Earthquake Commission

25 March 2019

Insurance Liability Valuation as at 31 December 2018

Final Report

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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 $11,173 million. This is an increase of $129 million since 30 June 2018.

Canterbury earthquakes only
Estimated ultimate claims costs (undiscounted) - 31 December 2018 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Claims costs paid to date *						
Land	58	394	50	4	1	506
Building	2,368	4,859	374	106	191	7,899
Contents	125	303	29	12	7	477
CHE	490	867	118	39	51	1,564
Total	3,041	6,422	571	161	250	10,446
Estimated future						
Land	10	77	7	0	0	95
Building	453	174	(102)	(11)	9	523
Contents	0	0	0	0	-	1
CHE	29	56	18	3	2	108
Total	493	308	(77)	(8)	11	727
Gross ultimate incurred claims cost - central estimate						
Land	68	471	57	4	1	601
Building	2,821	5,033	272	96	200	8,422
Contents	126	303	29	12	7	478
CHE	519	923	136	41	53	1,672
Total	3,534	6,730	494	153	262	11,173
30 June 2018 comparative						
Gross ult inc claims cost - cent est	3,222	6,765	622	171	264	11,044

*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 2.9.1.

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.

1.1.2 *Kaikoura earthquake claims*

The gross estimated ultimate claims costs from the Kaikoura earthquake event are $631 million. This has increased from our previous estimate ($616 million) due to:

- Higher than expected settlements for multi-unit buildings
- Ongoing payments in respect of insurer-managed building claims
- Increased estimates for CHE costs.

Kaikoura earthquakes only
Estimated ultimate claims costs (undiscounted) - 31 Dec 2018

	31 Dec 2018 $m	30 Jun 2018 $m
Claims costs paid to date		
Land	10	9
Building	461	416
Contents	13	13
CHE	103	78
Total	586	516
Estimated future		
Land	0	0
Building	37	67
Contents	1	5
CHE	7	28
Total	45	100
Gross ultimate incurred claims cost - central estimate		
Land	10	9
Building	498	483
Contents	13	18
CHE	110	105
Total	631	616

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 - 31 December 2018 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	3,015	5,807	358	112	208		521	10,022
Claims handling expenses (CHE)	519	923	136	41	53		110	1,783
Gross ult claims incl CHE, undisc - central est	3,534	6,730	494	153	262	n.a.	631	11,804
Reinsurance recoveries, undiscounted - central est	(1,989)	(2,478)	0	(0)	0	-	0	(4,467)
Net ult inc claims incl CHE, undisc - central est	1,545	4,253	494	153	262	n.a.	631	7,338
Net claims costs paid to date	(1,045)	(3,078)	(454)	(123)	(199)		(484)	(5,382)
CHE paid to date	(490)	(867)	(118)	(39)	(51)		(103)	(1,667)
Discounting	(0)	(5)	1	0	(0)	(0)	(0)	(4)
Net OS including CHE, disc - central est	9	303	(76)	(8)	11	14	44	298
Net risk margin, diversified, 85% PoA	0	176	57	5	4	4	19	266
Net OS including CHE, disc - 85% PoA	9	478	(19)	(3)	15	18	64	563

The diversified net risk margin (85% PoA) is $266 million, which is $86 million lower than the previous valuation. The reduction in the net risk margin is despite the gross risk increasing since the previous valuation. The risk margin includes a loading to allow for the challenges related to data quality, which have a great impact in the tail of events. There is also a significant component relating to close. Refer Sections 1.4.3 and 8.2.2 for details.

1.2 Current insurance activities

1.2.1 *Canterbury earthquake building claims*

Reopened claims

Canterbury claims have continued to reopen with a number going overcap. Additionally, overall management of litigation claims has been passed to the Canterbury team, with assistance from EQC Legal as required.

Financial Close

9(2)(j)

[redacted]

1.2.2 *Canterbury earthquake land claims*

EQC have been in discussions with insurers regarding whether the use of Intermediate Gravel Rafts ('IGR') is a valid form of land repair under the ILV policy and as a consequence will qualify for reimbursement as costs incurred. The discussions will also include consideration of whether to include cases where an insurer has cash settled with the customer on the basis of an IGR.

1.2.3 Kaikoura earthquake event

As at 25 October 2018, based on the 'Kaikoura Event - Programme Progress Report', EQC had assessed 99% of its building claims with 99% having been settled.

In respect of insurer managed building claims, insurers have informed EQC that 99% have been assessed and 99% have been settled. This claim status information is not yet fully reflected in EQC's claims management system. Additionally, there are delays between an insurer paying a claim and invoicing EQC for reimbursement – this is reflected in our recommended provisions for the Kaikoura event.

As at 31 December 2018, total payments made by EQC sum to $586 million, which includes claims costs and CHE costs incurred by EQC and by the insurers. This also includes $12 million for which insurers have invoiced EQC but which had not yet been reimbursed as at 31 December 2018. This amount is included within EQC's accounts as a separate accrual.

1.2.4 Other claims

There have been a small number of other natural disaster events over the past year. These have primarily related to weather events. Section 7 details the breakdown of the notable events.

1.3 Data and data migration

EQC holds a tremendous volume of data and information over a variety of claims management and project management systems. These systems have evolved over time as required to facilitate the management of the claims as they arise.

Whilst they allow EQC to manage claims, they do not easily report claims information for other purposes. This includes management reporting and also as an input into actuarial valuations.

The transfer from CMSv4 to CMSv8 has highlighted this issue.

CMSv4 held claims information as follows:

- BAU claims were recorded and managed on CMSv4.
- Canterbury earthquake claims were recorded on CMSv4 although it did not contain payment or resolution information in respect of claims that were managed through EQC's PMO, EQR.
- Kaikoura earthquake claims were recorded on CMSv4 although there was a lag in recording all claim payments as most claims were managed by the relevant insurer.

In respect of CMSv8:

- New BAU claims have been managed on CMSv8 since May 2017.
- Canterbury earthquake claims were migrated to CMSv8 on 20 April 2018 only if they were believed to be open. Approximately 5,000 claims were migrated covering building, contents and land.
- Kaikoura earthquake claims were migrated to CMSv8 in May 2018 only if they were open and were managed by EQC. Insurer managed claims are being recorded in a separate system.

CMSv4 is now in read-only state.

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 cheque. 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.
- 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 large.

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

1.4 Canterbury earthquakes – model developments

1.4.1 Developments since prior valuation

Since the previous valuation, there have been developments in respect of financial close insurer, and reopened building provisions and expected land settlements.

Below is a brief note on these developments and what has been implemented as a consequence.

Building financial close – insurers

9(2)(j)

It is expected that it will take several more months for this joint work to conclude but early observations of the process have enabled us to produce a draft valuation model. Section 1.4.3 has more detail on this.

Building reopened claims

As at June 2018, the provision for future reopened claims was revised. It was calculated with a component in respect of claims that would remain undercap and in respect of claims that would go overcap. The overall provision was $213 million and was forecast to materially arise over the two-year period to June 2020.

The experience over the six-month period to 31 December 2018 illustrated that the overall projected numbers of claims reopening was consistent with that which was expected. However, the number of claims going overcap was higher than expected.

A key aspect to revising the provision is an understanding of why properties are being reopened and the consequential payments that are being made. The claims management system contains voluminous detail on why claims are open, the state of the settlement and expected outcomes.

Unfortunately, it is not able to be easily collated into a usable form for the valuation. Consequently assumptions must be based purely off limited claim data fields. It would be useful to discuss the reopening claims rate with Canterbury claim managers prior to the June 2019 valuation to better understand the drivers behind these claims.

Further detail on these provisions is provided in Section 1.4.3.

Land: Intermediate Gravel Rafts

9(2)(h)

Canterbury CHE

The estimated ultimate CHE has been increasing as the expected time to resolve all Canterbury claims has lengthened.

EQC Finance have forecast CHE through to 30 June 2019. We have projected EQC's Canterbury operations beyond this point, through to 2022, albeit with a diminishing presence. This has been revised for this valuation with a $30 million increase.

A key driver in the actual ultimate cost of CHE will be how the rate of reopened claims trends.

1.4.2 *Key areas of judgement*

In undertaking the valuation there are some areas of judgement required that materially affect the results. These are briefly discussed below.

Canterbury building claims

In respect of building claims, a key area of judgement in the provision is understanding how claims are being reopened, the expected quantum per claim and how systemic this might be.

9(2)(j)

Canterbury land claims

9(2)(h)

9(2)(h)

[redacted]

1.4.3 *Canterbury building claims – key assumptions*

Canterbury managed claims

The Canterbury team have overall management responsibility for all Canterbury earthquake claims. This includes claims which are cash settled, managed repair or are in the alternative disputes resolution ('ADR') process (this includes claims which have filed for litigation but may be settled prior to reaching court).

The figures quoted below are based heavily on the open exposure information from CMSv8. This report allows an analysis into many factors, including:

- The number of claims open.
- Average amount paid per claim (open or closed)
- Claims closed with no payment (nil-claim rate)

The data from CMSv8 is relatively new and covers experience from April 2018. Despite its recent creation, it is considered usable for the purposes of informing the provisions below.

In formulating the valuation provisions, it is assumed that the recent claims settlement process is not expected to materially change in the future.

The chart below illustrates the progression of the average costs experienced by the Canterbury unit. The average costs for cash settlement and managed repair have diverged significantly since 30 June 2018.

9(2)(j)

[redacted]

The table below shows the experience recorded by the Canterbury team since its inception, and as compared to that reported at 30 June 2018.

Assumptions	30 Jun 2018	31 Dec 2018
Average no-nil claim cost for cash settled claims	9(2)(j)	
Average no-nil claim cost for managed repair claims		
Average no-nil claim cost for ADR (litigation) claims		
Nil claim rate for future cash settled claims	41%	31%
Nil claim rate for future managed repair claims	31%	12%
Nil claim rate for current cash settled claims	24%	2%
Nil claim rate for current managed repair claims	14%	2%
Nil claim rate for current ADR (litigation)	9(2)(j)	
Proportion of future claims assigned to managed repair	30%	12%

The nil claim rates have reduced, both for claims currently being managed and for those expected to open in the future.

9(2)(j)

9(2)(h)

Future reopened claims

There has continued to be a steady flow of reopened claims with a continuation of claims going overcap.

Normal modelling approach

The preferred approach that would be followed to estimate the future development of a claim issue would be:

- Identify the properties / claims that had exhibited the issue. In this case, claims that had reopened.
- For each property, record the characteristics of the property that may have contributed to the reopened claim.
- Determine the relevant weight of each characteristic to the claim being reopened and the ultimate cost implications.
- Use these risk factors to estimate which other properties in the population, with appropriate characteristics, are likely to reopen.

Modelling difficulties

There are two main difficulties to overcome with this approach.

Firstly, although we have a sample list of recently reopened properties, we don't have the complete list of all properties that have reopened. It is not feasible to produce the complete list as there is no reopened flag in CMSv4. There are notes and documents attached to each claim which will identify whether the claim was reopened but these are not readily available for reporting.

Similarly, risk characteristics are not obtainable for reporting. While the risk information is clearly recorded in CMSv4, it is difficult to extract this in bulk. Some information is available in bulk, such as evidence of liquefaction and peak ground acceleration but this has demonstrated limited predictive value in respect of identifying the ultimate claims cost for a property.

We have therefore been obliged to use alternative techniques to address the issue. We have divided the population into those that may reopen and go overcap and those that may stay within EQC's cap.

Overcap claims

To estimate the number of future properties which may go overcap requires some knowledge of the properties that have already gone overcap.

The previous claims management system (CMSv4) contained a flag which was used to indicate whether the property was overcap. This flag does not exist in CMSv8 and so the identification of whether a property is overcap is less certain. Consequently, any attempt to mechanically identify properties which are overcap will only ever be approximately correct.

Prior expectation

Notwithstanding this, we were provided with a listing of overcap properties at the previous valuation and this was used to estimate that there would be some 1,000 further overcaps. As part of this, we assumed that 359 would emerge over the six-month period to 31 December 2018 (with 641 to emerge thereafter. It was assumed that all future overcaps would emerge prior to June 2020.

