
Diminution of Value Methodology for
Increased Flooding Vulnerability (for where
the residential building has been or will be
rebuilt)

OCTOBER 2016

TABLE OF CONTENTS

(A)	EXECUTIVE SUMMARY	3
(B)	BACKGROUND	6
(B1)	Purpose	6
(B2)	Increased vulnerability damage	6
(B3)	Diminution of value methodologies	6
(B4)	Statutory context – Earthquake Commission Act 1993	7
(B5)	Background to Canterbury earthquakes and residential property market	7
(C)	DEFINING THE VALUATION OUTCOMES SOUGHT	9
(D)	ASSUMPTIONS (LEGAL AND VALUATION)	11
(E)	INPUTS TO VALUATION METHODOLOGY	14
(E1)	Engineering advice regarding the impact of IFV	14
(E2)	Other information regarding the land being assessed	17
(E3)	Repair costs	17
(E4)	Market sales evidence	18
(F)	THE PILOT	20
(F1)	The process	20
(F2)	Findings from the pilot	21
(F3)	Conclusions and Recommendations	22
(G)	THE METHODOLOGY	23
(G1)	Introduction	23
(G2)	Development of matrix to apply to land values	23
(G3)	Valuation Process	27
(G4)	Guidance notes	33
(G5)	Review of DoV assessments	34

APPENDIX 1

(A) EXECUTIVE SUMMARY

- 1 This paper describes the methodology developed by the professional valuation advisors to the Earthquake Commission (**EQC**) in conjunction with legal and engineering advice to determine what, if any, reduction or diminution of value (**DoV**) of insured residential land has resulted from what is defined as Increased Flooding Vulnerability (**IFV**) land damage to that land, a form of natural disaster damage under the Earthquake Commission Act 1993, in circumstances where the residential building that was on the land prior to the Canterbury earthquake sequence has been or will be removed from the land, and a new house has been or will be rebuilt, due to the extent of the earthquake damage.
- 2 The methodology has been developed for the purpose of enabling EQC to settle residential land claims for IFV damage on the basis of a payment of the DoV, in circumstances where the DoV of the land is the most appropriate measure of the insured's loss as a result of the IFV damage, rather than the cost of repairing that damage. This will be the case, for example, where no repair is technically feasible or where resource consent for the repair cannot be obtained under the Resource Management Act 1991.
- 3 For these purposes, the methodology must assess the DoV caused by IFV damage – that is, the **change** in a property's vulnerability to flooding **as a result of subsidence to insured land**.
- 4 Other matters which may affect the value of insured land as a direct or indirect result of the Canterbury earthquakes are to be excluded from the DoV. Accordingly, the DoV must exclude any value reduction as a result of increased vulnerability to flooding of insured land which is not due to subsidence of that land (for example, as a result of the Heathcote River mouth rising due to the earthquakes), and exclude any value reduction as a result of general market uncertainty following the earthquakes, stigma, and decisions by regulatory authorities regarding services.
- 5 The methodology described in this paper enables expert valuers to assess the DoV, in absolute dollar terms, that the insured land has suffered from its value immediately prior to the first earthquake of 4 September 2010 as a result of IFV damage caused by the Canterbury earthquake sequence. The methodology has essentially four parts:
 - 5.1 Determination of the pre-earthquake (September 2010) value for the insured land, using conventional valuation techniques;
 - 5.2 Identification of an appropriate percentage adjustment (if any) for IFV damage;
 - 5.3 Application of the percentage adjustment to the pre-earthquake value of the insured land; and
 - 5.4 Exercise of valuation judgement as to the resulting DoV.
- 6 A matrix of DoV adjustments to insured land value for increased flooding vulnerability has been developed based on the matrix set out in the Diminution of Value Methodology for Increased Flooding Vulnerability (2014), which was developed

to assess the loss in value of residential properties (insured residential land and the associated residential buildings) resulting from IFV land damage in situations where the pre-earthquake building remains in place (**IFV DoV Methodology (Residential Building in Place)**).

- 7 The matrix enables calculation of a DoV adjustment depending on the key characteristics of the increased flood vulnerability:
 - 7.1 changes to **severity** of flooding;
 - 7.2 changes to **frequency** of flooding; and
 - 7.3 any **over-riding positive attributes** of the land that reduce the impact of the increased flooding vulnerability on value.
- 8 The matrix has been adjusted to reflect loss of value to land, rather than the property, taking into account the impact of IFV damage on the future use of the land as a building platform. In assessing how the matrix should be used to assess loss of value of land, consideration has been given to the implications of legal requirements for new buildings on land in Christchurch for flooding vulnerability. Consideration has also been given to whether potential repair costs for IFV damage are relevant to the assessment of the DoV in circumstances where the land is, or will be, vacant.
- 9 Use of the matrix to determine DoV adjustments will ensure the consistent and principled assessment of DoV across land that has suffered IFV damage. However, the matrix does not exclude the need for the application of valuation judgement to particular land to ensure the DoV assessed is a fair reflection of the extent of damage and has appropriate uniformity.
- 10 The methodology has been tested in a pilot project of approximately 50 properties with potential IFV damage, where the pre-earthquake residential building has been or will be rebuilt, and determined to be robust.
- 11 EQC's valuers principally responsible for this report, and the development of the DoV methodology for IFV damage to insured land, are:
 - 11.1 Dave Townsend FNZIV, FPINZ, a registered valuer who works for his own company and has been involved in the valuation and property consultancy industry for the past 34 years. Dave is a contractor to, and advises, EQC on a range of valuation matters. Working as a contracted Lead Valuer with EQC often involves working with and advising local valuers in the event of specific land value issues that arise throughout New Zealand;
 - 11.2 Ken Blucher, a registered valuer and Fellow of the New Zealand Property Institute (FPINZ) with over 34 years valuing experience. Based in Wellington, he is a Director at Darroch and has a wealth of experience with respect to EQC claims, compensation work, disposal of surplus Crown properties and Treaty settlements acting on behalf of the Crown. Ken also advises clients on various legislative matters, specifically relating to rating. Ken has been a key member of the valuation team assisting EQC with property and valuation policy advice in Christchurch, since September 2010 through to the current day. He is

currently valuation team leader with respect to the assessment of properties with IFV and ILV; and

- 11.3 Chris Bridges ANZIV, SPINZ, a Christchurch based Registered Valuer with 33 years' experience in valuation and property advice. Chris manages his own company, and provides valuation advice to EQC on a range of matters. He is a key member of the team that has developed the methodology for DoV valuation.

- 12 The methodology and the results of the pilot project have also been reviewed by the independent Expert Valuation Panel appointed by EQC. The Expert Valuation Panel comprises four senior members of the valuation profession nominated by the Institute of Valuers and the Property Institute of New Zealand. The Expert Valuation Panel has approved the methodology as an appropriate methodology for assessing the DoV caused by increased vulnerability to flooding that accords with accepted valuation standards and practice.

.....

(B) BACKGROUND

(B1) Purpose

- 13 The purpose of this paper is to explain the development of a methodology to determine what, if any, reduction or diminution of value (**DoV**) of residential land has resulted from Increased Flooding Vulnerability (**IFV**) land damage in circumstances where the house has been or will be rebuilt. This methodology is to be used as an alternative basis of settlement for IFV land damage claims, rather than the cost of repairing that damage.
- 14 This paper and methodology address only properties with IFV land damage. As IFV land damage only affects the flat lands of Canterbury (rather than the Port Hills), this paper is confined to the assessment of DoV for flat land properties.
- 15 The methodology and this paper reflect a combination of valuation, legal and engineering advice provided to EQC.

