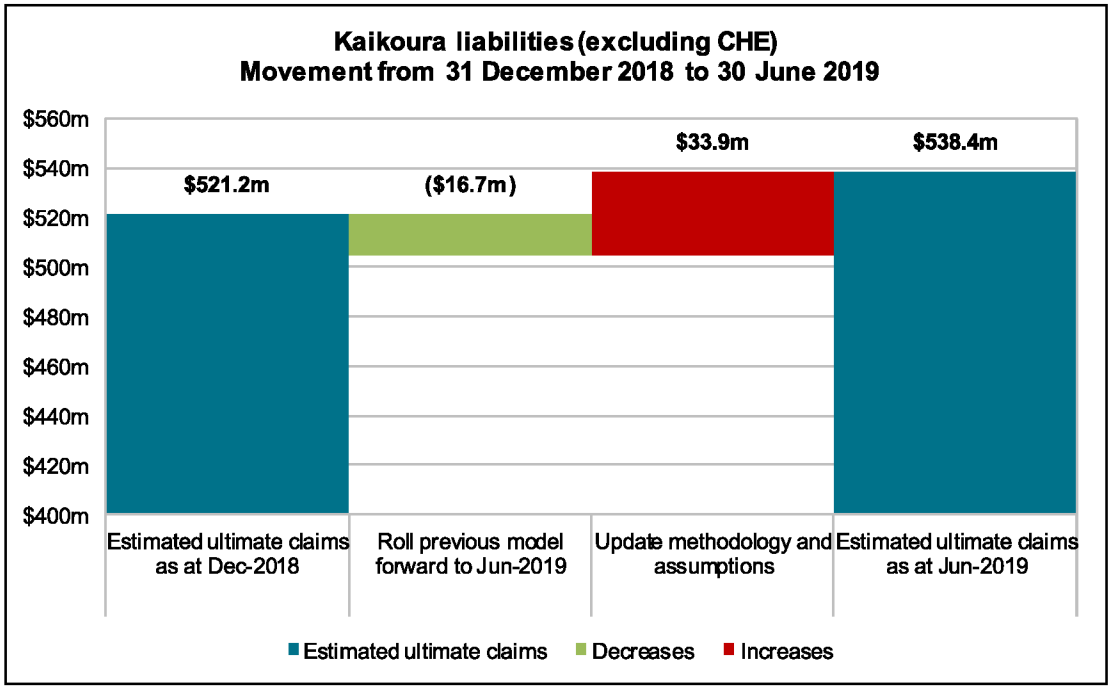
The estimated ultimate gross claims cost for Canterbury earthquake events has moved from $11.173b as at 31 December 2018 to $11.407b as at 30 June 2019. Shown below is a graphical representation of the change in estimated ultimate incurred liabilities.



The movement in the Building component relates to a strengthening in the provision for future reopening claims and 9(2)(j) [redacted].

1.2.2 *Estimated ultimate claims costs – movement since 31 December 2018 - Kaikoura only*

The estimated ultimate claims costs (excluding CHE) for Kaikoura have moved from $521 million to $538 million.



A simple roll forward of the previous model would result in a reduction in estimated claims costs of $16.7 million. This is largely a result of a significant number of insurer-managed claims being closed off in KDMS in recent months. However, the remaining open claims in KDMS now represent a very different claim profile with different likelihoods of incurring further costs, so we have updated our assumptions to reflect this.

In addition, the previous model projected claims to be materially finalised by December 2019. As the number of claims outstanding has reduced the portion expected to be paid beyond December 2019 has become more material. We have therefore also updated the duration over which we are projecting future claims costs.

The bulk of the $34 million increase is due to allowing for reopened claims to continue over a longer period. A smaller component relates to MUB claims where we have adjusted the model to allow for specific claims which are all but finalised (detailed in the movement in analysis in Appendix I.1.3).

1.3 Key Challenges

There are a number of key challenges facing EQC in respect of settling and reporting its Canterbury and Kaikoura earthquake claims. These are discussed briefly below.

1.3.1 *Insurer Finalisation*

9(2)(j)

9(2)(j)

[redacted]

1.3.2 *Reopened claims*

EQC has faced a steady stream of reopened building claims which is putting pressure on the ultimate claims costs. There has been little evidence that the stream of reopened claims is slowing down and there is considerable uncertainty in the projected reopened provision.

A key challenge for EQC is to establish how it may satisfactorily resolve all Canterbury earthquake claims.

1.3.3 *Systemic Building issues*

As part of the general issue of reopened claims, there are a number of systemic building issues which are being investigated to assess their potential cost. The first of these relates to drainage with early feedback suggesting there may be a significant number of properties remaining with drain damage, although it is not yet clear how the costs to remediate these will fall between the interested parties.

1.3.4 *Land litigation*

9(2)(h)

[redacted]

1.3.5 *Data*

EQC has amassed a considerable body of data in settling Canterbury and Kaikoura earthquake claims. This has not always been recorded in a consistent format, nor a format which has allowed robust analysis. This has impacted negatively on the organisation's ability to report, measure, track and communicate effectively.

In respect of this valuation, many sources of data are used to produce the expected ultimate claims costs and while we are comfortable that the overall figures produced are adequate, there are limitations on our ability to analyse and justify some of the components. There are also limits on our ability to compare experience to expectations at a granular level.

EQC has been carrying out a number of initiatives to improve the data, the most recent example being the triaging exercise of reopened dwelling claims. This is an important first step in analysing experience and we expect this to provide a more robust basis for setting assumptions.

1.3.6 *Kaikoura claims management*

The Kaikoura earthquake event has unique characteristics with challenges. It is being almost wholly managed by third parties who will handle claims according to their own procedures and policies, within the terms of the MoU. EQC has less visibility over the status of the claims and the nature of the settlements than would be the case for internally managed claims.

A process is currently underway to bring the majority of open claims back under EQC management in the coming months. This has already occurred for a number of IAG claims. However, in the meantime there are challenges in using the data that we hold in respect of Kaikoura claims – for example the claim status information in KDMS does not necessarily reflect the insurers' views on whether or not a claim is open. This is discussed further in Section 2.2.3.

Once most claims are manged in house this should enable us to form a more robust view on the number and potential cost of open claims, although there will still be challenges in estimating patterns in reopened Kaikoura claims given how the data has changed over time.

The estimated outstanding claims includes an allowance for reopened insurer-managed non-MUBs which amounts to around 4.6% of costs paid to date. We will look to test this figure against the development of open claims as we accumulate further data.

1.4 Key recommendations

1.4.1 Progress against previous recommendations

Several recommendations were set out in the previous ILVR. The progress against these recommendations is as follows:

- In respect of settling the remaining Canterbury earthquake claims
  - Continue engaging with insurers in respect of Insurer Close. *Ongoing*
  - Review reopened claims to better understand the causes *Stage 1 complete*
  - Use KDMS to track the status of insurer managed claims. *Started*
- In respect of Data. Undertake a review of the data capture process to ensure that as much data as possible may be effectively utilised. *Started*
- In respect of Kaikoura management. Investigate the robustness (finality) of the cash settlements and to manage risks as they emerge. *Outstanding*

1.4.2 Current Recommendations

The key recommendations, from an actuarial estimate perspective, arising from this investigation are:

- In respect of settling the remaining Canterbury earthquake claims
  - Continue engaging with insurers in respect of Insurer Finalisation.
  - Review reopened claims to better understand the payments and causes
- Bring the management of Kaikoura claims into CMS as the period of insurer-management ceases.
- In respect of Data. Undertake a review of the data capture process to ensure that as much data as possible may be effectively utilised.
- Analyse a sample of Kaikoura insurer-managed claims to assess the adequacy of cash settlements.

1.5 Authors

Craig Lough
Fellow of the NZ Society of Actuaries

Jeremy Holmes
Fellow of the NZ Society of Actuaries

2 Key developments since prior valuation

MJW have previously provided an assumptions and methodology letter to EQC which set out our intended valuation approach as at 30 June 2019. The discussion below highlights key areas of judgement or materiality.

2.1 Canterbury earthquakes

2.1.1 *Canterbury earthquake building claims*

Reopened claims

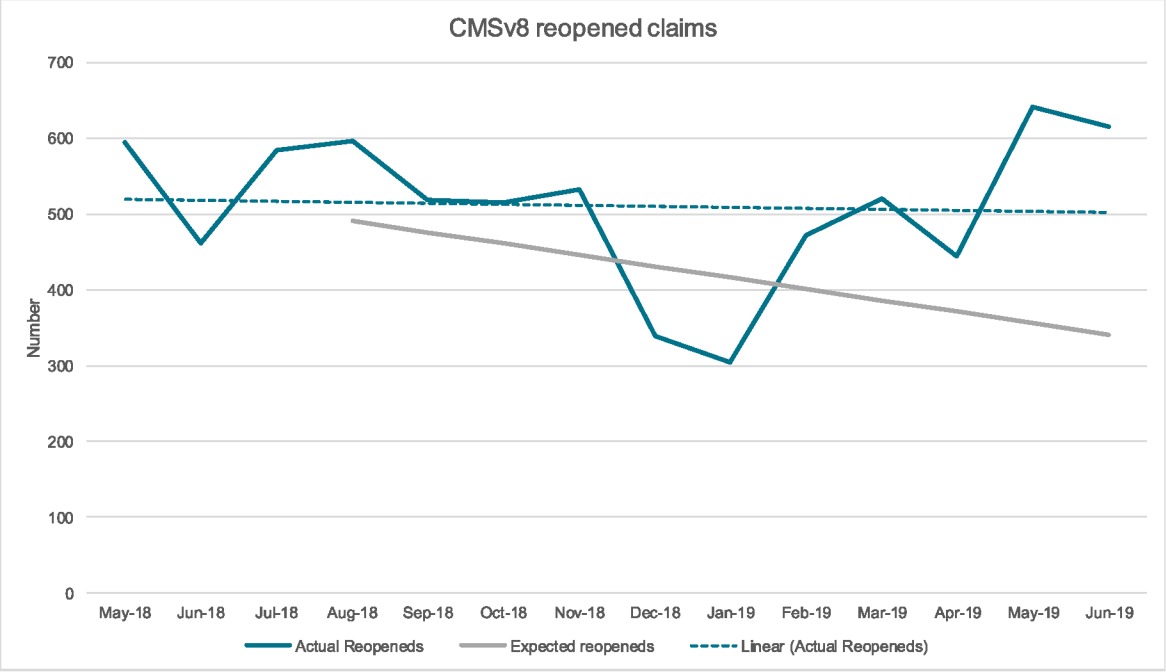
Canterbury claims have continued to reopen with a number going overcap.

A triaging exercise was carried out earlier this year to catalogue the reason that each property reopened including into the categories; drainage, foundations and administration. Unfortunately many properties will have been reopened for more than one reason. Triaging each property into a single category will therefore obscure the variety of reasons why claims are reopening.

We understand that there is a project underway to add extra fields into CMSv8 which will allow claim payments to be tagged with the reason for the payment. This should assist greatly in understanding the materiality of each reopened claim reason, and actions EQC may be able to take to proactively address reopen reasons.

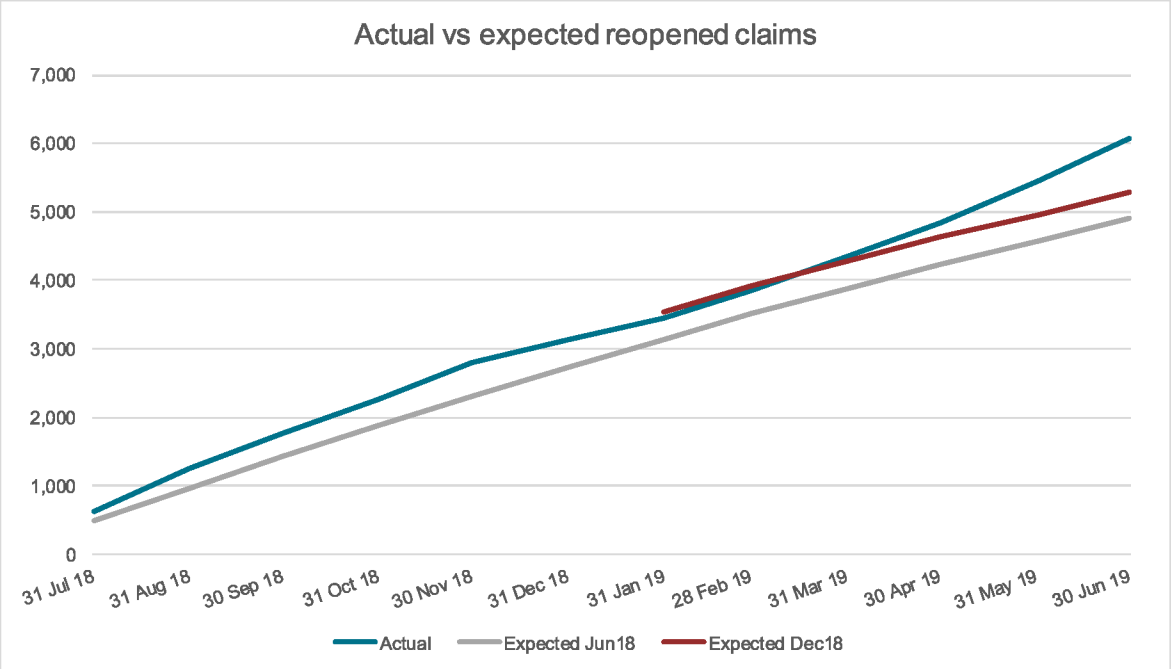
Over time it is anticipated that this will allow meaningful insights into how long the reopened trend might continue, and actions EQC may be able to take to proactively address reopen reasons. Currently, the reopened provision carries significant uncertainty.

A comparison of the experience of reopened claims since 30 June 2018 shows that our previous assumption for the volume of reopens was too low. The chart below shows the number of actual and expected claims reopening in CMSv8 since May 2018. A trendline has been added.



There has been little indication that the reopening trend is slowing, albeit there is a dip in the number reopening over the Christmas period. This dip has been reversed in the subsequent months.

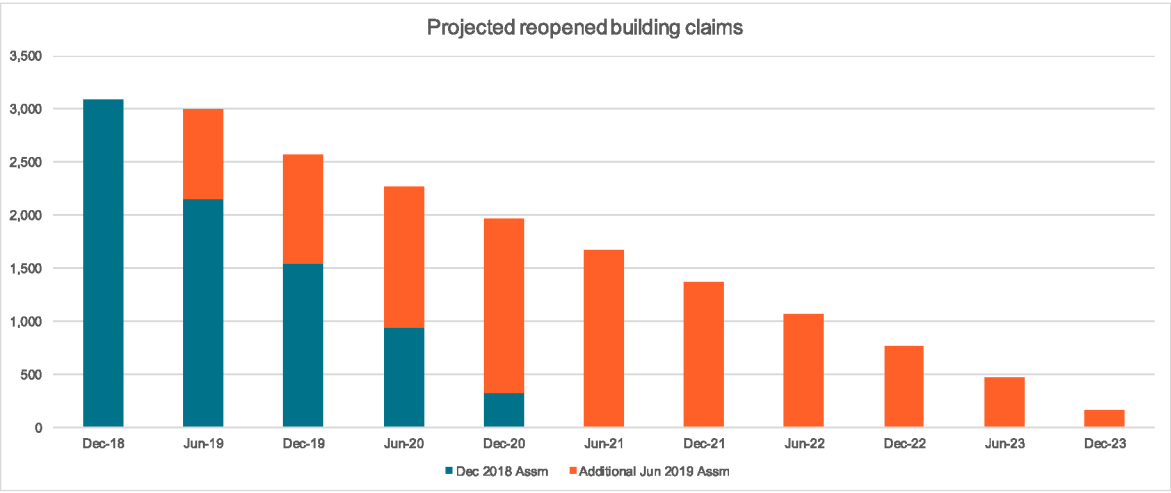
The cumulative position since 30 June 2018 is shown in the chart below which highlights how the experience has diverged from our assumptions.

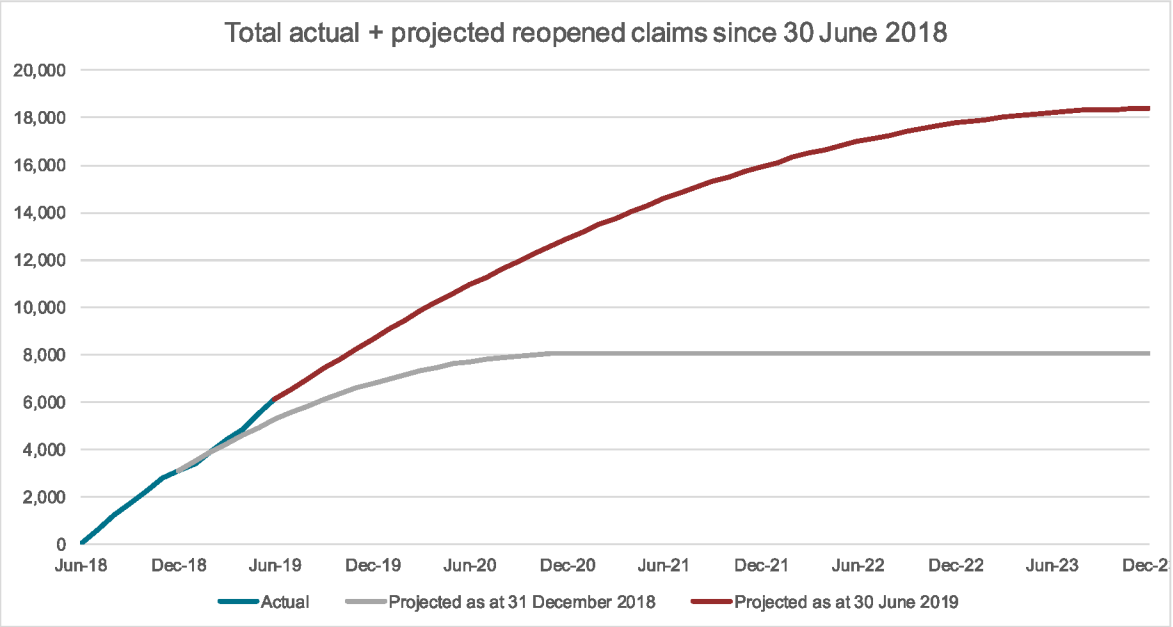


The actual claims development since June 2018 (blue line) has been higher than expected since then (grey line). The red line is the revised projection from Dec 2018 although this also falls away from the actual experience.

Based on the overall experience from June 2018, and allowing for the recognition of the systemic building issue challenges noted below, we believe it is appropriate to significantly increase the future projected reopened claim number.

Previously we had projected that there would be just less than 7,800 reopened claims after 30 June 2018. Following discussions with management, this has been increased to 18,400. This change has significantly increased the expected ultimate cost. This is shown in the following charts.





The chart above shows the actual reopened claims since 30 June 2018 and the projected reopened claims for the previous and this valuation.

Systemic building issues

Any large-scale natural disaster event will produce a number of systemic loss factors. The Canterbury earthquake event was highlighted by severe liquefaction across much of the flat land in Canterbury.

While many of these factors have been identified, and largely addressed, there are several for which there is a degree of uncertainty which still needs to be investigated.

Three examples of this include:

- Drainage
- Foundations
- Weathertightness risk homes.

The first of these to be investigated relates to possible drainage issues. A preliminary study, jointly carried out by Christchurch City Council ('CCC') and EQC has identified six areas in Christchurch where there appears to be drainage problems. There are 25,000 properties in these 'at risk' areas which have not already been remediated or cash settled for drainage problems.

In respect of EQC's reopened claims information, the average payment made in respect of a property triaged as drainage is around $15k. This is in-line with the previous drainage assumption.

Irrespective of the average cost assumption, there is the potential for significant costs relating to this issue.

Dispute resolution

9(2)(j)

9(2)(j)

Insurer Finalisation

9(2)(j)

9(2)(j)

Canterbury earthquakes–key assumptions

The table below shows the key cost assumptions for the Canterbury building claims for this valuation.

Assumptions	30 Jun 2019	31 Dec 2018
Average non-nil claims costs		
Settlement claims	9(2)(j)	9(2)(j)
Dispute Resolution claims		
Drainage		n.a.
SRES claims*		n.a.
Settlement claim - nil claim rates		
Current cash settled claims	0%	2%
Future cash settled claims	34%	30%

*The SRES claims were combined with the Settlement claims as at the previous valuation

9(2)(j)

Summary of Canterbury building claim provisions

The table below summarises the building claim provisions. With the triaging of the reopened claim data, it is now possible to separate out the drainage claims as a separate category.

	30 June 2019 $m	31 December 2018 $m
Open claims	9(2)(j)	
Cash settled^		
Managed repair / Drainage		
DR - Insurance payment		
DR - Customer reimbursement*		
Future claims		
Undercap (cash settled / managed repair)		
Overcap		
DR - Insurance payment		
DR - Customer reimbursement*		
Financial close - insurer		
Total	601	522

^Includes SRES
*Customer legal and technical advice reimbursement

2.1.2 *Canterbury earthquake land claims*

There has been little development in respect of the Canterbury land claims since the previous valuation. The model and assumptions are largely unchanged. The structure of the land model is still based around modelling various litigation scenarios.

2.1.3 *Canterbury CHE*

There has been an internal revision of the Canterbury CHE budget by EQC Finance for the year ended June 2020. This has then been projected by MJW for four years beyond this point.

9(2)(j) Unfortunately, this reduction has been more than offset by the increased expectation of reopened claims with overall higher staffing levels.

The table below illustrates the budgeted and projected costs as at the current and previous valuations.

Category	Year ended	Jun 19 $m	Dec 18 $m
Paid to date			
	30 Jun 11	225	225
	30 Jun 12	302	302
	30 Jun 13	262	262
	30 Jun 14	244	244
	30 Jun 15	203	203
	30 Jun 16	148	148
	30 Jun 17	90	90
	30 Jun 18	61	61
	30 Jun 19	62	58
Budget FY2020			
	30 Jun 20	46	33
CHE beyond June 2020			
		81	45
Ultimate CHE		1,723	1,669

The changes to the projected CHE have resulted in an estimated ultimate CHE of $1,723 million. After allowing for inflation, the expected ultimate CHE will be $1,730 million.

A key driver in the actual ultimate cost of CHE will be how the future rate and timespan of reopened claims trends and the complexity of these claims.

2.1.4 Key areas of judgement

In undertaking the valuation there are some areas of judgement required that materially affect the results. The areas resulting in the highest level of uncertainty are:

- **Reopened Canterbury building claims.** The number of claims reopened each month and the duration for which reopened claims will continue at this rate is a key judgement. We have relied heavily upon our discussions with EQC to assess these assumptions.
- **Insurer Finalisation.** The ultimate transaction which will take place between EQC and each insurer to settle any remaining liability in regard to overcap claims is an area of great uncertainty. We have relied upon discussions with and models provided by EQC's engineering consultants to assess this figure.

2.2 Kaikoura earthquakes

2.2.1 Model components

For the valuation at December 2018 we modelled the future cost of claims according to:

- The exposure type (land building or contents)
- Whether it related to a Wellington multi-unit building (for building exposures)
- Whether the claim was managed by EQC or an insurer (for the non-MUB building exposures).

The land, contents and EQC-managed non-MUB building exposures have all shown little development since December 2018 and the estimated outstanding amounts for these components are minimal. There has been a small amount paid since December in respect of MUB claims and there remains around $5 million in insurer case estimates at 30 June. Our estimate of the ultimate cost of MUB claims has not changed materially.

The insurer-managed non-MUB building claims continue to present some challenges as discussed below.

2.2.2 Claim system challenges

For claims managed by insurers EQC relies on the insurers to provide information to EQC in regard to the status of these claims and to invoice EQC once payments have been made to the claimant or repairer. This has been a challenge for the valuation since the beginning of the MoU and continues to be the case.