Experience

A new listing of overcap properties has been provided for this valuation. The two listings were created using different methodologies so it is expected that there will be anomalies between the two sets.

Using the two lists we have attempted to identify how many properties have gone overcap since 30 June 2018.

The first method we used was to simply compare the two lists of overcap properties. This indicated that there were some 550 'new' overcap properties with a payment after 30 June 2018.

The second method was to combine the new listing of overcap properties with a transactional listing of all claim payments to determine the date at which each property first appeared to go overcap. Under this method, we identified 421 properties that went overcap after 30 Jun 2018. For the purposes of this valuation, we have assumed that 500 properties have gone overcap since June 2018.

New projection

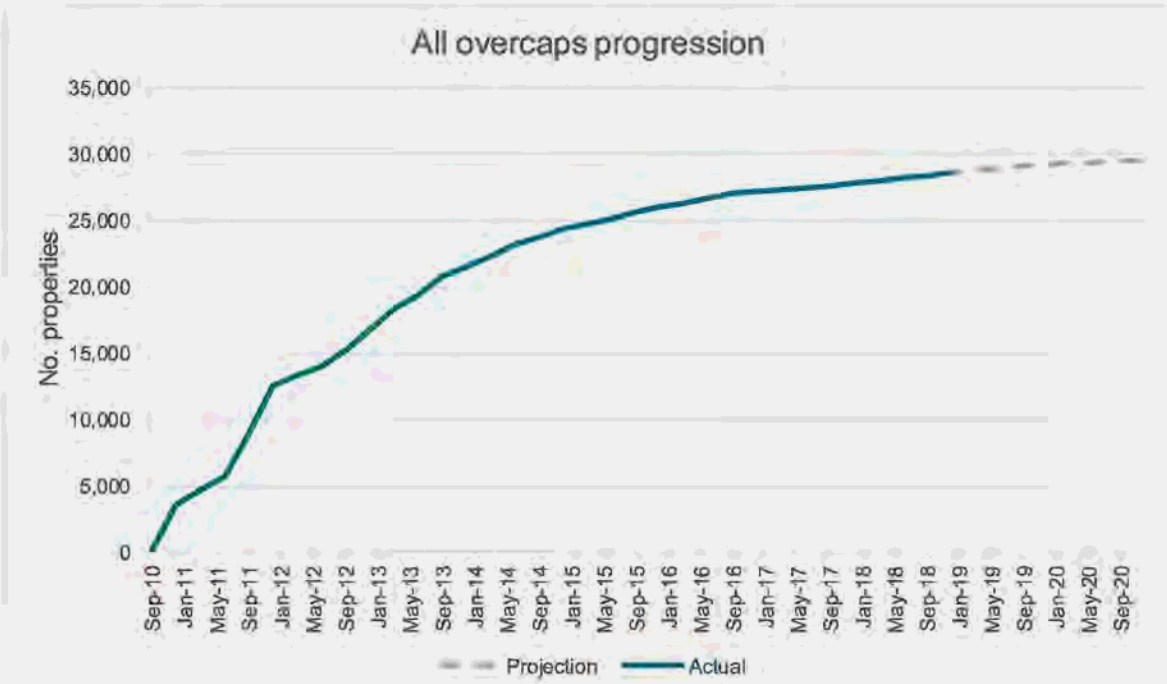
In respect of future overcaps, we have considered a number of possible scenarios, these being:"

- Jun18 estimated total figure was correct. Dec18 estimate is 1,000 - 500
- Jun18 projected number pattern was correct. Dec18 estimate is 641.
- Jun18 projected % pattern was correct. Dec18 estimate is 641 * 500 / 359 = 890

Comparing these estimates with the recent emergence of overcaps, it is evident that the third option produces the most appropriate figure. It has also been considered appropriate to rebase the end point to December 2020.

That is, the revised projection is 890 further overcaps with these being expected to emerge through to December 2020.

A chart showing the cumulative number of overcap properties along with the projected overcaps is shown below.



As at 31 December 2018 it is estimated that there are 28,605 overcap properties. The ultimate number of overcaps is estimated to be 29,495.

Cost

In respect of these properties we have estimated an average top up payment of 9(2)(j) This includes an amount of 9(2)(j) in respect of costs which do not contribute to cap . The total estimated provision for this component is therefore 9(2)(j) .

Undercap claims

We have previously estimated that there would be a further 7,500 claims that will reopen over the 24-month period following 30 June 2018.

In respect of the numbers of reopened claims, we had assumed at 30 June 2018 that there would be an additional 2,655 claims reported by 31 December. The experience shows that there have been 2,565 claims which have reopened. This includes undercap, overcap and ADR claims.

These figures are materially similar and we have retained our existing overall projection of undercap claims. We have however extended the time horizon for these claims to emerge, to be consistent with the overcap assumption.

That is, we have assumed that the remaining 4,900 claims will generate 2,230 settlement claims and 395 managed repair claims. These are expected to cost 9(2)(j) and 9(2)(j) respectively.

ADR claims

9(2)(j)

Financial close – insurers

9(2)(j)

Summary of Canterbury building claim provisions

	31 December 2018 $m	30 June 2018 $m
Open claims	9(2)(j)	
Cash settled		
Managed repair		
ADR - Insurance payment		
ADR - Customer reimbursement*		
Future claims		
Undercap (cash settled / managed repair)		
Overcap		
ADR - Insurance payment		
ADR - Customer reimbursement*		
Open claims Subtotal		
Financial close - insurer		
Total	522	534

*Customer legal and technical advice reimbursement

1.4.4 *Canterbury land claims – key assumptions*

Litigation risk

Litigation risk has been modelled as the difference between:

- EQC incurring no further cost other than that related to open claims
- Various potential outcomes based on current actual litigation as well as potential future legal challenge related to ILV settlements

The central estimate of outstanding claims is the weighted average of potential scenarios. The scenarios are detailed in Section 5.5. The nature of the scenarios and their respective likelihoods are based on our discussions with EQC's legal and engineering advisors.

1.4.5 *Canterbury CHE – key assumptions*

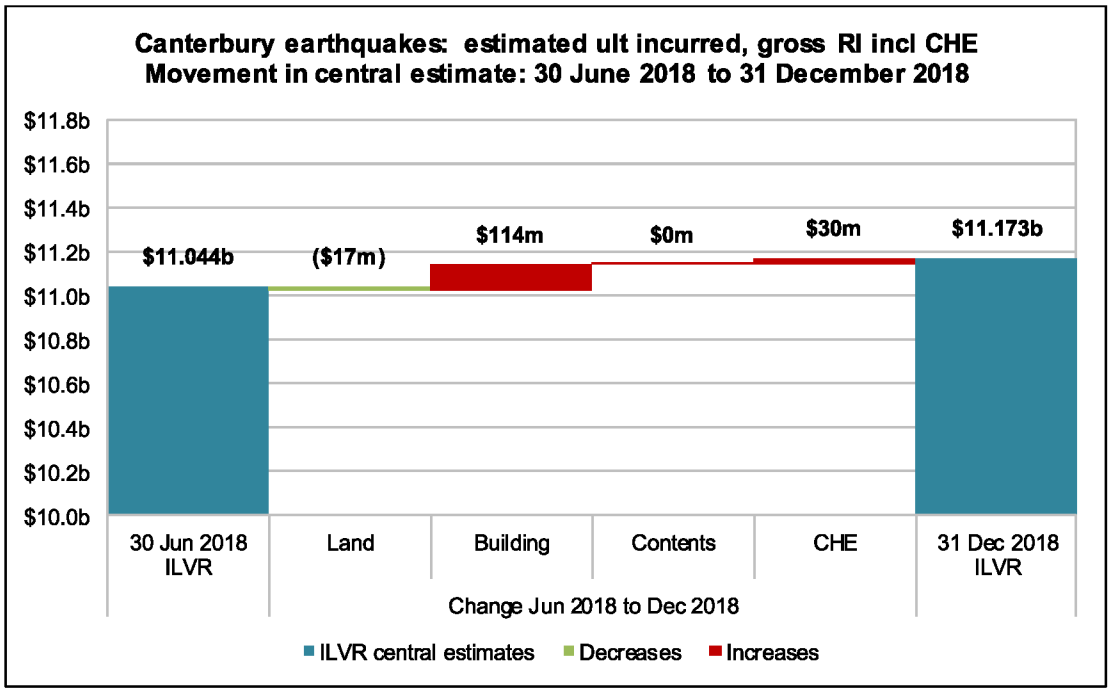
The Claims Handling Expenses ('CHE') related to settling Canterbury earthquake claims will continue for as long as there are outstanding claims.

The current EQC budget projects costs to 30 June 2019 although we expect costs to be incurred beyond this point, primarily due to individual and insurer litigation – which is constrained to a large extent by the court process. The issue of reopened claims is also highly uncertain and will affect the actual CHE costs.

We have projected the CHE budget beyond 2019 through to June 2022. A revision for this valuation has increased the ultimate CHE by $30 million.

1.4.6 *Estimated ultimate claims costs – movement since 30 June 2018 - Canterbury only*

The estimated ultimate gross claims cost for Canterbury earthquake events has moved from $11.044b as at 30 June 2018 to $11.173b as at 31 December 2018. Shown below is a graphical representation of the change in estimated ultimate incurred liabilities.



The movement in the Building component relates to additional expected costs from the Financial close process and a strengthening in the provision for future overcap claims.

1.5 Kaikoura earthquake – modelling developments

Information developments

The table below summarises the reported settlement position of the insurers and EQC, along with the amounts paid at the previous and this valuation. We note that the settlement percentages are by number of claims, rather than by amount. In particular a large EQC-managed multi-unit claim was paid during the period.

	30-Jun-18		31-Dec-18		Movement	
	EQC	Insurers	EQC	Insurers	EQC	Insurers
Proportion settled	99%	96%	99%	99%	0%	3%
Amount paid ($m)	33.6	404.8	39.9	444.0	6.3	39.2

These figures are not used directly as an input into the valuation nor are they are output from the valuation. Of interest are the significant claims payments being made for the 'tail' of the settlement.

Data challenges

As noted in Section 1.3, not all Kaikoura earthquake claims are fully recorded in CMSv8. Insurer managed claims are recorded in a separate database specific to the Kaikoura events. There are around 17,000 building exposures that are still flagged as being open. Whilst we are confident that most of these claims will have already been cash settled by the insurers (and a large subset of which will have been reimbursed by EQC), the lack of clarity over exposure statuses does present some challenges for the valuation.

These data challenges seen in combination with the payment development table which shows considerable claim payments over the past six months, with little apparent progress in settled claim numbers.

An additional challenge is the lack of certainty regarding the finality of any cash settlements. EQC is unable to make 'full and final' settlements so will be liable until the earthquake damage is actually remediated.

1.5.1 Kaikoura claims costs – judgement & assumptions

The key judgement in respect of Kaikoura claims is the likely level of final and reopened claim payments. This is especially true in the *Building – insurer managed non MuBs* category which contains the majority of the claims costs. For this category, a multi-state model with transition probabilities and payment assumptions between the various states was used. Details on this are shown in Appendix C.2 and C.3.

1.5.2 Claims handling expenses

The CHE for Kaikoura has been increased by $5 million following a review of the forecasted expenses. This has increased the expected ultimate CHE for Kaikoura to $110 million.

1.5.3 Reopened allowance

The most likely source of reopened claims is from the largest component of costs to date i.e. the insurer-managed non-MUBs. The multi-state model explicitly allows for claims to transition to a reopened status. Experience of reopened claims for Kaikoura to date is limited, so the assumptions in regard to reopened claims have been estimated with consideration given to the Canterbury experience.

We have used the same assumption set for reopened claims as we did for the June 2018 valuation, rolled forward six months. Some sensitivity/scenario analysis around the reopened allowance is provided in Section 6.5.

1.6 Implications of above

In respect of Canterbury earthquake claims only, the implications of the above are that the estimated gross ultimate claims costs have been increased. The net outstanding claims liabilities have reduced, partially from claims payment but more from the reallocation of claim payments between events.