(B2) Increased vulnerability damage

- 16 The 2010-2011 Canterbury earthquake sequence has resulted in certain types of land damage that may not severely impact the owner's present ability to use the land, but which have made the land more vulnerable to certain future natural disaster events.
- 17 These types of land damage result largely from the lowering of ground levels. This change in turn has increased the land's vulnerability to future natural disasters, namely flooding and liquefaction damage in the event of another significant earthquake. These types of land damage have been classified as:
- 17.1 Increased Liquefaction Vulnerability (**ILV**); and
- 17.2 Increased Flooding Vulnerability (**IFV**).
- 18 ILV and IFV damage are each discussed in more detail in section (F) of the Diminution of Value Methodology for Increased Liquefaction Vulnerability (for properties with Residential Building in Place) (2014) and section (G) of the IFV DoV Methodology (Residential Building in Place) respectively.
- 19 This report sets out the methodology for assessing DoV for IFV, where the pre-earthquake residential building has been or will be rebuilt.

(B3) Diminution of value methodologies

- 20 Ordinarily, EQC does not settle land claims by reference to any DoV of land damaged by a natural disaster. Rather, it settles such claims based on the estimated cost of repair. However, ILV and IFV damage have led to the need to consider settling claims by reference to the DoV to the property caused by the damage to the land resulting from the earthquakes.
- 21 Methodologies for assessing DoV resulting from ILV and IFV damage have already been developed for properties where the pre-earthquake house remains in place. These are as set out in the reports:

- 21.1 *Diminution of Value Methodology for Increased Flooding Vulnerability* (updated March 2015) (**IFV DoV Methodology (Residential Building in Place)**); and
- 22 *Diminution of Value Methodology for Increased Liquefaction Vulnerability (for properties with residential building in place)* (May 2016). In the context of EQC's settlement policy for IFV land damage, the High Court confirmed that DoV is an available basis of settlement in appropriate circumstances. Accordingly, the above methodologies are being used by EQC in appropriate circumstances as the basis of settlement of ILV and IFV damage claims.
- 23 Consistent with its approach to IFV land damage where the residential building remains in place, EQC has decided to develop a methodology to provide a consistent framework for the assessment of any DoV to land resulting from IFV damage for properties where the residential building has been or will be rebuilt.

(B4) Statutory context – Earthquake Commission Act 1993

- 24 EQC provides statutory insurance for residential buildings and land (where the buildings have private fire insurance), for damage resulting from a natural disaster. The scope of the cover is set out in the Earthquake Commission Act 1993 (the **EQC Act**).
- 25 As regards land, EQC covers the land on which the house is situated, 8m around the house (and any appurtenant structures such as sheds), the main access way (up to 60m from the house) and land supporting that access way.
- 26 EQC provides building cover, in general, up to \$100,000 (plus GST) for each earthquake event. There is no equivalent fixed cap for land cover. Instead, EQC insures the land up to a maximum amount, being the value of the smaller of certain areas, which will typically be the area of the land damaged or lost, or the minimum lot size for an equivalent residential purpose under the District Plan applicable to the property.
- 27 EQC may settle both land and building claims, up to the maximum amount, by way of payment, replacement or reinstatement at its discretion. In the past, EQC has settled land claims either by payment or reinstatement. Where it settles by payment, the payment has been calculated by reference to the cost of reinstatement or repair (subject to that amount not exceeding the maximum amount). Where land has been "lost", for example by landslip, EQC has paid the maximum amount, being generally the value of the area of land lost.
- 28 In the case of ILV and IFV, rather than paying the cost of repairing the land, another option is for EQC to pay a claimant DoV of the property resulting from the land damage. The High Court has confirmed that DoV may be a more appropriate measure of the claimant's true loss.

(B5) Background to Canterbury earthquakes and residential property market

- 29 The IFV DoV Methodology (Residential Building in Place) set out detail about other matters relevant to this methodology. These are not repeated in this paper, but include:

29.1 the Canterbury earthquake sequence;

29.2 post-earthquake land classifications;

29.3 the nature of the Canterbury market before and after the earthquakes; and

29.4 relevant valuation principles and standards.

(C) DEFINING THE VALUATION OUTCOMES SOUGHT

- 30 The objective of the methodology is to provide, for each parcel of insured land with IFV damage, a dollar value for the DoV of the land resulting from that damage.
- 31 More specifically, the objective is to assess the **discount** from the price that would have been paid for the **land on the day prior to the earthquake** that would be agreed between a **willing buyer and willing seller** because of the **specified physical change** to the land, with **full knowledge** about that change and its impact on the vulnerability of the land to flooding, and the costs of repair options, and advice from competent and **reasonable advisors** recommending any course of action.
- 32 The key elements of this objective can be broken down as follows:
- 32.1 **Discount:** EQC is not attempting to assess the value of the land, or all changes in value after the earthquake; EQC is only assessing the change in value resulting from certain physical land changes. The total change to the land value may reflect impacts for uncertainty, stigma, externalities, etc. which need to be disregarded.
- 32.2 **Land:** The DoV is that of the land insured by EQC with no buildings on it, but taking account of the potential use of that land as a platform for a residential building. EQC is assessing the DoV in order to settle claims of damage to land only (the insurance of residential buildings and personal property being separate). Where the house that existed prior to the earthquake is either not capable of being, or will not be, repaired as a result of the earthquakes, damage to the land does not affect the value of that building, but only the value of the land as a platform for a residential building. However, to the extent that the damage to the land will also affect the value of any potential residential building situated on the land, this will be reflected in the discount of the value of the land.
- 32.3 The methodology described in this paper is limited to assessing DoV on properties where the house that existed prior to the earthquakes is going to be or has been rebuilt. The methodology for assessing DoV arising from IFV damage on properties where the house that existed prior to the earthquakes is still in place on the land, and is going to be repaired, is set out in a separate paper: "*Diminution of Value Methodology for Increased Flooding Vulnerability*" (April 2014).
- 32.4 **The day prior to the earthquake:** The DoV is the discount from the value of the land immediately prior to the 4 September 2010 earthquake. That reflects the value of the land when the damage occurred.
- 32.5 **Willing buyer and willing seller:** The objective is still to determine, as much as possible, what value would be attributed to the physical damage in an open market transaction.
- 32.6 **Specified physical change:** EQC is assessing the DoV that results from physical changes to the land, specifically IFV damage (increased flooding vulnerability).

- 32.7 **Full knowledge:** While the details of the physical changes were not ascertained immediately after the earthquake (and were not for some time), those physical changes (including increases to vulnerability) had already occurred. The market participants are taken to have full knowledge of those changes and their impacts (other than on value), including therefore the pre-earthquake vulnerability of the land to flooding damage. This does not entail full knowledge of every detail regarding the land, changes, repair options and costs etc., but rather the level of detail a reasonable buyer and seller would obtain from relevant experts.
- 32.8 **Reasonable advisors:** EQC compensates for loss as a direct result of land damage; it does not compensate for regulatory changes made following the earthquakes (e.g. decisions regarding the maintenance of services in the Red Zone). The assessment of DoV will therefore not take into account future known or potential regulatory changes that have occurred after the earthquakes. However, an assessment of the DoV may reflect future steps that a property owner may reasonably wish to take as a result of the change to the land (e.g. raising floor heights in any future rebuild).
- 33 Aspects of the above are elaborated on in the assumptions section, below.
- Relevant valuation principles and standards*
- 34 The relevant valuation principles are set out in the IFV DoV Methodology (Residential Building in Place).
- One DoV assessed for 2010 – 2011 earthquake series*
- 35 The EQC Act responds to damage caused by each natural disaster event separately. However, as the valuation of a DoV for IFV is a difficult exercise involving the application of a multifaceted methodology and then valuation judgement based on limited market information, EQC's valuers consider that it is necessary to value the effect of all IFV caused by the entire earthquake sequence. Due to the variable and often insignificant change from one event to another, this provides a truer assessment of the land's loss of amenity and value. This is because, in general, the change across the sequence will be larger and the loss of value more confidently and accurately identified.
- 36 Accordingly, the valuation of DoV will be undertaken for each property to reflect the discount in value arising from all IFV caused over the full earthquake series since 4 September 2010. Any apportionment of the DoV to specific earthquake events is a matter being considered by EQC, and does not form part of this paper.
- Scope of methodology*
- 37 This methodology is focused on assessing DoV for land where the house that existed prior to the earthquakes has been or will be demolished, and a new house has been or will be rebuilt.
- 38 This methodology is not intended to provide the basis for assessing DoV arising from IFV damage on properties where the house that existed prior to the earthquakes is still in place on the property and has been or is going to be repaired.

