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# Addendum to Diminution of Value Methodologies for Increased Liquefaction Vulnerability

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AUGUST 2017

## Introduction

- 1 This paper confirms the methodologies that will be used to assess the diminution of value (**DoV**) of residential land or property that has resulted from Increased Liquefaction Vulnerability (**ILV**) to residential land in the Residential Red Zone. The methodologies described in this paper apply to all properties in the Residential Red Zone except those able to be identified as having vulnerability to severe lateral spreading. Further decisions on the methodologies applicable to those properties are to be made by EQC.
- 2 This paper includes the following sections:
  - 2.1 *Background* – outlines the nature of ILV land damage, the creation of the Residential Red Zone and discusses the DoV methodologies for ILV land damage prepared to date;
  - 2.2 *Valuation Outcomes and assumptions* – provides additional comment on assumptions that are of particular note in the context of the Residential Red Zone;
  - 2.3 *Engineering advice* – summarises advice from Tonkin + Taylor regarding the practical implications of ILV land damage in the Residential Red Zone; and
  - 2.4 *Valuation conclusions* – sets out EQC’s valuers’ conclusions regarding the appropriate methodologies for assessing DoV for ILV land damage in the Residential Red Zone.

## Background

### *ILV land damage*

- 3 The 2010-2011 Canterbury earthquake sequence has resulted in certain types of land damage that have made the land more vulnerable to certain future natural disaster events.
- 4 In the case of ILV land damage, the land has become materially more vulnerable to damage due to liquefaction caused by earthquake events because, in general terms, a reduction in the height or level of the land relative to the groundwater level has generally resulted in a thinner non-liquefying “crust”. This makes the land and building more vulnerable to liquefaction related damage.

### *Residential Red Zone*

- 5 Following the first Canterbury earthquake in September 2010, the Government established the Canterbury Earthquake Recovery Authority (**CERA**) to lead the recovery planning for the Canterbury region.
- 6 CERA’s role included undertaking assessments of the areas most affected by the earthquakes and providing recommendations to Government about the suitability of the land for ongoing residential occupation. Based on these recommendations, Government made decisions about future usability, represented by Red and Green zones:
  - 6.1 Red Zone – the condition of the land is such that it is unlikely it can be rebuilt on for a prolonged period:

- (a) The Government, through CERA, offered to purchase any Red Zone residential properties at their 2007 Rating Valuation. There were two different purchase options, which resulted in the Crown also acquiring any associated private insurance and EQC claims in some cases. The Crown, through CERA, will therefore be EQC's largest claimant;
- (b) It is uncertain what will happen to this land in the medium to longer term. In the short term at least, it will not be used for residential land, and the houses will be removed;
- (c) As such, there are a series of significant practical constraints on whether anyone would attempt to repair or rebuild houses in the Red Zone.

6.2 Green Zone – the land is suitable for residential occupation, though some properties may require geotechnical investigation and/or particular types of foundations to secure building consent.

7 While these zones were being confirmed, there was also an orange zone, which represented areas that were damaged but required more investigation to determine whether they would be zoned Red or Green.

8 The initial red, green and orange zones were announced on 22 June 2011. The last of the Orange Zone properties on the flat lands were reclassified red or green on 18 May 2012.

#### *ILV DoV Methodologies*

9 The professional valuation advisors to the Earthquake Commission (**EQC**) have developed methodologies, in conjunction with legal and engineering advice, to determine what, if any, reduction or diminution of value (**DoV**) of residential land or property has resulted from ILV land damage to insured residential land under the Earthquake Commission Act 1993. These methodologies are:

9.1 *Diminution of Value Methodology for Increased Liquefaction Vulnerability (for properties with residential building in place)* (May 2016); and

9.2 *Diminution of Value Methodology for Increased Liquefaction Vulnerability (for where with residential building has been or will be rebuilt)* (November 2016):

together the **ILV DoV Methodologies**;

10 EQC's valuers considered the nature and extent of ILV land damage in the Residential Red Zone in developing the ILV DoV Methodologies. However, it was noted in those methodologies that Tonkin + Taylor's advice concerning the implications of ILV land damage on future foundation requirements was based on the MBIE Guidance, which was strictly applicable only in the Green Zone areas of Canterbury. Accordingly, the methodologies noted that further consideration would be given, in conjunction with further advice from Tonkin + Taylor, to whether any adjustment to the DoV percentage discounts outlined in those methodologies was required for Red Zone properties with ILV land damage.

- 11 Since the ILV DoV Methodologies were prepared, Tonkin + Taylor have provided further advice regarding the practical implications of ILV land damage for properties in the Red Zone, which is discussed below.

### **Valuation outcomes and assumptions**

- 12 The valuation outcomes and assumptions for the assessment of DoV resulting from ILV land damage are set out in sections (C) and (D) of the ILV DoV Methodologies. These outcomes and assumptions remain applicable to the assessment of DoV for properties in the Red Zone. However, some further comments on those that are particularly relevant to the Red Zone are set out below.

#### *DoV to only reflect ILV land damage*

- 13 One of the key assumptions in the ILV DoV methodologies is that the DoV is only to reflect the ILV land damage. As explained in those methodologies, this is to ensure that EQC is compensating customers for only natural disaster damage that is covered under the EQC Act. For this reason, the DoV does not reflect any changes to value of property that result from:

13.1 the decision by the Crown to offer to purchase residential property in the Red Zone, and the widespread acceptance of that offer by owners;

13.2 the decision by the Christchurch City Council to not maintain services in the Red Zone to the same level as before the earthquakes; or

13.3 other forms of land damage.