The estimated ultimate CHE costs have been strengthened. There is considerable uncertainty in how the remaining claims experience will evolve.

In respect of the Kaikoura earthquake claims, the estimated ultimate building costs have been strengthened slightly, partly due to timing of the claims data migration with the valuation process.

1.7 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 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 9.3.3 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.

1.8 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.

1.8.1 Land litigation

9(2)(h) [redacted]

1.8.2 Financial close

9(2)(j) [redacted]

1.8.3 Reopened claims

EQC has faced a constant stream of reopened building claims which is putting pressure on the ultimate claims costs. There is limited detail on why these claims are reopened and therefore little to indicate how long it may continue.

1.8.4 Data

EQC has amassed a considerable body of data in settling Canterbury and Kaikoura earthquake claims. This has not always been recorded in a single 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.

1.8.5 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.

This has been highlighted with the recent migration of data from CMSv4 to a database system. There were some data challenges experienced during the transition period and some of the data we used is no longer captured in the new system.

In addition, the claims are typically being settled by way of cash payment. It will be up to the claimant to manage their repair. Some of the claimants live in smaller communities with limited resources available to remediate damage. With limited alternative accommodation and limited labour resource, it may take some time for the repairs to be carried out. There is therefore the risk of economic inflationary impacts resulting in the original cash settlement being ultimately insufficient.

The estimated outstanding claims includes an allowance for reopened insurer-managed non-MUBs which amounts to around 3.7% of costs paid to date.

1.9 Key recommendations

1.9.1 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 land claims
  - Improve the quality of the link between properties in the land model and properties in the ADE. *Stage 1 complete*
  - Continue engaging with insurers in respect of Insurer Close. *Ongoing*
- Collect timely and accurate information in respect of the Kaikoura earthquake claims managed under the MoU. *Ongoing*
- In respect of Data. Undertake a review of the data capture process to ensure that as much data as possible may be effectively utilised. Ongoing
- In respect of Kaikoura management. Continue communicating with insurers to be able to manage risks as they emerge. *Ongoing*

1.9.2 Current Recommendations

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

- In respect of settling the remaining Canterbury earthquake claims
  - Continue engaging with insurers in respect of Insurer Close.
  - Review reopened claims to better understand the causes
- Utilise the Kaikoura Data Management System to track the status of insurer managed claims.
- In respect of Data. Undertake a review of the data capture process to ensure that as much data as possible may be effectively utilised.
- In respect of Kaikoura management. Continue communicating with insurers to be able to investigate the robustness of the cash settlements and to manage risks as they emerge.

1.10 Authors

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2 Report description

2.1 Addressee

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

2.2 Report commissioned by

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

2.3 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 31 December 2018.
- The development of EQC's Canterbury earthquakes claims costs since 30 June 2018.
- The development of EQC's Kaikoura earthquakes claims costs since 30 June 2018.

2.4 Scope

2.4.1 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 31 December 2018.
- Premium liabilities – which relate to the future net claims costs and administration and reinsurance expenses for future claims arising from unexpired risks as at 31 December 2018.

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.

2.4.2 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.

2.5 Effective valuation date

The effective date of the valuation is 31 December 2018.

2.6 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).

2.7 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 30 June 2018 (dated 20 August 2018).

2.8 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 I.

2.9 Event groups

2.9.1 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.

2.9.2 *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.

2.9.3 *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.

2.9.4 *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 Canterbury.
- Enhanced seismicity in respect of Canterbury earthquake claims and Kaikoura earthquake claims.

2.10 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.

2.11 MJW staff involved in the investigation

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

- Craig Lough — Principal
- Jeremy Holmes — Principal
- 9(2)(a) — Analyst
- [redacted] — Analyst

3 Canterbury Event Key Assumptions

	BUILDING CLAIMS as at 31 December 2018			
Assumption	**Explanation**	**31 Dec 2018 provision**	**30 Jun 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	• 2,394 open properties in this stream. Expect 2,342 to require a non-nil payment. • Average payment recently experienced is 9(2)(j) .	9(2)(j) [redacted]		• Claim stage gate report. Provides information on average cost, non-nil %, numbers of open claim etc
Current - Managed repair	• 264 open properties in this stream. Expect 259 to require a non-nil payment. • Average payment recently experienced is 9(2)(j) .			• Claim stage gate report. Provides information on average cost, non-nil %, numbers of open claim etc
Current - Alternative disputes resolution (increased insurance payment)	• 9(2)(h) [redacted]			
Current - Alternative disputes resolution (additional CHE)	• [redacted]			

	BUILDING CLAIMS as at 31 December 2018			
Assumption	**Explanation**	**31 Dec 2018 provision**	**30 Jun 2018 provision**	**Informed by**
Future claims				
Future – cash settlements and managed repair	• Reviewed analysis carried out at June 2018 and compared actual vs expected experience since then. • Actual reopened claim rates are similar to that we had expected • We have maintained our view of future re-openeds and will review further for June 2019. • 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
Future – Overcap claims	• We have reviewed new overcaps since June 2018. • Actual overcap rate appears to be higher than expected. • Have revised upwards our view of future overcap claims. • Each claim is assumed to accrue top-up payment to cap plus costs which do not contribute to cap.			• Claim stage gate report. Provides information on average cost, non-nil %, numbers of open claim etc • Listing of overcap properties at December 2018.
Future - Alternative disputes resolution (increased insurance payment)	9(2)(j) [redacted]			

	BUILDING CLAIMS as at 31 December 2018			
Assumption	**Explanation**	**31 Dec 2018 provision**	**30 Jun 2018 provision**	**Informed by**
				9(2)(j)
Future - Alternative disputes resolution (additional CHE)	9(2)(h)			
Financial Close – Insurers	9(2)(j)			

	LAND CLAIMS as at 31 December 2018			
Assumption	**Explanation**	**31 Dec 2018 provision**	**30 June 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	9(2)(h) [redacted]			

4 Kaikoura Event Key Assumptions

	KAIKOURA CLAIMS as at 31 December 2018			
Assumption	**Explanation**	**31 Dec 2018 Ult claims cost**	**30 Jun 2018 Ult claims cost**	**Informed by**
Insurer managed non – MUB building claims	• Multi-state model based on: o Claim status in CMS and/or KDMS o Number of payments made by EQC to insurer o Duration since last payment to insurer o 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 30 June 2018 that have affected the estimation of EQC's Canterbury claims costs. These relate to:

- Land model
  - Actual settlements – Red Zone
- Building model
  - Resolved and reopened claims
  - Insurer Finalisation
- Claims Handling Expenses (CHE)

These have been discussed earlier in Section 1.3.

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 31 December 2018.

Canterbury earthquakes only
Ultimate claims costs, central estimate, undiscounted, including CHE - 31 December 2018 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Claims paid to date (excl. CHE)*	2,551	5,555	454	123	199	8,882
Estimated future (excl. CHE)	463	252	(95)	(11)	9	618
Gross estimated ultimate incurred claims	3,015	5,807	358	112	208	9,500
Claims handling expenses (CHE)						
Paid to date	490	867	118	39	51	1,564
Estimated future	29	56	18	3	2	108
Total	519	923	136	41	53	1,672
Gross ultimate incurred claims including CHE	3,534	6,730	494	153	262	11,173
Reinsurance recoveries	(1,989)	(2,478)	-	(0)	-	(4,467)
Net ultimate incurred claims including CHE	1,545	4,253	494	153	262	6,706
30 June 2018 comparatives						
Gross ult incurred claims including CHE	3,222	6,765	622	171	264	11,044

*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) - 31 December 2018 valuation

	EQ1 $m	EQ2 $m	EQ3 $m	EQ4 $m	AS $m	Total $m
Claims costs paid to date *						
Land	58	394	50	4	1	506
Building	2,368	4,859	374	106	191	7,899
Contents	125	303	29	12	7	477
CHE	490	867	118	39	51	1,564
Total	3,041	6,422	571	161	250	10,446
Estimated future						
Land	10	77	7	0	0	95
Building	453	174	(102)	(11)	9	523
Contents	0	0	0	0	-	1
CHE	29	56	18	3	2	108
Total	493	308	(77)	(8)	11	727
Gross ultimate incurred claims cost - central estimate						
Land	68	471	57	4	1	601
Building	2,821	5,033	272	96	200	8,422
Contents	126	303	29	12	7	478
CHE	519	923	136	41	53	1,672
Total	3,534	6,730	494	153	262	11,173
30 June 2018 comparative						
Gross ult inc claims cost - cent est	3,222	6,765	622	171	264	11,044

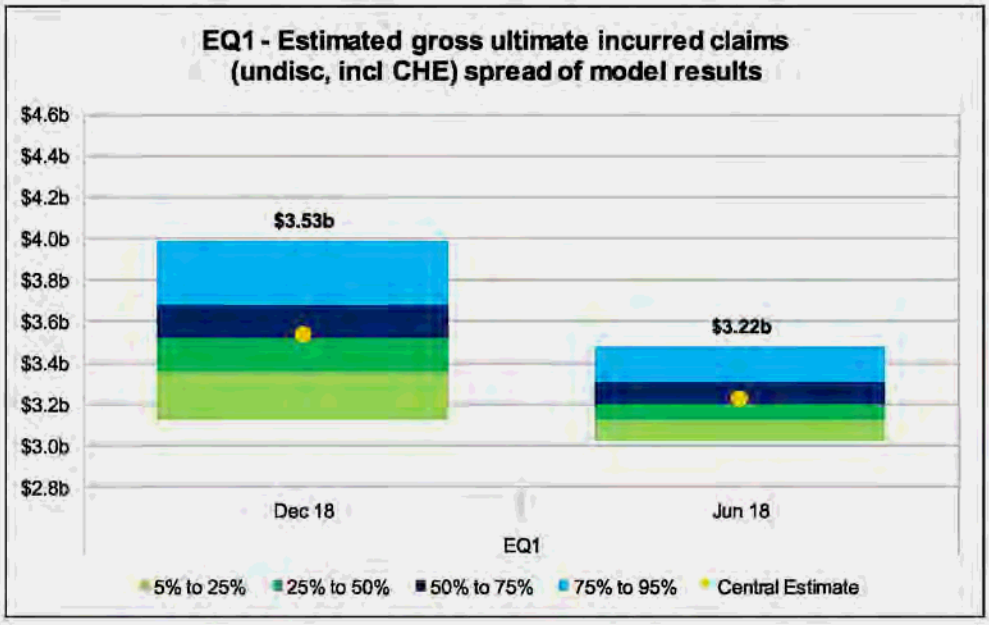
*Includes Fletcher PMO direct costs of repair (excludes margin and infrastructure costs)

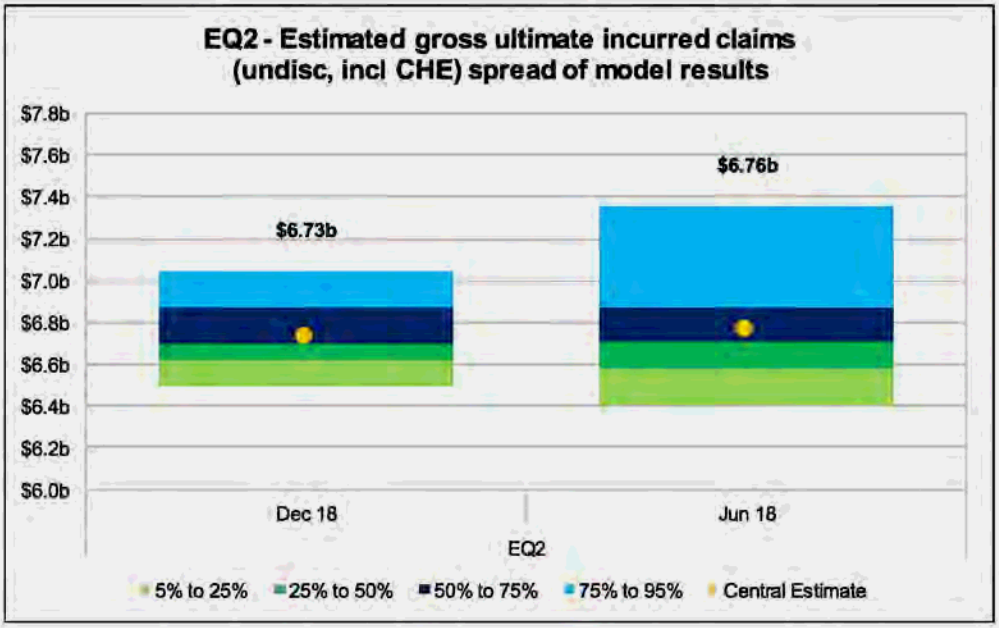
5.1.2 *Estimated ultimate claims costs – variability in modelled results*