(D) ASSUMPTIONS (LEGAL AND VALUATION)

39 This methodology is based on a range of legal and valuation assumptions. EQC's legal advisors and valuers currently consider that assumptions will need to be made in relation to matters listed below. These assumptions are likely to be valid and appropriate at the time that valuations for Canterbury earthquake damage are completed, and given the nature of the land insurance provided under the EQC Act. The assumptions are as follows.

Date of valuation

40 The DoV is to be assessed as the reduction from the land value immediately before the earthquake on 4 September 2010. In practice, the value on 3 September 2010 is used.

Willing buyer and seller

41 The DoV is based on the standard valuation assumption that the value is the exchange value between a willing, but not anxious, seller and a willing, but not anxious, buyer.

Basis of valuation

42 The value immediately before the September earthquake will be the Market Value of the insured land where reasonable comparable market indicators are available.

43 The DoV will be based on a market value that refers to a set of assumptions as to what is to be valued. This assumptions based market value is unable to draw on directly comparable market sales given the absence of information regarding IFV damage in the Canterbury market to date, and the difficulties in isolating the impact of IFV damage from other earthquake damage suffered by the land. Instead, the assumptions based market value will draw from evidence of market sales in Canterbury following the earthquakes, around New Zealand and internationally concerning the impact of the risk of natural disasters. It will not take into account any short term stigma which may temporarily affect land values.

Land to be used as a residential site

44 The EQC Act provides cover for natural disaster damage (being a physical change resulting from a natural disaster that affects the use and amenity of the property) to residential land and buildings. In this context, the Act is primarily concerned with a physical change caused by the earthquakes that affects the use and amenity of residential land as a building platform for a residential building, and its associated uses.

45 Consistent with the scheme and purpose of the EQC Act, for the purposes of assessing DoV, it is assumed that the land will continue to be used as a residential site.

Actual redevelopment (including rebuilding of a residential building) is relevant as a proxy for the likely future use of the land as a building platform

46 The assessment of DoV is of the value of the land as a platform for a residential building. However, as noted above, to the extent that the damage to the land will also affect the value of any potential residential building situated on the land, this will be reflected in the discount of the value of the land.

- 47 Where the land is vacant, the valuers must assess the impact of the IFV damage taking into account the likely location and characteristics of a potential residential building situated on the land (such as the floor level of the building). Consistent with standard valuation practice for land, this assessment will be of the highest and best use of the land as a residential building platform (taking into account the relevant characteristics of the land and locality).
- 48 In a number of cases, due to the passage of time between the Canterbury earthquake sequence and the valuation assessment, a residential building may have been rebuilt on the land. While the valuation assessment remains that of a vacant site, EQC's valuers consider that it is appropriate to have regard to the residential building rebuilt on the land as a proxy for the potential residential building to be built on the land at the date of the earthquake, in assessing the ongoing impact of IFV damage to the land.
- 49 Similarly, in some cases in the course of redevelopment of the land works may have been done to the land that are not intended to respond to IFV damage but that alter its contours in ways that are likely to affect the location and extent of flooding on the land. Again, EQC's valuers consider that it is appropriate to have regard to such redevelopment as a proxy for the potential use of the land as a residential building platform, in assessing the ongoing impact of IFV damage to the land.

Insurance

- 50 This methodology proceeds on the assumption that insurance will be generally available to properties affected by IFV damage, once a residential building is rebuilt on the affected land, other than in the most extreme and rare cases (for example where a reduction in the height of the land means that tidal impact may now cause that land to flood on an almost daily basis). EQC's valuers are comfortable that this assumption is appropriate, and that, where the assumption requires relaxing in the case of properties with extreme IFV damage, this can be taken into account in assessing DoV.

Finance

- 51 It is also assumed that finance to purchase residential land or land with a rebuilt residential building will be available on normal terms for any property for which insurance is available.

Public availability of information regarding flood vulnerability

- 52 Flooding vulnerability as assessed by Christchurch City Council of each property will be disclosed to buyers and sellers through Council published flood maps that will also be used by the Council for the purposes of the Land Information Memoranda (**LIM**)¹ and Project Information Memoranda (**PIM**)².
- 53 As is explained in section (G2) of the IFV DoV Methodology (Residential Building in Place), these flood maps differ to those used by EQC to determine which properties have suffered IFV damage for the purposes of the EQC Act. EQC has considered whether the effect of flood vulnerability on the value of properties ought to be

¹ Not all buyers review LIMs before completing a purchase based on information from unpublished market research commissioned by the Department of Building and Housing in 2010 as part of the Building Act 2004 review.

² PIMs were made voluntarily under an amendment to the Building Act 2004 in 2008.

determined by both the change in actual flood vulnerability and any change in the status of land in Council flood maps. However, the valuation evidence discussed further in sections (K) and (L) below showed that the market value of a property is not materially affected by it being in a flood mapped area but rather by knowledge of its actual flood vulnerability. Accordingly, IFV is to be assessed solely on the basis of the actual increase in flooding vulnerability on each insured property.

DoV to only reflect IFV damage

- 54 The DoV will be the reduction in value resulting only from physical changes to that residential land assessed by EQC as IFV damage. This assumption is made to ensure that EQC is compensating customers for only natural disaster damage that is covered under the EQC Act.
- 55 The DoV will not therefore reflect any changes in value resulting from external changes or effects, whether from the earthquakes or otherwise. Equally it will not reflect changes in value due to increased knowledge of pre-existing vulnerability as against increased vulnerability due to the earthquake damage. For example:
- 55.1 *Operational services*: It will not consider whether the land has, and will continue to have, operational services such as roading, telephone, sewerage etc. The fact that the council has decided that it will not maintain services in the residential Red Zone to the same level as prior to the earthquakes, is not something that EQC will be compensating for.
- 55.2 *Neighbouring properties*: Any effect from the earthquakes on neighbouring properties will be disregarded.
- 55.3 *Short term temporary stigma*: Any short to medium term stigma arising from the earthquakes that may temporarily affect land values will be disregarded.
- 55.4 *Non-insured land*: EQC is making an insurance payment to claimants for loss in value of the insured land resulting from damage to that land. To the extent the property includes land that is not insured, the DoV EQC is assessing will not include any DoV resulting from the damage to that uninsured land.
- 56 Finally, the DoV will not reflect any physical changes to the residential land assessed by EQC as damage in other land damage categories (including increased liquefaction vulnerability). It will be assumed that EQC will assess the loss caused by other categories of damage separately (whether by paying the cost of repair or otherwise).

(E) INPUTS TO VALUATION METHODOLOGY

57 The key inputs to the methodology are:

- 57.1 engineering advice and information regarding the impacts to the residential land resulting from increased flooding vulnerability;
- 57.2 other information regarding the land being assessed; and
- 57.3 market sales evidence of the appropriate reduction in value for IFV land damage.

58 Each of these is outlined below.

(E1) Engineering advice regarding the impact of IFV

59 EQC's valuers have been provided with engineering advice and information regarding the impact of increases in liquefaction and flooding vulnerability caused by the Canterbury earthquake sequence from EQC's engineering advisors, Tonkin + Taylor.

60 At a high level, the practical implications of IFV damage are:

- 60.1 **increased likelihood of land and building damage:** IFV properties are likely to have a significant increase in flood depth in a future flood event, potentially over a greater proportion of the property, which may also affect the house; and
- 60.2 **increased frequency of land and building damage:** IFV properties may also have more frequent flooding than they had prior to the Canterbury earthquake sequence.

Flood Maps

61 The practical implications of IFV damage for each property are primarily represented in flood maps produced by EQC's engineering advisors, Tonkin + Taylor, for the purposes of the valuation assessment. This is consistent with the approach taken under the IFV DoV Methodology (Residential Building in Place).

62 The flood maps are produced using models developed or adapted by Tonkin + Taylor on behalf of EQC for the purposes of IFV assessment. Further information on the engineering assessment for IFV land damage can be found in the Tonkin + Taylor report *Canterbury Earthquake Sequence: Increased Flooding Vulnerability Assessment Methodology* (April 2014).