EQC now records developments on insurer-managed claims in the Kaikoura Data Management System ('KDMS'). Previously information was recorded in CMS4 but this data flow stopped with the move to CMS8 and KDMS was developed as a standalone system. EQC managed claims are recorded in CMSv8. For some time the number of claims open in KDMS remained very high (around 17,000 open building exposures) despite information from the insurers showing only a few hundred open claims. Nevertheless we endeavoured to model the claims by combining the claim status in KDMS with the payment status (i.e. whether a payment has been made).

In April this year there was a programme to close out a large number of exposures in KDMS; around 3,000 now remain open. We understand that the exposures still open are those which are either noted as being open by the insurers or have yet to have their EQC cover verified (and can't be closed until this is done). We appreciate the efforts by EQC to close out exposures which are no longer open, although this does present a challenge for modelling the closure of the remaining exposures.

The bulk, infrequent process by which exposures are closed means that projecting closure patterns into the future is very difficult. Additionally, the characteristics of the currently open claims are very different to those open at 31 December 2018. We have used the same methodology to model the outcomes for the open claims (as well as modelling reopened claims) as in the previous valuation but we have attempted to adjust the assumptions to allow for the different pool of open claims compared to that at December. This includes extending the settlement pattern out for a further six months to 30 June 2020. The selected assumptions have been guided by considering the insurer case estimates (although see below) and the amounts accrued by EQC in respect of claims paid by insurers but not yet invoiced to EQC.

In Section 2.2.5 below we discuss the number of 'open' claims in KDMS, Most of these claims are effectively closed, but may be awaiting some sort of action (such as verification) before having their status changed in KDMS. Whilst our Kaikoura model does treat these claims as open, it recognises that – historically – many open Kaikoura claims have closed at no further cost to EQC, especially where an open claim has already incurred one or more payments. As a sense check we compared the Kaikoura model estimated future cost of open claims against the insurer case estimates (Section 6.6) and are satisfied that the model does not produce an unreasonable estimate.

Additionally, we tested the impact of running the Kaikoura model after significantly reducing the number of open claims and this produced a very low estimate. The estimate appeared too low compared to the case estimates and is a reflection of the fact that the Kaikoura model assumptions allow for many claims to settle at no future cost to EQC. It would be inappropriate to apply these assumptions only to a small pool of claims very likely to incur future costs. This approach may need to be revisited in future depending on the pool of open claims at future valuations.

In Appendix D we provide some reconciliations around the various data sources for Kaikoura claims.

2.2.3 *Insurer open claims reporting*

For the December 2018 valuation we were able to obtain lists of open claims from each insurer at that date. These were used to sense check the results of the model at the time, with the intention that monthly updates on open claims would enable the insurer estimates to be used more rigorously in future.

Unfortunately, updates from the insurers since then have been irregular. We were eventually able to obtain a list from all insurers as at approximately 30 June but do not have consistent monthly development for earlier months. In addition, some of the case estimate data provided by insurers was incorrect. We attempted to allow for this by utilising earlier figures or making adjustments where possible.

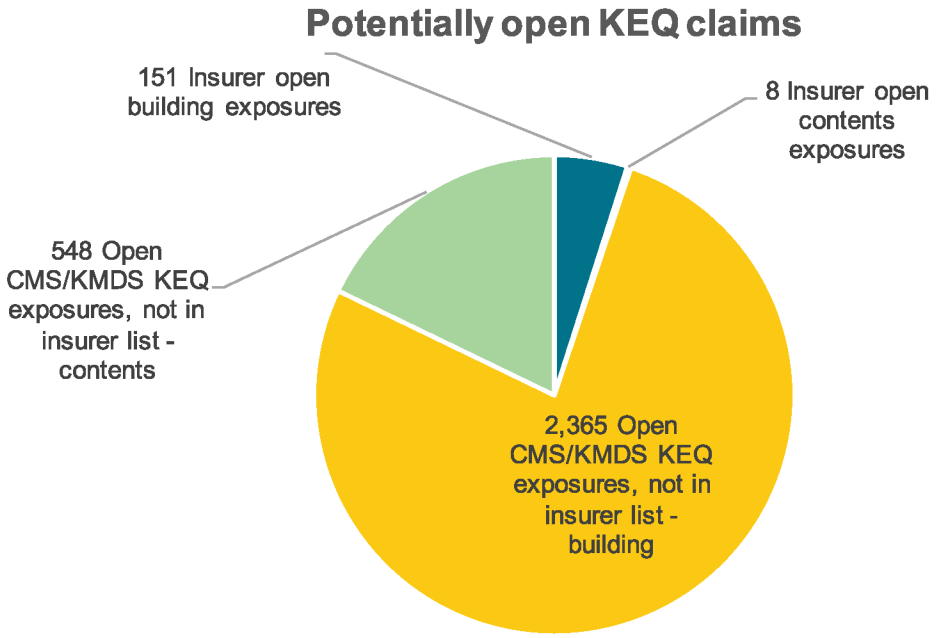
Gaining an understanding of movements in open claims in future will be key to estimating future reopened claims form the Kaikoura event. We anticipate seeing more robust information on open claims developments as the management of the majority of the remaining claims is brought in-house to EQC in the coming months.

2.2.4 *Reopened claims allowance*

The allowance for reopened claims within the Kaikoura model has increased from $14.6 million at 31 December to $19.1 million at 30 June. This is the result of extending the projected settlement pattern for a further six months and thereby assuming a greater period during which reopened claims might arise. In the absence of regular, robust data on open claims numbers we have erred on the side of a higher reopened claims provision. Some sensitivity/scenario analysis around the reopened allowance is provided in Section 6.4.

2.2.5 *Summary of potentially open Kaikoura claims*

The chart below summarises the Kaikoura exposures for which one or more of the data sources suggest they may be open.



There are only 151 open building exposures and 8 open contents exposures in the lists of open claims provided by insurers under the MoU as at approximately 30 June 2019.

However, there are a large number of exposures which are open in KDMS or CMS but are not in the list of open claims provided by insurers. We have obtained the claim status from either CMS or KDMS depending on which system the claim is managed in. We understand that this includes:

- Claims which have been paid by the insurer but for which EQC has not yet been invoiced.
- Claims which have been invoiced to EQC but have not yet been reimbursed by EQC. The number of these is likely to be very small given the requirement for EQC to pay invoices within 5 days.
- Claims which have yet to have their EQC cover validated. These may have been reimbursed by EQC, or may not have incurred any payments.

In regard to the first two points, these costs are accrued separately by EQC based on information provided by the insurers. As at 30 June 2019 this accrual was $3.3 million (see Section 6.2.1).

We have been informed by EQC that there are 2,109 claims which have been paid but have not had their cover verified yet and are therefore still open in KDMS. There are also 420 invalid claims which are not yet closed. Some of these claims may include both a contents and building exposure. Based on these figures, the true underlying number of open claims is likely to be much closer to the list of open claims provided by the insurers.

Whilst our Kaikoura model uses the status information in CMS and/or KDMS, it also uses payment information as provided by Finance. Where a claim is open (like those noted above) but has already incurred a payment then this is allowed for in the model. To ensure that the Kaikoura model does is not skewed by the apparent large number of open claims, we sense checked the results against the case estimates provided by insurers in respect of the genuinely open claims (see Section 6.6).

2.3 Data and data migration

EQC fully migrated to a new claims management system (CMSv8) in May 2018. All claims are now managed on this system, with the exception of the Insurer-managed Kaikoura claims.

2.3.1 CMSv8

The introduction of CMSv8 has provided some initial benefits in that it has illuminated the actual number of building claims yet to be resolved. However, it has some limitations, relative to CMSv4 such as:

- Not allowing a payment to be recorded without creating a payment. This retards the ability to load insurer managed Kaikoura claims onto CMSv8.
- Not being able to report the reason why a claim is open. This means that open building claims cannot be classified into sub-classifications within CMSv8.

We emphasise that, while these systems may fulfil EQC's core function of managing claims, it has made management reporting challenging. This has a flow on effect to any party that relies on this data.

Some examples of these challenges include:

- Obtaining an accurate assessment of overcap properties. This was due to the lack of a robust open / close indicator for each property and why it was closed.

- Obtaining an accurate breakdown of building issues in CMSv8. CMSv8 does not allow for the identification of why the building exposure is open. This has been partly mitigated by a Claim Stage Gate report, managed by the Canterbury Team although the level of granularity is not high.

Despite these challenges, it is still possible to produce a valuation estimate, albeit with more uncertainty than would be desirable. This uncertainty is evident with a high risk margin attached to the outstanding claims provision.

2.3.2 Developments

In respect of the Canterbury earthquake reopened claims data, a large triaging process was undertaken to provide more context for these claims. This has assisted in providing more granularity into the claims provisions. A key challenge for EQC is to continue this process to better understand the reasons why claims are reopening and to provide better management reporting of the progress of settling Canterbury claims.

In addition to this, a project is underway to add additional fields in CMSv8 to provide more context to why claims are opened and closed and what the payments relate to.

2.4 Limitations

In this report, we provide the results of our investigations together with an outline of the matters considered and the methods and assumptions applied to obtain these results. Opinions and estimates contained in this report constitute our judgement as at the date of the report.

There is considerable uncertainty surrounding the outstanding Canterbury earthquake claims liability, especially given the uniqueness of the event sequence. There is also some residual uncertainty regarding the estimate for the Kaikoura earthquake, primarily due to the lag in reporting assessment and settlement information from private insurers. Care should be taken in relying on this estimate at this stage. Refer to Section 10.3.3 for more detail.

This report must be read in its entirety. Individual sections of the report, including the Executive Summary, could be misleading if considered in isolation from each other.

3 Canterbury Event Key Assumptions

	BUILDING CLAIMS as at 30 June 2019			
Assumption	**Explanation**	**30 Jun 2019 provision**	**31 Dec 2018 provision**	**Informed by**
Resolution	• Resolution of properties is now materially completed so key assumptions now relate to reopened claims, litigation and Financial Close with Insurers (see below)			• EQC data on resolved claims
Open claims				
Current - Cash settlement	• 1,740 open properties in this stream. Expect 1,698 to require a non-nil payment. • Average payment recently experienced is 9(2)(j)	9(2)(j)		• Claim stage gate report. Provides information on average cost, non-nil %, numbers of open claim etc
Current - Managed repair	• The number of current Construction claims is immaterial. There is no longer a Construction team.			• Claim stage gate report. Provides information on average cost, non-nil %, numbers of open claim etc
Current - Drainage	• 157 open properties in this stream. • Average payment including fees and reinstatement costs are 9(2)(j)			
SRES	• 278 open properties in this stream. • Average payment recently experienced is 9(2)(j)			
9(2)(h)				

	BUILDING CLAIMS as at 30 June 2019			
Assumption	**Explanation**	**30 Jun 2019 provision**	**31 Dec 2018 provision**	**Informed by**
9(2)(h) [redacted]				
Future claims				
Future – cash settlements and managed repair	• Reviewed analysis carried out at December 2018 and compared actual vs expected experience since then. • Actual reopened claim rates are slightly higher than we had estimated. • We have adjusted our view of future reopeneds upwards. • We have used the same cost assumptions as used for open claims.	9(2)(j) [redacted]		• Claim stage gate report. Provides information on average cost, non-nil %, numbers of open claim etc • Assorted BIU information on building claims
Future – Overcap claims	• Now included as part of the general projection of future claims.			
9(2)(j) [redacted]				

	BUILDING CLAIMS as at 30 June 2019			
Assumption	**Explanation**	**30 Jun 2019 provision**	**31 Dec 2018 provision**	**Informed by**
9(2)(h) [redacted]				
Insurer Finalisation	9(2)(j) [redacted]			

	LAND CLAIMS as at 30 June 2019			
Assumption	**Explanation**	**30 Jun 2019 provision**	**31 Dec 2018 provision**	**Informed by**
Land model – open claims	• Settle the remaining number of open claims as per EQC's policy i.e. DoV where in situ or repair where cleared site and land is repaired.	9(2)(j) [redacted]		• T&T advice • Actual settlement experience to date 9(2)(h) [redacted]
Land model – litigation	[redacted]			

4 Kaikoura Event Key Assumptions

	KAIKOURA CLAIMS as at 30 June 2019			
Assumption	**Explanation**	**30 Jun 2019 Ult claims cost**	**31 Dec 2018 Ult claims cost**	**Informed by**
Insurer managed non – MUB building claims	• Multi-state model based on: • Claim status in CMS and/or KDMS • Number of payments made by EQC to insurer • Duration since last payment to insurer • Duration since claim closed (if applicable) • The model intends to make the most of the limited information at EQC's disposal i.e. whether or not EQC has already closed a claim in CMS and whether or not one or more payments have already been made to the insurer.	9(2)(j) [redacted]		• Observed experience to date as recorded in either CMS or KDMS • Finance records of payments made to insurers • Sense checked against lists of open claims supplied by insurers.
All other claims	• Open/closed claims projection • Simulates potential future costs for all open claims.			• Observed experience to date as recorded in CMS • EQC information and estimates for open EQC-managed MUB claims.

5 Canterbury earthquake claim liabilities

There have been a number of developments that have occurred over the six months from 31 December 2018 that have affected the estimation of EQC's Canterbury claims costs. These relate to:

- Building model
  - Resolved and reopened claims
  - Insurer Finalisation
- Claims Handling Expenses (CHE)

These have been discussed earlier in Section 2.1.

5.1 Valuation results – Canterbury earthquakes

5.1.1 Estimated ultimate claims costs – Canterbury earthquakes only

The table below summarises the main components involved in estimating the ultimate cost of claims to EQC arising from the Canterbury earthquakes only as at 30 June 2019.

Canterbury earthquakes only
Ultimate claims costs, central estimate, undiscounted, including CHE - 30 June 2019 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Claims paid to date (excl. CHE)*	9(2)(j)					8,988
Estimated future (excl. CHE)						689
Gross estimated ultimate incurred claims	3,208	5,717	428	121	203	9,677
Claims handling expenses (CHE)						
Paid to date	9(2)(j)					1,596
Estimated future						134
Total	560	934	140	42	54	1,730
Gross ultimate incurred claims including CHE	3,768	6,651	568	164	258	11,407
Reinsurance recoveries	(2,153)	(2,478)	0	0	0	(4,631)
Net ultimate incurred claims including CHE	1,614	4,174	568	164	258	6,777
31 December 2018 comparatives						
Gross ult incurred claims including CHE	3,534	6,730	494	153	262	11,173

*Includes Fletcher PMO direct costs of repair (excludes margin and infrastructure costs - included in CHE)

The table below shows the components split by exposure.

Canterbury earthquakes only
Estimated ultimate claims costs (undiscounted) - 30 June 2019 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Claims costs paid to date *						
Land	9(2)(j)					512
Building						7,998
Contents						477
CHE						1,596
Total						10,584
Estimated future						
Land	9(2)(j)					88
Building						601
Contents						0
CHE						134
Total						823
Gross ultimate incurred claims cost - central estimate						
Land	69	468	58	4	1	600
Building	3,013	4,945	342	105	195	8,599
Contents	126	303	29	12	7	478
CHE	560	934	140	42	54	1,730
Total	3,768	6,651	568	164	258	11,407
31 December 2018 comparative						
Gross ult inc claims cost - cent est	3,534	6,730	494	153	262	11,173

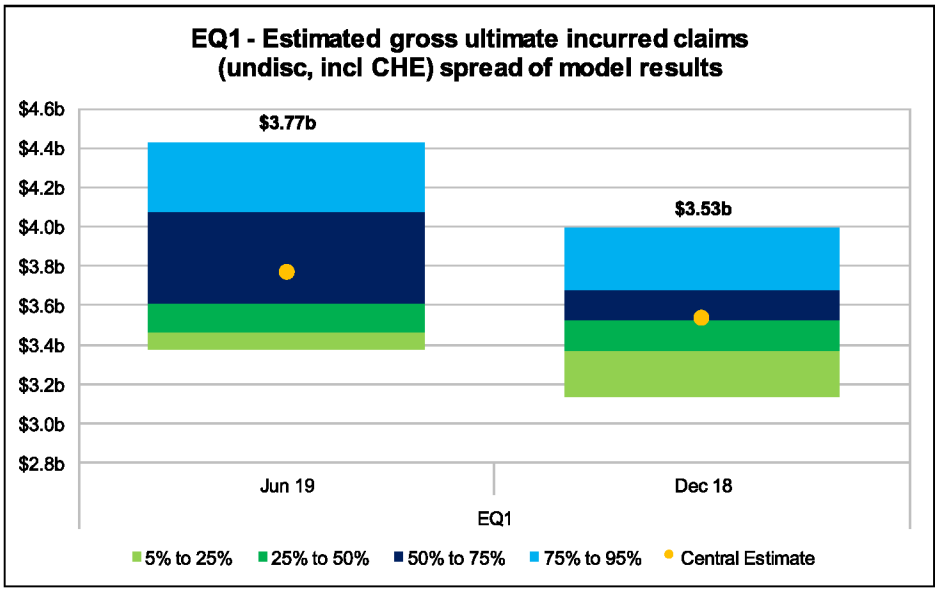
*Includes Fletcher PMO direct costs of repair (excludes margin and infrastructure costs)

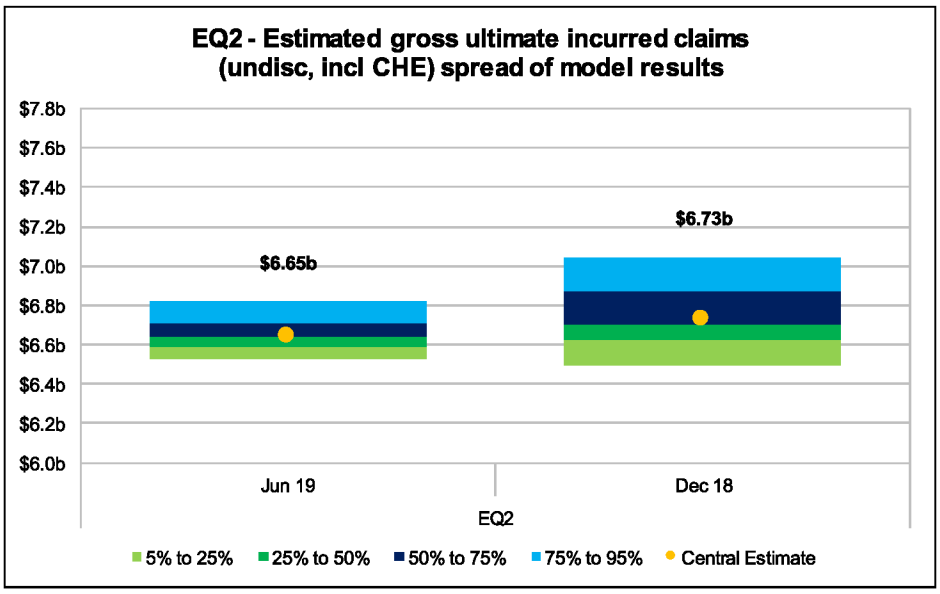
5.1.2 *Estimated ultimate claims costs – variability in modelled results*

The actual ultimate incurred claim costs arising from the Canterbury earthquake events will not be known until the last claim is settled. The figures shown in Section 5.1.1 are the central estimate (mean) of a distribution of modelled outcomes.

The charts below illustrate the variability in the ultimate claims liabilities for EQ1 and EQ2 according to our valuation model, split by Canterbury earthquake event. The numbers shown correspond to the central estimates.

Canterbury Earthquakes only





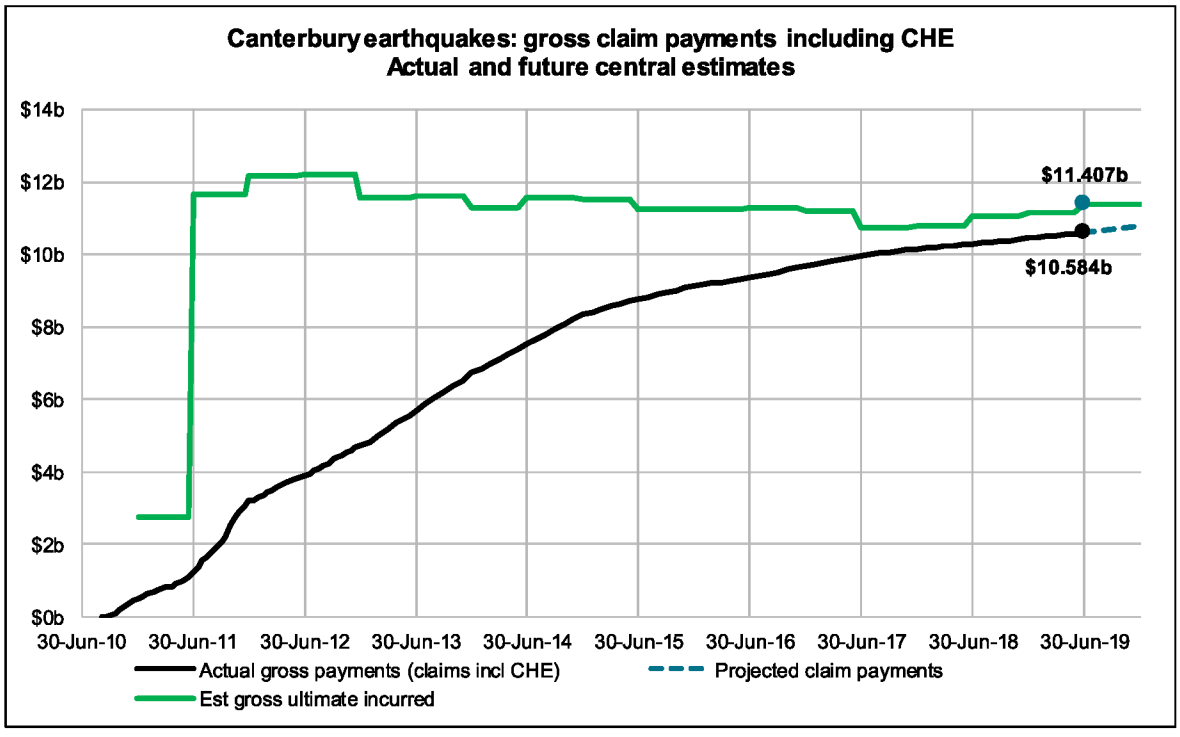
Estimated gross ultimate incurred cost incl CHE

	EQ1	EQ2	EQ3	EQ4	AS
30 June 2019 ILVR					
5%	$3.379b	$6.526b	$0.513b	$0.160b	$0.256b
25%	$3.464b	$6.584b	$0.531b	$0.162b	$0.257b
50%	$3.605b	$6.641b	$0.559b	$0.163b	$0.258b
75%	$4.075b	$6.707b	$0.602b	$0.165b	$0.258b
95%	$4.432b	$6.819b	$0.648b	$0.168b	$0.260b
Central Est	$3.768b	$6.651b	$0.568b	$0.164b	$0.258b
31 December 2018 ILVR					
5%	$3.132b	$6.493b	$0.421b	$0.144b	$0.254b
25%	$3.365b	$6.620b	$0.450b	$0.149b	$0.259b
50%	$3.526b	$6.700b	$0.482b	$0.153b	$0.262b
75%	$3.679b	$6.870b	$0.529b	$0.157b	$0.265b
95%	$3.996b	$7.046b	$0.603b	$0.163b	$0.270b
Central Est	$3.534b	$6.730b	$0.494b	$0.153b	$0.262b

Note that the distributions shown here do not allow for diversification across events. For example, adding the 75% figures for each event will produce a figure greater than the 75% figure for Canterbury as a whole.

5.1.3 Gross claim payments – comparison to previous estimates

The following chart shows actual gross claim payments for Canterbury earthquakes to 30 June 2019 (including EQR payments and CHE) as the solid black line. Projected payments are shown as the dotted line.



The valuation reflects our understanding of anticipated future cashflows. CHE payments are assumed to continue until 30 June 2024.