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



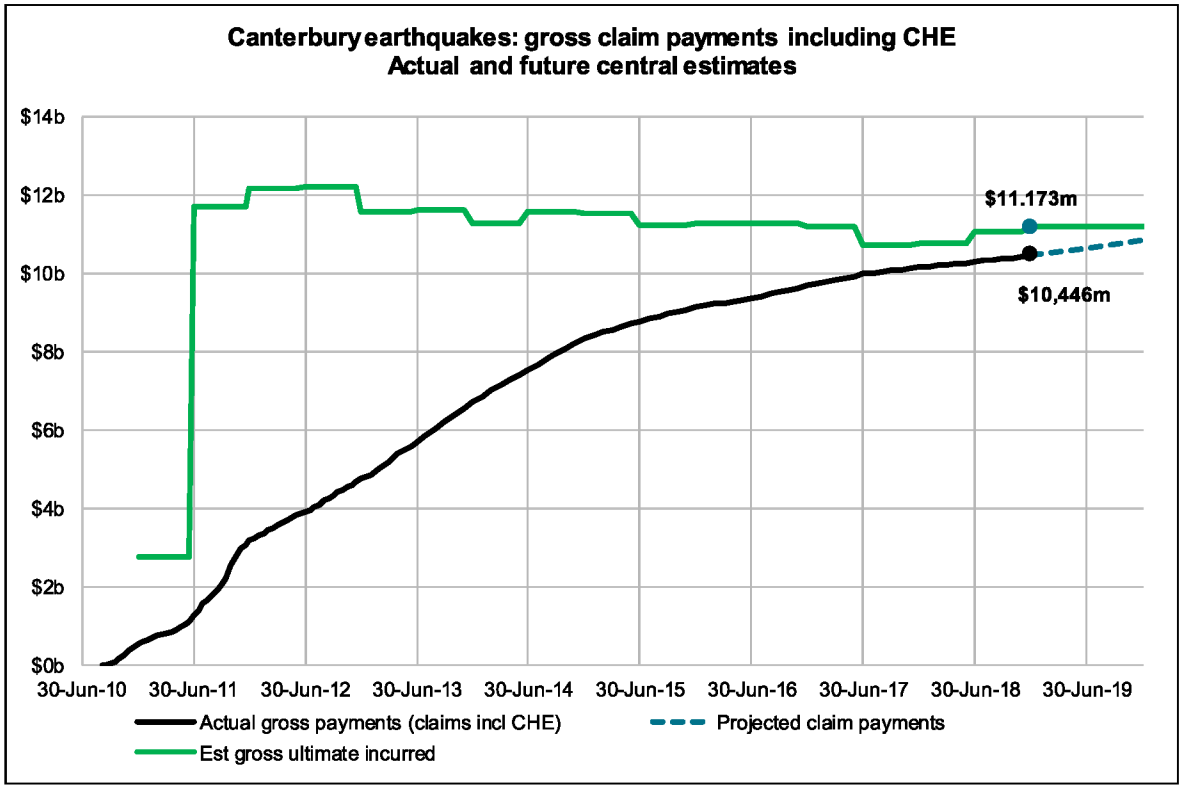


Estimated gross ultimate incurred cost incl CHE

	EQ1	EQ2	EQ3	EQ4	AS
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
30 June 2018 ILVR					
5%	$3.019b	$6.409b	$0.581b	$0.161b	$0.247b
25%	$3.124b	$6.580b	$0.601b	$0.167b	$0.257b
50%	$3.207b	$6.710b	$0.618b	$0.171b	$0.264b
75%	$3.307b	$6.869b	$0.641b	$0.175b	$0.271b
95%	$3.480b	$7.356b	$0.674b	$0.181b	$0.281b
Central Est	$3.222b	$6.765b	$0.622b	$0.171b	$0.264b

5.1.3 Gross claim payments – comparison to previous estimates

The following chart shows actual gross claim payments for Canterbury earthquakes to 31 December 2018 (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 2022. The final two years of CHE payments are assumed to be relatively smaller and will be required for a variety of tail issues including managing reopened claims and litigation.

5.1.4 *Movement in Canterbury earthquake claims costs*

All EQC claims
Gross ultimate claims costs to net outstanding claims liabilities - 31 December 2018 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	3,015	5,807	358	112	208		521	10,022
Claims handling expenses (CHE)	519	923	136	41	53		110	1,783
Gross ult claims incl CHE, undisc - central est	3,534	6,730	494	153	262	n.a.	631	11,804
Reinsurance recoveries, undiscounted - central est	(1,989)	(2,478)	0	(0)	0	-	0	(4,467)
Net ult inc claims incl CHE, undisc - central est	1,545	4,253	494	153	262	n.a.	631	7,338
Net claims costs paid to date	(1,045)	(3,078)	(454)	(123)	(199)		(484)	(5,382)
CHE paid to date	(490)	(867)	(118)	(39)	(51)		(103)	(1,667)
Discounting	(0)	(5)	1	0	(0)	(0)	(0)	(4)
Net OS including CHE, disc - central est	9	303	(76)	(8)	11	14	44	298
Net risk margin, diversified, 85% PoA	0	176	57	5	4	4	19	266
Net OS including CHE, disc - 85% PoA	9	478	(19)	(3)	15	18	64	563

Canterbury earthquakes only
Comparison to 30 June 2018 ILVR Results

	EQ1			EQ2			EQ3			EQ4			AS			Total		
	Dec 18 $m	Jun 18 $m	Change $m	Dec 18 $m	Jun 18 $m	Change $m	Dec 18 $m	Jun 18 $m	Change $m	Dec 18 $m	Jun 18 $m	Change $m	Dec 18 $m	Jun 18 $m	Change $m	Dec 18 $m	Jun 18 $m	Change $m
Gross ultimate claims excl CHE, undiscounted - central estimate																		
Land	68	69	-1	471	487	-16	57	57	+0	4	4	+0	1	1	-0	601	618	-17
Building	2,821	2,517	+304	5,033	5,076	-43	272	399	-127	96	113	-17	200	203	-2	8,422	8,307	+114
Contents	126	126	+0	303	303	+0	29	29	-0	12	12	+0	7	7	+0	478	478	+0
Total	3,015	2,712	+303	5,807	5,865	-58	358	485	-127	112	129	-17	208	211	-2	9,500	9,402	+98
Claims handling expenses (CHE)																		
Paid	490	484	+6	867	843	+24	118	116	+2	39	39	-1	51	51	-0	1,564	1,534	+31
Future	29	26	+3	56	56	-0	18	21	-3	3	3	-0	2	2	+0	108	108	-0
Total	519	511	+9	923	900	+23	136	137	-1	41	42	-1	53	53	+0	1,672	1,642	+30
Gross ult claims incl CHE, undisc - central est	3,534	3,222	+311	6,730	6,765	-35	494	622	-128	153	171	-18	262	264	-2	11,173	11,044	+128
Reconciliation to gross outstanding (OS)																		
Gross ult cost incl CHE, undisc - central est	3,534	3,222	+311	6,730	6,765	-35	494	622	-128	153	171	-18	262	264	-2	11,173	11,044	+128
Paid claims costs excl CHE	(2,551)	(2,514)	-37	(5,555)	(5,476)	-79	(454)	(446)	-8	(123)	(121)	-2	(199)	(196)	-3	(8,882)	(8,753)	-129
Paid CHE	(490)	(484)	-6	(867)	(843)	-24	(118)	(116)	-2	(39)	(39)	+1	(51)	(51)	+0	(1,564)	(1,534)	-31
Gross OS incl CHE, undisc - central est	493	224	+269	308	445	-137	(77)	61	-138	(8)	11	-19	11	17	-5	727	757	-31
Reinsurance recoveries, undiscounted - central estimate																		
Past payments recoveries	(1,506)	(1,465)	-41	(2,478)	(2,478)	+0	-	-	-	-	-	-	-	-	-	(3,983)	(3,943)	-41
Future payments recoveries	(483)	(220)	-263	(0)	(0)	+0	0	0	+0	(0)	0	(0)	-	-	-	(483)	(220)	-263
Total expected recoveries	(1,989)	(1,686)	-304	(2,478)	(2,478)	+0	0	0	+0	(0)	0	(0)	-	-	-	(4,467)	(4,163)	-304
Net ult inc claims incl CHE, undisc - central est	1,545	1,537	+8	4,253	4,287	-35	494	622	-128	153	171	-18	262	264	-2	6,706	6,881	-175
Reconciliation to net outstanding																		
Gross OS incl CHE, undisc - central est	493	224	+269	308	445	-137	(77)	61	-138	(8)	11	-19	11	17	-5	727	757	-31
Future payments recoveries	(483)	(220)	-263	(0)	(0)	+0	0	0	+0	(0)	0	-0	-	-	+0	(483)	(220)	-263
Net OS including CHE, undisc - central est	9	3	+6	308	445	-137	(77)	61	-138	(8)	11	-19	11	17	-5	243	537	-294
Discounting	(0)	(0)	-0	(5)	(9)	+4	1	(1)	+3	0	(0)	+0	(0)	(0)	+0	(4)	(11)	+8
Net OS including CHE, disc - central est	9	3	+6	303	436	-133	(76)	59	-135	(8)	11	-19	11	16	-5	239	525	-286
Net risk margin, diversified, 85% PoA	0	3	-3	176	249	-73	57	34	+23	5	6	-1	4	9	-5	242	300	-58
Net OS including CHE, disc - 85% PoA	9	6	+3	478	684	-206	(19)	93	-112	(3)	17	-20	15	26	-10	481	825	-344

5.1.5 *Movement in results*

9(2)(j)

5.1.6 *Drivers of results*

9(2)(h) and 9(2)(j)

5.2 Scenario modelling

We have carried out scenario modelling on a number of key provisions within the Canterbury earthquake model. These were calculated as gross central outstanding figures and are shown in Appendix E.1.

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 2019 although we expect costs to be incurred beyond this point, primarily due to individual and insurer litigation – which is constrained to a large extent by the court process. The issue of reopened claims is also highly uncertain and will affect the actual CHE costs.

The expected ultimate CHE has been increased by $30 million.