63 The flood maps produced for valuation purposes are superimposed on an aerial photo of the property and show:

- 63.1 the location (including in relation to the pre-earthquake house, appurtenant structures, such as garages, and the access-way) and depth of flooding expected on a property before and after the 2010-2011 Canterbury earthquake sequence in 1%, 2% and 10% (or a 1 in 100 year, 50 year of 10 year) Annual Exceedance Probability events (**AEP**); and

63.2 the location and depth of exacerbated flooding on a property resulting from the subsidence caused by the Canterbury earthquake sequence.

- 64 Information from the flood maps is provided in a field sheet, which summarises the proportion of the site affected and the extent of any change in the post CES flood depth. The field sheet also records the finished floor level of any dwelling on the land at the time to Tonkin + Taylor's assessment, where that is available.
- 65 In assessing the DoV attributable to IFV damage using this methodology, EQC's expert valuers rely on the flood maps produced by Tonkin + Taylor as an accurate (accepting the limitations documented in the Tonkin + Taylor reports) visual representation of flood prior to and after the Canterbury earthquakes and exacerbated flood depths associated with IFV damage.

Planning requirements regarding floor levels

- 66 The practical implications of IFV damage for land are assessed having regard to the implications of greater flood vulnerability to a new building on the land, rather than the pre-earthquake building. Accordingly, further information has been provided by Tonkin + Taylor to enable EQC's valuers to assess the implications of IFV damage for use of the site as a building platform, taking into account the regulatory requirements that will apply to any new building.
- 67 In the IFV DoV Methodology (Residential Building in Place), EQC's valuers identified whether modelled flooding is expected to enter the dwelling as an important factor in the assessment of IFV damage. Whether this is expected to be the case for land where the pre-earthquake building has been or will be removed will depend on the relationship between the expected floor level of the dwelling and the modelled flood levels.
- 68 Tonkin + Taylor has also provided information regarding the planning requirements relevant to floor levels of new residential buildings, which is set out in the Tonkin + Taylor report, *Review of RMA and Building Act Requirements in areas susceptible to flooding* (October, 2016).
- 69 In summary, this report includes the following advice:
- 69.1 The proposed Christchurch Replacement District Plan, which became operative in September 2015, provides for a more extensive Flood Management Area (**FMA**) than was previously in place, and introduces a Flood Minimum Floor Level Overlay. This requires floor levels of new buildings within the FMA to be above the Christchurch City Council's 0.5% AEP (1 in 200 year) flood level (plus freeboard);
- 69.2 There is provision for the filling of residential building platforms to achieve the minimum floor levels as a permitted activity, but other resource consents may be required (due to, for example, the quantity or height of fill, or proximity to waterways);
- 69.3 The Building Code also provides that water from a 2% AEP (1 in 50 year) event shall not enter buildings. The Christchurch City Council (**CCC**) implements this by requiring, where new houses are built (or foundations

rebuilt), floor levels to be above the 2% AEP flood level (plus 400mm freeboard); and

- 69.4 Existing use rights may apply under the Resource Management Act to allow houses within the FMA to be rebuilt with floor levels below the Council's 0.5% AEP (1 in 200 year event) floodplain, but the floor levels would still need to be above the 2% AEP (1 in 5 year event) levels required by the Building Act. The Council confirmed in discussions that they are not allowing any houses to be built with floor levels below the 2% AEP flood level (plus freeboard) as those levels were assessed at the date of the consent.
- 69.5 In Waimakariri District, the plan provides for specific floor level requirements for certain areas, which Tonkin + Taylor can provide further information on when required.
- 69.6 Given the above guidance about council floor level requirements, Tonkin + Taylor consider that it is appropriate to assume that new houses will be built in accordance with council floor level requirements for the property.
- 70 To assess the relationship between CCC minimum floor level requirements and expected flood levels predicted by the models used to analyse IFV land damage, Tonkin + Taylor compared minimum floor levels provided by Christchurch City Council against the post-CES 1% AEP flood levels predicted by EQC's models. The results showed that minimum floor levels set by Christchurch City Council using both the 2% and 0.5% AEP (including freeboard) were usually higher than the 1% AEP post-CES flood level on site.
- 71 To inform EQC's valuers about the impact of planning rules on specific land, Tonkin + Taylor will also provide:
- 71.1 for land where the residential building has not yet been rebuilt (and for which there are no building consent plans approved by the relevant local authority), information regarding the relevant floor level requirements of the local authority (which will depend, in the case of Christchurch City, on whether the land is within the FMA);
- 71.2 where available, for land where the residential building has been rebuilt (or for which building consent plans have been approved):
- (a) information regarding the finished floor levels from the building consent plans for the new residential building;
 - (b) copies of the site plan from the building consent, showing location of the new residential building on the site. In some cases, these will also note floor and ground levels;
 - (c) a recent aerial photograph of the land including the new residential building.
- 72 Further details about the information provided to EQC's valuers by Tonkin + Taylor is set out in Tonkin + Taylor's report *IFV cleared site methodology - Engineering Inputs* (October, 2016).

(E2) Other information regarding the land being assessed

73 In addition to the above information, EQC's valuers will have the following information available to assist in the assessment of DoV:

- 73.1 Information gathered through kerb-side observations of the land by valuers, and any new residential building that has been built on the land since the Canterbury earthquakes at the date of inspection; and
- 73.2 A MUD map will be produced by EQC's Land Review Team. This is a detailed plan depicting the location of any structures on the land, the insured land boundaries and the estimated area of the insured land. The MUD map is particularly useful to identify only those insured areas affected by flooding.

(E3) Repair costs

74 In the IFV DoV Methodology (Residential Building in Place), the cost of undertaking land repair to remove the impact of the IFV land damage was taken into account as an input to the methodology. However, the ultimate methodology developed for IFV DoV Methodology (Residential Building in Place), and in particular the percentage discounts, did not reflect a direct relationship with repair costs, consistent with international literature and New Zealand sales data.

75 Some landowners have options to reduce or eliminate the impacts of IFV damage. These include undertaking land repair or reinstatement by raising the ground, where such works are technically feasible or consentable. In other cases, works undertaken in the course of rebuilding the residential building may mitigate the impact of IFV damage. Alternatively, a landowner may simply decide to live with the increased level of vulnerability rather than undertake mitigating works.

76 In general terms, repair of IFV damage by raising the land may be more readily undertaken where the residential building is required to be demolished or rebuilt due to earthquake damage than when the residential building remains in place. However, this will depend on a combination of technical characteristics of the land, the extent and severity of IFV damage, and application of consenting requirements.

77 Tonkin + Taylor has reviewed potential repair techniques for IFV damage and described their findings in *IFV cleared site methodology - Engineering Inputs* (October, 2016). In summary, Tonkin + Taylor's advice is that:

- 77.1 the most likely practical technique available to remediate IFV land damage is to raise the land by importing fill. It is unlikely that alternative repair strategies will be pursued on an individual basis for most properties;
- 77.2 there are legal and engineering restrictions on undertaking repair works for a significant majority of cleared site properties with IFV land damage even where the dwelling has been removed. These include:
 - (a) the need to obtain resource consent, which is in practice unlikely to be granted, for most properties within the FMA;
 - (b) that eliminating the IFV land damage in many cases would require a fill height greater than recommended by MBIE Guidance to address land stability issues;

- (c) that, in many cases, eliminating the IFV land damage would not remove the overall vulnerability of the property to flooding (because the property was vulnerable prior to the Canterbury earthquake sequence). Eliminating all flooding vulnerability to the land is more likely to trigger consenting and stability issues;

77.3 based on a review of 23 IFV potential properties in 2014 by EQC, the repair costs for land ranged from approximately \$600 to \$43,000, with an average cost of approximately \$13,000. The valuers note Tonkin + Taylor's advice that, in practice, there will likely be a number of additional costs which will need to be considered, such as the cost of consents, professional fees, and temporary removal and replacement of appurtenant structures.