5.1.4 Movement in Canterbury earthquake claims costs

Canterbury earthquakes only
Comparison to 31 December 2018 ILVR Results

	EQ1			EQ2			EQ3			EQ4			AS			Total		
	Jun 19 $m	Dec 18 $m	Change $m	Jun 19 $m	Dec 18 $m	Change $m	Jun 19 $m	Dec 18 $m	Change $m	Jun 19 $m	Dec 18 $m	Change $m	Jun 19 $m	Dec 18 $m	Change $m	Jun 19 $m	Dec 18 $m	Change $m
Gross ultimate claims excl CHE, undiscounted - central estimate																		
Land	69	68	+1	468	471	-3	58	57	+0	4	4	+0	1	1	-0	600	601	-1
Building	3,013	2,821	+192	4,945	5,033	-88	342	272	+70	105	96	+9	195	200	-5	8,599	8,422	+178
Contents	126	126	-0	303	303	-0	29	29	-0	12	12	-0	7	7	+0	478	478	-0
Total	3,208	3,015	+193	5,717	5,807	-91	428	358	+70	121	112	+9	203	208	-5	9,677	9,500	+177
Claims handling expenses (CHE)																		
Paid	521	490	+31	867	867	-0	118	118	-0	39	39	+1	51	51	+0	1,596	1,564	+32
Future	39	29	+9	68	56	+12	22	18	+4	3	3	+1	3	2	+0	134	108	+26
Total	560	519	+41	934	923	+12	140	136	+4	42	41	+1	54	53	+1	1,730	1,672	+58
Gross ult claims incl CHE, undisc - central est	3,768	3,534	+234	6,651	6,730	-79	568	494	+74	164	153	+10	258	262	-4	11,407	11,173	+234
Reconciliation to gross outstanding (OS)	[redacted]														9(2)(j)			
Gross ult cost incl CHE, undisc - central est																11,407	11,173	+234
Paid claims costs excl CHE																(8,988)	(8,882)	-106
Paid CHE																(1,596)	(1,564)	-32
Gross OS incl CHE, undisc - central est																823	727	+97
Reinsurance recoveries, undiscounted - central estimate																		
Past payments recoveries	[redacted]														9(2)(j)	(4,038)	(3,983)	-55
Future payments recoveries																(592)	(483)	-109
Total expected recoveries	(2,153)	(1,989)	-164	(2,478)	(2,478)	-0	0	0	+0	0	0	0	-	-		(4,631)	(4,467)	-164
Net ult inc claims incl CHE, undisc - central est	1,614	1,545	+70	4,174	4,253	-79	568	494	+74	164	153	+10	258	262	-4	6,777	6,706	+70
Reconciliation to net outstanding	[redacted]														9(2)(j)			
Gross OS incl CHE, undisc - central est																823	727	+97
Future payments recoveries																(592)	(483)	-109
Net OS including CHE, undisc - central est																231	243	-12
Discounting																(2)	(5)	+3
Net OS including CHE, disc - central est																229	238	-10
Net risk margin, diversified, 85% PoA																223	242	-19
Net OS including CHE, disc - 85% PoA																451	480	-29

Commenting on the table on the previous page it can be seen that in respect of EQ1:

- The gross ultimate claims including CHE are estimated to be $3,768 million, which is less than the reinsurance programme, which stops at $4bn.
- Gross ultimate claims including CHE have increased by $234 million.
- Expected reinsurance recoveries have increased by $164 million.
- Net ultimate claims including CHE have increased by $70 million.

The reason for this split is that the valuation model is run stochastically, and there are many possible outcomes that may eventuate. The gross ultimate claims figure is the average of all of these outcomes.

The expected reinsurance recoveries are based on these gross outcomes, but the recoveries are limited to the reinsurance programme (stopping at $4bn) so the average outcome will be less than the average of the gross outcomes.

Similarly, the net ultimate claims are also based on the gross outcomes but will result in additional costs where the gross outcomes are greater than the reinsurance programme. That is, for many simulations, the future net incurred claim cost will be zero.

5.1.5 Movement in results

The principal areas of judgement for this valuation revolve around whether a sufficient provision has been made for:

- The risk of reopened claims.
- The risk of insurer challenge.

There is considerable uncertainty in these provisions. It will take some time for the likely outcome of these risks to evolve.

The main movements in the estimated gross ultimate claims costs for Canterbury relate to:

- Building claims. +$178 million.
- CHE. +58 million.

5.1.6 Drivers of results

The key drivers of the result are:

- How the reopened claims rate continues.
- How Insurer Finalisation eventuates.

5.2 Sensitivity testing

We have carried out sensitivity testing on a number of key provisions within the Canterbury earthquake model. These are shown in Appendix J.

5.3 Claims handling expenses (CHE)

5.3.1 Canterbury earthquakes

The Claims Handling Expenses ('CHE') related to settling Canterbury earthquake claims will continue for as long as there are outstanding claims.

The current EQC budget projects costs to 30 June 2020 although we expect costs to be incurred beyond this point. The reopened claims are continuing at a high rate and may take some years to resolve. This will affect the actual CHE costs.

The expected ultimate CHE has been increased by $58 million after allowing for the impact of inflation.

5.3.2 CHE rates

The table below illustrates the estimated ultimate CHE for the Canterbury earthquakes and also illustrates this as a percentage of the gross ultimate claims costs.

Canterbury earthquakes only
CHE - 30 June 2019 valuation

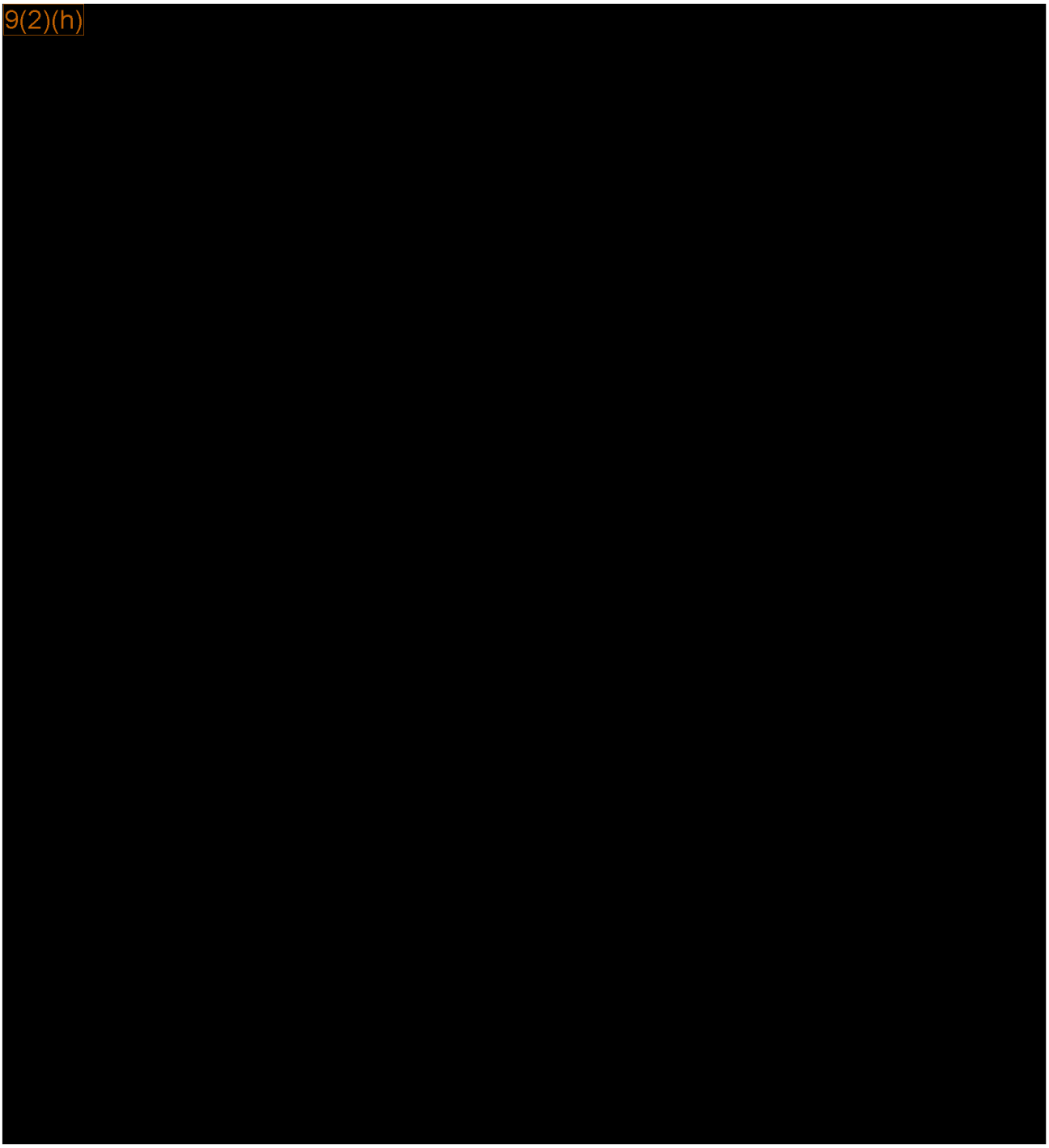
	EQ1	EQ2	EQ3	EQ4	AS	Total
Total CHE $m	559.8	934.5	139.6	42.4	54.2	1,730.5
CHE % of gross ultimate excl CHE	17.5%	16.3%	32.6%	35.0%	26.7%	17.9%
CHE % of gross ultimate incl CHE	14.9%	14.1%	24.6%	25.9%	21.0%	15.2%

The apportionment of CHE to events is based on expected ultimate costs and claim numbers for each event. This results in a 'flatter' spread of CHE costs than the overall claim costs, resulting in a wide range of CHE percentages.

5.4 Breakdown of properties with land exposure

9(2)(h) [redacted]

9(2)(h)



5.5 Scenario Analysis

9(2)(h), 9(2)(j)

9(2)(h), 9(2)(j)

[redacted]

5.6 Scenario probabilities

9(2)(h), 9(2)(j)

[redacted]

5.6.1 Scenario summaries

The table below summarises the assumed distribution of potential outcomes.

9(2)(j)

5.6.2 *Scenario results*

9(2)(h)

Canterbury land litigation scenarios
As at 30 June 2019

9(2)(h)

5.7 Breakdown of land claims costs

The table below shows the decomposition of the ultimate land claims costs both, with and without allowance for the weighted litigation scenarios described above.

We have also illustrated the net impact of the litigation allowance on the risk margin.

9(2)(h)

[redacted]

The central estimate ultimate cost of land claims is $600 million. 9(2)(h)

[redacted]

5.8 Movement since December 2018

5.8.1 Movement in land claims

The table below shows a summary of how the estimated cost of Canterbury land claims has changed since the valuation as at 31 December 2018. A more detailed movement analysis is provided in Appendix I.

Canterbury land liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
9(2)(h), 9(2)(j)	[redacted]		
Total	511,922	87,900	599,821

Note: All figures are gross of reinsurance, undiscounted and exclude CHE

The movement analysis shows that:

- The estimated ultimate claims as at 31 December 2018 were $601 million
- If we apply the same methodology and assumptions to the new data at 31 December 2018 then the estimated ultimate claims would reduce by $1 million to $600 million. This is due to a number of land exposures having been closed since December 2018 incurring lower costs than we had previously allowed for.
- Allowing for some minor changes to the assumptions based on recent land payments reduces the estimated ultimate claims by a further $0.2 million to $599.8 million.

5.8.2 *Movement in building claims*

The table below shows how the estimated cost of Canterbury building claims has changed since the valuation as at 31 December 2018.

Canterbury building liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 31 December 2018			
9(2)(j)	[redacted]		
Total	7,898,976	522,612	8,421,588
Impact of adjusting for actual experience over the period			
9(2)(j)	[redacted]		
Total		(6,971)	(6,971)
Position as at 30 June 2019 using previous methodology and assumptions			
9(2)(j)	[redacted]		
Total	7,960,064	416,171	8,376,236
Impact of adjusting assumptions in line with experience			
9(2)(j)	[redacted]		
Total		184,853	184,853
Position as at 30 June 2019			
9(2)(j)	[redacted]		
Total	7,998,446	601,025	8,599,470

Note: All figures are gross of reinsurance, undiscounted and exclude CHE

5.8.3 *Movement in CHE*

The table below shows how the estimated cost of Canterbury CHE has changed since the valuation as at 31 December 2018.

Canterbury CHE liabilities
Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 31 December 2018			
Reinsurable	1,557,292	104,339	
Non reinsurable	7,177	0	
Total	1,564,469	104,339	1,668,808
Position as at Jun-2019 using rolled forward actual payments			
Reinsurable	1,587,746	73,885	
Non reinsurable	8,708	(1,531)	
Total	1,596,454	72,354	1,668,808
Position as at 30 June 2019			
Reinsurable	1,587,746	126,689	
Non reinsurable	8,708	0	
Total	1,596,454	126,689	1,723,143

Note: All figures are gross of reinsurance, undiscounted and exclude CHE

The increase in the ultimate CHE is due to the lengthening of the expected programme to manage the increased expected number of reopened claims.

The negative future non-reinsurance figure of $1,531k is due to the fact that no future non-reinsurable CHE if projected.

That is, over the period to 30 June 2019, an additional $1.531 million of non-reinsurable expenses were paid. The rolled forward position adds this amount onto the paid to date figure and subtracts from the estimated future figure.

6 Kaikoura earthquake claim liabilities

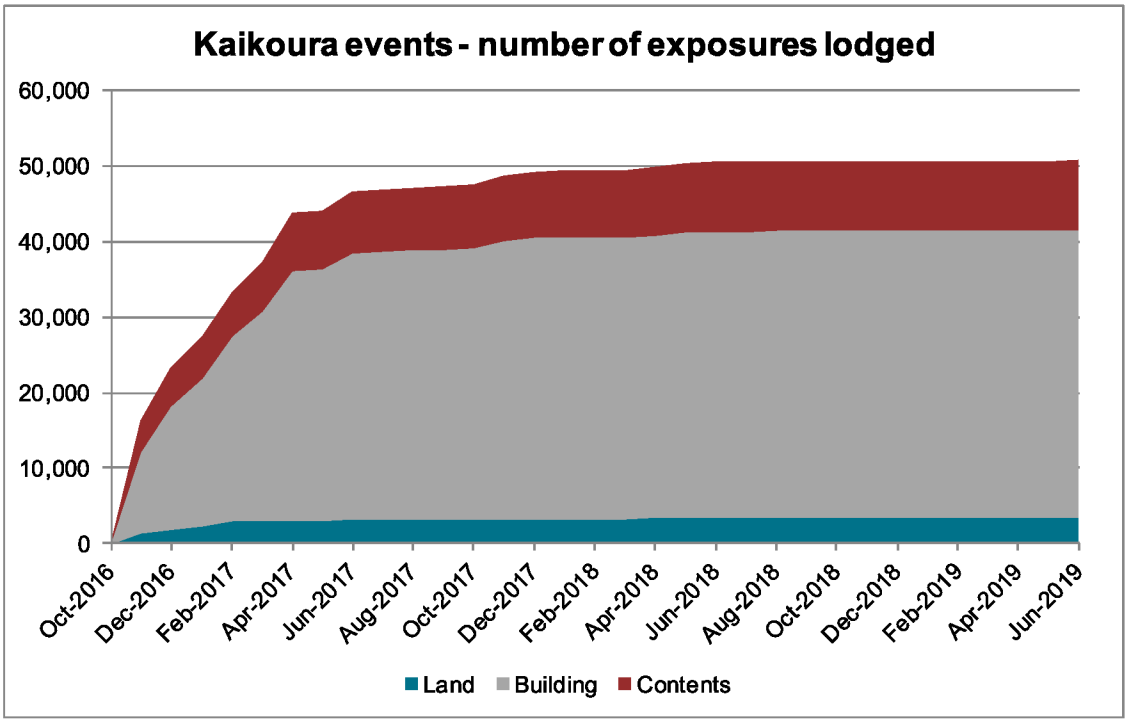
With the implementation of the MoU there will necessarily be a lag in claims information finding its way into EQC's claim management system. This has the effect of delaying any informational changes to the Kaikoura earthquake model.

The results in this section have been derived partly based on the claim statuses in CMS and/or KDMS. For the Kaikoura event, just under 3,000 land, building and contents exposures remain open in KDMS as at 30 June 2019. Consequently, there has been a significant degree of judgement applied in regard to the likely outcome of these open exposures.

6.1 Experience to date

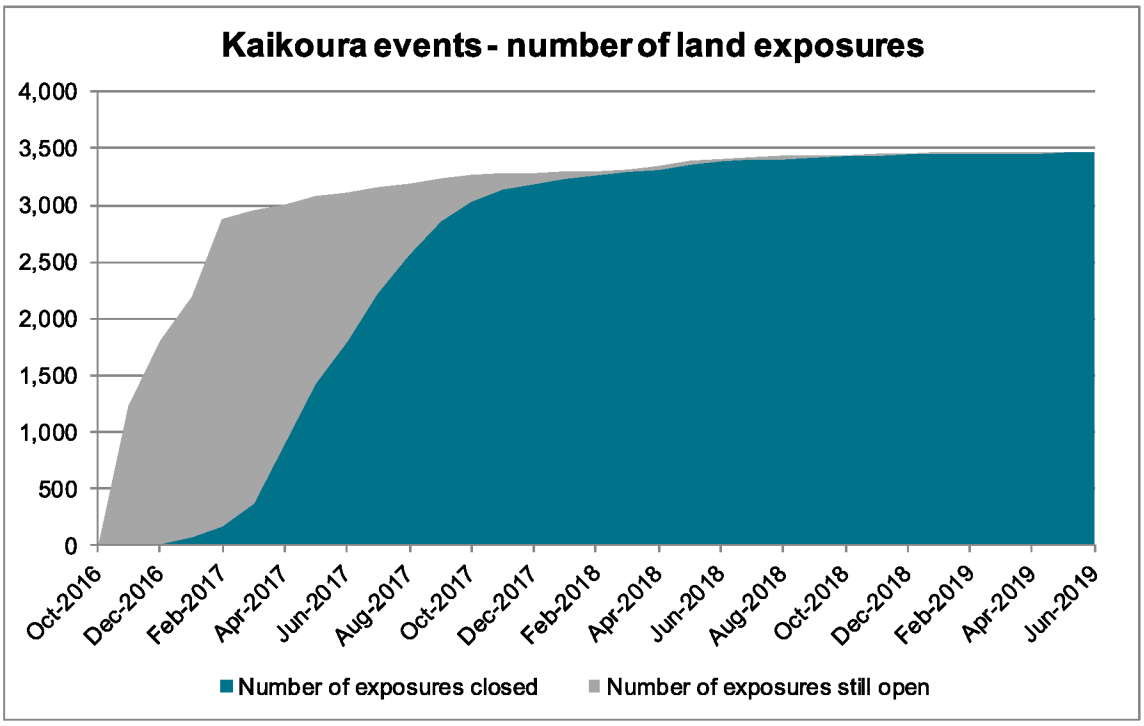
6.1.1 Exposure statuses

The chart below illustrates the number of exposures lodged to date in respect of the Kaikoura events.



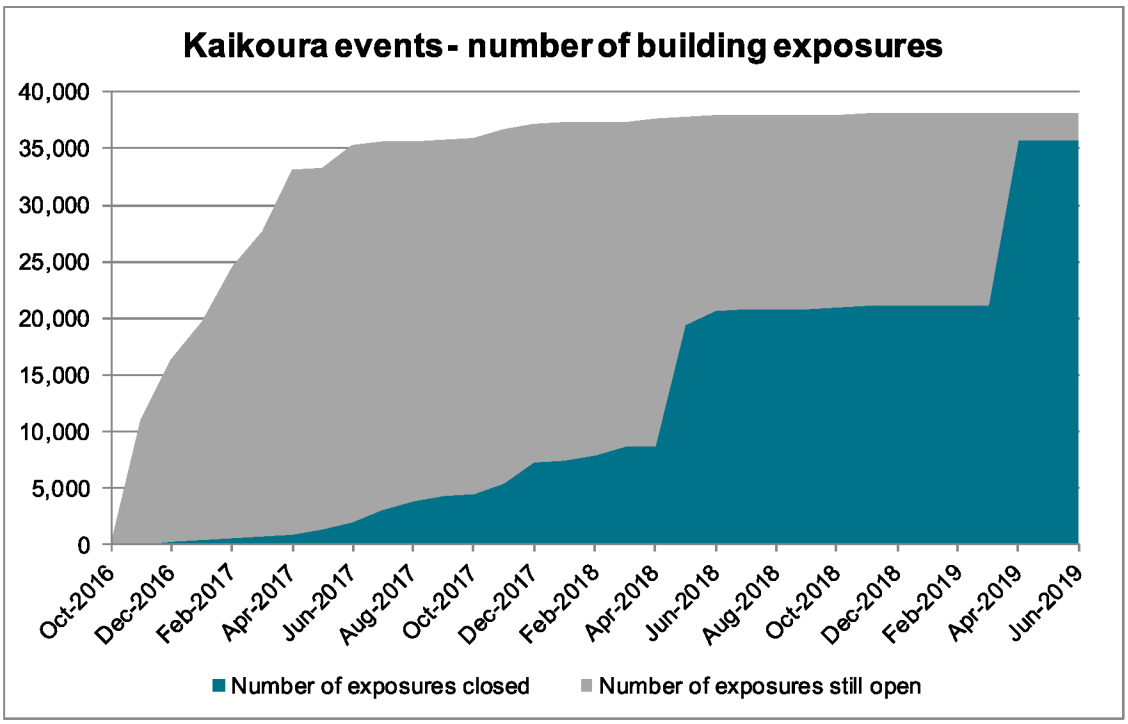
Whilst the majority of exposures were opened in CMS within the first 90 days after the events, there were still a significant number opened after this. This can be due to delays between the claimant notifying the insurer/EQC and EQC opening the relevant exposure on the claim. Very few exposures have been opened in the last 12 months.

The following chart drills down into the land exposures.



As all land exposures are managed by EQC, there has been a clear and consistent pattern in terms of closing land exposures.

A very different picture is presented in regard to building exposures (below), based on CMS and KDMS data.



The MoU, combined with various IT issues, has created some challenges for EQC in identifying whether or not a building exposure is closed. There have been two significant drives to close off open exposures in EQC's systems: in May 2018 and April 2019. A much smaller number of building exposures remain open in KDMS, although the number is still significantly greater than that reported by insurers. We note, however, that a claim may be 'closed' to an insurer – meaning that the customer has received payment – but still 'open' to EQC, in that an invoice has not yet been received from the insurer.

6.1.2 *Costs incurred to date*

The table below summarises the claims cost experience of Kaikoura to date.

Kaikoura experience to 30 June 2019

	Land claims	Contents claims	Insurer managed non-MUB building claims	EQC managed non-MUB building claims	WGN MUB building claims	Total
Number of exposures						
Closed - zero	2,606	4,113	11,117	1,677	329	19,842
Closed - non-zero	864	4,551	21,279	1,139	187	28,020
Open - zero	0	400	1,625	26	57	2,108
Open non-zero	0	116	622	0	19	757
Total	3,470	9,180	34,643	2,842	592	50,727
Proportion non-zero (to date)						
Closed exposures	25%	53%	66%	40%	36%	59%
Open exposures	-	22%	28%	0%	25%	26%
Total	25%	51%	63%	40%	35%	57%
Paid to date						
Closed exposures	$9.6m	$15.2m	$391.9m	$19.3m	$31.3m	$467.3m
Open exposures	$0.0m	$0.5m	$20.1m	$0.0m	$5.5m	$26.1m
No exposure	$0.0m	$0.1m	$0.2m	$0.0m	$0.0m	$0.3m
Accruals & adjustments	$0.0m	$0.0m	$5.4m	$0.0m	$0.0m	$5.4m
Total	$9.6m	$15.8m	$417.6m	$19.3m	$36.8m	$499.1m
Average paid per non-zero exposure						
Closed exposures	$11.1k	$3.3k	$18.4k	$17.0k	$167.5k	$16.7k
Open exposures	-	$4.4k	$32.3k	-	$286.9k	$34.4k
Total	$11.1k	$3.4k	$19.1k	$17.0k	$178.5k	$17.3k
Estimated number of units						
Closed - zero					2,431	
Closed - non-zero*					3,664	
Open - zero					509	
Open non-zero*					786	
					7,390	
Average paid per unit with non-zero building paid						
Closed exposures					$8.5k	
Open exposures					$6.9k	
Total					$8.3k	

*Where there is a non-zero paid for the building (some units may have zero paid)

The categorisation of the table above is a function of the methodology employed (see Appendix C).