5.3.2 *CHE rates*

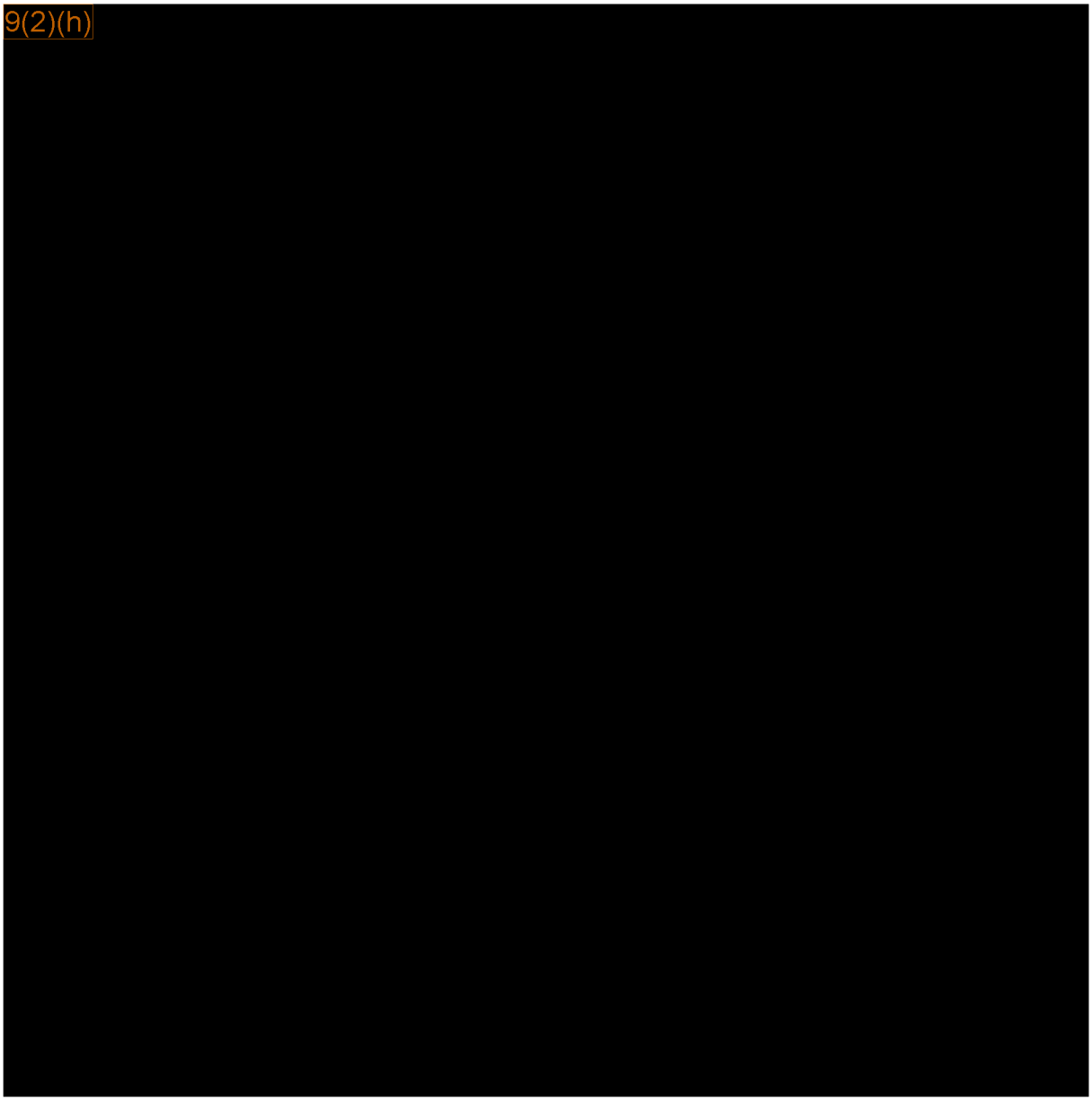
The table below illustrates the estimated ultimate CHE for the Canterbury earthquakes and also illustrates this as a percent of the gross ultimate claims costs.

Canterbury earthquakes only
CHE - 31 December 2018 valuation

	EQ1	EQ2	EQ3	EQ4	AS	Total
Total CHE $m	519.2	923.0	135.8	41.2	53.3	1,672.5
CHE % of gross ultimate excl CHE	17.2%	15.9%	37.9%	36.8%	25.6%	17.6%
CHE % of gross ultimate incl CHE	14.7%	13.7%	27.5%	26.9%	20.4%	15.0%

5.4 Breakdown of properties with land exposure

The chart below illustrates the split of all properties with an open or closed Canterbury land exposure.



9(2)(h)

5.5 Scenario Analysis

9(2)(h) and 9(2)(j)

5.6 Scenario probabilities

9(2)(h) and 9(2)(j)

9(2)(h) and 9(2)(j)

[redacted]

These assumptions are the same as those used as at 30 June 2018.

5.6.1 Scenario summaries

The table below summarises the assumed distribution of potential outcomes.

9(2)(j)

[redacted]

5.6.2 Scenario results

9(2)(h)

[redacted]

Canterbury land litigation scenarios
As at 31 December 2018

9(2)(h)

[redacted]

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)

The central estimate ultimate cost of land claims is $601 million. 9(2)(h)

5.8 Movement since June 2018

The table below shows how the estimated cost of Canterbury land claims has changed since the valuation as at 30 June 2018.

Canterbury land liabilities
Movement from 30 June 2018 to 31 December 2018

	Paid to date $000s	Estimated future $000s	Estimated ultimate $000s
9(2)(h) and 9(2)(j)	[redacted]	[redacted]	[redacted]
Total	506,118	94,800	600,918

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

The movement analysis shows that:

- The estimated ultimate claims as at 30 June 2018 were $617 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 9(2)(j) [redacted] to 9(2)(j) [redacted]. This is because a large number of land exposures have been closed since June 2018.
- Allowing for the new treatment of intermediate gravel rafts reduces the estimated ultimate claims by a further 9(2)(j) [redacted] to $601 million.

6 Kaikoura earthquake claim liabilities

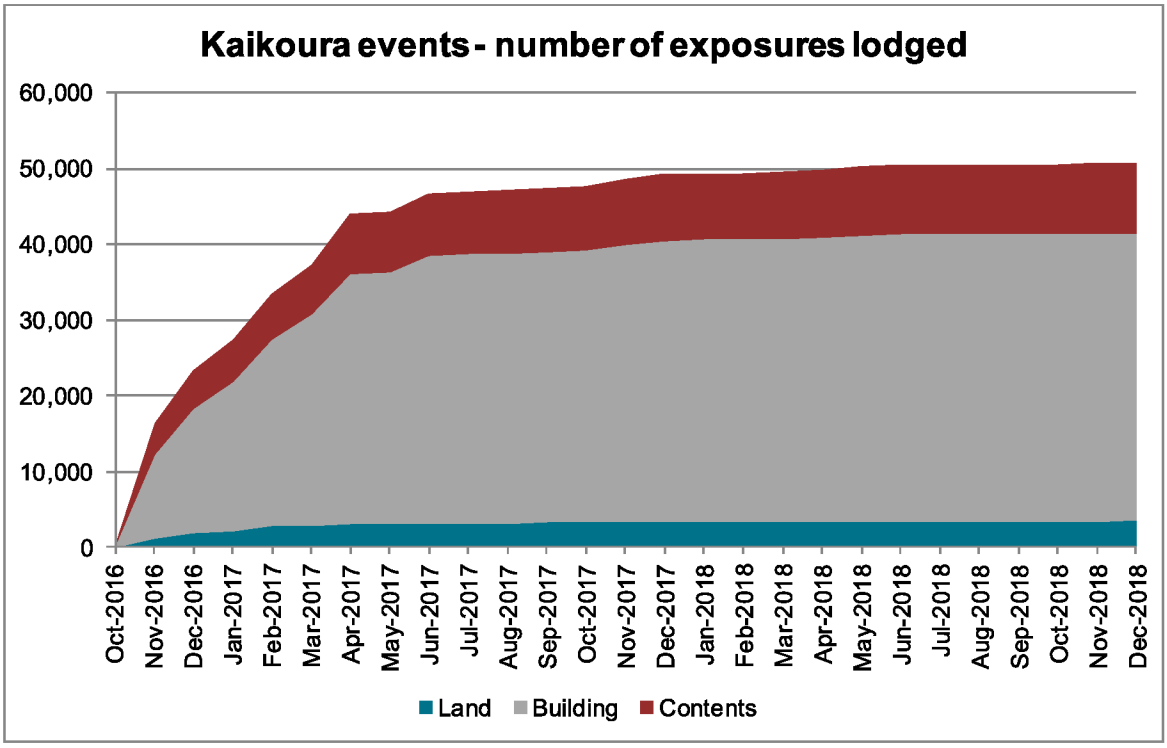
With the implementation of the MoU there will necessarily be a lag in claims information finding its way into EQC's claim management system. This has the effect of delaying any informational changes to the Kaikoura earthquake model.

The results in the section have been derived partly based on the claim statuses in EQC's claims management system. For the Kaikoura event, around 40% of land, building and contents exposures remain open as at 31 December 2018. Consequently, there has been a significant degree of judgement applied in regard to the likely outcome of these open claims.