78 These observations, together with EQC's valuers' understanding of common practice in Canterbury, indicate that remediation of IFV damage does not play a significant role in decision-making regarding redevelopment of land in Canterbury. Few properties have had significant land raising works undertaken, and those that have appear to have been driven by a combination of regulatory requirements to meet minimum floor levels for the new residential building and aesthetic choices of the land owner.

79 Accordingly, EQC's valuers do not consider that it is necessary or appropriate for the discounts for IFV damage to reflect a direct relationship with repair costs. As noted in the IFV DoV Methodology (Residential Building in Place), this is consistent with international literature and New Zealand sales data (albeit in the context of improved properties).

80 However, repair costs, where available for a specific property, will be considered by EQC's valuers as a trigger to check that the assessed DoV is appropriate, particularly where the DoV is greater than repair costs.

(E4) Market sales evidence

81 The relevant market evidence, including the literature reviewed, for IFV damage is considered in sections (J) to (L) of the IFV DoV Methodology (Residential Building in Place).

82 The available market evidence primarily comprises studies of improved properties and includes very little that is directly focussed on vacant land sales.

83 EQC's valuers considered whether there was any further sales evidence that would be relevant to the development of the methodology, in particularly whether it would be useful to examine vacant land sales in Christchurch since the earthquakes.

84 There are only limited numbers of vacant land sales in Christchurch, spread across different technical categories, and in areas with different levels of pre-earthquake flooding vulnerability and knowledge of that vulnerability. It would be difficult to isolate the impact of IFV damage from those sales from other characteristics of the land which may affect value. This is particularly the case given that the Canterbury market is characterised by a number of factors not present in other markets, such as the position of the buyer and seller as regards any earthquake damage insurance settlements at the time of the sale.

- 85 Given this, EQC's valuers considered that any analysis of vacant land sales was unlikely to be useful to the development of this methodology. Accordingly, an alternative analysis was required.
- 86 The value of vacant residential land is informed by the expected value of the property once a house is built on the land. That is, a willing buyer will take into account the development potential of the land, and the value of the land once it is developed, in assessing the price he or she is willing to pay for the land.
- 87 It follows that, if IFV damage would reduce the value of the property once any residential building was built on the property (for example, because the future residential building would now likely experience flooding underneath it in a 1% AEP event), then the IFV damage will most likely also reduce the value of the land, as a building platform to a similar extent. Put in simple terms, for example, if property once developed with a residential building is likely to be worth \$10,000 less due to IFV land damage, it follows that a willing buyer is likely to pay approximately \$10,000 less for the land due to IFV land damage.
- 88 Accordingly, EQC's valuers consider that market evidence concerning the impact of vulnerability to flooding and other natural disasters on improved property values is relevant to the impact of vulnerability to flooding and other natural disasters on values of vacant residential land.

(F) THE PILOT

89 EQC's valuers conducted a pilot study to test how to assess DoV for IFV on land where the pre-earthquake house has been or will be rebuilt. In particular, this included exploring what information could be gathered and used to inform the impact of IFV on any future building constructed on the land given the floor height that a new dwelling is likely to be built at.

(F1) The process

90 A sample list of 51 properties were selected from IFV properties that had already been inspected by EQC's valuers, and where it was known that the former house had been demolished. Each of these properties was therefore either a vacant site or the dwelling had already been rebuilt.

91 Tonkin + Taylor provided the flood maps for each property along with additional data that provided comparisons between actual finished floor levels for new dwellings (based on council files), council floor level requirements in a 2% AEP event and 0.5% AEP event (for properties in FMAs) and the EQC flood levels for each of the 1%, 2% and 10% events.

92 Tonkin + Taylor and EQC's valuers carried out kerbside inspections of the properties in order to assess how the exacerbated flood depths identified on the flood maps for the property were likely to impact the property, including:

92.1 confirming whether the land was currently vacant, rebuilt, or in the process of rebuilding;

92.2 identifying properties where the ground level may have been altered, and, if so, by how much;

92.3 capturing the estimated observed floor height of any new building above ground levels;

92.4 determining whether new dwellings are being built above the EQC 1% AEP flood level, and above the council floor level requirements;

92.5 recording observations about whether the intensity of site use had changed; and

92.6 observing whether rebuilt houses were generally sited on the same footprint as the pre-earthquake dwelling.

93 This information, together with the draft matrix that was being developed, and preliminary pre-earthquake values based on previous land valuations carried out for EQC, was then used to assess provisional DoV percentages and amounts based on the likely location and floor height of the new dwelling. The matrix was applied in the manner described in paragraphs 161-166 below.

94 More detail regarding the information provided by Tonkin + Taylor for the pilot properties, and some of the findings discussed below are set out in Tonkin + Taylor's report *Increased Flooding Vulnerability (IFV) Cleared Sites – Engineering Inputs*.

(F2) Findings from the pilot*Vacant and rebuilt properties*

95 Of the 51 selected properties:

95.1 10 sites were noted as being currently vacant;

95.2 38 properties were identified as rebuilt, or at least to a stage of construction where foundation height could be estimated relative to the ground; and

95.3 3 were unable to be observed from the road.

Floor height and ground levels

96 For the purposes of the trial, the floor level relative to the immediate post-quake ground level (before any works were done to the property or house) was estimated. This assisted in assessing whether the flood levels were likely to extend under the building platform and, if so, whether the flood levels were likely to be above or below the floor levels of the new dwelling. This included observing whether the height above ground of the new building was similar to the pre-earthquake building or whether it had been changed.

97 In most cases, there were no indications of changes to the ground levels and therefore the floor height above current ground levels was estimated.

98 For five properties, there were indications that ground levels had been changed, though any changes were generally only of a minor nature. Where there did appear to be changes to the ground levels, visual aids such as relativity to existing fences, comparison of slope of drive on neighbouring properties, reference to existing flood maps and kerb height, or other unaltered land features usually enabled an estimate of the finished floor height over the original ground to be made. In some circumstances, for example where neighbouring properties had also been rebuilt, it was more difficult to determine whether the ground levels had changed. Observations were also limited to what could be seen from the road.

99 For some properties, council files also provided information on finished floor and ground levels.

Relationship to CCC floor level requirements

100 Of the dwellings that had been rebuilt, and had data about the CCC 2% AEP floor level requirements, most (33 out of 42) were built at or above the current CCC 2% AEP floor level requirements. On the other hand, most properties (19 out of 35 that had been rebuilt and had sufficient data) were rebuilt below the CCC 0.5% floor level requirements.

New houses relative to EQC post CES 1% AEP levels

101 Most rebuilt dwellings (36 out of 42 properties for which there were data) were built with floor levels above the post-CES 1% AEP flood level. Some of these properties would still, however, have flooding under the building platform in a 1% AEP event.

Intensity of site use

- 102 In most cases, the intensity of site use remains unchanged. Single unit dwellings were typically replaced with single unit dwellings, and cross lease / unit title properties were replaced with a similar number of units.

Siting of rebuilt homes

- 103 Rebuilt homes were usually sited substantially on the footprint of the original dwelling. However, it was observed that many rebuilt dwellings included attached garages that had replaced previously detached garages. Most garages were at ground level, or at least below the level of the dwelling floor, which would need to be considered in assessing the likely DoV.

(F3) Conclusions and Recommendations

- 104 EQC's valuers are comfortable that the existing matrix structure remains appropriate and is able to be applied to both vacant sites and rebuilt sites using the information provided by Tonkin + Taylor and gathered through the kerbside inspections.
- 105 EQC's valuers are also comfortable that the percentage discounts as adjusted to apply to land values, as explained in section (G2) below, is producing appropriate outcomes.

(G) THE METHODOLOGY

(G1) Introduction

107 The valuation of DoV assesses the reduction in value from the value of the land immediately prior to 4 September 2010 caused by the IFV damage suffered by the land as a result of all earthquakes up to, and including, 24 December 2011. DoV is calculated by applying a percentage adjustment derived from a matrix developed by EQC's valuers to the pre-earthquake value of the land, then testing the resulting DoV against valuation judgement to ensure that the reduction is appropriate.