6.2 Valuation results – Kaikoura earthquake

6.2.1 *Estimated claims costs – Kaikoura earthquake*

The results from our Kaikoura model are shown below, along with comparatives from the December 2018 valuation.

Central estimate undiscounted excl CHE

	Paid to date $m	Future $m	Ultimate $m	c.f. Dec-18 $m
Model components				
Insurer managed non-MUB building claims	412.3	30.8	443.1	420.7
Land claims	9.6	-	9.6	9.6
Contents claims	15.8	0.7	16.4	15.9
EQC managed non-MUB building claims	19.3	0.5	19.8	18.8
WGN MUB building claims	36.8	7.3	44.1	43.7
Total	493.7	39.3	533.0	508.5
Reconciliation items*				
Land	-		-	-
Building	1.8		1.8	3.5
Contents	-		-	(2.6)
Total	1.8	-	1.8	1.0
Accruals**				
Land	-		-	-
Building	3.6		3.6	11.7
Contents	-		-	-
Total	3.6	-	3.6	11.7
Total				
Land	9.6	-	9.6	9.6
Building	473.7	38.6	512.4	498.4
Contents	15.8	0.7	16.4	13.3
Total	499.1	39.3	538.4	521.2

*To match the trial balance
**For insurer payments not yet reimbursed by EQC

The addition of CHE brings the estimated ultimate to $648 million.

6.2.2 *Areas of judgement*

The two most significant areas of judgement in regard to the estimated claims from the Kaikoura event both relate to the insurer-managed non-MUB claims:

- The future cost of claims which remain open in CMS (many of which have already received a payment).
- The number and cost of claims which may reopen.

There is also a notable amount of judgement involved in the settlement of Wellington multi-unit building claims, although the number of these is much smaller and therefore the potential for large numbers of reopened claims is limited.

6.2.3 *Drivers of results*

Key drivers of the result are:

- The likelihood that a currently open exposure will close with/without further payment.
- The average cost where a claim does incur further payment.
- The likelihood with which a claim will reopen.

6.3 Claims handling expenses (CHE)

6.3.1 *CHE rates*

The table below illustrates the estimated ultimate CHE for the Kaikoura earthquake and also illustrates this as a percent of the gross ultimate claims costs.

Kaikoura earthquakes only
CHE - 30 June 2019 valuation

	KEQ
Total CHE $m	110.0
CHE % of gross ultimate excl CHE	20.4%
CHE % of gross ultimate incl CHE	17.0%

6.4 Scenario analysis

The Kaikoura valuation model uses a range of assumptions to allow for the possibility that a claim might reopen (the assumptions vary over time and according to whether or not there has been anything paid on the claim to date). The assumptions used for this valuation have been based on the assumptions used for the December 2018 valuation but have been rolled forward and rebased to apply for an additional six months. The reopened allowance now equates to around 4% closed claims to date reopening at a total cost of around $19.1 million. The table below shows the impact of varying the reopen assumptions to achieve different reopened rates.

KEQ reopen rate scenario testing

	Central estimate undiscounted excl CHE					
	Future cost			Ultimate cost		
Scenario	$m	Δ $m	Δ %	$m	Δ $m	Δ %
Base (future reopens 4%)	39.3			538.4		
No future reopens	20.2	(19.1)	-49%	519.3	(19.1)	-3%
Future reopens 2%	30.9	(8.4)	-21%	530.0	(8.4)	-2%
Future reopens 10%	73.4	34.1	87%	572.5	34.1	6%
Future reopens 20%	126.7	87.4	222%	625.7	87.4	16%

Our baseline assumption is that the central estimate undiscounted future costs of claims is $39.3 million. If the eventual reopen rate were to reduce to 2%, we would expect the future claims cost to be $30.9 million, a 21% reduction.

6.5 Movement since December 2018

The table below shows how the estimated cost of claims from the Kaikoura event has changed since the valuation as at 31 December 2018.

Kaikoura liabilities
Movement from 31 December 2018 to 30 June 2019

	Paid to date* $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 31 December 2018			
Insurer managed non-MUB building claims	407,665	28,256	435,921
Land claims	9,549	16	9,565
Contents claims	12,704	587	13,291
EQC managed non-MUB building claims	18,202	551	18,753
WGN MUB building claims	35,605	8,077	43,683
Total	483,724	37,487	521,212
Impact of adjusting for actual experience over the period			
Insurer managed non-MUB building claims	9,975	(24,201)	(14,227)
Land claims	30	(16)	15
Contents claims	3,057	(57)	3,000
EQC managed non-MUB building claims	1,135	(42)	1,093
WGN MUB building claims	1,163	(7,721)	(6,558)
Total	15,360	(32,037)	(16,677)
Position as at 30 June 2019 using previous methodology and assumptions			
Insurer managed non-MUB building claims	417,640	4,054	421,694
Land claims	9,579	0	9,579
Contents claims	15,761	530	16,291
EQC managed non-MUB building claims	19,337	509	19,846
WGN MUB building claims	36,768	356	37,125
Total	499,085	5,450	504,535
Impact of updating methodology and assumptions			
Insurer managed non-MUB building claims		26,754	
Land claims		0	
Contents claims		153	
EQC managed non-MUB building claims		(10)	
WGN MUB building claims		6,956	
Total		33,853	
Expected position as at Jun-2019			
Insurer managed non-MUB building claims	417,640	30,809	448,448
Land claims	9,579	0	9,579
Contents claims	15,761	684	16,444
EQC managed non-MUB building claims	19,337	499	19,836
WGN MUB building claims	36,768	7,312	44,080
Total	499,085	39,303	538,388

Note: All figures are gross of reinsurance, undiscounted and exclude CHE
*Includes amounts paid by insurers and accrued but not yet paid by EQC

The movement analysis shows that:

- The estimated ultimate claims (excluding CHE) as at 31 December 2018 were $521 million

- If we apply the same methodology and assumptions to the new data at 30 June 2019 then the estimated ultimate claims would decrease by $17 million to $505 million. This is mostly because there were a very large number of claims closed in April 2019 and a simple roll forward of the previous model does not capture the likelihood that the remaining open claims are more likely to settle for some cost.
- Updating the assumptions to extend the payment pattern out for an additional six months as well as allowing for a greater proportion of the remaining claims to settle at some cost increases the estimated ultimate claims by $34 million to $538 million.

6.6 Comparison to case estimates

There is limited case estimate information available for insurer-managed Kaikoura claims. Whilst there have been attempts to capture this on a regular basis the data from insurers has been inconsistent. This makes it difficult for us to incorporate insurer case estimate information into the valuation in a systemic manner. Nevertheless, we have compared the valuation results for some sub-components to the case estimates, where available, as a sense check.

The table below compares the insurer case estimates to the valuation results for insurer-managed non-MUB building claims very recently advised to us.

Insurer managed non-MUB building claims	$m
Estimated future cost to EQC*	30.8
Of which reopen allowance	19.1
Of which future cost of open/new claims	11.7
Insurer case estimates	6.2
Effective IBNR/IBNER allowance	5.5

*Does not include amounts already accrued by EQC

- Our estimated future cost of claims to EQC is $30.8 million. This is comprised of $19.1 million in respect of reopened claims and $11.7 million for claims currently open. This does not include allowance for claims invoiced to EQC but not yet reimbursed, nor claims paid by insurers but not yet invoiced to EQC (to the extent that these amounts have been accrued separately by EQC).
- Insurer case estimates total $6.2 million. That is, insurers individual claim estimates (for the EQC component of each claim) total $6.2 million for currently open claims.
- This implies that the valuation includes an additional allowance of $5.5 million ($11.7m less $6.2m) for payments on open claims in excess of that estimated by insurers.

The table below compares the insurer case estimates to the valuation results MUB claims.

WGN MUB building claims	$m
Estimated future cost to EQC	7.3
Of which insurer managed MUBs (approx)	7.2
Insurer case estimates	5.2
Effective IBNR/IBNER allowance	2.0

- Our estimated future cost to EQC of MUB claims is $7.3 million, $7.2 million of which relates to insurer-managed claims.

The insurer case estimates add up to $5.2 million, implying that there is a $2.0 million allowance in the valuation for payments in excess of insurers' estimates.

7 BAU claim liabilities

The central estimate outstanding claims (excluding CHE) for BAU events is $4.4 million as at 30 June 2019. The tables below summarise the quantum as at the valuation date, split by current year and prior period (PP) events i.e. losses incurred prior to 30 June 2018.

BAU outstanding claims as at 30 June 2019
Undiscounted central estimate excluding CHE

	Land $000s	Building $000s	Contents $000s	Total $000s
BAU				
Open claims	1,304	596	0	1,901
IBNR	897	708	5	1,610
Total	2,202	1,304	5	3,511
BAU PP				
Open claims	629	299	(0)	928
IBNR	0	0	0	0
Total	629	299	(0)	928
All loss periods				
Open claims	1,933	896	(0)	2,829
IBNR	897	708	5	1,610
Total	2,830	1,604	5	4,439

7.1 CHE rates

The provision for BAU Claims Handling Expenses is $4.9 million. This includes:

- The marginal costs of managing the BAU claims.
- A contribution to overhead costs that must be maintained to manage BAU claims.

The overhead component is relatively large, compared to the marginal costs and so the overall CHE amount will be relatively constant each year. This will mean that where the BAU outstanding claims amount is low, the CHE as a percentage of the outstanding claims will appear unduly large.

The table below illustrates the estimated outstanding CHE for BAU claims and also illustrates this as a percent of the net central outstanding claims costs. Note that while the measurement for this is outstanding costs (rather than ultimate costs for Canterbury and Kaikoura), the marginal CHE % is comparable to the percentages shown for the Canterbury and Kaikoura events.

BAU claims only
CHE - 30 June 2019 valuation

	BAU
CHE provision $m	
Marginal	$0.6m
Fixed	$4.3m
CHE % of net OS claims	
Marginal	13.3%
Fixed	95.9%

7.2 Large events

Over the past several years, there have been a number of significant BAU events. These are shown in the table below.

It is worth noting that the reliability of the figures is heavily dependent on the correct classification of each BAU claim to the correct event.

BAU results by event as at 30 June 2019

	Period	Land	Building	Contents	Total
Paid to date ($000s)					
Earthquake201906	BAU	0	0	0	0
Landslip/Storm/Flood201904	BAU	58	8	0	67
Earthquake201904	BAU	0	17	0	17
Landslip/Storm/Flood201905	BAU	0	0	0	0
Earthquake201905	BAU	0	0	0	0
Landslip/Storm/Flood201906	BAU	0	0	0	0
Christchurch 15km E, 15km, 5.7	BAU PP	384	50,476	1,730	52,590
Landslip/Storm/Flood201707	BAU PP	10,558	3,286	67	13,911
April 2017 Landslip/Storm/Flood	BAU PP	18,416	4,189	52	22,656
Landslip/Storm/Flood201812	BAU	1,801	456	0	2,258
Undiscounted central estimate excl CHE ($000s)					
Earthquake201906	BAU	1	179	0	180
Landslip/Storm/Flood201904	BAU	537	222	1	759
Earthquake201904	BAU	2	89	0	91
Landslip/Storm/Flood201905	BAU	249	82	0	331
Earthquake201905	BAU	0	71	0	71
Landslip/Storm/Flood201906	BAU	229	53	2	284
Christchurch 15km E, 15km, 5.7	BAU PP	0	54	0	54
Landslip/Storm/Flood201707	BAU PP	74	39	0	113
April 2017 Landslip/Storm/Flood	BAU PP	126	69	0	195
Landslip/Storm/Flood201812	BAU	276	118	0	394
Other		1,336	627	2	1,966
Total		2,830	1,604	5	4,439
Estimated ultimate ($000s)					
Earthquake201906	BAU	1	179	0	180
Landslip/Storm/Flood201904	BAU	595	230	1	826
Earthquake201904	BAU	2	107	0	109
Landslip/Storm/Flood201905	BAU	249	82	0	331
Earthquake201905	BAU	0	71	0	71
Landslip/Storm/Flood201906	BAU	229	53	2	284
Christchurch 15km E, 15km, 5.7	BAU PP	384	50,531	1,730	52,644
Landslip/Storm/Flood201707	BAU PP	10,632	3,325	67	14,025
April 2017 Landslip/Storm/Flood	BAU PP	18,542	4,258	52	22,851
Landslip/Storm/Flood201812	BAU	2,078	574	0	2,652

The table above shows that the outstanding claims liability for BAU is spread across a number of small events. Very little remains open in relation to the 14 February 2016 Christchurch earthquake.

Note that the paid to date and estimated ultimate figures are only shown for named events which have open claims.

7.3 Movement since December 2018

The table below shows how the estimates for BAU claims have changed since December 2018. A more detailed movement analysis is provided in Appendix I.

BAU outstanding claims liabilities
Movement from 31 December 2018 to 30 June 2019

	Claims incurred up to Dec-2018 $000s	Claims incurred after Dec-2018 $000s	All claims $000s
Central estimate outstanding claims as at 31 December 2018	9,342		
Less: expected payments between Dec-2018 and Jun-2019	4,124		
Expected central estimate as at Jun-2019	5,218		
Less: actual minus expected payments between Dec-2018 and Jun-2019	4,300		
Central est as at Jun-2019 rolled forward using actual payments	918		
Adjust for actual experience being different to expected	2,235		
Plus: outstanding for claims incurred after Dec-2018		1,286	
Central est OSC as at Jun-2019 using previous assumptions	3,153	1,286	4,439
Adjust for changes to assumptions	0	0	0
Central estimate outstanding claims as at 30 June 2019	3,153	1,286	4,439

Note: All figures are undiscounted and exclude CHE

The movement analysis shows that:

- The central estimate of outstanding BAU claims (excluding CHE) as at 31 December 2018 was $9.3 million.
- The projected payments over the following six month period were $4.1 million. Therefore the expected outstanding claims at 30 June 2019 (for losses prior to December 2018) was $5.2 million.
- Over the six month period to June 2019 the actual payments were $4.3 million higher than expected. Adjusting for the difference in actual vs. expected payments bring the outstanding claims for prior periods to $0.9 million.
- If we were to apply the same methodology and assumptions at 30 June 2019 as the previous valuation, then the outstanding claims (in respect of prior period events) would be $2.2 million higher at $3.1 million.
- If we add to this a further $1.3 million for claims incurred after 31 December 2018 then then we would have an outstanding claims liability of $4.4 million at 30 June 2019 (using the same assumptions as at December 2018).
- We have elected to use the same BAU assumptions again for this valuation, therefore there is no adjustment due to changes in assumptions.

8 Overall results

8.1 Claims incurred

The gross incurred claims costs for all Canterbury and Kaikoura EQ events, incurred to 30 June 2019, include:

- Claims costs paid to date
- Claims costs expected to be paid in future (the OS claims liability).

Claims costs paid to date are known, but those to be paid in the future are unknown and so must be estimated. The approach that we have taken is to estimate the ultimate incurred claims costs and then deduct payments made to 30 June 2019 in order to determine the estimated OS claims liability.

The ultimate incurred claims costs are calculated in respect of Canterbury and Kaikoura earthquake events only.

It is not useful (or practical) to include ultimate incurred claims costs from BAU events as this would include a vast number of smaller events which may have been materially settled. This makes comparisons of BAU claims costs between valuations meaningless.

No risk margins have been calculated and no discounting has been applied to the estimated ultimate incurred claims costs.

The outstanding claims liabilities are in respect of all outstanding EQC claims (Canterbury and Kaikoura earthquakes plus BAU) and are discounted for the time value of money and include risk margins at the 85th percentile.

8.2 All outstanding claims

8.2.1 Ultimate and outstanding claims liabilities – all claims

The table below summarises the key components of the gross ultimate claims costs and the derivation of the outstanding claims liabilities ('OSCL') as at 30 June 2019

The net discounted OSCL at a probability of adequacy of 85% is $524 m. The largest component of the liabilities is in respect of the EQ2 event, followed by the EQ1 event.

All EQC claims
Gross ultimate claims costs to net outstanding claims liabilities - 30 June 2019 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	BAU $m	KEQ $m	Total $m
Gross ultimate claims excl CHE, undisc - central es	3,208	5,717	428	121	203		538	10,215
Claims handling expenses (CHE)	560	934	140	42	54		110	1,841
Gross ult claims incl CHE, undisc - central est	3,768	6,651	568	164	258	n.a.	648	12,056
Reinsurance recoveries, undiscounted - central est	(2,153)	(2,478)	0	0	0	-	0	(4,631)
Net ult inc claims incl CHE, undisc - central est	1,614	4,174	568	164	258	n.a.	648	7,425
Net claims costs paid to date	9(2)(j)						(499)	(5,448)
CHE paid to date							(105)	(1,701)
Discounting						(0)	(0)	(3)
Net OS including CHE, disc - central est						9	44	282
Net risk margin, diversified, 85% PoA						2	17	242
Net OS including CHE, disc - 85% PoA						11	62	524

8.2.2 Movement in net outstanding claims liabilities – all claims

The table below shows the movement in the net outstanding claims liabilities since 31 December 2018.

The net OSCL (85% probability of adequacy, discounted) has decreased from $0.563b as at 31 December 2018 to $0.524b as at 30 June 2019.

The principal drivers of the change in total claims liabilities in decreasing order of impact are:

- Actuarial determination; this has increased by $96m on a net of reinsurance basis.
  - +$70m as a result of the Canterbury earthquakes.
  - +$17m as a result of the Kaikoura earthquake.
  - +$4m as a result of BAU events.
- Claim payments; $109m of net payments since 31 December 2018.
- Risk margin has decreased by $24m.
- Discounting has decreased by $1m.

The following table provides a reconciliation and explanation of the movement in outstanding claims liabilities, by event.

All EQC claims

Reconciliation of change in outstanding claims liability from 31 December 2018 ILVR

	Prior Periods (to 31 Dec 2018)							Current		All Periods			
	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	BAU $m	Subtotal $m	KEQ	BAU $m	CEQ $m	KEQ	BAU $m	Total $m
Net OSCL (85% PoA, discounted) as at 31 December 2018	[redacted]				9(2)(j)	7	n.a	64	11	481	64	18	563
Remove net risk margin (85% PoA)						(2)	n.a	(19)	(3)	(242)	(19)	(4)	(266)
Net OSCL (central estimate, discounted) as at 31 December 2018						5	245	44	9	239	44	14	298
Remove discounting						0	4	0	0	4	0	0	4
Net OSCL (central estimate, undiscounted) as at 31 December 201						5	249	45	9	243	45	14	302
Estimated net paid over period						(4)	(86)	(17)	(6)	(83)	(17)	(9)	(109)
Change in net actuarial determination						0	115	17	4	70	17	4	92
Net OSCL (central estimate, undiscounted) as at 30 Jun 2019						2	278	45	7	231	45	9	285
Add discounting						(0)	(3)	(0)	(0)	(2)	(0)	(0)	(3)
Net OSCL (central estimate, discounted) as at 30 June 2019						2	230	44	7	229	44	9	282
Net diversified risk margin (85% PoA, discounted)						0	n.a	17	2	223	17	2	242
Net OSCL (85% PoA, discounted) as at 30 June 2019						2	n.a	62	9	451	62	11	524

8.3 Premium liabilities

The table below summarises the key results of the estimation of EQC's premium liabilities as at 30 June 2019. The premium liabilities will be used in the liability adequacy test.

The total value at 75% probability of adequacy is $237 million. This is greater than the $207 million unearned premium reserve. This means that an additional unexpired risk reserve will be required in the accounts as at 30 June 2019.

The largest component ($115 million) relates to projected costs of future claims arising from major events (other than those related to Canterbury earthquakes) during the period of the runoff of risks on the books as at 30 June 2019. These claims are modelled by Minerva.

The next largest components relate to the enhanced seismicity following the Canterbury earthquakes ($68 million) and Kaikoura earthquake ($41 million).

The other claims costs relate to future BAU (small) claims and the associated reinsurance and administration expenses.

The cost to EQC of reinsurance has increased considerably for cover negotiated since the Canterbury events. The future reinsurance costs for unexpired risks are $90 million.

Estimated Premium Liabilities - 30 June 2019

	BAU	Minerva	Cant EQ	KEQ	Total
	$m	$m	$m	$m	$m
Unearned premium reserve					207
Cost of future claims from unexpired risks					
Gross claims, undiscounted - central estimate	6	51	52	35	145
Administration and reinsurance costs for unexpired risks					
Claims administration expenses	2	5	5	4	16
Policy (non-claims) admin expenses for unexpired	5	0	0	0	5
Future reinsurance costs for unexpired risks	0	73	14	4	90
Reinsurance recoveries					
Reinsurance recoveries, undiscounted	0	(13)	(3)	(1)	(17)
Net premium liabilities, undiscounted - central estimate	13	116	69	42	239
Discounting	(0)	(1)	(1)	(1)	(2)
Net premium liabilities, discounted - central estimate	13	115	68	41	237
Diversified risk margin, discounted - 75% PoA					0
Net premium liabilities, discounted - 75% PoA					237

Note that the reason that the risk margin is zero is because the distribution of potential claims is very skewed. The central estimate is the average of all possible outcomes; this includes some very low probability but high severity events. As a consequence, the central estimate (mean) outcome is larger (slightly) than the 75th percentile.

The outcome of the liability adequacy test is often taken as a proxy for the adequacy of the levies (premium rates) that are charged. Consequently, the outcome above suggests that the current levy rates are less than sufficient to cover the expected costs of claims. However:

- The expected claims costs are currently inflated due to the heightened seismic conditions in Canterbury and Kaikoura.
- The central estimate claims costs may not be the best decision-making tool for setting levy rates for such a highly-skewed distribution.
- EQC's considerations differ from insurers and will include such factors as the Crown's appetite for managing earthquake risk including pre and post-funding.

8.3.1 Material implications of the results

As the net discounted premium liability at 75% probability of adequacy ($237 million) exceeds the unearned premium reserve ($207 million) it will be necessary to hold an additional unexpired risk reserve.

8.3.2 Quality control processes

The valuation was subject to internal peer review and the results were compared to those from previous ILVRs.

Actual vs. expected experience

The current data does not support an exact analysis of actual claims experience against that expected from the 31 December 2018 premium liabilities calculations. This is because there is no way of identifying incurred claims costs arising from unexpired risks as at the previous valuation. However, it is still interesting to compare the estimated cost of claims incurred in the current period with the undiscounted central estimate future claims costs from 31 December 2018.

8.4 Quality control processes

The valuation was subject to internal peer review. In addition, all results were compared to those of the previous valuations.

9 Report description

9.1 Addressee

This report is addressed to Sid Miller, Chief Executive of the Earthquake Commission ('EQC').

9.2 Report commissioned by

This report was commissioned by Chris Chainey, EQC's Chief Financial Officer.

9.3 Purpose

This report was commissioned to provide information with regards to:

- EQC's insurance liabilities and reinsurance recoveries for use in the financial statements as at 30 June 2019.
- The development of EQC's Canterbury earthquakes claims costs since 31 December 2018.
- The development of EQC's Kaikoura earthquakes claims costs since 31 December 2018.

9.4 Scope

9.4.1 Insurance liabilities components

The insurance liabilities include:

- Outstanding (OS) claims liabilities – which relate to the future direct and indirect claims costs and reinsurance recoveries for claims incurred up to 30 June 2019.
- Premium liabilities – which relate to the future net claims costs and administration and reinsurance expenses for future claims arising from unexpired risks as at 30 June 2019.