6.1 Experience to date

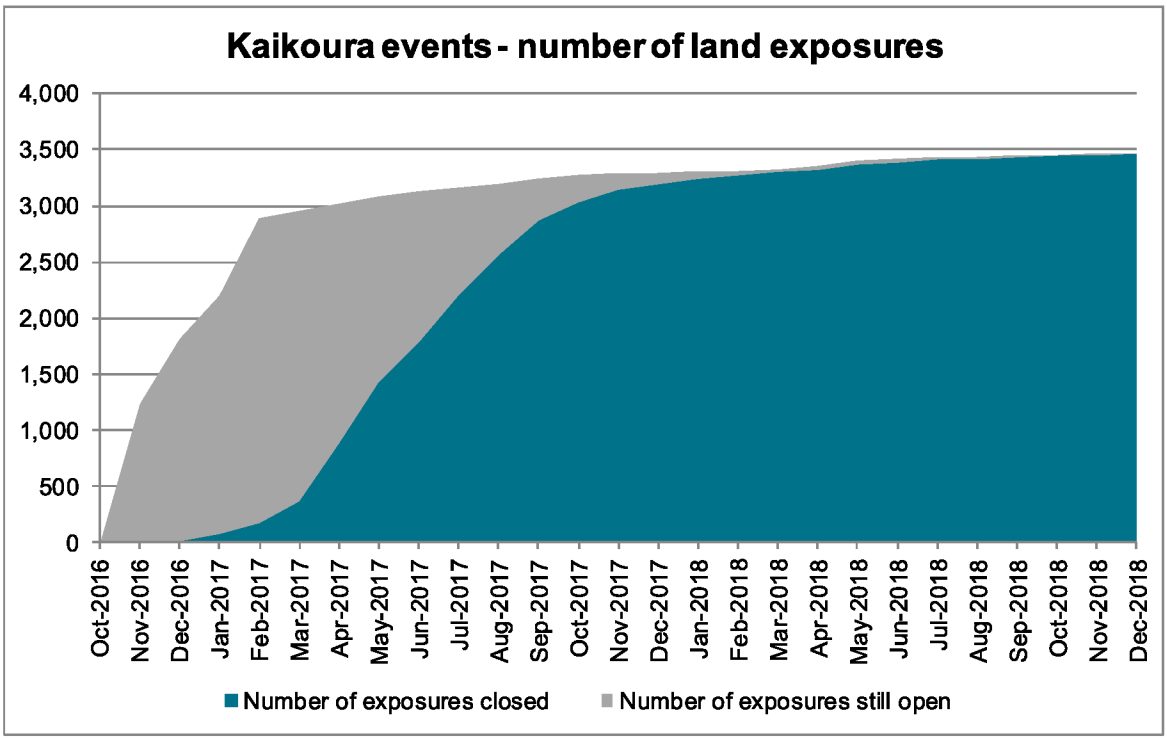
6.1.1 Exposure statuses

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



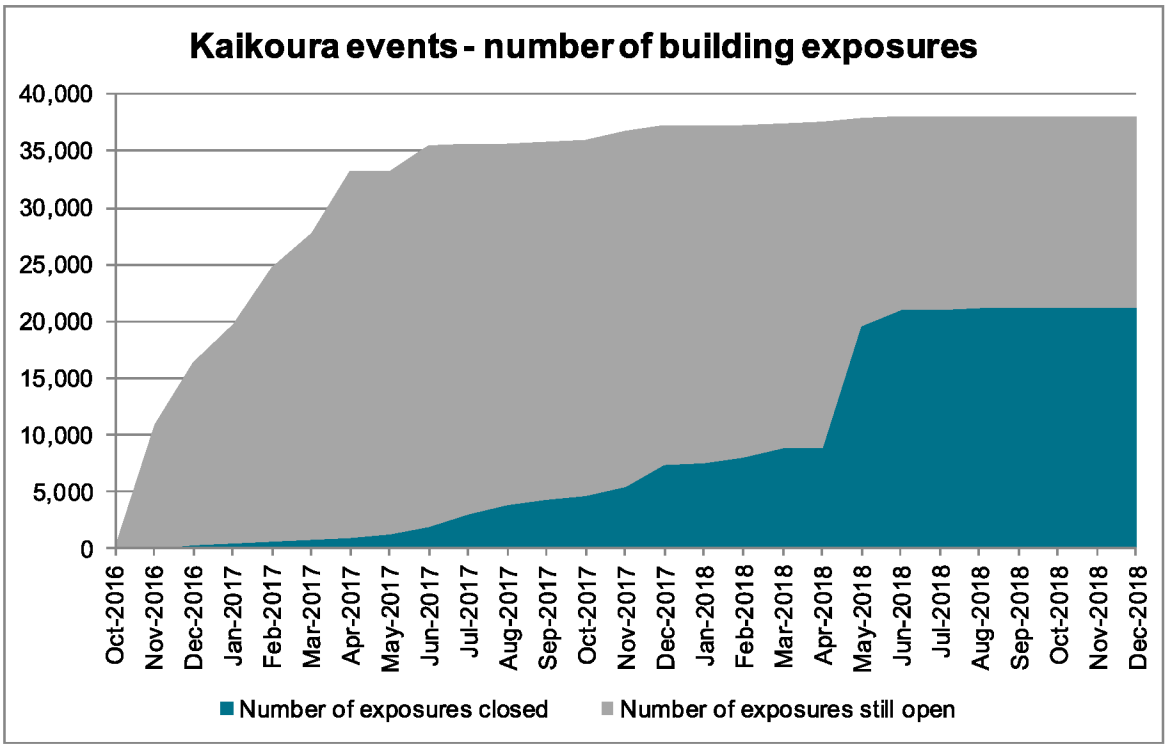
Whilst the majority of exposures were opened in CMS within the first 90 days after the events, there were still a significant number opened after this. This can be due to delays between the claimant notifying the insurer/EQC and EQC opening the relevant exposure on the claim.

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).



The MoU, combined with various IT issues, has created some challenges for EQC in identifying whether or not a building exposure is closed. Whilst there was a drive to close building exposures in the lead up to CMS4 migration in May, there are still a significant number of exposures remaining open.

6.1.2 *Costs incurred to date*

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

Kaikoura experience to 31 December 2018

	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	2,601	2,618	4,809	1,655	287	11,970
Closed - non-zero	861	3,126	13,218	1,132	86	18,423
Open - zero	2	1,966	8,254	28	105	10,355
Open non-zero	0	1470	8,362	0	114	9,946
Total	3,464	9,180	34,643	2,815	592	50,694
Proportion non-zero (to date)						
Closed exposures	25%	54%	73%	41%	23%	61%
Open exposures	0%	43%	50%	0%	52%	49%
Total	25%	50%	62%	40%	34%	56%
Paid to date						
Closed exposures	$9.5m	$8.9m	$215.8m	$18.2m	$13.7m	$266.2m
Open exposures	$0.0m	$6.3m	$176.6m	$0.0m	$21.9m	$204.8m
No exposure	$0.0m	$0.0m	$0.0m	$0.0m	$0.0m	$0.1m
Accruals & adjustments	$0.0m	($2.6m)	$15.2m	$0.0m	$0.0m	$12.7m
Total	$9.5m	$12.7m	$407.7m	$18.2m	$35.6m	$483.7m
Average paid per non-zero exposure						
Closed exposures	$11.1k	$2.8k	$16.3k	$16.1k	$159.7k	$14.4k
Open exposures	-	$4.3k	$21.1k	-	$191.8k	$20.6k
Total	$11.1k	$2.8k	$18.9k	$16.1k	$178.0k	$17.1k
Estimated number of units						
Closed - zero					1,368	
Closed - non-zero*					1,721	
Open - zero					785	
Open non-zero*					2,283	
					6,157	
Average paid per unit with non-zero building paid						
Closed exposures					$8.0k	
Open exposures					$9.6k	
Total					$8.9k	

*Where there is a non-zero paid for the buliding (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 June 2018 valuation.

Central estimate undiscounted excl CHE

	Paid to date $m	Future $m	Ultimate $m	c.f. Jun-18 $m
Model components				
Insurer managed non-MUB building claims	392.4	28.3	420.7	394.4
Land claims	9.5	0.0	9.6	9.5
Contents claims	15.3	0.6	15.9	18.7
EQC managed non-MUB building claims	18.2	0.6	18.8	19.3
WGN MUB building claims	35.6	8.1	43.7	36.2
Total	471.1	37.5	508.5	478.1
Reconciliation items*				
Land	-		-	-
Building	3.5		3.5	0.9
Contents	(2.6)		(2.6)	(0.9)
Total	1.0	-	1.0	(0.0)
Accruals**				
Land	-		-	-
Building	11.7		11.7	32.4
Contents	-		-	-
Total	11.7	-	11.7	32.4
Total				
Land	9.5	0.0	9.6	9.5
Building	461.5	36.9	498.4	483.3
Contents	12.7	0.6	13.3	17.7
Total	483.7	37.5	521.2	510.5

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

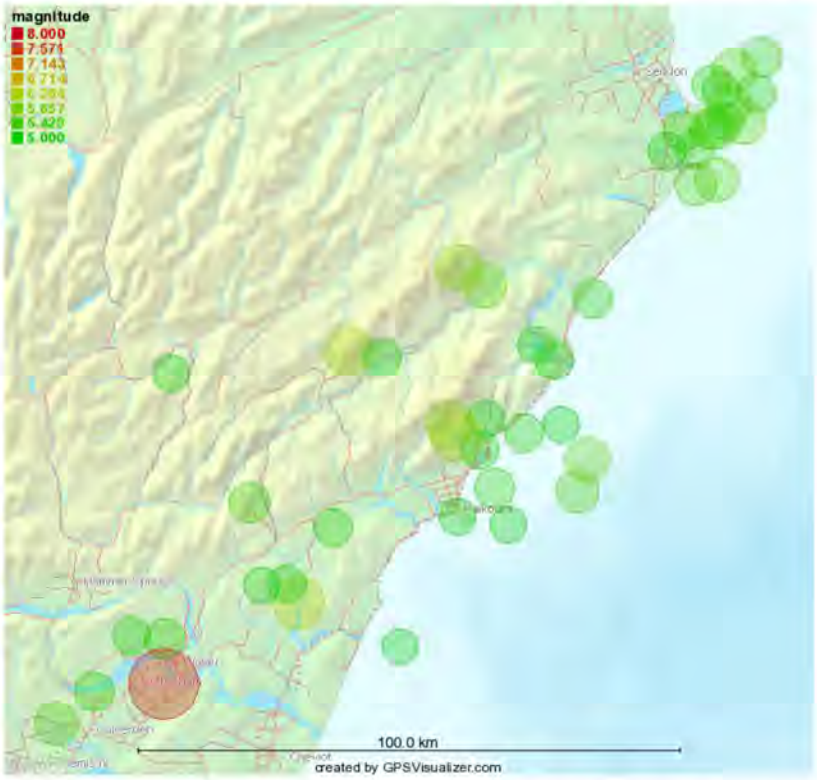
The addition of CHE brings the estimated ultimate to $631 million.

6.3 Background

The 2016 Kaikoura earthquake was a magnitude 7.8 earthquake in the South Island of New Zealand that occurred two minutes after midnight on 14 November 2016. The earthquake started at about 15 kilometres north-east of Culverden and 60 kilometres south-west of the tourist town of Kaikoura and at a depth of approximately 15 kilometres. Ruptures occurred on multiple fault lines in a complex sequence that lasted for about two minutes. The cumulative magnitude of the ruptures was 7.8, with the largest amount of that energy released far to the north of the epicentre.

The shaking caused significant damage for areas immediately around the fault lines that ruptured, including a number of very large land slips. It also caused significant shaking in Wellington although this most affected medium rise buildings which had natural shaking frequencies similar to that produced by the earthquake.

The chart below illustrates the quakes greater than magnitude 5.0 that occurred on 14 November 2016. The size and colour of the circles represent the magnitude of the quakes.



Source: GeoNet project, sponsored by EQC, GNS Science and LINZ

Memorandum of Understanding

A Memorandum of Understanding (MoU) was signed between EQC and eight insurers to allow insurers to directly settle their customers' EQC claims on behalf of EQC. In summary, almost all building and contents claims are managed by the relevant insurer on behalf of EQC, who then invoices EQC for their share of claims costs and claims handling expenses.

Building and contents claims that are managed by EQC include:

- Claims relating to properties where there is still an open or otherwise unresolved prior EQC claim.
- Claims where the insurer is not party to the MoU.

EQC also manages all land claims.

6.3.1 *Valuation developments*

Previously we have used an exposure-based model to determine the ultimate claims costs. This was primarily due to the lack of claims data with which to create a claims-based model.

For this valuation we have developed claim based models for the five categories of exposure that are still open. These categories are; Land, Contents, Building (MuBs), Building (EQC managed) and Building (insurer managed).

The model is in two parts, an average cost per claim model for the four less material claim categories and a multi-state model for the most material category, Building - insurer managed non-MUB exposures. Further details can be found in Appendix C.3.

Claims handling expenses

We have assumed CHE costs of $110 million. This is $5 million higher than the figure that we assumed as at June 2018 and is based on an approved EQC budget.

6.3.2 *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.

6.3.3 *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.

6.4 Claims handling expenses (CHE)

6.4.1 *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 - 31 December 2018 valuation

	KEQ
Total CHE $	110.1
CHE % of gross ultimate excl CHE	21.1%
CHE % of gross ultimate incl CHE	17.4%

6.5 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 rolled forward from the June 2018 valuation unchanged. As we are now 6 months further along, and the remaining projection period is now 6 months shorter, the effective reopen allowance has decreased. This now equates to around 4% closed claims to date reopening at a total cost of around $14.7 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%)	37.5			521.2		
No future reopens	22.8	(14.7)	-39%	506.5	(14.7)	-3%
Future reopens 2%	30.4	(7.1)	-19%	514.1	(7.1)	-1%
Future reopens 10%	60.6	23.1	62%	544.3	23.1	4%
Future reopens 20%	98.5	61.0	163%	582.3	61.0	12%

Our baseline assumption is that the central estimate undiscounted future costs of claims is $37.5 million. If the eventual reopen rate were to reduce to 2%, we would expect the future claims cost to be $22.8 million, a 39% reduction.

6.6 Movement since June 2018

The table below shows how the estimated cost of claims from the Kaikoura event has changed since the valuation as at 30 June 2018.

Kaikoura liabilities
Movement from 30 June 2018 to 31 December 2018

	Paid to date* $000s	Estimated future $000s	Estimated ultimate $000s
Position as at 30 June 2018			
Insurer managed non-MUB building claims	375,704	52,034	427,738
Land claims	9,354	131	9,485
Contents claims	12,696	5,038	17,734
EQC managed non-MUB building claims	18,175	1,139	19,315
WGN MUB building claims	22,321	13,893	36,214
Total	438,251	72,234	510,485
Impact of adjusting for actual experience over the period			
Insurer managed non-MUB building claims	31,961	(27,223)	4,738
Land claims	195	(120)	75
Contents claims	7	(130)	(123)
EQC managed non-MUB building claims	26	(909)	(883)
WGN MUB building claims	13,284	(1,767)	11,517
Total	45,474	(30,149)	15,325
Position as at 31 December 2018 using previous methodology			
Insurer managed non-MUB building claims	407,665	24,811	432,476
Land claims	9,549	11	9,560
Contents claims	12,704	4,908	17,611
EQC managed non-MUB building claims	18,202	230	18,432
WGN MUB building claims	35,605	12,126	47,731
Total	483,724	42,086	525,810
Impact of updating assumptions in line with emerging experience			
Insurer managed non-MUB building claims	0	3,445	3,445
Land claims	0	5	5
Contents claims	0	(4,321)	(4,321)
EQC managed non-MUB building claims	0	321	321
WGN MUB building claims	0	(4,049)	(4,049)
Total	0	(4,599)	(4,599)
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

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

The movement analysis shows that:

- The estimated ultimate claims (excluding CHE) as at 30 June 2018 were $510 million

- If we apply the same methodology and assumptions to the new data at 31 December 2018 then the estimated ultimate claims would increase by $15 million to $526 million. The is largely because the insurer-managed claims have remained open in CMSv8 and/or KDMS whereas the model at June 2018 had expected that these would tend to close as EQC's claims management systems were aligned with the information held by insurers.
- Updating the assumptions in line with emerging experience reduces the estimated ultimate claims by $5 million to $521 million.