- 14 The overall effect of this, and other assumptions, is that the DoV resulting from ILV land damage will inevitably be less than the total loss in value that properties in the Red Zone may have experienced since the Canterbury earthquakes.

#### *Insurance*

- 15 Another assumption in the ILV DoV Methodologies is that insurance will generally be available for properties affected by ILV land damage. In that context, the ILV DoV Methodologies note that if insurance is not available for a specific property, this will be separately considered. This remains applicable to the assessment of DoV in the Red Zone. However, for an inability to insure a property to affect the assessment of DoV, it would need to be demonstrated to have been caused by the ILV land damage.

### **Engineering Advice**

- 16 To assist the valuers in developing the ILV DoV Methodologies, Tonkin + Taylor prepared a report on the practical implications of liquefaction vulnerability *Practical Implications of Increased Liquefaction Vulnerability (June 2016) (the **Practical Implications Report**)*. This identifies the practical implications that result from the land having experienced a material increase in liquefaction vulnerability due to the Canterbury earthquake sequence.
- 17 Tonkin + Taylor has subsequently further considered whether the practical implications of ILV land damage are different for properties in the Residential Red Zone, and provided advice to EQC in the report *Practical Implications of Increased Liquefaction Damage: Residential Red Zone (August 2017)*. The remainder of this section summarises that advice.

- 18 The severity and change in severity classifications identified in the Practical Implications Report and the implications for increased risk of building damage and land damage associated with each classification (as summarised in Table E1 of the Practical Implications Report) apply to the Red Zone.
- 19 Properties in the Red Zone are more likely to be more vulnerable to liquefaction damage at a certain level of shaking, and more likely to be vulnerable to liquefaction damage at lower levels of shaking, than in the Green Zone, as is reflected by properties' severity classifications in 1 in 25 and 1 in 100 year levels of shaking.
- 20 It is not possible to reliably undertake liquefaction severity and change in severity mapping for anything less than 25 year return period levels of earthquake shaking. However, based on an approximated 10 year return period level of earthquake shaking, no areas of Christchurch are materially vulnerable to liquefaction damage. Further, there are no areas (in the Green or Red Zones) where the change in vulnerability severity at 25 year return period levels of shaking is greater than at 100 year return period levels of shaking.
- 21 In relation to the implications of ILV land damage for future foundation costs in the Red Zone:
- 21.1 As with Green Zone TC3 land, specific engineering judgment is required for foundation designs, but as with Green Zone properties the ground improvement and surface foundation options in the MBIE Guidance will be the starting point for that design exercise.
- 21.2 As in the Green Zone, the foundation requirements for residential building will depend on the interaction of a number of factors including:
- (a) liquefaction vulnerability;
  - (b) lateral spreading vulnerability; and
  - (c) floor level requirements.
- 21.3 As in the Green Zone, on the basis of current information, it is generally not possible to identify, either on a regional or property specific basis, the presence of one or more of these constraints. The range of potential foundation cost implications for ILV land damage set out in Table E2 of the Practical Implications Report therefore remains applicable to the Red Zone.
- 21.4 However, at a general population level, Red Zone properties are more likely to have severe lateral spreading vulnerability and / or floor level requirements (relative to the subsided land height), that make building residential buildings more expensive, than the Green Zone population of properties with ILV land damage. As Tonkin + Taylor has separately confirmed to EQC, vulnerability to lateral spreading existing prior to, and has not been increased by, the Canterbury earthquakes.
- 21.5 There are no properties where the ILV land damage has resulted in the land not being viable for residential development.

- 22 As a result of the Canterbury earthquake sequence, some areas in the Residential Red Zone have been identified as subject to severe lateral spreading vulnerability. In the absence of area-wide treatment of this vulnerability, the practical implications of ILV land damage may differ from land which is not subject to this degree of lateral spreading vulnerability.

**Valuation conclusions**

- 23 EQC's engineering advice has confirmed that:
- 23.1 the practical implications of ILV land damage are the same for properties in the Residential Red Zone as the Green Zone (excluding properties identified to have severe lateral spreading vulnerability); and
  - 23.2 that the potential for increased foundation costs is not known to be any greater in the Residential Red Zone.
- 24 Based on this advice, EQC's valuers consider that the discounts outlined in the ILV DoV Methodologies are applicable to properties in the Residential Red Zone. For properties able to be identified as having vulnerability to severe lateral spreading, further decisions on the methodologies applicable to those properties are to be made by EQC.
- 25 Pre-earthquake values for the Residential Red Zone can also be assessed using the same processes outlined in the ILV DoV Methodologies.
- 26 However, EQC's valuers note that where properties are to be assessed based on the ILV DoV Methodology for residential buildings in place, but where the house has since been demolished as a result of being purchased by the Crown, there may be limited information available about the property.
- 27 In particular, it is no longer possible – or useful – to do a roadside inspection of the property. Instead, information about the pre-earthquake property, including the construction type of the roof and wall claddings, will be gathered from database information, including photographs. Similarly, EQC's valuers' audit of those pre-earthquake values will not include any roadside inspection.