The liabilities calculated include a risk margin and are discounted for the time value of money.

Premium liabilities are not included directly on the balance sheet but are used for the Liability Adequacy Test of the unearned premium liability provision.

A more detailed description of the nature and components of the insurance liabilities is set out in Section 8.

9.4.2 EQC Act 1993

The scope of this report includes all claims costs and associated expenses required to be paid to settle legitimate insurance claims as defined in the EQC Act 1993 or as required through Ministerial Direction. These include costs and potential liabilities arising in connection with claims brought by IAG and Tower in connection with the settlement of land insurance claims.

Liabilities and Costs which may arise from outside the Act, such as damages for tortious negligence, are excluded from this report.

9.5 Effective valuation date

The effective date of the valuation is 30 June 2019.

9.6 Materiality

The level of materiality has been set by EQC Finance as part of its reporting requirements.

9.7 This report

Although this report includes considerable detail on all aspects of the actuarial investigations, in order to keep it to a manageable size a lot of the information has been summarised. Further details regarding the data, methods, assumptions, calculations and results underlying this report are available from the authors on request.

Unless otherwise indicated, all amounts in this report are stated in New Zealand dollars and are net of GST (i.e. they exclude GST).

9.8 Previous valuations

Melville Jessup Weaver ('MJW') has prepared valuations for EQC at six monthly intervals since 2010, when the Canterbury Earthquake Sequence began.

The most recent valuation for EQC, which is referenced in this report, is the Insurance Liability Valuation Report ('ILVR') as at 31 December 2018 (dated 25 March 2019).

9.9 Definitions of technical terms

Whilst we have tried to avoid unnecessary insurance jargon where possible, to help understand the technical terms which were used in this report we have included a glossary in Appendix L.

9.10 Event groups

9.10.1 Canterbury earthquake claim events

A series of damaging earthquakes has affected the Canterbury region in general, and the city of Christchurch in particular, since the first event on 4 September 2010. These earthquakes have resulted in injury, loss of life, and billions of dollars of damage to infrastructure, commercial property and residential buildings.

For the purposes of valuing the outstanding claims, the Canterbury earthquake claims have been split into the following event groups:

- EQ1 – 4 September 2010 event – Darfield event
- EQ2 – 22 February 2011 event – Lyttelton event
- EQ3 – 13 June 2011 event (including 21 June 2011 event)* - Sumner event
- EQ4 – 23 December 2011 event

- Aftershocks ('AS') – the ten other events shown on the Business Information Unit ('BIU') Daily Report as well as 'Other Canterbury claims' included in the Daily Report totals. The logic used to identify these claims is based on the claim's Territorial Local Authority and loss cause and is consistent with the BIU's definition It does not include claims from the 14 February 2016 event.

*EQC's reinsurance programme covers all incurred losses arising within 720 hours from a declared event. Consequently, losses arising from the 21 June 2011 aftershock are included in the EQ3 event definition.

9.10.2 Kaikoura earthquake claim events

At 12:02am on 14 November 2016, an earthquake occurred near Culverden (approximately 100km north of Christchurch). This caused other faults to rupture in a domino effect, and other earthquakes occurred in a North-East direction towards Seddon. This earthquake event group has been named the Kaikoura earthquake. For the purposes of this report, it has the three-letter code KEQ.

9.10.3 Other claim events

Other outstanding EQC claims, including those arising from landslips, hydrothermal events, and from earthquakes outside Canterbury are categorised as 'BAU' (Business As Usual) claims. This includes the 14 February 2016 earthquake event.

9.10.4 Components of premium liabilities

For the purposes of valuing the premium liabilities, the following event categories were used:

- Business as Usual ('BAU') claims.
- Minerva claims - catastrophe event claims arising from earthquakes in NZ outside the Canterbury region.
- Enhanced seismicity in respect of Canterbury earthquake claims and Kaikoura earthquake claims.

9.11 Professional standards

This report has been written to comply with Professional Standard No. 30 (Valuations of General Insurance Claims) of the New Zealand Society of Actuaries.

9.12 MJW staff involved in the investigation

The following MJW staff members were involved in some capacity during the course of the investigation:

- 9(2)(a) [redacted] Principal
- [redacted] Principal
- Other MJW staff as required

10 Uncertainty, Limitations and Reliances

10.1 General comment

There is inherent uncertainty in any estimation of insurance liabilities – estimates of liabilities are based on assumptions and deviations from estimates are normal and to be expected. The estimates are therefore a probability statement rather than an absolute judgement.

The actual ultimate incurred claim costs arising from the Canterbury earthquake events will not be known until the last claim is settled.

The actual ultimate incurred claim costs arising from the Kaikoura earthquake will take some time to estimate accurately. There is very little data with which to form an estimate.

10.2 General sources of valuation uncertainty

The general sources of error in the estimation of liabilities include:

- Normal variation that is inherent in any random process.
- The valuation model being a poor representation of reality.
- Incorrect valuation assumptions arising from:
  - Assumptions being derived from an unrepresentative sample.
  - Underlying experience drifting over time and chosen assumptions failing to accurately follow the 'drift' – this could be due to internal factors such as changes in the claims process or external factors such as changes in the legal environment, cost inflation etc.
- Incomplete or poor-quality data.
- Errors in calculations.

All of these sources of error are potentially present in this investigation.

10.3 Key uncertainties

10.3.1 Exceptional uncertainties arising from the Canterbury earthquakes

The Canterbury earthquakes have resulted in a high level of uncertainty. Some of the key sources of uncertainty are:

- The impact of multiple events on the allocation of damage, EQC coverage and EQC's reinsurance coverage.
- The resolution of the Insurer Finalisation process.
- Severe land damage and a very complex land claims environment from engineering, valuation and legal perspectives.
- Claims development. There has been considerable progress within EQC in regard to the operational aspects of assessing and settling claims, especially in trying to process land claims. However, for a number of reasons, outcomes of that progress cannot be fully reflected in the information available for the valuation, and so there remains residual uncertainty in the valuation results.
- 9(2)(h) [redacted]

- Whether a particular property has been satisfactorily resolved without reopening.

Consequently, even at this relatively late stage of claims development, there is still a degree of unavoidable uncertainty regarding the future claims costs.

As noted in our previous reports, as the claims are settled and as the reasonableness of the model and its assumptions are refined and tested against the emerging claims experience, the level of uncertainty will reduce.

10.3.2 Land valuation uncertainties

The list below sets out some specific sources of uncertainty regarding the estimation of EQC's land liabilities. These sources include, but are not limited to, interpreting the land cover provisions in the Act with respect to:

- Legal aspects
- Valuation, and
- Engineering challenges

Some practical outcomes of the uncertainty associated with the valuation are:

- The actual claims outcome will differ to some degree from the estimates.
- There are confidence ranges in the estimated liabilities for each event.
- Different practitioners could legitimately arrive at quite different estimates of claims cost.

10.3.3 Uncertainties arising from the Kaikoura earthquake

The magnitude of and settlement approach to the Kaikoura earthquake resulted in a high level of uncertainty. Although it is being settled considerably quicker than the Canterbury earthquake sequence, there is still some uncertainty remaining to identify, quantify and cash settle all earthquake damage. It is acknowledged that much of this may simply be in respect of reporting. Specific sources of uncertainty include:

- The Memorandum of Understanding ('MoU') places claims handling in the hands of insurers.
    - This necessarily delays the receipt of information surrounding each claim.
    - There is not perfect consistency in how claims are managed across all insurers, affecting the claims outcome.
- There is little information as to the extent of residential building damage in the South Island. Many properties will be rural and access to these will be limited. While EQC will now be aware of the settlements that have been made, it will not know whether these are sufficient in the light of future demand surge.
- There is little detailed and quantifiable information on the extent of damage to residential apartment buildings in Wellington that are managed by insurers. This would facilitate some assurance that settlements are sufficient.

10.3.4 Data sources

EQC has a number of data systems that enable it to settle claims. There are a number of issues with these systems from a management reporting perspective and this includes the data that is used for the actuarial valuation.

It has not inhibited our ability to produce an estimate of the ultimate claims costs, but it does add uncertainty to that estimate.

10.4 Limitations

In this report, we provide the results of our investigations together with an outline of the matters considered and the methods and assumptions applied to obtain these results. Opinions and estimates contained in this report constitute our judgement as at the date of the report.

This report must be read in its entirety. Individual sections of the report, including the Executive Summary, could be misleading if considered in isolation from each other.

This report is addressed to the management and Board of EQC and should not be provided to or used by any other party (except as specified below) without the express written permission of MJW. This limitation has been provided with the intention of preventing the use of the report for purposes for which the analysis was not intended. MJW will not be liable for the consequences of any third party acting upon or relying upon any information or conclusions contained within this report.

MJW has agreed to a request from EQC that this report may be provided to EQC's Minister, auditor, reinsurance broker (AON Benfield), reinsurers, legal counsel, geotechnical engineers (Tonkin + Taylor) and the New Zealand Treasury. In agreeing to this request, we point out in particular that this report is addressed to EQC, and therefore we do not warrant or represent that any information, analysis or results set out in it are sufficient or appropriate for any other parties' purposes. This report cannot substitute for any investigations that any other party may wish to carry out for its own purposes, and the authors of this report and MJW will not accept any liability to any other party arising from the use of this report.

10.4.1 Official Information Act (OIA)

It is recognised that EQC will publish the ILVR on its website.

This report will be covered by the OIA and therefore will be released subject to any redactions allowable under the OIA.

The limitations above also apply to any other reader of this report.

10.5 Key reliances

In completing this report, considerable reliance has been placed on data and information supplied to MJW by EQC and its external advisors. The most important reliances were placed on the data sources listed in Section E.1.

More details regarding data, information and reliances are set out throughout Section E.

10.6 Quality control and risk management processes

The estimation of EQC's liabilities, particularly the building component, involves constructing multiple complex statistical models.

The data, methodology and results that drive, and are output from, these models undergo a variety of quality control and audit processes.

We undertake to ensure the robustness of these by:

- Internal peer review, including:
  - Detailed review of data, assumptions, methodology and results.

    - Periodic rotation of staff which allows, over time, a 'fresh set of eyes' over aspects of the valuation process.
  - Data validation where possible to independent sources (e.g. management accounts, daily reports)
  - Analysis of change in assumptions for reasonableness.
  - Comparison of results to previous models and valuations.
  - Comparing results to alternative models.
- External review, including
    - Discussions with EQC staff
    - Discussions with external auditors at year ends.

Earthquake Commission

16 August 2019

Insurance Liability Valuation as at 30 June 2019

Appendices

MELVILLE JESSUP WEAVER

Willis Towers Watson Alliance Partner

A EQC – Background

A.1 EQC structure and role

EQC is a NZ Government-owned Crown entity whose origins stretch back to 1945 and is currently established under the Earthquake Commission Act 1993 ('the Act') and associated schedules and regulations.

EQC's role may be summarised as follows:

- To provide insurance against insured perils.
- To administer the Natural Disaster Fund (NDF), including investments, and obtain reinsurance.
- To facilitate research and education about matters relevant to natural disaster damage and its mitigation.
- To undertake other functions as required by the Minister of Finance or the Minister Responsible for the Earthquake Commission.

A Government Guarantee ensures that EQC will be able to meet its financial obligations in all circumstances.

Details on EQC's operations including what is covered under EQC insurance, can be found on its website www.eqc.govt.nz or in previous ILVRs.

A.1.1 Reinstatement of cover limits

Following the High Court's declaratory judgment on 2 September 2011 (EQC v the Insurance Council / Vero / IAG; and Tower Insurance v EQC) the issue of the reinstatement of EQC's cover after an event has now been clarified.

In summary, for policies which commence, renew from 1 July 2019, EQC is generally liable for up to $150k plus GST for each building claim; i.e. there is immediate reinstatement of cover after each natural disaster event as long as the contract of fire insurance is in force. Until that renewal date, EQC will be generally liable for up to $100k plus GST for each building claim plus $20k plus GST for each contents claim.

A.2 Direct EQCover

Section 22 of the Earthquake Commission Act 1993 (EQC Act) - Voluntary insurance against natural disaster damage - provides that "On application made by any person having an insurable interest in any residential building, residential land, or personal property, the Commission may enter into a contract to insure that building, land, or personal property under this Act against natural disaster damage for such period and to such amount (not exceeding the amount which would apply if the property were insured under any of sections 18 to 20) and upon or subject to such conditions as the Commission thinks fit."

As at 30 June 2019, there were 4 customers with Direct EQCover with $400,000 exposure.

B Canterbury land settlement

B.1.1 Ministerial Direction - Unclaimed damage

Given the need to apportion the costs of the claims between the various earthquake events, there is the issue that damage is deemed to have occurred to events where no valid claim has been lodged.

In these cases, there is therefore a possibility that the insured may not be covered for all of the damage that has occurred due to a lack of claim lodgement for a particular event. As a consequence, there have been a number of Ministerial Directions to clarify the issue.

For the purposes of this ILVR, the relevant directions were given on:

- 19 December 2012. Relates to residential building and states that all apportioned residential building damage will be covered by EQC, so long as at least one valid claim has been made for that residential building.
- 19 December 2013. An amendment to the previous residential building direction stating that no excess shall apply to apportioned damage where no valid claim was made.
- 29 October 2015. Relates to residential land and states that all apportioned residential land damage will be covered by EQC (subject to the land cap), so long as at least one valid claim has been made. Excesses will be deducted from all apportioned damage claim payments

These directions have consequences for the gross and net exposure of EQC in that all damage is covered by EQC (subject to there being at least one claim) but not necessarily the reinsurers.

B.1.2 Remediation of land claim damage

Canterbury land suffered visible and other forms of land damage. Other land damage includes ILV and IFV. Visible flat land damage is broken into 7 categories, descriptions of which can be found on the EQC website www.eqc.govt.nz.

Shown below is the manner in which EQC is settling the various land claim categories. The land damage may be broken down into 4 broad groups as discussed below.

- Repair of damage categories 1 – 7 on the flat.
- Repair of, or compensation for, ILV damage on the flat (formerly known as category 8 damage).
- Repair of, or compensation for, IFV damage on the flat (formerly known as category 9 damage).
- Repair of damage on the Port Hills.

Damage categories 1 – 7 on the flat

The land damage reinstatement costs have been calculated for each property on an individual property basis.

Diminution of value

Diminution of Value ('DoV') measures the reduction in a property's market value which has been caused by IFV or ILV land damage.

This is consistent with the indemnity principle of insurance and is being used by EQC (amongst other options) to settle land claims.

ILV damage on the flat

EQC's policy in respect of ILV damaged land considers

- Whether the property qualifies for settlement
- The costs and ability to repair the land and the DoV that has been incurred.

IFV damage on the flat

Flooding encompasses both flooding from rivers which exceed their capacity during prolonged rainfall and also overflowed flow path stormwater run-off during shorter, more intense rainfall events.

EQC's policy in respect of IFV damaged land considers

- Whether the property qualifies for settlement
- The costs and ability to repair the land and the DoV that has been incurred.

Repair of damage on the Port Hills

Port Hills land damage is more conventional as there is no liquefaction. Compared to damage on the flat, it is more straightforward to assess on a case by case basis. However, it is more difficult to assess, estimate and/or reinstate on a grouped basis.

Further details can be found on EQC's website www.eqc.govt.nz.

C Kaikoura Earthquake – Methodology and Assumptions

This appendix summarises the methodology used to estimate the cost of the Kaikoura earthquake of 14th November 2016. The Kaikoura model only deals with damage from the earthquakes, not damage from the storms in Wellington shortly afterward (which are addressed using the standard BAU model).

This methodology uses the (in some cases limited) information available in regard to claim and exposure statuses. The results of the model are sense checked against the case estimates provided by insurers and the amounts accrued by EQC for claims paid by insurers but not yet invoiced to EQC.

C.1 Claim/exposure status models

All exposures have been categorised into the following groups based on their status at the valuation date.

- Land exposure
- Contents
- Building
  - Wellington MuBs
  - EQC managed non-MuBs
  - Insurer managed non-MuBs

The majority of the claims costs arise from the last of these categories, insurer managed building claims. This was modelled using a Markov chain multi-state model and is detailed further below.

In respect of the first four, there are a smaller number of open exposures remaining and a simplified approach was taken i.e. a stochastic average cost per claim model.

C.2 Average cost per claim models

The average cost per claim models simulate, for each open exposure:

- Whether or not some non-zero cost will be incurred
- The ultimate cost (zero or otherwise) for that exposure.

The simulation takes into account any costs already paid to date on an exposure.

For the Wellington MUBs the simulation was undertaken at a whole building level i.e. treating each building as a single exposure and incurring costs in proportion to the number of units which appear to be included in claim(s) for that building. For the small number of buildings for which we have some case estimate reserve figures available, these were also incorporated: the model uses a weighted average between the simulated result and the case estimate reserve.

The table below summarises the assumptions used.

Kaikoura assumptions as at 30 June 2019

All claims other than insurer managed non-MUBs

	Land claims	Contents claims	EQC managed non-MUB building claims	WGN MUB building claims
Effective average claim size*	10,000	5,000	47,918	8,500
Claim size CoV	175%	135%	250%	225%
Proportion finalising non-zero	85%	50%	40%	100%
Weighting applied to reserve (where available)				50%

CoV - coefficient of variation

*After applying the EQC $100k cap

C.3 Multi-state model

In respect of insurer managed building claims, a multi-state model was used. Each exposure was either categorised as open or closed (at various points in time). Exposures were then further categorised as:

- Having made no payments to date
- Having made one payment to date (or a single month in which payments were made)
- Having made more than one payment (over more than one month).

The multi state model then applies transition probabilities for each claim, moving between exposure states and potentially incurring costs in each state.

There are a large number of assumptions used in the multi-state model for insurer managed non-MUBs, and it is not straightforward to present these in a simple table. However, the table below summarises some of the key outputs from the model which give some indication of the effective average assumptions.

Kaikoura key outputs as at 30 June 2019

Insurer managed non-MUBs

Total building exposures	34,678
Of which ultimately non-zero	22,493
Proportion non-zero	65%
Ultimate building cost	$445m
Effective cost per non-zero exposure	$20k

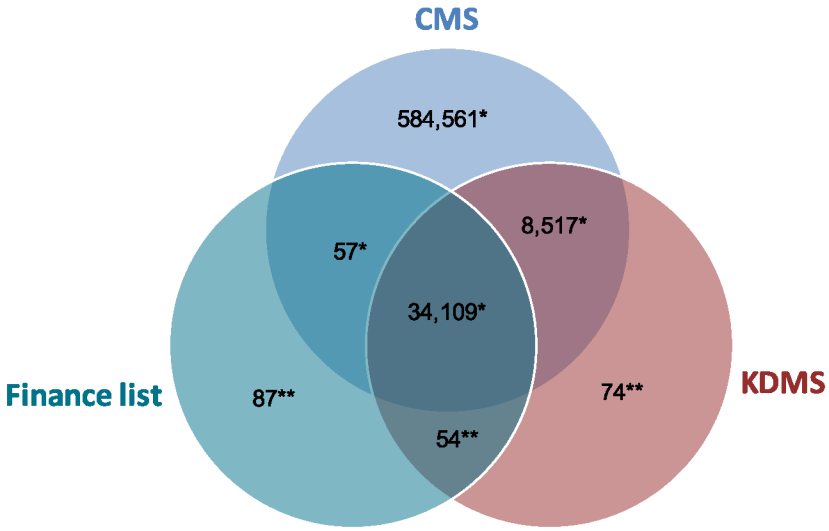
For more detail in regard to the multi-state model please contact the authors.

D Kaikoura reconciliations

D.1 Overall claim number summary

The chart below summarises all the claims data that we have been provided with which may potentially feed into the Kaikoura model.

Number of claims by management system



*Included in KEQ model if allocated to a KEQ event in CMS
**Not included in KEQ model

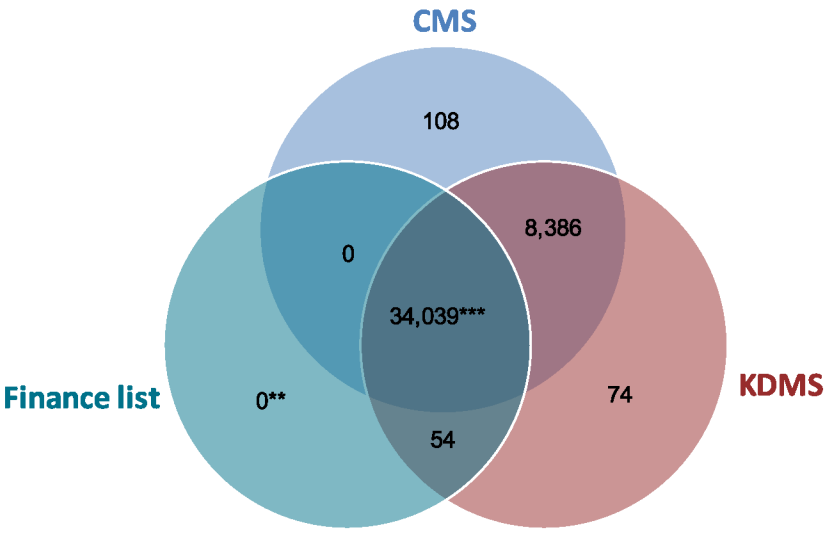
- The majority of CMS claims relate to BAU or Canterbury events, but they have been included here for completeness and reconciling against claim number totals in CMS.
- The 'Finance list' is a list of all Kaikoura reimbursement payments to insurers. We have compiled a summary of claim numbers from that list to compare against the claim numbers in CMS and KDMS.
- For the 87 claims in the Finance list which are not in any other data source, these do not have any net payments associated with them. Where there are payment records these are later reversed.

The Kaikoura model captures all claim which have a Kaikoura event code associated with them in CMS. As can be seen from the chart there are a small number of claims which are in KDMS but are not in CMS and may potentially relate to Kaikoura claims. These claims are not captured within our Kaikoura model. However, these claims may be included within the insurer case estimates, or they may be included in the amounts accrued by EQC for payments advised by insurers but not yet reimbursed by EQC. Where this is the case, the case estimates and accruals have guided our selection of assumptions for the Kaikoura.

D.2 Claims with Kaikoura event codes

The chart below summarises those claims which have a Kaikoura event code attached to them.

Number of claims with KEQ event codes*

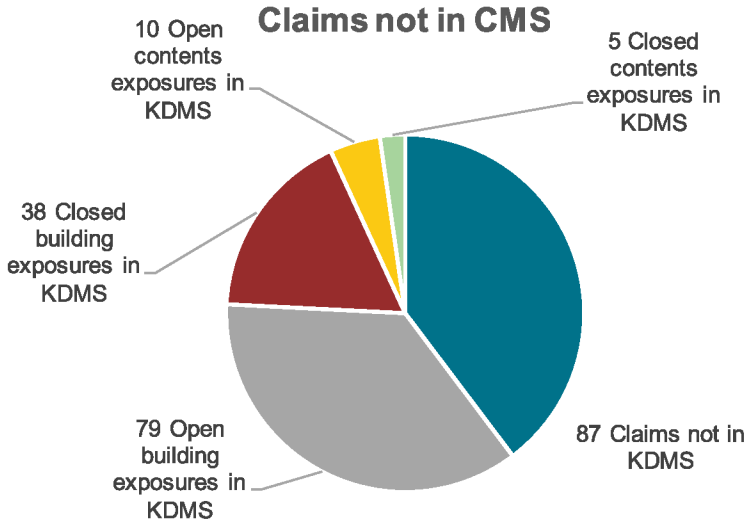


*KEQ event in either CMS or KEQ
**Finance list does not show event codes
***3 of these claims were a KEQ event in KDMS but not CMS

The 54+74=128 Kaikoura claims in KMDS but not in CMS are not captured within our Kaikoura model. It is possible that these claims were loaded into KDMS after the CMS4/8 changeover and after the decision was made to manage certain Kaikoura claims in KDMS rather than CMS. Some detail on these claims is provided below.