6.7 Comparison to case estimates

There is limited case estimate information available for insurer-managed Kaikoura claims and only recently has this information been captured on a regular basis. 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.

Insurer managed non-MUB building claims	$m
Estimated future cost to EQC*	28.3
Of which reopen allowance	14.7
Of which future cost of open/new claims	13.6
Insurer case estimates	8.9
Effective IBNR/IBNER allowance	4.7

*Does not include amounts already invoiced to EQC

- Our estimated future cost of claims to EQC is $28.3 million. This is comprised of $14.7 million in respect of reopened claims and $13.6 million for claims currently open.
- Insurer case estimates total $8.9 million. That is, insurers individual claim estimates (for the EQC component of each claim) total $8.9 million for currently open claims.
- This implies that the valuation includes an additional allowance of $4.7 million ($13.6m less $8.9m) 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	8.1
Of which insurer managed MUBs (approx)	7.9
Insurer case estimates	4.7
Effective IBNR/IBNER allowance	3.2

- Our estimated future cost to EQC of MUB claims is $8.1 million, $7.9 million of which relates to insurer-managed claims.

The insurer case estimates add up to $4.7 million, implying that there is a $3.2 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 $9.3 million as at 31 December 2018. The tables below summarise the quantum as at the valuation date.

BAU outstanding claims as at 31 December 2018
Undiscounted central estimate excluding CHE

	Land $000s	Building $000s	Contents $000s	Total $000s
BAU				
Open claims	2,569	1,072	8	3,648
IBNR	881	1,191	10	2,082
Total	3,450	2,262	18	5,730
BAU PP				
Open claims	1,241	502	4	1,748
IBNR	1,422	427	16	1,864
Total	2,663	929	20	3,612
All loss periods				
Open claims	3,810	1,574	12	5,396
IBNR	2,303	1,617	26	3,946
Total	6,112	3,191	38	9,342

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 % 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 CHE % is comparable to the percentages shown for the Canterbury and Kaikoura events.

BAU claims only
CHE - 31 December 2018 valuation

	BAU
CHE provision $	
Marginal	$0.6m
Fixed	$4.3m
CHE % of net OS claims	
Marginal	6.3%
Fixed	45.7%

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. An indicator is shown as to whether the event is from this financial year (BAU) or from prior periods (BAU PP).

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 31 December 2018

		Land	Building	Contents	Total
Paid to date ($000s)					
Central North Island (EQ, Oct 2018)	BAU	7	684	15	705
Landslip/Storm/Flood201812	BAU	22	0	0	22
Landslip/Storm/Flood201811	BAU	34	0	0	34
Christchurch 15km E, 15km, 5.7	BAU PP	382	50,176	1,730	52,287
Landslip/Storm/Flood201809	BAU	405	216	25	646
Landslip/Storm/Flood201808	BAU	415	57	0	472
Landslip/Storm/Flood201806	BAU PP	2,541	366	0	2,907
Landslip/Storm/Flood201810	BAU	36	4	0	39
Earthquake201811	BAU	0	2	0	2
Landslip/Storm/Flood201807	BAU	923	308	1	1,231
Undiscounted central estimate excl CHE ($000s)					
Central North Island (EQ, Oct 2018)	BAU	17	1,156	11	1,184
Landslip/Storm/Flood201812	BAU	1,165	213	2	1,379
Landslip/Storm/Flood201811	BAU	893	145	0	1,038
Christchurch 15km E, 15km, 5.7	BAU PP	1	79	1	82
Landslip/Storm/Flood201809	BAU	387	142	1	530
Landslip/Storm/Flood201808	BAU	403	124	0	527
Landslip/Storm/Flood201806	BAU PP	517	180	0	697
Landslip/Storm/Flood201810	BAU	227	76	0	304
Earthquake201811	BAU	1	61	0	63
Landslip/Storm/Flood201807	BAU	356	165	1	522
Other		2,146	849	21	3,016
Total		6,112	3,191	38	9,342
Estimated ultimate ($000s)					
Central North Island (EQ, Oct 2018)	BAU	23	1,840	26	1,889
Landslip/Storm/Flood201812	BAU	1,187	213	2	1,401
Landslip/Storm/Flood201811	BAU	928	145	0	1,073
Christchurch 15km E, 15km, 5.7	BAU PP	383	50,255	1,731	52,369
Landslip/Storm/Flood201809	BAU	792	358	26	1,175
Landslip/Storm/Flood201808	BAU	818	181	0	999
Landslip/Storm/Flood201806	BAU PP	3,058	546	0	3,604
Landslip/Storm/Flood201810	BAU	263	80	0	343
Earthquake201811	BAU	1	63	0	65
Landslip/Storm/Flood201807	BAU	1,278	473	2	1,753

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 June 2018

The table below shows how the estimates for BAU claims have changed since June 2018.

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

	Claims incurred up to Jun-2018 $000s	Claims incurred after Jun-2018 $000s	All claims $000s
Central estimate outstanding claims as at 30 June 2018	23,834		23,834
Less: payments between Jun-2018 and Dec-2018	(12,551)		(12,551)
Adjust for actual experience being different to expected	(9,613)		(9,613)
Plus: outstanding for claims incurred after Jun-2018		4,076	4,076
Central est OSC as at Dec-2018 using previous assumptions	1,671	4,076	5,747
Adjust for changes to assumptions	1,941	1,654	3,595
Central estimate outstanding claims as at 31 December 2018	3,612	5,730	9,342

Note: All figures are undiscounted and exclude CHE

The movement analysis shows that:

- The central estimate of outstanding BAU claims (excluding CHE) as at 30 June 2018 was $23.8 million.
- Over the six months to 31 December 2018, $12.6 million has been paid on claims incurred prior to 30 June 2018. If the previous model had been perfectly correct then we might expect the estimated outstanding claims to reduce by this amount.
- If we were to apply the same methodology and assumptions at 31 December 2018 as the previous valuation, then the outstanding claims (in respect of events up to 30 June 2018) would reduce by a further $9.6 million to $1.7 million. This is because a large number of claims have closed sooner than our model at June 2018 expected.
- If we add to this a further $4.1 million for claims incurred after 30 June 2018 then then we would have an outstanding claims liability of $5.7 million at 31 December 2018 (using the same assumptions as at June 2018).
- Adjusting the assumptions to reflect emerging experience increases the outstanding claims by $3.6 million to $9.3 million.

8 Overall results

8.1 Claims incurred

The gross incurred claims costs for all Canterbury and Kaikoura EQ events, incurred to 31 December 2018, 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 31 December 2018 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 31 December 2018

The net discounted OSCL at a probability of adequacy of 85% is $563m. The largest component of the liabilities is in respect of the EQ2 event, followed by the Kaikoura earthquake claims.

All EQC claims
Gross ultimate claims costs to net outstanding claims liabilities - 31 December 2018 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	3,015	5,807	358	112	208		521	10,022
Claims handling expenses (CHE)	519	923	136	41	53		110	1,783
Gross ult claims incl CHE, undisc - central est	3,534	6,730	494	153	262	n.a.	631	11,804
Reinsurance recoveries, undiscounted - central est	(1,989)	(2,478)	0	(0)	0	-	0	(4,467)
Net ult inc claims incl CHE, undisc - central est	1,545	4,253	494	153	262	n.a.	631	7,338
Net claims costs paid to date	(1,045)	(3,078)	(454)	(123)	(199)		(484)	(5,382)
CHE paid to date	(490)	(867)	(118)	(39)	(51)		(103)	(1,667)
Discounting	(0)	(5)	1	0	(0)	(0)	(0)	(4)
Net OS including CHE, disc - central est	9	303	(76)	(8)	11	14	44	298
Net risk margin, diversified, 85% PoA	0	176	57	5	4	4	19	266
Net OS including CHE, disc - 85% PoA	9	478	(19)	(3)	15	18	64	563

8.2.2 *Movement in net outstanding claims liabilities – all claims*

The table below shows the movement in the net outstanding claims liabilities since 30 June 2018.

The net OSCL (85% probability of adequacy, discounted) has decreased from $1.004b as at 30 June 2018 to $0.563b as at 31 December 2018.

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

- Claim payments; $201m of net payments since 30 June 2018.
- Actuarial determination; this has decreased by $165m on a net of reinsurance basis.
  - -$175m as a result of the Canterbury earthquakes.
  - +$15m as a result of the Kaikoura earthquake.
  - -$5m as a result of BAU events.
- +$13m for new storm events. Risk margin has decreased by $86m.
- Discounting has decreased by $11m.

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 30 June 2018 ILVR

	Prior Periods (to 30 Jun 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 30 June 2018	4	684	93	17	26	23	n.a	137	20	824	137	43	1,004
Remove net risk margin (85% PoA)	(2)	(249)	(34)	(6)	(9)	(5)	n.a	(40)	(7)	(300)	(40)	(12)	(352)
Net OSCL (central estimate, discounted) as at 30 June 2018	2	436	59	11	16	18	542	98	13	524	98	31	652
Remove discounting	1	9	1	0	0	0	13	2	0	13	2	0	15
Net OSCL (central estimate, undiscounted) as at 30 June 2018	3	445	61	11	17	18	555	100	13	537	100	31	668
Estimated net paid over period	(2)	(102)	(10)	(1)	(3)	(7)	(125)	(70)	(5)	(118)	(70)	(12)	(201)
Change in net actuarial determination	8	(35)	(128)	(18)	(2)	(5)	(136)	15	1	(175)	15	(5)	(165)
Net OSCL (central estimate, undiscounted) as at 31 Dec 2018	9	308	(77)	(8)	11	5	294	45	9	243	45	14	302
Add discounting	(0)	(5)	1	0	(0)	(0)	(4)	(0)	(0)	(4)	(0)	(0)	(4)
Net OSCL (central estimate, discounted) as at 31 December 2018	9	303	(76)	(8)	11	5	245	44	9	239	44	14	298
Net diversified risk margin (85% PoA, discounted)	-	176	57	5	4	2	n.a	19	3	242	19	4	266
Net OSCL (85% PoA, discounted) as at 31 December 2018	9	478	(19)	(3)	15	7	n.a	64	11	481	64	18	563

8.3 Premium liabilities

The table below summarises the key results of the estimation of EQC's premium liabilities as at 31 December 2018. The premium liabilities will be used in the liability adequacy test.

The total value at 75% probability of adequacy is $245 million. This is greater than the $202 million unearned premium reserve. This means that an additional unexpired risk reserve will be required in the accounts as at 31 December 2018.

The largest component ($113 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 31 December 2018. These claims are modelled by Minerva.

The next largest components relate to the enhanced seismicity following the Canterbury earthquakes ($67 million) and Kaikoura earthquake ($40 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 $91 million.

Estimated Premium Liabilities - 31 December 2018

	BAU $m	Minerva $m	Cant EQ $m	KEQ $m	Total $m
Unearned premium reserve					202
Cost of future claims from unexpired risks					
Gross claims, undiscounted - central estimate	17	49	51	34	151
Administration and reinsurance costs for unexpired risks					
Claims administration expenses	2	5	5	3	16
Policy (non-claims) admin expenses for unexpired	5	0	0	0	5
Future reinsurance costs for unexpired risks	0	73	14	4	91
Reinsurance recoveries					
Reinsurance recoveries, undiscounted	0	(13)	(3)	(1)	(16)
Net premium liabilities, undiscounted - central estimate	24	114	68	41	247
Discounting	(0)	(1)	(1)	(0)	(3)
Net premium liabilities, discounted - central estimate	24	113	67	40	244
Diversified risk margin, discounted - 75% PoA					1
Net premium liabilities, discounted - 75% PoA					245

Note that the reason that the risk margin is small 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 very close to 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 ($245 million) exceeds the unearned premium reserve ($202 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 30 June 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 30 June 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 Uncertainty, Limitations and Reliances

9.1 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.