(G2) Development of matrix to apply to land values

108 As outlined in section (E4) above, EQC's valuers consider that there is a direct relationship between the impact of IFV on property values and land values. That is, as the land value will reflect its use primarily as a building platform, a negative feature which will reduce the ultimate value of the property when the land is developed will similarly affect the value of the land.

109 The best available market evidence concerning the impact of vulnerability to flooding and other natural disasters on improved property values was used to develop the IFV DoV Methodology (Residential Building in Place). That Methodology incorporates a matrix which reflects valuer judgement as to the relative impact on property value of different increases in severity of flooding (defined in terms of depth and location) and frequency of flooding to property.

110 EQC's valuers believe that the same relativities between different severities of IFV damage and frequency considerations should be reflected in the DoV for land. For example, IFV land damage that results in flood waters entering a building should be treated as relatively more significant than IFV land damage that results only in flooding away from the residential dwelling. This relationship applies irrespective of whether the flooding occurs in relation to an existing residential building or is likely to occur in relation to any future building on the site.

111 Accordingly, EQC's valuers consider that the most robust way of developing a methodology to assess DoV on land resulting from IFV damage, is to adjust the matrix from the IFV DoV Methodology (Residential Building in Place) to apply to land values. This will have the advantage of:

111.1 preserving the structure of the way in which various practical implications of IFV land damage are considered by valuers; and

111.2 providing consistent relative discounts for the different practical implications of IFV land damage with those assessed for properties where the residential building remains in place.

112 The IFV DoV Methodology (Residential Building in Place) matrix contains percentage discounts from the property value (e.g., the application of Steps 1 and 2 of the methodology might identify that those implications are expected to impact the value of the property by 5%). For properties where the pre-earthquake building has been or will be removed is based on a discount from the land value, it is necessary to determine the equivalent discounts to be applied to a land value.

113 For the reasons given above, EQC's valuers consider that the discount from the value of the land should be, in numerical terms, the discount from the land developed to highest and best use as a residential building site (taking into account the relevant characteristics of the land and locality). For example, if a vacant site is worth \$100,000 but fully developed would be worth \$150,000, and assuming IFV land damage that would be assessed as 5% from the value of the property:

113.1 the DoV assessed for the property if developed with a residential building that accorded with the properties highest and best use would be \$7,500 or 5% of \$150,000;

113.2 the discount for IFV land damage should be the same in absolute numerical terms for the land: that is, \$7,500 or 7.5% of the value of the land.

114 For the example property, the property to land value ratio is 1:1.5 (that is, the property value (\$150,000) is 150% of the land value (\$100,000)). It follows that the adjustment to the percentage discount applied to the property value to achieve an equivalent numerical discount for the land value is also 1.5 or 150% (that is, 7.5% is 150% of 5%).

115 In order to develop a matrix to be applied to land values, EQC's valuers undertook analysis of the relationship between land and improved property values in Christchurch to determine whether a consistent relationship between land and improved values existed. This analysis and the conclusions reached are set out below.

- ***Analysis of existing IFV population***

116 An analysis for of pre-earthquake quake insured area land values (**PQLV**) compared to pre-earthquake property (capital) values (**PQV**) was undertaken for IFV properties where the residential building remains in place, where those values had already been assessed as part of the assessment of DoV under the IFV DoV Methodology (Residential Building in Place).

117 A total of 4,318 IFV valuations were analysed by grouping them into the suburb description as originally provided by Tonkin + Taylor. For each suburb, the median ratio (on a percentage basis of PQLV to PQV) was calculated. A copy of this analysis is provided in Appendix One.

118 The analysis showed some strong general trends:

118.1 The median proportion of PQLV to PQV for all properties is 57%.

118.2 The median proportion of PQLV to PQV analysed per suburb is 58%.

118.3 In suburbs where the price of houses is typically low, the percentage of PQLV to PQV was lower than the median, for example, Bromley is 49%.

119 A low proportion of land value to property value indicates the likelihood of a higher quality or larger house in the locality. If these proportions were used to assist with the development of an adjustment to the percentages in the existing IFV matrix, a lower proportion indicates the need for a higher adjustment and vice versa. Based on the percentages above, the adjustment would range 1.72 to 2.04 (Bromley)

120 In suburbs where the price of houses is typically higher, the proportion of PQLV was higher than the median. For example, the proportion for Fendalton is 76%, most likely reflecting high value sites that are underutilised by existing housing.

- ***Analysis of Land utilisation for modern homes***

121 Given the cleared sites methodology considers the future risk to a new house that has / will be built, EQC's valuers consider a more reliable proxy for the relationship between land values and the value of developed property is to analyse the land value to capital value relationship for newer housing throughout Christchurch.

122 This approach avoids the distortion that occurs when considering the analysis of the existing housing stock which includes small houses on large sections. For example in the 1950s, a 90 m² bungalow may have been built on a 1000 m² site, whereas today in the same locality a typical dwelling may be 140 m² on a 700 m² site.

123 Accordingly, an analysis of properties built between 2000 and 2010 was undertaken, again across suburbs. To do this, the 2007 rating capital values and land values were considered by selecting houses with a build date after 2000, being the age of properties most likely to represent modern homes.

124 The analysis shows for a median proportion of PQLV to PQV of 61% for all properties. Importantly, the range of proportion of PQLV to PQV for modern properties is much smaller than for all properties. Fendalton properties, (representing a high value area) have a proportion of 55.8%, whilst Aranui, Wainoni, Burwood and Avonside have a proportion of 61.6%.

- ***Single unit dwellings (post 2000)***

125 Repeating the analysis considering only single unit residential dwellings shows a median ratio of PQLV to PQV of 62% for all properties. Similarly Fendalton properties have a ratio of 61%, whilst Aranui, Wainoni, Burwood and Avonside have a ratio of 67% indicating adjustments ranging from 1.49 to 1.61.

126 We note that when only houses built later than 2000 were considered, the proportion for a high valued area is now below the median (by a small amount), whereas it was previously higher.

127 EQC's valuers are comfortable that this result is appropriate as the added value of improvements (for a modern house) is likely to be higher in a high value area. It also most likely reflects higher utilisation of expensive land in a high value area.

- ***Multi unit properties (after 2000)***

128 We have also considered flats built after 2000 as a separate grouping, recognising the land value relationships are considered less reliable as cross lease sites rarely trade in the open market. As a consequence less reliance has been placed on flats as a separate group.

- ***Summary results***

129 The table below summarises the results of the analysis. This shows the average results across Christchurch, the results for Fendalton as an example of higher value areas in western Christchurch, and the average of the results for Aranui and Wainoni as examples of lower value suburbs in eastern Christchurch:

	All Property categories	RD and RF>2000	RD>2000	RF>2000
All	58% (1.72)	62% (1.61)	62% (1.61)	69% (1.45)
Fendalton	76% (1.32)	56% (1.79)	61% (1.64)	51% (1.96)
Aranui and Wainoni	57% (1.75)	65% (1.54)	67% (1.49)	67% (1.49)

Table 1: summary of results

- 130 It is considered that the proportion of land to property value for modern dwellings is the most meaningful, as, in the case of the land to be valued, the demolished dwelling will be replaced by a modern dwelling. It is also appropriate to remove the influence of multi-unit developments, to focus on the predominant type of residential building that will be built on cleared sites.
- 131 Considering only newer housing stock the range of proportions across suburbs compressed to the extent that the variation between suburbs is negligible. This supports the adoption of a single adjustment.
- 132 A default position, based on a ratio of 61% - 67% PQLV compared to PQV would indicate that the IFV matrix discounts for property values could be multiplied by a factor of approximately 1.6 to apply to land values.
- **Conclusions**
- 133 Based on this analysis, EQC's valuers consider that it is appropriate to develop a single matrix to reflect the percentage discounts to land values from IFV damage, without any differentiation for high or low value properties or by suburb.
- 134 Taking into account the range of ratios between land and building values in the above analysis, EQC's valuers consider that it is appropriate to base the percentage discounts in the matrix on those in the IFV DoV Methodology (Residential Building in Place) methodology applying a multiplier of 1.6 and rounding to the nearest 0.5%.
- 135 EQC's valuers have considered the resulting matrix, and its application to a pilot sample of approximately 50 properties (discussed in section (F), above). They consider that, as a matter of valuation judgement, the resulting matrix will permit the consistent and robust identification of percentage discounts for IFV damage to land that, when applied with careful judgement from EQC's valuers on a property by property basis, will produce appropriate valuation assessments of the DoV to the land value caused by IFV damage.
- 136 The matrix in the IFV DoV Methodology (Residential Building in Place) was developed in the context of the pre-earthquake existing housing stock in Christchurch, which included a broad range of property types including old and new housing. However, EQC's valuers consider that the matrix developed was not dependent on the type of housing that was being considered and that the same matrix would have been developed even had that methodology focused on a particular subset of properties, such as properties with recent housing.