D.3 Claims not in CMS

The chart below summarises the Kaikoura KDMS claims which are not in CMS and the claims in the Finance list which are in neither KDMS nor CMS.

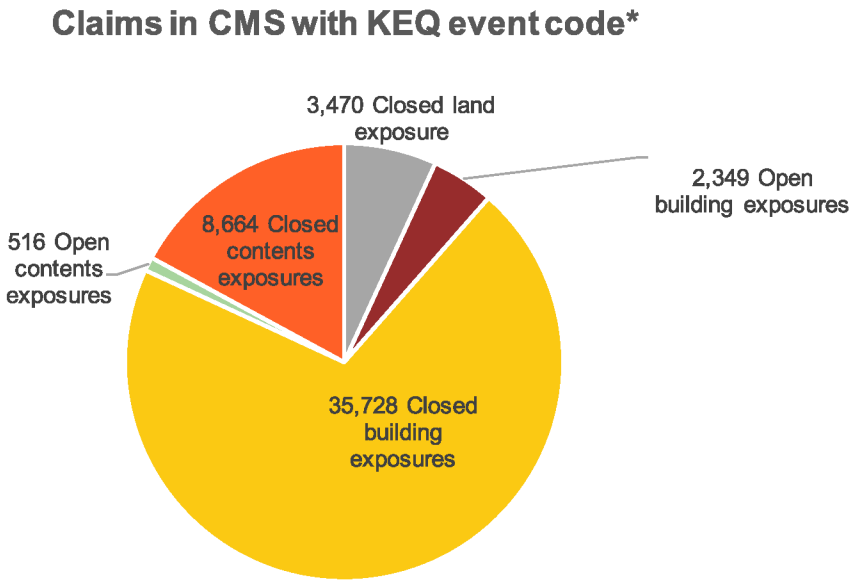


- The 87 claims in the Finance list but not in KDMS have no net payments associated with them, as noted earlier. The payments all appear to be reversed out and may have been entered in error.

- Within KDMS there are 10 open contents exposures and 79 open building exposures which are in CMS. These exposures are not captured in our model but represent only a small portion of the potentially open claims (see below).

D.4 Claims in CMS with Kaikoura event codes

The chart below shows all the exposures in CMS which have been attributed to a Kaikoura event code in CMS. This adds up to a total of 50,727 exposures.

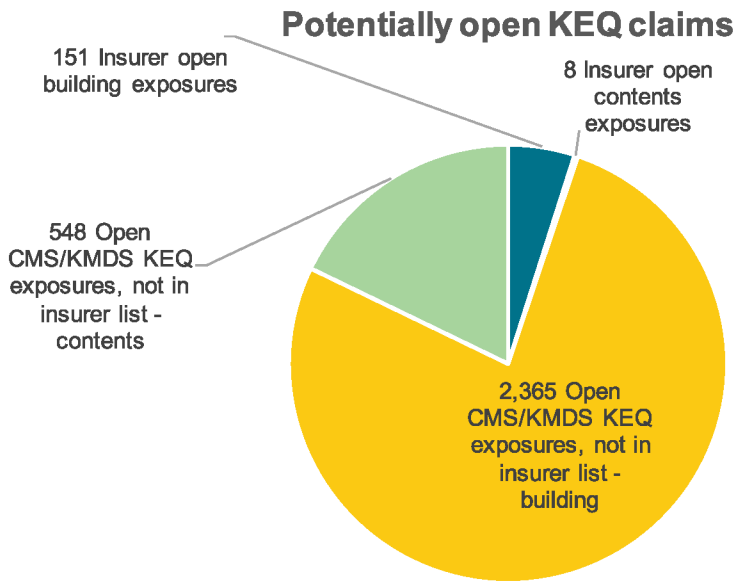


*KEQ event code in CMS

For modelling purposes the building exposures were further subdivided into insurer/EQC managed and MUB/non-MUB as discussed in Appendix C

D.5 Potentially open Kaikoura claims

The chart below summarises all the claims which may be potentially open. This includes any claim which is open in CMS/KDMS or any claim which is on the list of open claims provided by insurers as at 30 June 2019.



In order to establish the status of each exposure in CMS/KDMS we have considered the status in both systems and used the status more likely to be correct given the type of exposure (land, building or contents), who is managing the exposure, and when the status was last updated.

Clearly there are a much greater number of claims which remain open in CMS/KDMS than are on the lists of open claims provided by the insurers. We discussed with EQC the rationale for leaving an insurer-managed exposure open in KDMS. We understand that the exposures which are still open include:

- Claims which have been paid by the insurer but for which EQC has not yet been invoiced.
- Claims which have been invoiced to EQC but have not yet been reimbursed by EQC. The number of these is likely to be very small given the requirement for EQC to pay invoices within 5 days.
- Claims which have yet to have their EQC cover validated. These may have been reimbursed by EQC or may not have incurred any payments.

These three points are in addition to claims which the insurers still consider to be open.

E Data and Information

E.1 Sources of data – Canterbury earthquake claims

The most important sources of data for the Canterbury earthquake investigations were:

- Actuarial Data Extracts from the Claim Centre Claims Information Management System ('ADE').
  - Archived CMSv4 extract from 30 June 2018
  - Data as at 30 June 2019.
- ACE apportionment data from the Business Intelligence Unit ('BIU') – see below.
- Small PAT results - see below.
- EQR paid data.
- Claim & Exposure Gate data as at 30 June 2019
- Transactional listing of all claim payments
- Listing of all Kaikoura claim payments
- Claim-to-address mapping data from the BIU.
- Land cost calculations from EQC & T+T.
- Fletcher Construction completion cost data.
- Trial Balances as at 30 June 2019.
- A Minerva model run generated in January 2011.
- Discussions with EQC employees and contractors.
- Assorted other BIU data sets to assist with estimating reopened claims.

E.1.1 ACE & Small PAT

Properties with building damage are managed either by EQC or by the relevant insurer. Generally, all properties with building damage less than the EQC cap ($100,000 +GST at the time of the Canterbury earthquakes) per claim will be managed by EQC with the remainder ('overcap properties') managed by the insurer.

To assess whether a property is overcap, a manual Apportioned Cost Estimates ('ACE') process is carried out. This will indicate whether any claim has expected damage of more than the cap and therefore whether it should be handed over to the insurer. All overcap properties, and some undercap properties, will have ACE data.

Undercap properties were not, as a rule, manually apportioned. For the purposes of the valuation and for reinsurance, undercap properties have been apportioned using a statistical model, developed by the statistician, Dr David Baird. The statistical apportionment method is referred to as Small PAT (Proxy Apportionment Tool).

E.1.2 Actuarial Data Extract from ClaimCentre

Actuarial Data Extracts (ADE) have been taken from ClaimCentre v8. This was combined with the last extract from CMSv4 which is now in a read only state.

We have used extracts from both ClaimCentres along with other complementary data sources as not all claims are being recorded in the new Claims management system.

V4 and V8 are structured as single database tables. Each record relates to a single claim (itself relating to up to three sub-claims) with many fields describing the claim's details.

E.1.3 ACE damage data

The ACE damage data (as at 30 June 2019) consisted of a table, provided by the BIU, showing apportioned damage estimates for a number of Christchurch properties. There were approximately 130,000 properties in the table although many of these had yet to be populated with apportionment information. There were 51,265 approved properties from this data set that were used in the building model. The table below details how the usable properties were derived from the total data set. It is in respect of all review statuses.

	Number of Properties	Sum of Raw ACE Estimates EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Raw ACE Data	129,999	9(2)(j)					7,484
Remove:							
NAs	(74,774)						-
Duplicates	(39)						-
Property ID errors & non-approved	(3,921)						(435)
Extremely large estimates (>$100m)	0						-
Data used in model	51,265						7,049

E.1.4 EQR paid data

The EQR paid data (as at 30 June 2018) consisted of a table, provided by the BIU, showing the amounts paid to substantively completed properties. There were approximately 68,000 properties from this data set used in the model. This dataset is now static.

E.1.5 Tonkin + Taylor land data and assumptions

The land valuation model has been constructed using information from T+T and supplemented with information from EQC and their advisors. This has been checked for reasonableness against claim payment information.

E.1.6 Output from the Minerva loss model

Output from the Minerva model was the same as that used for the 30 June 2012 valuation. This output was provided by EQC in July 2011. No more recent outputs have been provided as there has been no input of revised parameters following the Christchurch events.

E.2 Sources of data – Kaikoura earthquake claims

E.2.1 Actuarial Data Extract from ClaimCentre

The ADE was also used to assist in the Kaikoura earthquake claims costs.

E.2.2 Kaikoura Data Management System (KDMS)

Insurer managed claims are not contained in CMSv8 and are held on a separate table, referred to as KDMS.

E.3 Sources of information

The additional sources of information used for the investigation were:

- Trial balance for the period ending 30 June 2019.
- Small PAT results.
- Reports supplied by the Fletcher Construction EQR.
- T+T land claims cost model.
- Information from the Treasury website.
- Discussions and correspondence with various relevant EQC staff, contractors and advisors.

E.4 Validation of data

The data validation process carried out for this valuation compares the ADE CMS extract used for the loss run.

E.4.1 ADE vs Loss Run data from finance

This table shows the comparison between the actuarial data extract against the CMS payments file provided by EQC Finance

Claims validation
30 June 2019

	Event					
	EQ1 $000s	EQ2 $000s	EQ3 $000s	EQ4 $000s	AS $000s	Total $000s
ADE	9(2)(j)					
Building						5,409,495
Land						372,157
Contents						477,999
Total						6,259,651
CMS Payment file						
Building						5,408,723
Land						372,145
Contents						477,999
Total						6,258,867
Difference						
Building	(3,684)	3,903	167	912	(526)	772
Land	0	24	0	0	(12)	12
Contents	0	0	0	5	(5)	0
Total	(3,684)	3,927	167	916	(543)	784

E.4.2 ADE vs Trial Balance

This table shows the comparison between the actuarial data extract against the Trial Balance provided by EQC Finance.

Claims payments
Reconciliation of ADE (30 June 2019) to trial balance

	Payment Type		
	ClaimCentre $m	EQR $m	Total $m
Actuarial Data Extract			
EQ1	9(2)(j)		
EQ2			
EQ3			
AS/EQ4			
Total	6,379	2,563	8,942
Trial Balance			
EQ1	9(2)(j)		
EQ2			
EQ3			
AS/EQ4			
Total	6,383	2,560	8,942
Difference			
EQ1	(1)	10	9
EQ2	(2)	(15)	(17)
EQ3	(3)	36	33
AS/EQ4	3	(28)	(25)
BAU*	-	-	-
Total	(3)	3	(0)

*BAU payments in this table relate to the 2015 financial year only.

E.4.3 Summary

In summary, the reconciliations showed that the data used for the valuation was appropriate and correct.

Overall the level of agreement is satisfactory for our purposes.

E.4.4 Other data

The other data sources were not able to be reconciled against the accounts but were reconciled against other sources where relevant and possible.

E.5 Reliances

The key data and information upon which we have placed reliance are described in Sections E.1 to E.2.1 above.

E.6 Concerns and qualifications

E.6.1 General comments regarding the data held by EQC

The two main areas of concern with respect to the use of the data for actuarial purposes are that:

- the claim payment information is held in many different systems which makes it challenging to capture all payments. This is particularly due to the introduction of the claims management system (CMSv8) and the separate system for Kaikoura Insurer-managed claims (KDMS).
- The data fields that are useful for actuarial modelling are not always captured in these systems, or in a suitable format. An example of this include the inability to identify the reason for each payment that has been made.

This makes it increasingly more difficult to analyse trends and justify the assumptions that are chosen. This has been mitigated to some extent through the management of the Claim Stage Gate report maintained by the Canterbury Team.

E.7 Recommendations

E.7.1 Progress against previous recommendations

The data-related recommendation from the previous report was:

- In respect of Data. Undertake a review of the data capture process to ensure that as much data as possible may be effectively utilised.

The progress against this recommendations is as follows:

- Review data capture process *Not started*

E.7.2 Current Recommendations

The recommendations that were noted in the previous ILVR are outstanding. We would repeat these recommendations so that the information that EQC has acquired from Canterbury and Kaikoura can be used for reporting, research and analysis.

E.8 Adequacy and Appropriateness

The quality of the results in this report relies on the accuracy and completeness of the data and information supplied. Overall, and subject to the significant but unavoidable issues identified in Sections E.6, we consider that the information provided to us was adequate and appropriate for the purposes of this valuation.

F Outstanding Claims Liabilities – Valuation Methodologies

F.1 Liability components

EQC's outstanding (OS) claims liabilities to be included in its accounts for 30 June 2019 are, in summary, an estimate of the total value of liabilities arising from all claims incurred up to the valuation date of 30 June 2019.

Claims incurred will include both reported and unreported claims as at the valuation date. Liabilities are calculated both net and gross of reinsurance.

The OS claims liabilities include both claim payments that will be made after the valuation date and the associated claims handling expenses.

The direct claims payments have been calculated to include the valid claims costs payable to insureds, as defined by the Earthquake Commission Act 1993 ('the Act'). The claims handling costs include the administration costs and allocated overheads associated with the management of those claims.

Insurance accounting standards also require the OS claims liabilities to be discounted for the time value of money and to include the addition of a risk margin to increase the probability of adequacy of the provision.

Based on the comments above the key liability components are:

- Direct claims costs of reported, open claims; this part of the liability comprises:
  - Case estimates held within ClaimCentre.
  - An allowance for IBNER (incurred but not enough reported) claims costs where the case estimates are considered to be insufficient.
- Direct claims costs of reported, closed claims that reopen (Reopened).
- Non-reinsurance recoveries.
- Claims handling expenses.
- Reinsurance recoveries.
- Risk margins.
- Discounting for the time value of money.

F.2 Valuation groupings

The OS claims liabilities are subdivided by:

- Event (EQ1 – EQ4, BAU, KEQ).
- Sub-claim (land, building and contents).

This subdivision is necessary because different cover and reinsurance rules apply to the different valuation groupings and the underlying data for the creation of assumptions also varies.

F.3 Valuation methodology

In summary, the valuation model selected may be described as an aggregate stochastic frequency / severity model. The model itself runs in an MS-Excel spreadsheet and the R statistical package.

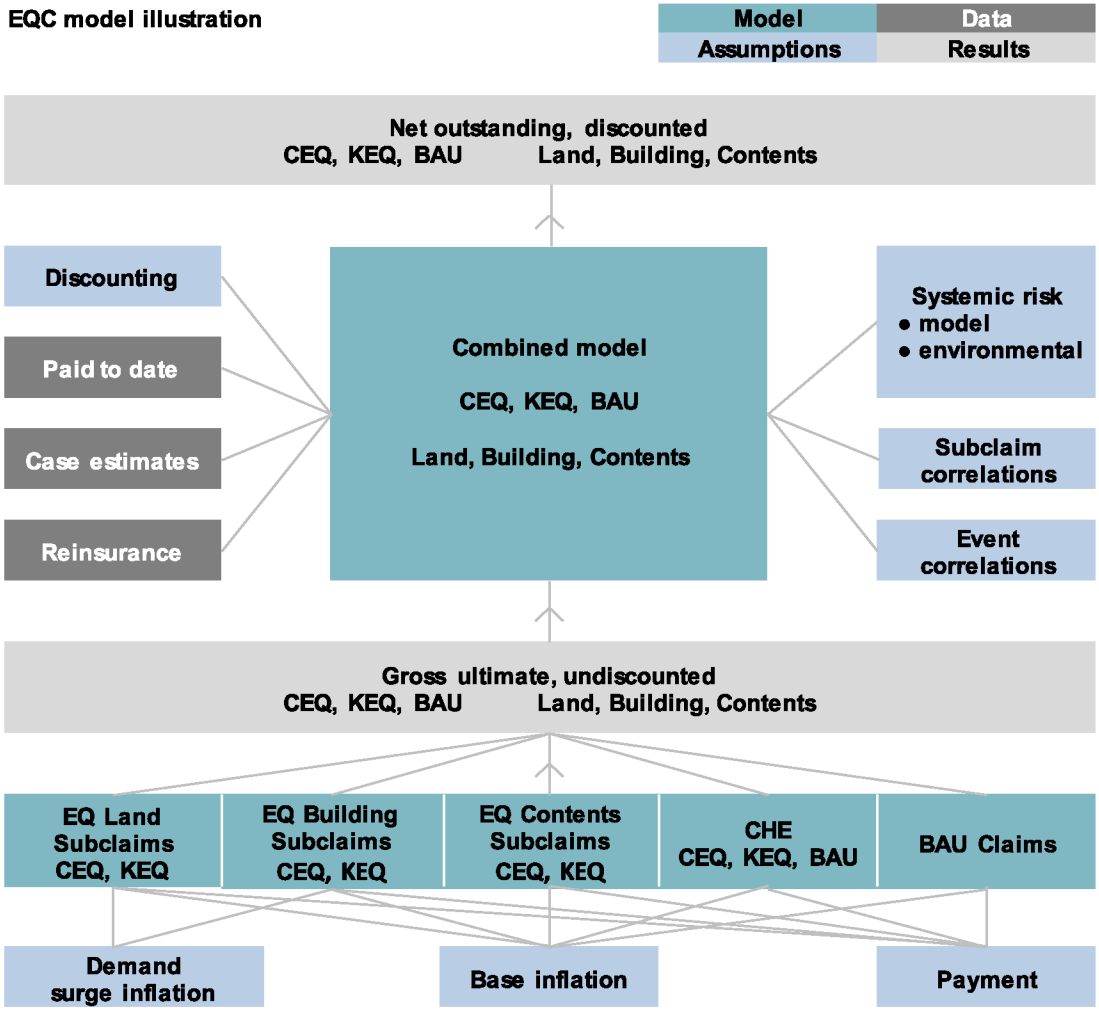
F.4 Gross incurred claims costs

The costs paid to date are known with certainty, but those to be paid in the future are unknown and so must be estimated. The approach that we have taken is to first estimate the projected ultimate claims costs and then to deduct payments made to 30 June 2019 in order to determine the estimated OS claims liability.

F.4.1 Diagrammatic illustration of the valuation model

The diagram below illustrates the components and overall structure of the valuation model.

The structure represents the process for a single run of the model. Each event will have its own unique set of assumptions but needs to be run in parallel in the model as it is the aggregate claims position across the whole entity that must be captured.



The model is run 10,000 times and the output (which is subdivided by the valuation groups described earlier) from each run is collected to form an aggregate gross claims distribution. The central estimate claims cost is found by taking the mean value of the distribution and the 85% probability of adequacy estimate is found by taking the 85th percentile of the distribution.

F.5 Changes since previous valuation

There have been no material changes in methodology since the previous valuation.

F.6 Assumptions required

The assumptions required are driven by the structure of the valuation model. The key assumptions are shown in Section 3 and 4. For a full set of assumptions, please contact the authors.

G Derivation of risk margin

The process by which the net discounted risk margin is determined is shown in Section F.4.1. It is explained in more detail below.

G.1 Step 1: Individual component models

Individual valuation models have been built for:

- Canterbury EQs
  - Building
  - Contents
  - Land
- BAU (Current and Prior Period events)
- Kaikoura EQs (Building, Contents and Land in one model)
- CHE (Canterbury, Kaikoura and BAU)

For each model, the output is 10,000 simulations of the outstanding undiscounted claims cost for that component.

G.2 Step 2: Combine by event

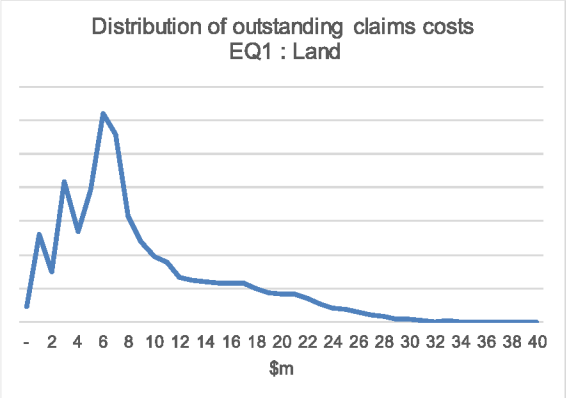
Within a central model, the outputs from Step 1 are combined. Each Event (EQ1 – EQ4, AS, KEQ, BAU, BAUPP) will be the sum of the three claim exposures and CHE. The picture illustrates this for EQ1.

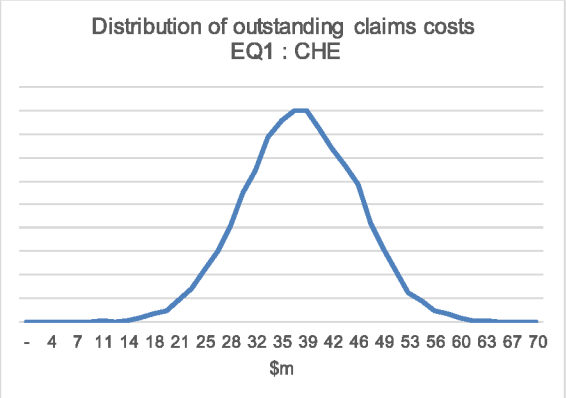
Output 1: Excel Model Join

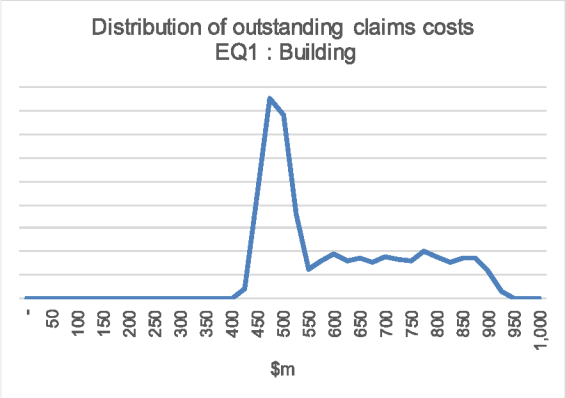
Gross Outstanding EQC liability

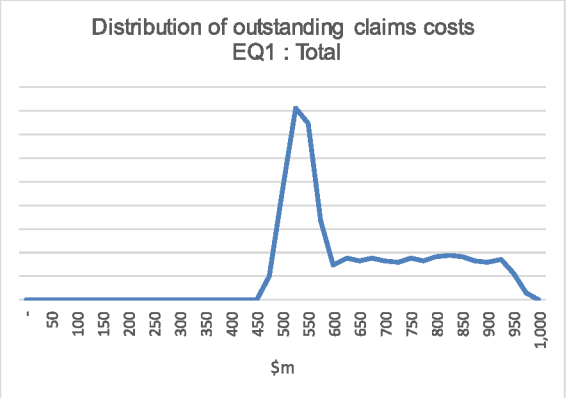
Event:	EQ1	EQ1	EQ1	EQ1	EQ1
Cost Type 1:	Est. OS Claim Cost Undisc	Est. OS Claim Cost Undisc	Est. OS Claim Cost Undisc	Est. OS CHE Undisc	Total
Subclaim	Land	Building	Contents	All	All
0%	762,329	431,349,142	38,781	8,684,008	476,405,814
25%	5,368,456	497,509,138	159,150	33,327,917	545,788,098
50%	7,515,059	551,812,454	191,412	38,479,419	603,402,090
75%	12,835,003	743,230,516	224,948	43,819,184	791,703,203
85%	17,023,703	811,296,380	244,862	46,531,612	860,835,272
95%	22,513,822	886,202,695	278,839	51,070,611	933,312,750
100%	34,772,014	950,435,877	434,949	67,316,614	1,016,180,631
Mean	9,557,064	619,418,051	193,121	38,507,412	667,675,649
Risk Margin	7,466,639	191,878,329	51,741	8,024,200	193,159,623
StDev	6,306,920	143,646,601	49,987	7,701,482	144,068,507
Run					
1	10,715,869	524,921,938	190,050	44,109,242	579,937,098
2	6,625,590	830,852,145	140,261	38,688,951	876,306,946
3	11,172,309	473,078,269	214,992	35,581,380	520,046,950
4	7,056,228	526,685,312	273,226	38,184,704	572,199,471
5	17,856,303	827,649,604	196,729	47,999,964	893,702,601

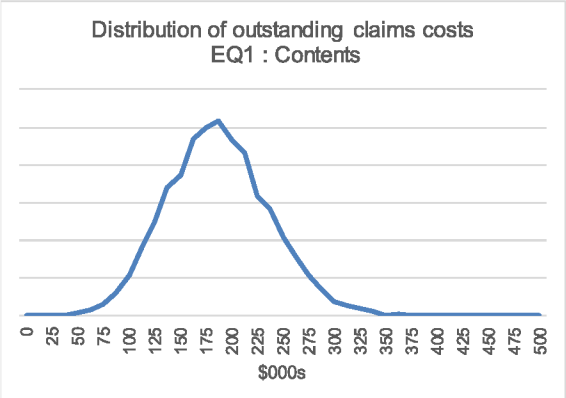
It should be noted that the individual exposure models were run independently of each other and the correlation will not be what is desired. The charts below show the distribution of the outstanding claims for each component for EQ1.