9.2 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.

9.3 Key uncertainties

9.3.1 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 financial close 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 claim 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.

9.3.2 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.

9.3.3 Uncertainties arising from the Kaikoura earthquake

The Kaikoura earthquake has resulted in a 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.

9.3.4 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.

9.4 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 (Chapman Tripp), 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.

9.4.1 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.

9.5 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 D.1.

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

9.6 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

25 March 2019

Insurance Liability Valuation as at 31 December 2018

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, EQC is generally liable for up to $100k plus GST for each building claim and $20k plus GST for each contents 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.

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).

The methodology has changed for this valuation with a move towards attempting to make use of the (in some cases limited) information available in regard to claim and exposure statuses. The previous model was an exposure-based model which more loosely reflected the experience to date.

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 31 December 2018

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*	12,500	3,000	28,050	8,796
Claim size CoV	175%	150%	150%	200%
Proportion finalising non-zero	65%	70%	45%	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). Exposure 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 31 December 2018

Insurer managed non-MUBs

Total building exposures	34,665
Of which ultimately non-zero	22,077
Proportion non-zero	64%
Ultimate building cost	$424m
Effective cost per non-zero exposure	$19k

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

D Data and Information

D.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 November 2018.
  - Data as at 31 December 2018
- 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 31 December 2018
- 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 31 December 2018.
- A Minerva model run generated in January 2011.
- Discussions with EQC employees and contractors.

D.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) 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).

D.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.

D.1.3 *ACE damage data*

The ACE damage data (as at 31 October 2018) 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 50,636 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	130,638	1,676	5,325	235	29	50	7,315
Remove:							
NAs	(75,880)	-	-	-	-	-	-
Duplicates	(37)	-	-	-	-	-	-
Property ID errors & non-approved	(4,031)	(105)	(323)	(9)	(2)	(5)	(445)
Extremely large estimates (>$100m)	(54)	(3)	(8)	0	(0)	(0)	(11)
Data used in model	50,636	1,568	4,994	226	27	45	6,859

D.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.

D.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.

D.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.

D.2 Sources of data – Kaikoura earthquake claims

D.2.1 *Actuarial Data Extract from ClaimCentre*

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

D.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.

D.3 Sources of information

The additional sources of information used for the investigation were:

- Trial balance for the period ending 31 December 2018.
- 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.

D.4 Validation of data

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

D.4.1 ADE vs Trial balance

This table shows the comparison between the ADE to the claims payments from the trial balance.

Claims payments
Reconciliation of ADE (31 Dec 18) to trial balance

	Payment Type		
	ClaimCentre $m	EQR $m	Total $m
Actuarial Data Extract			
EQ1	1,639	502	2,141
EQ2	3,986	1,356	5,342
EQ3	431	531	962
AS/EQ4	237	174	410
Total	6,293	2,563	8,855
Trial Balance			
EQ1	1,636	498	2,133
EQ2	3,992	1,358	5,350
EQ3	434	502	935
AS/EQ4	234	202	437
Total	6,295	2,560	8,855
Difference			
EQ1	4	4	8
EQ2	(6)	(2)	(7)
EQ3	(3)	29	26
AS/EQ4	3	(29)	(26)
BAU*	-	-	-
Total	(3)	3	0

We note that the ADE figures were adjusted to allow for the LINZ claim payments made outside CMS.

D.4.2 *ADE vs Loss Run data from finance*

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

Validation of Claims General
Comparison to CMS Payment file

	Event					
	EQ1 $000s	EQ2 $000s	EQ3 $000s	EQ4 $000s	AS $000s	Total $000s
ADE						
Building	1,456,427	3,300,939	357,212	114,885	99,624	5,329,087
Land	30,091	322,653	11,474	1,223	778	366,219
Contents	125,694	303,145	29,019	12,477	7,305	477,640
Total	1,612,212	3,926,737	397,705	128,585	107,707	6,172,946
CMS Payment file - 31 December 2018						
Building	1,456,006	3,300,155	356,921	114,342	100,112	5,327,536
Land	30,062	322,635	11,474	1,223	778	366,172
Contents	125,693	303,124	29,007	12,477	7,305	477,608
Total	1,611,761	3,925,914	397,402	128,042	108,195	6,171,315
Difference - 30 June 2018						
Building	421	784	291	543	(488)	1,551
Land	30	17	(0)	(0)	(0)	47
Contents	0	21	12	(0)	(0)	33
Total	451	822	303	543	(488)	1,631

D.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.

D.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.

D.5 Reliances

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

D.6 Concerns and qualifications

D.6.1 General comments regarding the data held by EQC

The main area of concern with respect to the use of the data for actuarial purposes is that the claim payment information is held in many different systems which makes it challenging to capture all payments.

This is exacerbated with the introduction of the new claims management system and the separate system for Kaikoura Insurer-managed claims.

In addition to this, it is making 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.

D.7 Recommendations

D.7.1 Progress against previous recommendations

Several data-related recommendations were set out in Section 3.6 of the 30 June 2018 report. The progress against these recommendations is as follows:

- Rationalise sources of claims information. *Not started*

D.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.

D.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 D.6, we consider that the information provided to us was adequate and appropriate for the purposes of this valuation.

E Canterbury earthquake scenario modelling

E.1 Building provision

We have carried out scenario modelling in respect of; reopened undercaps, reopened overcaps, and individual litigation provision. These are shown below.

E.1.1 Reopened undercaps

The reopened undercap provision is dependent upon the period for which claims continue to reopen, the rate at which claims are settled for no payment (nil claim rate) and the average settlement costs for each non-nil claim. The table below shows the effect of varying these three assumptions.

	Total ($m)	Movement
BASE CASE: Draft ILVR (24 month inflow)	72.9	
Scenario 1: Inflow ends 12 months earlier	38.8	-34.1
Scenario 2: Inflow continues 12 months longer	121.7	+48.8
Scenario 3: Nil claim rate increases 20%	87.5	+14.6
Scenario 4: Nil claim rate decreases 20%	78.5	+5.6
Scenatio 5: Average claim costs decreases 20%	58.3	-14.6
Scenatio 6: Average claim costs increases 20%	87.5	+14.6

E.1.2 Reopened overcaps

The reopened overcap provision applies a probability for each claim going overcap. We split these into likelihood groups and then assumed that separate rates of overcaps eventuating will apply. For these properties a residual payment to cap was made plus an allowance for Cap Cost Review amounts. The table below illustrates the impact of varying these assumptions.

	No. properties	Total ($m)	Movement
BASE CASE: Draft ILVR ($35k CCR*)	890	78.8	
Scenario 1: Rate of overcaps reduced by 12 months ($35k CCR)	435	38.5	-40.4
Scenario 2: Rate of overcaps increased by 12 months ($35k CCR)	1,365	121.5	+42.7
Scenario 3: No allowance for CCR	890	47.2	-31.6
Scenario 4: Increase CCR to $45k	890	87.5	+8.7
Scenario 5: Assume minimum paid event is capped ($35k CCR)	890	149.7	+70.9

*CCR - Cap Cost Review

E.1.3 Individual litigation provision

9(2)(h) and 9(2)(j)

F Outstanding Claims Liabilities – Valuation Methodologies

F.1 Liability components

EQC's outstanding (OS) claims liabilities to be included in its accounts for 31 December 2018 are, in summary, an estimate of the total value of liabilities arising from all claims incurred up to the valuation date of 31 December 2018.

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.

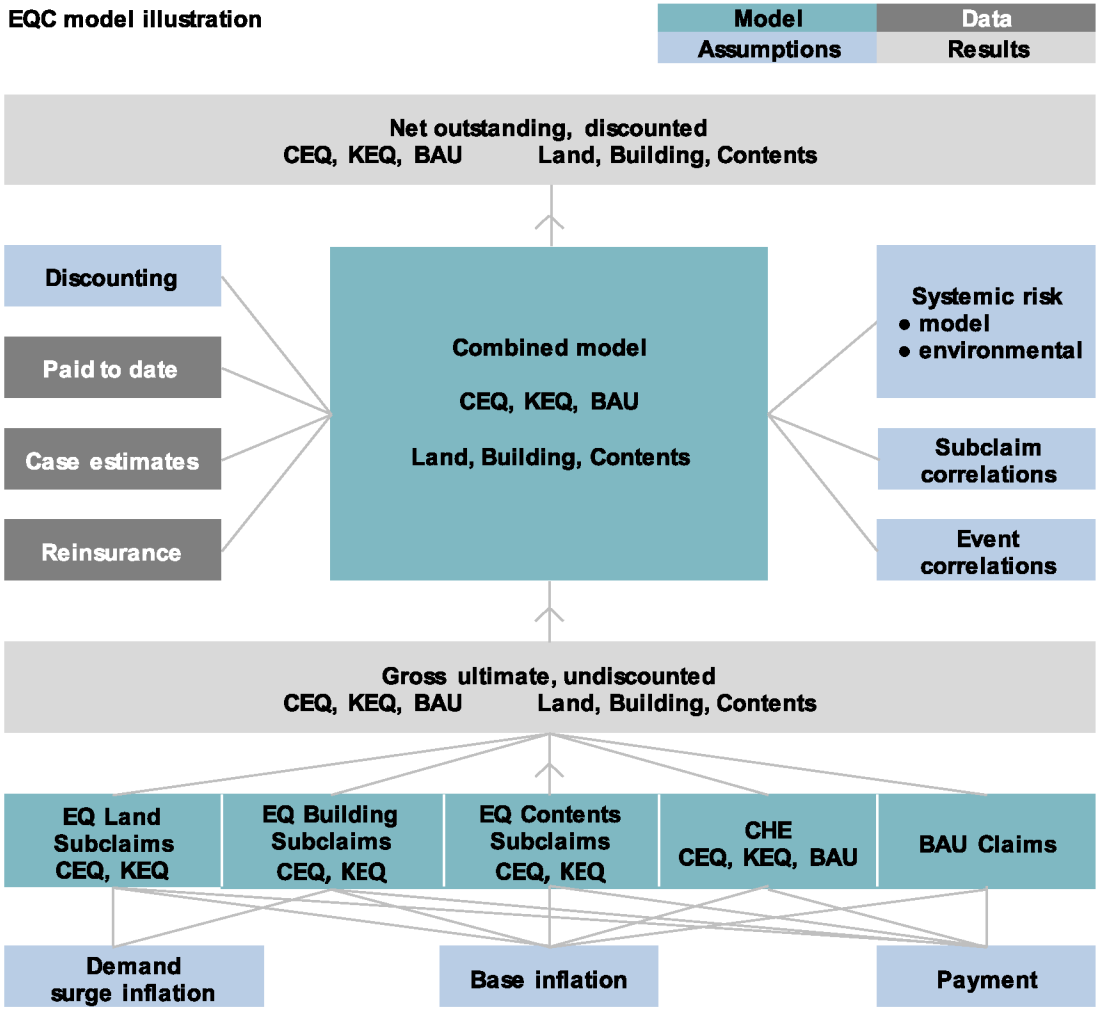
F.4 Gross incurred claims costs

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 31 December 2018 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 Premium Liabilities – Methodology and Assumptions

G.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 31 December 2018. The focus is therefore on claims incurred as a result of events after the 31 December 2018 valuation date, i.e. future claims. This is in contrast to the OS claims liabilities, which relate to claims incurred up to 31 December 2018, 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.

G.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.

G.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.

G.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.

G.4 Changes in methodology

The methodology has not materially changed from the previous valuation.

G.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.

G.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.

G.5.2 BAU

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

G.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.

G.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.

G.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.

H EQC Reinsurance

H.1 EQC reinsurance

H.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.

Current cover

From 1 June 2018, the reinsurance programme has four layers, beginning at NZD $1,750m and finishing at $6,650m.

In addition to this, there is a three-year aggregate layer (incepted 1 June 2016) which provides $500m cover for contributing losses, with a $1,000m deductible.

I 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.