- 137 EQC's valuers' conclusion in the IFV DoV Methodology (Residential Building in Place) that the use of a percentage discount was the best means of reflecting the discount in property values is also consistent with this. As noted in that methodology, the use of a percentage discount to assess the loss in value due to increased flooding vulnerability was supported by international literature on the impact of natural hazards on property values. The effect of a percentage discount approach is that the DoV assessed is directly proportional to the value of the property. The value of a property reflects many different characteristics, including the age of any house on the property. EQC's valuers are comfortable that properties with the same impacts from IFV land damage would generally experience a reduction in value of the same proportion of their property value, regardless of whether they were high or low value properties, and regardless of the age of the house on the property.
- 138 EQC's valuers therefore consider the original matrix forms an appropriate base for a matrix that will be applied to vacant land, taking into account its development potential. EQC's valuers also consider that it is appropriate to create this new matrix using an adjustment derived from properties with recent housing as the best reflection of the land to property value ratio of the properties once a new house has been built on the land.

(G3) Valuation Process

- 139 The assessment of DoV involves a multi-phase process as follows:

PHASE 1 – Determination of the pre-earthquake (September 2010) value for the insured area (as defined in the EQC Act) and improvements.

PHASE 2 - Identification of an appropriate percentage discount (if any) for IFV.

PHASE 3 – Applying the percentage discount to the pre-earthquake value of the insured property.

PHASE 4 – Valuation review of the resulting DoV.

- 140 These phases of the work stream are discussed below.

PHASE 1 – Determination of the pre-earthquake value

Overview

- 141 The valuer assessing the DoV under this methodology will also assess the pre-earthquake value of the insured land. This valuation will follow the process set out below, and take into account prior work done for EQC to assess residential land values for the purposes of assessing maximum entitlements for land damage under section 19 of the EQC Act.

Process for valuing insured land

- 142 The land values will be based on market sales before the valuation date of 3 September 2010, principally using vacant land sales. In established areas where limited land sales existed, improved sales may be considered using a residual approach to arrive at a land value.
- 143 Using accepted valuation techniques adjustments will be made for differences in:
- 143.1 land size;

143.2 location and surrounding properties;

143.3 physical attributes including contour, outlook, views and shape;

143.4 tenure;

143.5 zoning; and

143.6 situation (inside, corner or rear lot).

Previous assessments of land values

144 As noted above, EQC has previously engaged valuers to provide land values for the purposes of assessing maximum entitlements for land damage under section 19 of the EQC Act.

145 This prior work involved valuers assessing both minimum site area land values and insured land values for many IFV and ILV properties. Individual land values were assessed for individual fee simple, cross lease and unit titled properties.

146 These values were assessed following a similar process to that outlined above and were used in the assessment of pre-earthquake values for IFV properties under the IFV DoV Methodology (Residential Building in Place). Where available, they will also inform the assessment of the pre-earthquake value for land under this methodology.

PHASE 2– Determination of the discount

147 As was explained in section (G2) above, a matrix has been developed to provide the appropriate discount to land for IFV damage.

148 The in-situ IFV matrix was used as a starting point, and each percentage discount in the matrix was multiplied by a factor of 1.6 on the basis of the analysis set out above in section (G2). The resulting percentage was rounded to the nearest 0.5%, and the relativity (absolute) between each resulting percentage was then considered, resulting in some minor deviation from a direct application of the rounded 1.6 multiplier. In particular, as a result of this review, EQC's valuers considered that the resulting percentage for the largest adjustment in Step 3 (flood frequency) was too high, and it was reduced by 0.5%.

149 The matrix considers the impact of IFV on the land and, in particular, the use of the land as a building platform for a residential building. The relevant residential building is the residential building that a willing buyer is likely to build on the land. Where the residential building has already been rebuilt, information about that building is taken into account as the best available information about, and therefore appropriate proxy for, what a willing buyer would have been likely to build on the land.

150 The following sets out how the matrix is applied. In large part, this mirrors the IFV DoV Methodology (Residential Building in Place), with some further explanation of how information, such as rebuilt floor levels and local authority floor level requirements, are taken into account.

The matrix

151 The matrix requires the valuer to assess DoV for land based on the following characteristics:

151.1 flood depth change;

151.2 flood profile, including—

- (a) the part or proportion of the land that is affected;
- (b) whether or not water would go beneath or into a new dwelling built on the land;

151.3 change in frequency of flooding;

151.4 the general location and whether or not other desirable features such as water views “soften” the impact of any flooding.

152 In general terms, the greater the proportion of the property affected by flooding the greater the DoV. The flood depth change is also a significant factor; the greater the depth change the higher the DoV. Highest DoV is seen in cases where the water would enter the dwelling.

153 **Steps 1 and 2** in the application of the matrix involve the selection of a base adjustment based on (1) the flood profile and (2) flood depth change (i.e., together, the **severity** of the flooding for a 1% AEP flood). These first two steps are shown in the table below.

154 The matrix provides a base adjustment for four different ranges of flood depth change for nine different flood profiles. The extent and coverage and impact on a dwelling to be built on the land are incorporated into the flood profile descriptions. If land that previously was unaffected now floods, this is likely to have a greater impact on value than land with a history of flooding that now simply floods more severely. The profiles are designed to reflect this.

STEPS 1 & 2						
		1	2	3	4	
FLOOD PROFILE (STEP 1)	8	Significant frequent flooding across whole of site. eg. Tidal influence.	Treat on merit	Treat on merit	Treat on merit	Treat on merit
	7	Majority of site affected. Water previously did not affect potential building platform, but now likely to enter potential dwelling.	19%	24%	27%	32%
	6	Minor to moderate proportion of site affected. Potential building platform previously wet. Water now likely to extend above potential floor level.	14%	18%	21%	26%
	5	Site moderately to significantly affected. Water previously above potential dwelling floor level, now more significant flooding.	10%	13%	19%	24%
	4	Site moderately to significantly affected. Potential dwelling platform unaffected, water now on potential building platform.	8%	10%	13%	18%
	3	Minor to moderate proportion of site affected. Potential building platform previously affected and now worse. Water does not extend above likely floor level.	5%	8%	11%	16%
	2	Majority of site affected excluding potential building platform, or a small part of site more critical in nature eg close to potential dwelling site	3%	6%	8%	12%
	1	Moderate proportion of site affected. Generally extends close to potential building platform	1.5%	3%	5%	6.5%
	0	Minor proportion of site affected. Non critical. Yard only, well away from potential dwelling platform. Difficult to identify any discernible impact on value.	0%	0%	Nominal amount less than 1%	Nominal amount less than 1%
		0.2 - 0.3 m	0.3 - 0.5 m	0.5 - 1 m	1m +	
FLOOD DEPTH CHANGE (STEP 2)						

Table 2: Matrix Steps 1 & 2

- 155 In **Step 1**, the valuer will determine which flood profile best fits the land being assessed. Flood profile Groups 0-2 relate to cases where only a minor to moderate area of the site is affected. Groups 3-7 relate to land where more of the site is affected and the future improvements on the property are also likely to be affected to varying degrees. The most significant impact on value is seen when water would enter a new dwelling when it would not have done so had the IFV damage not occurred. Group 8 is difficult to quantify as it pertains to the worst affected land with significant, frequent flooding. The majority of this land would tend to be in the Red Zone.³
- 156 In the descriptions of site coverage in the flood profiles, a "**minor**" portion of the site is generally less than a quarter, a "**moderate**" portion of the site is around a quarter to two thirds, and "**most**" of the site is generally over two thirds of the site.