Clearly the total distribution is dominated by the outstanding Building claims costs.

G.3 Step 3: Adjust correlations

A statistical process using copulas is carried out to reorder each of the exposure columns so that the correlation between exposures follows our correlation assumptions. The picture below illustrates the reordered data from Step 2. There are checks to make sure that after the process, the data is complete.

CHECK:	Okay	Okay	Okay	Okay	Okay
Event:	EQ1	EQ1	EQ1	EQ1	EQ1
Cost Type:	Est. OS Claim Cost Undisc	Est. OS Claim Cost Undisc	Est. OS Claim Cost Undisc	Est. OS CHE Undisc	Total
Subclaim	Land	Building	Contents	All	All
0%	9(2)(j)				463,900,181
25%					542,389,280
50%					600,337,215
75%					794,709,667
85%					865,210,735
95%					942,243,977
100%					1,019,655,150
Mean					667,675,649
Risk Margin					197,535,086
StDev					148,065,920
Run					
1					834,642,384
2					594,775,899
3					853,711,129
4					601,766,842
5					564,006,696

G.4 Step 4: Allow for external systemic risk

The next step is to allow for external systemic risk which cannot be allowed for in the modelling process. The external systemic risk is applied to the aggregate event OS claims cost. The picture below shows the gross outstanding claims costs per event after application of external systemic risk.

Distribution Type:	Post External	Post External	Post External	Post External	Post External	Post External	Post External	Post External	Post External
EQC Liability 1	OS	OS	OS	OS	OS	OS	OS	OS	OS
EQC Liability 2	GROSS	GROSS	GROSS	GROSS	GROSS	GROSS	GROSS	GROSS	GROSS
EQC Liability 3	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc
Event:	EQ1	EQ2	EQ3	EQ4	AS	BAU	BAU PP	KEQ	Total
0%	9(2)(j)					211,487	332,623	-7,810,558	142,500,747
25%						5,883,240	1,452,712	27,693,837	445,767,181
50%						7,229,939	1,811,420	40,976,854	703,722,436
75%						8,631,500	2,265,361	57,484,110	1,206,249,871
85%						9,460,010	2,570,495	68,261,198	1,403,188,242
95%						10,885,508	3,292,377	88,628,754	1,623,946,939
100%						24,164,177	12,413,120	201,174,357	2,006,812,797
Mean						7,338,258	1,949,102	44,679,936	832,675,644
Risk Margin						2,121,752	621,393	23,581,263	570,512,598
StDev						2,128,911	781,040	23,898,680	443,646,473
Run									
1						6,452,401	1,991,729	47,020,740	1,227,192,248
2						3,483,141	1,301,588	26,618,841	485,310,239
3						9,056,362	1,231,224	33,519,598	1,510,856,737
4						8,254,560	1,740,804	91,012,033	935,171,042
5						8,919,553	1,914,219	24,280,510	375,390,305

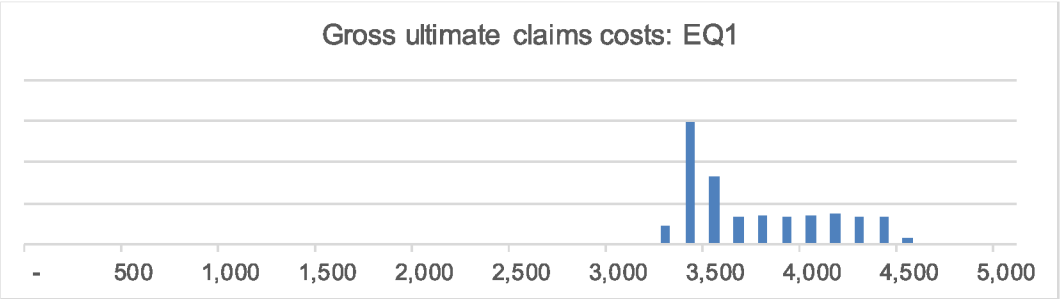
The chart below illustrates the impact of applying systemic risk to the distribution of outstanding claims costs for EQ1. Note that the addition of external systemic risk increases the standard deviation but does not affect the mean.

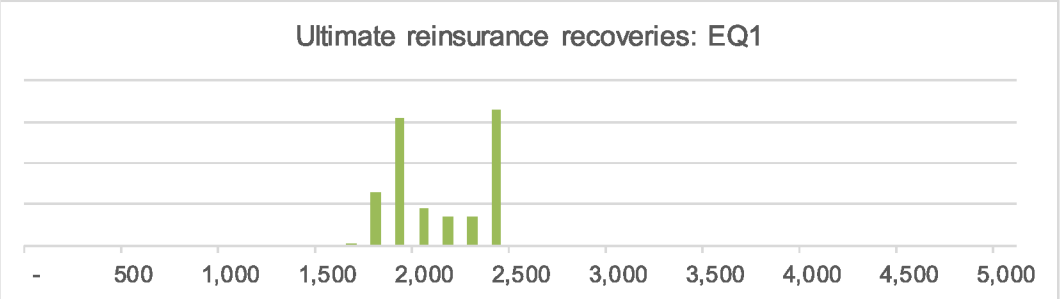
G.5 Step 5: Convert to Ultimate and apply reinsurance

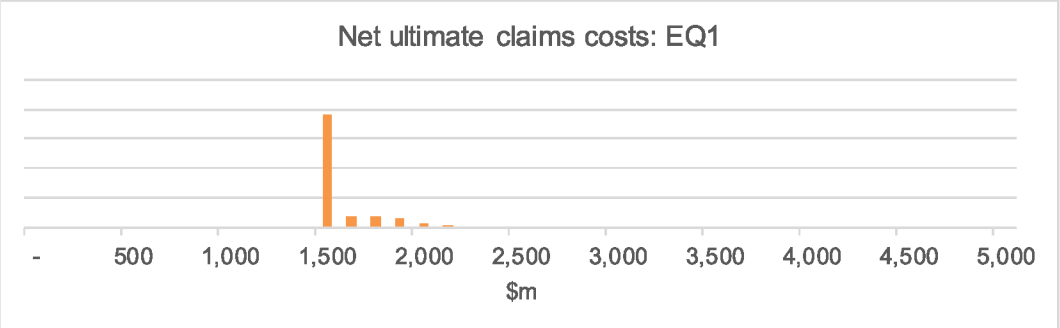
The outstanding undiscounted simulations above are added to the claims paid to date to get the ultimate claims costs distributions.

The reinsurance programme can then be applied to each event to separate each simulation into that which falls to EQC and that which falls to reinsurance.

At this stage, adjustments for non-reinsurable items are applied so that the ultimate reinsurance amount is calculated correctly. The charts below show the distribution of the gross ultimate claims costs, ultimate reinsurance recoveries and net ultimate claims costs.







Our modelling allows for the gross ultimate claims cost distribution for EQ1 to lie between $3.3bn and $4.6bn.

The ultimate reinsurance recoveries distribution occupies a range between $1.7bn and $2.5bn. The large bar at $2.5bn represents all outcomes where the gross ultimate claims costs exceed $4bn.

The net ultimate claims costs distribution ranges from $1.5bn to $2.1bn. The collection of small bars in excess of $1.5bn represent outcomes where the gross ultimate claims costs exceed $4bn.

G.6 Step 6: Convert back to Outstanding

The net paid amounts per event are then deducted from the net ultimate claims costs to get the net outstanding claims costs.

Distribution Type:	Post External	Post External	Post External	Post External	Post External	Post External	Post External	Post External	Post External
EQC Liability 1	OS	OS	OS	OS	OS	OS	OS	OS	OS
EQC Liability 2	NET	NET	NET	NET	NET	NET	NET	NET	NET
EQC Liability 3	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc	Undisc
Event:	EQ1	EQ2	EQ3	EQ4	AS	BAU	BAU PP	KEQ	Total
0%	9(2)(j)					211,487	332,623	-7,810,558	-82,601,972
25%						5,883,240	1,452,712	27,693,837	125,509,851
50%						7,229,939	1,811,420	40,976,854	224,013,388
75%						8,631,500	2,265,361	57,484,110	378,698,416
85%						9,460,010	2,570,495	68,261,198	529,653,637
95%						10,885,508	3,292,377	88,628,754	749,551,023
100%						24,164,177	12,413,120	201,174,357	1,158,319,357
Mean						7,338,258	1,949,102	44,679,936	284,913,410
Risk Margin						2,121,752	621,393	23,581,263	244,740,228
StDev						2,128,911	781,040	23,898,680	218,997,055
Run									
1						6,452,401	1,991,729	47,020,740	357,669,590
2						3,483,141	1,301,588	26,618,841	27,083,316
3						9,056,362	1,231,224	33,519,598	627,832,937
4						8,254,560	1,740,804	91,012,033	524,412,594
5						8,919,553	1,914,219	24,280,510	-10,777,099

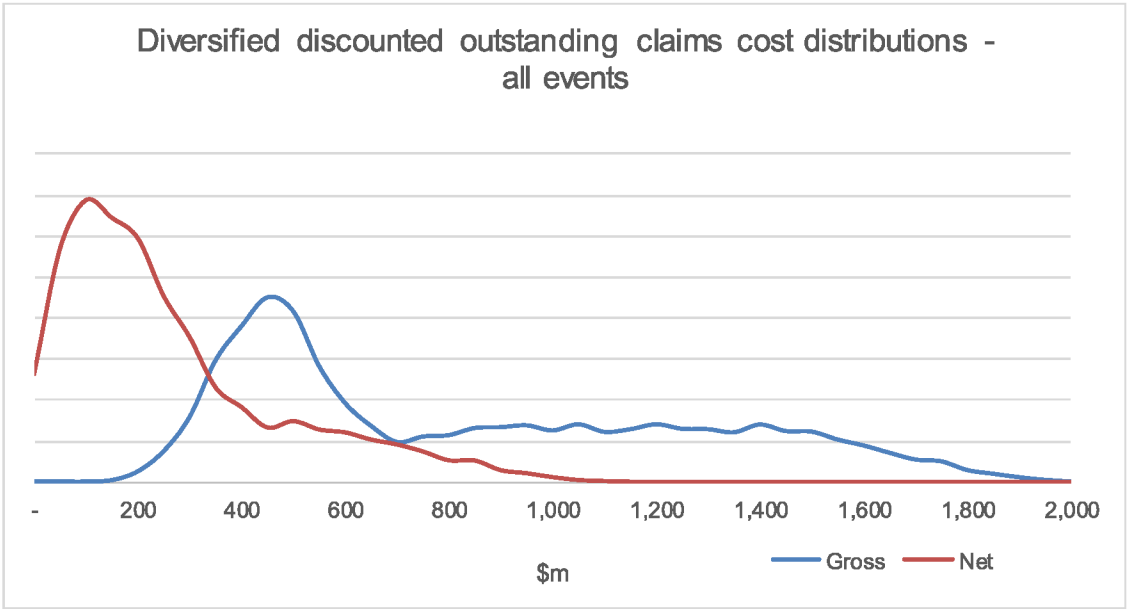
G.7 Step 7: Apply discounting

The final step in the process is to apply discounting. The net undiscounted outstanding amounts for each event are spread over future periods according to assumed settlement patterns. They are then discounted for the time value of money.

The events are then summed and the aggregate result gives the diversified net discounted risk margin, in this case $242m. Note that the gross risk margin is much higher at $558m. The difference is due to EQ1 where reinsurance still applies.

Event:	Total	Total	Total	Total	Total	Total
Payment Period:	Total	Total	Current	Current	Non Current	Non Current
EQC Liability 1 EQC Liability 2 EQC Liability 3	Gross OS Disc	Net OS Disc	Gross OS Disc	Net OS Disc	Gross OS Disc	Net OS Disc
0%	164,073,467	-80,895,470	92,292,241	-31,116,812	71,781,227	-60,386,413
25%	483,694,126	124,670,084	254,042,606	98,184,067	228,446,276	24,250,769
50%	736,322,687	221,502,412	378,235,122	152,482,520	357,991,892	63,694,014
75%	1,232,248,218	374,633,667	597,790,963	258,681,412	630,753,242	99,318,412
85%	1,421,619,870	524,479,587	684,126,964	417,766,751	737,502,601	122,078,628
95%	1,638,840,831	741,838,586	790,152,194	616,958,431	851,747,274	160,415,585
100%	2,041,326,654	1,145,659,546	1,030,608,033	971,617,024	1,039,412,706	263,214,082
Mean	863,410,370	282,210,421	430,687,471	216,293,040	432,722,899	65,917,381
Risk Margin	558,209,501	242,269,166	253,439,493	201,473,711	304,779,702	56,161,247
StDev	437,340,353	216,582,926	203,284,571	175,849,472	235,122,614	52,916,641
Run						
1	1,253,620,325	354,470,591	601,242,965	291,645,350	652,377,360	62,825,242
2	503,799,103	27,144,097	242,804,900	36,308,751	260,994,202	-9,164,654
3	1,519,149,102	620,614,429	734,190,686	450,599,043	784,958,415	170,015,386
4	1,010,352,816	517,056,061	548,031,807	334,202,671	462,321,009	182,853,390
5	393,475,485	-9,600,110	192,966,155	18,652,135	200,509,329	-28,252,245

The chart below illustrates the difference between the gross and net of reinsurance outstanding claims distributions.



H Premium Liabilities – Methodology and Assumptions

H.1 Liability components

In summary, EQC's premium liabilities are an estimate of the total value of net liabilities associated with the run-off of EQC's unexpired risks as at 30 June 2019. The focus is therefore on claims incurred as a result of events after the 30 June 2019 valuation date, i.e. future claims. This is in contrast to the OS claims liabilities, which relate to claims incurred up to 30 June 2019, i.e. past claims.

The premium liabilities comprise several components:

- The cost of future claims (net of reinsurance) arising from the unexpired risks.
- The claims handling expenses for the future claims arising from the unexpired risks.
- The cost of policy administration for the run-off of the unexpired risks.
- The cost of the reinsurance cover for the unexpired risks.

The estimate is set at a 75% probability of adequacy and discounted for the time value of money.

The premium liabilities are not included in EQC's balance sheet but will be used for the Liability Adequacy Test (LAT) of the unearned premium reserves (UPR). If the premium liabilities exceed the unearned premium reserves, then an additional unexpired risk reserve is required to make up the extent of shortfall. If the premium liabilities are less than the UPR then the UPR remains unchanged.

H.2 Valuation groupings

Because the focus of the premium liabilities is on future claims – for which, by definition, there can be no claims data held by EQC - the valuation groupings used for the premium liabilities are very different from those used for the OS claims liabilities.

H.2.1 Event valuation groupings

As we are now dealing with future claims it is not possible to categorise claims by event dates, however we must consider the sources from which future claims may arise. At the time of writing this report these are:

- 'BAU' (Business As Usual) claims
- Minerva claims - catastrophe event claims arising from earthquakes in NZ outside Canterbury
- Enhanced seismicity claims – claims arising from future earthquakes in the Canterbury or Kaikoura earthquake sequence.

The first two event groups above are traditional ones for the estimation of EQC's premium liabilities. The last item reflects the fact that the first two items were based on a 'stable' environment whereas the seismic conditions are more uncertain now. It is expected that this component will reduce over time as seismic conditions stabilise.

H.3 Valuation methodologies

We have decided to use a stochastic approach as it facilitated the determination of the risk margin and allowed us to directly model the effects of the catastrophe reinsurance.

This is consistent with the approach used for components of the OS claims liabilities so some of the assumptions developed for that work have been used.

H.4 Changes in methodology

The methodology has not materially changed from the previous valuation.

H.5 Assumptions required

The assumptions are driven by the valuation methodology. In the following sections, we set out the assumptions for each event group and provide some background to the assumption and how it was derived.

We note that the changes to the EQC Act, effective 1 July 2019, apply to policies which renew / commence after this date. Consequently, for the purposes of the premium liabilities, which is in respect of polices on risk as at 30 June 2019 and only for their remaining term, the cap is still $100,000 and contents cover is still provided.

H.5.1 Minerva

The Minerva component is based on output from the Minerva model in 2011. The only assumption used here is the inflation rate, which is 2.5% p.a.

H.5.2 BAU

The assumptions used for the BAU component are frequency and severity based. Please see the authors for details on these assumptions.

H.5.3 Enhanced seismicity claims

The Enhanced seismicity claims component is based on the probabilities of aftershocks in the Canterbury and Kaikoura region. The tables are available from the authors upon request.

H.5.4 Non-acquisition expenses

The premium liabilities require assumptions on the policy administration costs and the costs to manage and settle claims. It is assumed that:

- The average annual policy administration costs for unexpired risk is $5m
- The average claims handling cost per claim is $1,495.

H.6 Changes in assumptions

Given the underlying claims process and the valuation methodology, the assumptions are largely based on those used for the 30 June 2018 valuation. The latest GeoNet Canterbury forecasts were released on 3 September 2018. The latest GeoNet Kaikoura forecasts were released on 14 November 2018.

I Detailed movement analyses

I.1 Canterbury earthquake claim liabilities

The tables below detail the movement in estimated claims between 31 December 2018 and 30 June 2019. A similar analysis covering the period from 30 June 2018 to 31 December 2018 is available upon request. Also, a breakdown of the movement between earthquake events (EQ1/2/3/4) can be provided to interested parties.

I.1.1 Land claims

The table below details the movement in estimates for the Canterbury land claims. Note that, whilst allowance is made separately for different sources of future cost (e.g. ILV), the payment data in CMS does not readily allow to identify this breakdown for historical payments.

Canterbury land liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 31 December 2018			
9(2)(j)	[redacted]		
Total	506,118	94,800	600,918
Expected payments between Dec-2018 and Jun-2019			
9(2)(j)	[redacted]		
Total	31,284	(31,284)	
Expected position as at Jun-2019			
9(2)(j)	[redacted]		
Total	537,402	63,516	600,918
Actual minus expected payments between Dec-2018 and Jun-2019			
9(2)(j)	[redacted]		
Total	(25,481)	25,481	
Position as at Dec-2018 using rolled forward actual payments			
9(2)(j)	[redacted]		
Total	511,922	88,997	600,918

(Continued below)

(Continued from above)

Canterbury land liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
Impact of adjusting for actual experience over the period			
9(2)(j)			
Total		(875)	(875)
Position as at 30 June 2019 using previous methodology and assumptions			
9(2)(j)			
Total	511,922	88,122	600,043
Impact of adjusting assumptions in line with experience			
9(2)(j)			
Total		(222)	
Position as at 30 June 2019			
9(2)(j)			
Total	511,922	87,900	599,821

Note: All figures are gross of reinsurance, undiscounted and exclude CHE

In summary, the movements in the estimated future cost of Canterbury land claims are:

- A smaller reduction than expected due to paying down the liabilities over the period. A large component of the outstanding relates to the potential cost of litigation. We have projected this as being paid out over a number of future months to recognise a range of possibilities as to when this will be paid. In reality any future payments as a result of litigation are likely to be significant one-off sums at particular points in time.
- A slight reduction as a result of running the model at a new valuation date with a new pool of open/closed land claims.
- A very minor reduction (overall) as a result of updating the assumptions in line with experience.

I.1.2 Building claims

Canterbury building liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 31 December 2018			
9(2)(j)	[redacted]		
Total	7,898,976	522,612	8,421,588
Expected payments between Dec-2018 and Jun-2019			
9(2)(j)	[redacted]		
Total	134,704	(134,704)	
Expected position as at Jun-2019			
9(2)(j)	[redacted]		
Total	8,033,680	387,909	8,421,588
Actual minus expected payments between Dec-2018 and Jun-2019			
9(2)(j)	[redacted]		
Total	(35,234)	35,234	
Position as at Dec-2018 using rolled forward actual payments			
9(2)(j)	[redacted]		
Total	7,998,446	423,143	8,421,588

{Continued below}

{Continued from above}

Canterbury building liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
Impact of adjusting for actual experience over the period			
9(2)(j)			
Total		(6,971)	(6,971)
Position as at 30 June 2019 using previous methodology and assumptions			
9(2)(j)			
Total	7,960,064	416,171	8,376,236
Impact of adjusting assumptions in line with experience			
9(2)(j)			
Total		184,853	184,853
Position as at 30 June 2019			
9(2)(j)			
Total	7,998,446	601,025	8,599,470

Note: All figures are gross of reinsurance, undiscounted and exclude CHE

I.1.3 Kaikoura earthquake claim liabilities

The table below details the movement in estimated claims from the Kaikoura events between 31 December 2018 and 30 June 2019. A similar analysis covering the period from 30 June 2018 to 31 December 2018 is available upon request.

Kaikoura liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date* $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 31 December 2018			
Insurer managed non-MUB building claims	407,665	28,256	435,921
Land claims	9,549	16	9,565
Contents claims	12,704	587	13,291
EQC managed non-MUB building claims	18,202	551	18,753
WGN MUB building claims	35,605	8,077	43,683
Total	483,724	37,487	521,212
Impact of adjusting to use KDMS claim statuses rather than CMS			
Insurer managed non-MUB building claims		62	
Land claims		1	
Contents claims		(53)	
EQC managed non-MUB building claims		39	
WGN MUB building claims		910	
Total		959	
Position as at 31 December 2018 - adjusted to use KDMS claim statuses			
Insurer managed non-MUB building claims		28,318	
Land claims		16	
Contents claims		535	
EQC managed non-MUB building claims		590	
WGN MUB building claims		8,987	
Total		38,446	
Expected payments between Dec-2018 and Jun-2019			
Insurer managed non-MUB building claims	14,398	(14,398)	
Land claims	8	(8)	
Contents claims	271	(271)	
EQC managed non-MUB building claims	299	(299)	
WGN MUB building claims	4,560	(4,560)	
Total	19,537	(19,537)	
Expected position as at Jun-2019			
Insurer managed non-MUB building claims	422,063	13,920	435,983
Land claims	9,557	8	9,565
Contents claims	12,975	263	13,238
EQC managed non-MUB building claims	18,501	291	18,792
WGN MUB building claims	40,165	4,428	44,593
Total	503,261	18,910	522,171

(Continued below)

(Continued from above)

Kaikoura liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date* $000s	Estimated future $000s	Estimated ultimate $000s
Actual minus expected payments between: Dec-2018 and Jun-2019			
Insurer managed non-MUB building claims	(4,423)	4,423	
Land claims	22	(22)	
Contents claims	2,786	(2,786)	
EQC managed non-MUB building claims	835	(835)	
WGN MUB building claims	(3,397)	3,397	
Total	(4,177)	4,177	
Position as at Jun-2019 rolled forward using actual payments			
Insurer managed non-MUB building claims	417,640	18,343	435,983
Land claims	9,579	(14)	9,565
Contents claims	15,761	(2,523)	13,238
EQC managed non-MUB building claims	19,337	(545)	18,792
WGN MUB building claims	36,768	7,825	44,593
Total	499,085	23,086	522,171
Impact of adjusting for actual experience over the period			
Insurer managed non-MUB building claims		(14,288)	(14,227)
Land claims		14	15
Contents claims		3,053	3,000
EQC managed non-MUB building claims		1,054	1,093
WGN MUB building claims		(7,468)	(6,558)
Total		(17,636)	(16,677)
Position as at 30 June 2019 using previous methodology			
Insurer managed non-MUB building claims	417,640	4,054	421,694
Land claims	9,579	0	9,579
Contents claims	15,761	530	16,291
EQC managed non-MUB building claims	19,337	509	19,846
WGN MUB building claims	36,768	356	37,125
Total	499,085	5,450	504,535
Impact of updating assumptions in line with emerging experience but keeping methodology fixed			
Insurer managed non-MUB building claims		258	258
Land claims		0	0
Contents claims		155	155
EQC managed non-MUB building claims		(12)	(12)
WGN MUB building claims		(83)	(83)
Total		318	318
Position as at 30 June 2019 using previous methodology but with updated assumptions			
Insurer managed non-MUB building claims	417,640	4,312	421,952
Land claims	9,579	0	9,579
Contents claims	15,761	685	16,446
EQC managed non-MUB building claims	19,337	497	19,834
WGN MUB building claims	36,768	273	37,041
Total	499,085	5,768	504,853

(Continued below)

(Continued from above)

Kaikoura liabilities

Movement from 31 December 2018 to 30 June 2019

	Paid to date* $000s	Estimated future $000s	Estimated ultimate $000s
Impact of changing MUB methodology to use number of units in building rather than claim			
Insurer managed non-MUB building claims		(20)	(20)
Land claims		0	0
Contents claims		(2)	(2)
EQC managed non-MUB building claims		2	2
WGN MUB building claims		3,397	3,397
Total		3,377	3,377
Position as at 30 June 2019 after adjusting MUB unit methodology			
Insurer managed non-MUB building claims	417,640	4,293	421,933
Land claims	9,579	0	9,579
Contents claims	15,761	683	16,444
EQC managed non-MUB building claims	19,337	499	19,836
WGN MUB building claims	36,768	3,669	40,438
Total	499,085	9,145	508,230
Impact of changing MUB methodology for specific claim			
Insurer managed non-MUB building claims		35	35
Land claims		0	0
Contents claims		0	0
EQC managed non-MUB building claims		(2)	(2)
WGN MUB building claims		3,634	3,634
Total		3,667	3,667
Position as at 30 June 2019 after adjusting MUB unit methodology and specific claim allowance			
Insurer managed non-MUB building claims	417,640	4,328	421,967
Land claims	9,579	0	9,579
Contents claims	15,761	684	16,445
EQC managed non-MUB building claims	19,337	497	19,834
WGN MUB building claims	36,768	7,303	44,072
Total	499,085	12,812	511,897
Impact of extending insurer-managed non-MUBs for six months and modifying assumptions			
Insurer managed non-MUB building claims		26,481	26,481
Land claims		0	0
Contents claims		(0)	(0)
EQC managed non-MUB building claims		2	2
WGN MUB building claims		9	9
Total		26,491	26,491
Position as at 30 June 2019			
Insurer managed non-MUB building claims	417,640	30,809	448,448
Land claims	9,579	0	9,579
Contents claims	15,761	684	16,444
EQC managed non-MUB building claims	19,337	499	19,836
WGN MUB building claims	36,768	7,312	44,080
Total	499,085	39,303	538,388

Note: All figures are gross of reinsurance, undiscounted and exclude CHE
*Includes amounts paid by insurers and accrued but not yet paid by EQC

In summary, the movements in the estimated future cost of Kaikoura claims are:

- A small increase to MUB claims as a result of utilising claim status information in KDMS (where previously a number of claims were using the CMS status when in fact a KDMS status was available).
- A lower decrease than expected due to paying down liabilities over the period.
- A significant reduction due to applying the model at a new date with a reduced pool of open claims.
- An increase to the estimate for MUBs to recognise that the stated number of units claiming for a particular building is not always reliable and it is more informative to look at the total number of units in the building (even if they do not all have separate claims in CMS/KDMS).
- An increase after allowing for a specific claim which is effectively closed and for which the (rather high) cost is known with relative certainty.
- A significant increase due to extending the payment pattern out for an additional six months, in part to counteract the reduction over the period due to the lower number of open claims, but also to address the fact that claims appear to be taking longer to finalise (or reopen then finalise) than expected.

BAU outstanding claims liabilities

Movement from 31 December 2018 to 30 June 2019

	Claims incurred up to 31 December 2018				Claims incurred after 31 December 2018				All claims			
	Land $000s	Building $000s	Contents $000s	Total $000s	Land $000s	Building $000s	Contents $000s	Total $000s	Land $000s	Building $000s	Contents $000s	Total $000s
Central estimate outstanding claims as at 31 December 2018	**6,112**	**3,191**	**38**	**9,342**								
Less: expected payments between Dec-2018 and Jun-2019	2,698	1,409	17	4,124								
Expected central estimate as at Jun-2019	3,414	1,783	21	5,218								
Less: actual minus expected payments between Dec-2018 and Jun-2019	2,903	1,406	(9)	4,300								
Central est as at Jun-2019 rolled forward using actual payments	511	377	30	918								
Adjust for actual experience being different to expected	1,484	776	(25)	2,235								
Plus: outstanding for claims incurred after Dec-2018					835	451	(0)	1,286				
Central est OSC as at Jun-2019 using previous assumptions	1,995	1,153	5	3,153	835	451	(0)	1,286	2,830	1,604	5	4,439
Adjust for changes to assumptions	0	0	0	0	0	0	0	0	0	0	0	0
Central estimate outstanding claims as at 30 June 2019	1,995	1,153	5	3,153	835	451	(0)	1,286	**2,830**	**1,604**	**5**	**4,439**

Note: All figures are undiscounted and exclude CHE

J Sensitivity of key assumptions

Two key provisions in this valuation are in respect of future reopened claims and Insurer Finalisation. Shown below are sensitivity analyses for these two items.

J.1 Future reopened claims

In respect of the future reopened claims, sensitivity analysis has been carried out in respect of:

- The length of time the reopened claims continue for. (Base = 4.5 years)
- The nil claim rate attributable to these claims (Base = $34%)
- The average cost incurred by the reopened claims (Base = $9(2)(j)

	Number claims	Nil claim rate	Avg Cost $	Future Cost $m	Change $m
Base	12,306	34%	9(2)(j)	[redacted]	
Projection					
-6 months	9,663	34%			
+6 months	14,948	34%			
Nil claim rate					
-5%	12,306	29.00%			
+5%	12,306	39.00%			
Avg Cost					
-$5k	12,306	34%			
+$5k	12,306	34%			

J.2 Insurer Finalisation

9(2)(j)

[redacted]

K EQC Reinsurance

K.1 EQC reinsurance

K.1.1 Historical Cover

EQC utilises catastrophe reinsurance to reduce net claims volatility.

As from 1 June 2010, and effective for EQ1, EQC reinsurance programme was made up of three layers, providing a total of NZD 2.4775b* cover excess of NZD 1.5b first loss deductible:

- Layer 1: NZD $500m xs NZD $1,500m
- Layer 2: NZD $1,500m xs NZD $2,000m
- Layer 3: NZD $500m xs NZD $3,500m

*Note that EQC co-insured 1.5% or NZD 22,500,000 of Layer 2 (on the 2009 3-year placement).

This cover was placed in tranches and layers subject to different terms.

This reinsurance structure was the same for the 2011/12 year.

K.1.2 Current cover

From 1 June 2019, the reinsurance programme has four layers, beginning at NZD $1,750m and finishing at $7,750m.

K.1.3 Three-year aggregate cover

The claims costs arising from the Kaikoura event contribute to the total claims under a three-year aggregate programme which expired on 31 May 2019. There was one other (Storm) event over the three period which contributed.

Given the current estimates of the ultimate claims costs for the Kaikoura event and the Storm event, it is highly unlikely that this three-year cover will be called.

L Glossary

Accounting standard

In New Zealand, the accounting standards of the External Reporting Board apply. EQC's insurance activities are reported under *NZ PBE IFRS4 Insurance Contracts*.

Actuarial Data Extract (ADE)

A data extract used to facilitate an actuarial valuation. The data is typically sourced from the claims and policy administration systems.

Actuary

In general, in New Zealand an actuary is a Fellow or Associate Member of the New Zealand Society of Actuaries or equivalent body.

Aggregate excess of loss reinsurance

See **catastrophe reinsurance.**

Apportioned Cost Estimate (ACE) data

A number of properties have had their building damage apportioned between events in a manual fashion. This process uses all available information on that property (quantity surveyor reports, land damage information, neighbourhood damage, customer reports etc.) to inform the apportionment. These apportionments are called Apportioned Cost Estimates and will be included the ACE data set. The ACE data set includes all overcap properties and a number of undercap properties too.

Attachment date

See **inception date**.

Best estimate

In the context of scenarios, a best estimate means a realistic future scenario, rather than a deliberately pessimistic or optimistic one. Also, see **central estimate**.

Brokerage

An alternative term for commission paid to a **broker**.

Broker

An intermediary who acts for an insured in negotiating their insurance. The broker usually receives payment by way of commission from the insurer with whom the business is placed.

Business as Usual (BAU)

A distinction has been drawn between claims that are related to the Canterbury Earthquake Sequence or the Kaikoura earthquake and those that are from other events (earthquake or other). These other events are referred to as Business as Usual (BAU) events.

Canterbury Earthquake Sequence ('CES')

The sequence of earthquakes and aftershocks in the Canterbury area from 4 September 2010 to the end of 2011. This included four main earthquakes on 4 September 2010, 22 February 2011, 13 June 2011 and 23 December 2011.

Cap Cost Review

The process by which EQC determine which costs do or do not contribute towards a customer's cap. The process includes consideration of:

- Valid works. Costs of the work completed to the residential building that achieve EQC's repair standard.
- Workmanship. Costs of works completed to the residential building through CHRP/IHRP that need redoing due to poor quality of those works.
- Affected works. Cost of works completed to the residential building that need redoing because (a) missed earthquake damage and/or (b) a revised repair strategy is required to achieve EQC's repair standard.
- Additional repairs required. Cost of works currently required.
- Corrective costs.
    - Costs reasonably required to undo an original repair strategy before the new repair strategy can be pursued (that wouldn't have been required if all information was known and the repairs now required were completed the first time). OR
    - Costs reasonably required to repair an artificial surface or driveway because either the customer or their insurer have already carried out earthquake damage repairs to that artificial surface or driveway and the work (or parts of) will now need to be redone to enable the new foundation repair strategy to be completed.

Case estimate

The amount recorded by the insurer's claims personnel (including external claims assessors) as being the amount required to settle an open claim, based on the information available on that particular case. When a claim is first reported and recorded, a nominal placeholder estimate may be entered into the system. Estimates should be updated as extra information comes to light and adjusted to reflect any partial payments that may be made prior to final settlement.

Catastrophe

A catastrophe event for an insurer is generally considered to be a single event that results in one or more claims for very large amounts or in an aggregation of many claims collectively costing an extremely large amount. The nature and impact of potential catastrophe events will vary by insurer according to their business, amount of capital and risk management arrangements. Examples include earthquakes and terrorism.

Catastrophe reinsurance

Usually an excess of loss reinsurance arrangement providing cover to an insurer against very high losses arising from a **catastrophe** event, which meets the definition of 'catastrophe' as specified in the reinsurance policy. The nature and extent of the cover available / provided depends on the nature of the underlying insurer's business and the terms available for such protection. For some events, such as storm or earthquake, the reinsurer may impose a specified time limit on when claims may be covered under the catastrophe treaty.

Cedant or ceding insurer

An insurer who has ceded (passed on) all or part of the risks it has underwritten by way of reinsurance. Analogous to an insured who cedes risk to an insurer.

CEDAR

Canterbury Earthquake Defect And Repair review. MBIE commissioned an independent survey of the repairs of a sample (101 properties) of the earthquake-damaged Canterbury homes selected from more than 2,700 addresses provided by the Earthquake Commission (EQC), Housing New Zealand, and insurers Southern Response and IAG. The survey also included a small sample of houses where homeowners had opted out of an insurer-led home repair programme.

The aim was to assess the Building Code compliance of structural repairs that were exempt from a building consent under Schedule 1 (repairs and maintenance) of the Building Act.

Central Estimate

An estimate that contains no deliberate or conscious over- or under-estimation. NZ Accounting standards define this to be the mean of the probability distribution of future outcomes. Also, see **probability of adequacy**.

Claim frequency

The number of claims divided by exposure over a given time period. This could apply to **reported** or **incurred** claims.

Claims handling expenses (CHE)

The expenses involved in the processing and settlement of claims. Note that this term usually relates only to indirect claims expenses such as internal general administration claims costs. Expenses such as assessors' fees or legal costs, that arise in relation to specific claims, are termed direct expenses and are usually treated as part of the cost of those claims.

Claims paid

The amount paid in respect of claims.

Claims provision and claims reserve

These are both terms used to refer to the amount held or required to provide for future payments on outstanding claims. These terms are sometimes seen as being interchangeable. However, there are variations in the precise usage of both terms according to the context in which they appear.

A claims provision is often used to refer to the amount held in an insurer's accounts. In management accounts, claims reserve may refer to the total **case estimates**, possibly with an additional amount for **IBNR** claims. In actuarial contexts, the technical terms are, respectively, **incurred claims liability** and **outstanding claims liability**. These amounts might also include allowances for **CHE**, **discounting**, **claims paid**, and a **risk margin**. Figures may be given **net** or **gross of reinsurance**.

Closed claims

Those claims for which records have been closed, because settlement has been made and no recoveries are expected. However, see **reopened** claims.

Cover

The extent and nature of protection provided by an insurance policy. This will be defined in the policy documentation.

Deductible

See **excess.**

Demand surge

The increase in the cost of insurance claims following a major loss event. The event puts pressure on the demand for labour and materials to pay for repairs which, in the absence of increased supply, increases the price of these costs.

Diminution of Value (DoV)

Diminution of Value, in the context of IFV or ILV is the loss in value suffered by the homeowner, as a result of the land damage that caused the loss. In assessing the DOV, it does not include any change in value resulting from matters other than the land damage (e.g. a change in the building regulations and practices after the 2010-2011 Canterbury earthquakes).

Discounting

Discounting refers to the (absolute) reduction, for the time value of money, of any future cashflows. The extent of discounting is a consequence of two factors: length of time until payment and the discount rate with an increase in either of these increasing the impact of discounting. Cashflows which have been discounted are said to be *present values*.

Actuarial **professional standards** state that **risk-free discount rates** must be used to calculate present values.

Effective date

The effective date of an **ILVR** is the date to which the valuation calculations apply.

Excess

The amount of an insured loss that must be borne by the policyholder before the insurer becomes liable to make a claim payment. The amount of the excess will be set out in the policy documentation.

Excess of loss reinsurance

A non-proportional form of reinsurance whereby the insurer pays the cost of a claim up to a specified point (their **retention**) and the reinsurer pays the remainder of the cost. The amount payable by the reinsurer is usually subject to a specified maximum amount which may apply per claim or to the total amount. Also, see **catastrophe reinsurance.**

Experience

The term used to describe the results of blocks of insurance business, particularly when the results are the subject of detailed analysis.

Future Claim Liability (FCL)

A term sometimes used to refer to the **premium liability** arising from unearned policies. It is the value of future claim payments and related **CHE**, arising from future events for which the insurer is liable.

Green Zone

Canterbury land areas such that land repair / rebuild can begin. The Green Zone was further divided into commercial zoned land, Port Hills land, rural land, and three residential flat land categories. The three residential flat land categories describe how the land is expected to perform in future earthquakes, and also describe the foundation systems most likely to be required in the corresponding areas. Also, see Red Zone, TC1, TC2, and TC3.

Gross

Refers to the amounts of premiums, claims and expenses before allowing for the costs or income (including commission as well as claim recoveries) from reinsurance and other non-reinsurance recoveries.

Inception date

Inception date is the date on which cover commences.

Increased Flooding Vulnerability (IFV)

The physical change to land as a result of an earthquake which adversely affects the use and amenity that could otherwise be associated with the land by increasing the vulnerability of that land to flooding events.

Increased Liquefaction Vulnerability (ILV)

The physical change to land as a result of ground subsidence from an earthquake which materially increases the vulnerability of that land to liquefaction damage in future earthquakes.

Incurred

A term relating to claims arising from events that occurring in a specified period.

There are differences in the precise usage of the term according to the context in which it appears. In some contexts, it may refer to the group of claims *occurring* in the period (whether **reported** to the insurer or not) and their eventual cost. In accounting contexts, the term may refer to the amount of *claims payments made plus the change in outstanding claims provisions* from the start to the end of the period.

In an actuarial context, 'incurred' costs are taken to mean the claim costs cost which arise or come to light) during the period. An alternative expression of this is: claim payments made plus outstanding estimates (inclusive of **IBNR** and **IBNER**).

Further differences may also apply in regard to the inclusion (or not) of **CHE** and **risk margins.** Clarification should be provided in the actuarial commentary as to the precise meaning applied. It should also be stated whether there has been allowance for **discounting** in the quantification of future payments to be made on these claims. Also see **discounting** and **ultimate cost**.

Incurred but not reported (IBNR)

Any claim or claim amount for which, at a particular point in time, the loss event has occurred, but the insurer has not yet been notified and/or the claim entered into the claims system. Any **outstanding claims liability** must include an allowance for these claims.

Incurred but not enough reported (IBNER)

A monetary amount relating to **reported** claims. IBNER is defined as the ultimate cost of the claim less the current **case estimate** and could be positive or negative. The **outstanding claims liability** must include an allowance for this.

Incurred claims

Claims that were **incurred** during a specified time period.

Incurred claims liability

See **Outstanding Claims Liability**.

Indirect claims handling expenses

See **claims handling expenses**

Insurance liability valuation report (ILVR)

A report detailing a valuation by the **actuary** of the **insurance liabilities** of an insurer.

Joint Assessment and Review Team (JART)

The process whereby EQC and the relevant insurer would review building claims to assess whether it was likely to go overcap and if so, how it should be apportioned and settled. The JART report is a summary of the properties that had open building issues, categorised by the reason for the issue.

Kaikoura Earthquake ('KEQ')

The earthquake and related aftershocks that occurred on 14 November 2016, beginning 15 km north-east of Culverden and proceeded north-east through Kaikoura to Seddon.

Liability adequacy test (LAT)

A test applied under the **accounting standard** which consists of a comparison of the **unearned premium**, less deferred acquisition costs (DAC), against the **premium liability**. If the test indicates a deficiency, the DAC must be written down by an appropriate amount in the entity's income statement. If the deficiency is greater than the DAC, a premium deficiency reserve must be set up.

Material

In the context of an actuarial report, an item is deemed material if it is significant in the professional judgement of the actuary. This may not necessarily correspond exactly with 'material' as applied in an accounting context.

Net

Refers to the amounts of premiums, claims and expenses after allowing for the costs or income (including commission as well as claim recoveries) from reinsurance and other non-reinsurance recoveries.

Net outstanding claims liability

See **outstanding claims liability.**

Non-reinsurance recoveries

Non-reinsurance recoveries refer to the recoveries against claim payments that come from entities other than reinsurers. It includes amounts in respect of salvage and third parties. It doesn't refer to excesses and deductibles that are deducted from the claim.

Open claims

Those claims that have been **reported** to the insurer but are not regarded as finally settled as claim payments and/or recoveries associated with the claim, may occur in future.

Outstanding Claims Liability (OCL)

The expected value of future payments on claims that were **incurred** on or before the **effective valuation date**. This usually includes future **CHE** associated with those claims, allows for **discounting**, and includes a specified **risk margin**. It may be calculated **gross** or **net of reinsurance** and **non-reinsurance recoveries**.

Outstanding Claims Provisions

The amount in the insurer's accounts providing for **outstanding claims liabilities** at the accounting date.

Premium Liabilities

The value of future claim payments and related **CHE**, arising from future events for which the insurer is liable at the date of calculation.

Probability of adequacy

The statistical probability that a reserve or provision will ultimately prove to be adequate to provide for all relevant payments to be made.

Professional Standard

The form of professional guidance as issued by the New Zealand Society of Actuaries, or such other professional body as may be stated.

Red Zone

Canterbury land areas such that land repair would be prolonged and uneconomic. This includes flat land areas, which sustained significant crustal thinning and Port Hills areas which were at imminent risk of cliff collapse or rockfall. Also see Green Zone, TC1, TC2, and TC3.

Reinstatement premiums

Premiums that become payable under reinsurance treaties, particularly catastrophe reinsurances, when all or part of a layer of cover has been 'used' by the insurer making a claim, but the insurer wishes to reinstate full coverage for the remaining term of the treaty. A 'free reinstatement' may sometimes be included in the original terms of a treaty.

Reopened claims

Claims that had been regarded as settled (i.e. no further claim payments or recoveries) but for which claims records have since been reopened because an additional payment or receipt has been made or is now expected to be made. The **Outstanding Claims Liability** must take the possibility of claims reopening in future into account.

Reported

Claims are said to be reported if the insurer has been notified of their existence. This is in contrast to **IBNR** claims.

Resolved

For exposures settled by cash payment, the valid building, contents or land exposure is recorded as resolved when the claimant has been paid for that exposure. In the case where the building exposure is settled by managed repair, building exposures are only recorded as resolved when all planned repairs are complete (but the 90-day defect liability and warranty period may not have expired) and the customer has received a full cash payment from EQC for all contents and land exposures. Exposures are also considered resolved if the exposure has not been accepted and the customer informed.

Retention

The amount of risk retained by the direct insurer above which an excess of loss reinsurance will be triggered. Also see **excess**.

Risk-free discount rates

These are the rates of interest that would be available on a theoretical, riskless investment. In practice, they are the rates available on very secure investments, such as government bonds of suitable durations, which may be assumed to be free of default risk.

Risk Margin

The amount of extra provision over and above the **central estimate** which is intended to allow for the inherent uncertainty of insurance liabilities. The relevant **probability of adequacy** associated with the increased amount should be stated.

Sensitivity

The uncertainty in the calculation of insurance liabilities due to the assumptions involved. Accounting and **professional standards** require statements of the effects on the results to be illustrated by sensitivity tests. These involve reviewing the calculations after varying key assumptions.

Technical Category 1 – TC1

TC1 refers to Green Zone land where it was assessed that future land damage from liquefaction was unlikely. Residential buildings on TC1 land required no special foundation systems, relative to most flat land throughout New Zealand.

Technical Category 2 – TC2

TC2 refers to Green Zone land where it was assessed that minor to moderate land damage from liquefaction was possible in future large earthquakes. Residential buildings on TC2 land require face some restrictions on the type of foundation that is permitted, subject to the house design.

Technical Category 3 – TC3

TC3 refers to Green Zone land where it was assessed that moderate to significant land damage from liquefaction is possible in future large earthquakes. Residential buildings on TC3 land require a site-specific geotechnical investigation and a specific engineering foundation design.

Uncertainty

Where full, known information is not available, uncertainty exists as to the exact nature and extent of the ultimate outcome. In particular, there is inherent uncertainty in any estimation of insurance liabilities, which are necessarily based on assumptions, usually derived from analyses of past experience. Deviations from estimates are normal and are to be expected. See also **central estimate, probability of adequacy** and **sensitivity**.

Unearned Premium

The proportion of written premium that relates to the risk still to be covered after the balance date or effective date of the valuation. The calculation usually assumes that premium is earned evenly over the term of a policy, except for unusual types of risk where this is clearly not the case (for example, Contractors All Risks). Should a policy be cancelled, the unearned premium as at the cancellation date may be refunded to the policyholder, possibly after allowance for expenses incurred.

Unearned Premium Reserve (UPR)

The total amount of **unearned premiums** held, reflecting the periods of future cover to be provided under policies in force at the balance date or effective date of the valuation.

Valuation date

The **effective date** as at which a valuation has been made.