³ For more information about the Red Zone and land zoning following the Canterbury earthquakes more generally, see section (F2) of the IFV DoV Methodology (Residential Building in Place).

- 157 **Step 2** factors in the change in flood depth. The flood depth changes used in the matrix are the cumulative change in flood depth from September 2010 to December 2011. Where variable flood depth changes occur across the site, the **predominant** depth change is used. The increments of flood depth change used in the matrix align with the data provided by Tonkin + Taylor, though for the purposes of the matrix some increments have been aggregated. EQC’s valuers discussed with Tonkin + Taylor the format of the data to be provided and are comfortable with the increments used.
- 158 **Step 3** in the application of the matrix relates to changes in flood **frequency**. Flood maps both before and after the earthquakes are considered for flood events of 2% AEP and 10% AEP. Land that now floods in less severe events (e.g. which have moved from flooding only in a 1% AEP event, and which now flood in a 2% AEP event or 10% AEP event) receive an additional increment to the base adjustment calculated by Steps 1 and 2.
- 159 **Step 4** in the application of the matrix relates to **over-riding positive attributes** of the property that negate the DoV that would otherwise occur. This takes into account a situation where the strong positive attributes land possesses may reduce the discount a buyer would apply to take account of the flooding vulnerability. Situations where this could be used are where land has extensive river views and where land is in a sought after location. The international literature supports this phenomenon. Where this adjustment applies, it is deducted from the DoV calculated by Steps 1 – 3.

STEP 3			STEP 4	
ADDITIONAL CRITERIA			OVER- RIDING POSITIVE ATTRIBUTES	
Flood frequency	Groups 1 - 3	Groups 3- 8		
	Low impact(yard only)	Moderate impact (potential platform affected)	Code	
No change	0% (0)	0% (0)	1. Not applicable	0.0%
Moved into 1% AEP	0% (0)	0% (0)	2. Desirable higher priced suburbs	-4.0%
Moved from 1 % AEP to 2% AEP	1.5% (1)	3% (4)	3. River outlook	-4.0%
Moved from 2% AEP to 10% AEP	2.5% (2)	4.5% (5)		
Moved from 1% AEP to 10% AEP	3.5% (3)	9% (6)		
<p>The flood frequency is designed to recognise situations where a property passes through a 'gate' to the extent that the property now floods more often. Valuers also need to consider the extent of the affected site and overall impact.</p>			<p>Note the maximum total adjustment should not exceed -4%</p>	

Table 3: Matrix steps 3 & 4

- 160 It is important to note that the descriptions of the impact of IFV in each step of the matrix are indicative only. Valuer judgement will need to be applied to select the appropriate category in each step that best represents an impact equivalent to the observed increases in vulnerability to flooding on the property. This assessment may include factors such as where there is a significant impact on an attached garage due to it being built with a lower floor level than the house.

Practical application of the matrix

- 161 In applying the matrix to land where the pre-earthquake residential building has been or will be rebuilt, EQC's valuers need to have regard to:
- 161.1 the likely location of future improvements on the property; and
 - 161.2 the likely resilience of those future improvements to flooding on the property. Most significantly, this involves consideration whether any future improvement is likely to have flood waters in the building.
- 162 The information used to make this assessment includes information provided by Tonkin + Taylor, as outlined in section (E1) above, as well as EQC's valuers' kerb-side observations of the property.
- 163 The general approach taken by EQC's valuers in assessing flood profiles (Steps 1 and 2) and flood frequency (Step 3) are set out below.
- 164 EQC's valuers' approach to assessing DoV for IFV damage to land where the residential building has not yet been rebuilt (and for which there are no building consent plans approved by the relevant local authority) will generally assume that:
- 164.1 a new residential building would be built on substantially the same footprint as the residential building that was on the land prior to the earthquakes (as the best proxy for any redevelopment). The valuer will have regard to any change in the location and size of the building likely to result from using the land at its highest and best use (taking into account the relevant characteristics of the land and locality);
 - 164.2 in relation to floor levels, that any new building will be built to have a floor level at least at the level legally required for new buildings. That is:
 - (a) if the land is within the CCC's FMA, a new residential building would be built at or above the CCC 0.5% AEP (1 in 200 year) floor level requirement;
 - (b) if land is outside the FMA, a new residential building would be built at or above the relevant local authority's 2% AEP (1 in 50 year) floor level requirement;
 - (c) in any event, a new residential building would not be built below the height above ground level of the pre-earthquake building, and in accordance with engineering advice about relevant provisions of the New Zealand Building Code;
 - 164.3 the ground levels are the same as they were immediately after the Canterbury earthquakes (i.e. no earthworks have been undertaken on the land since the earthquakes), unless there are clear indications to the contrary.
- 165 EQC's valuers approach to assessing DoV for IFV damage to land on which a new residential building has already been built (or for which building consent plans have been approved by the relevant local authority) will take the new building as the best

available information about, or proxy for, the future new building that would be likely to result from using the land at its highest and best use (taking into account the relevant characteristics of the land and locality), unless the valuer considers that the new residential building should not be used as a proxy in the particular circumstance. That is, the valuers will generally assume:

- 165.1 a new residential building would be built on substantially the same footprint as the new residential building that has been built or consented;
 - 165.2 a new residential building would be built with approximately the same floor levels as the new residential building that has been built or consented;
 - 165.3 where there are indications that the ground levels have changed, including at the site of a new residential building, the new ground levels will be taken into account.
- 166 Where works have been undertaken as part of the rebuilding of the residential building that mitigate the impact of flooding of the land (such as raising the building platform by importing fill onto the land), it is appropriate to take those works into account as the property will no longer experience any practical implications that have been eliminated. Where works do not affect the practical implications of IFV damage, these are ignored for the purposes of the assessment.

PHASE 3 – Applying the discount to the pre-earthquake value of the insured land

- 167 Once the percentage discount and pre-earthquake value are assessed, the percentage discount is applied to the pre-earthquake value to obtain a DoV in a dollar amount.
- 168 The DoV dollar amount produced using this methodology is then rounded to avoid the suggestion of unobtainable precision.

PHASE 4 – Valuation review

- 169 The valuer then applies valuation judgement to the figure produced by PHASE 3 to assess whether, in all the circumstances and having regard to all information about the land, the resulting DoV is reasonable. It is not ordinarily expected that any adjustment as a result of this will be necessary, given the design of the matrix to produce reasonable valuation outputs. However, it is important that the valuer stand back and ask the question “*is the DoV produced by the matrix appropriate?*”
- 170 In this phase, the valuers will also consider any costs for repair of IFV damage on the property, if available.
- 171 Once the valuers have confirmed the appropriate DoV amounts, valuation letters for each property will be provided to EQC for settlement purposes.

(G4) Guidance notes

- 172 In the course of implementing the IFV DoV Methodology (Residential Building in Place), EQC’s valuers developed a number of guidance notes to assist the application of the methodology in various circumstances.⁴ Those guidance notes are to apply to

⁴ www.eqc.govt.nz/IFV.

the assessment of DoV for IFV damage to land where the residential building has been or will be rebuilt, with any necessary amendments for them to apply to assessment of DoV to land rather than improve properties.

(G5) Review of DoV assessments

173 As explained in EQC's IFV Policy statement,⁵ EQC claimants may request a review of EQC's decisions in relation to IFV land damage, including the assessment of DoV. Where requested to do so by EQC, EQC's valuers will review any additional information (or interpretation of existing information) and re-assess the DoV in light of that information.

⁵ www.eqc.govt.nz/IFV.

APPENDIX ONE – COMPARISON OF LAND VALUE TO TOTAL VALUE FOR IFV PROPERTIES WITH RESIDENTIAL BUILDING IN PLACE, ASSESSED TO DATE