

# Appendix 2: Recommended amendments to Stage 2 provisions relevant to Land Stability, Liquefaction and Mine Subsidence

## Chapter 15: Natural Hazards and Climate Change

### 15.1 Introduction

(6) New Zealand in general is a high earthquake hazard region and earthquake (and associated fault movement, ground shaking and liquefaction) considerations are integral to the design of the built environment [1]. Location of faults in Waikato District may be problematic, due to alluvial sediment and associated processes masking fault traces. While liquefiable soils are generally found within Holocene sediments in river valleys, more work is required within the Waikato District to determine areas where the liquefaction risk is high.

(14) While liquefaction areas have not been identified on the planning maps, provisions in the district plan require this seismically-induced natural hazard to be assessed before new zonings or subdivision and development are undertaken. This will primarily be achieved through resource consent or plan change processes.

(15) Areas of slope instability can occur within the district. To comprehensively identify these areas over the entire district is not practical, given the size of the district and the changing circumstances in which slope instability occurs (often after high rainfall or seismic events). Consequently, assessment matters are included in the subdivision rules that require a geotechnical investigation to confirm that a building platform is stable before subdivision or development takes place.

(16) Subsidence has occurred at Huntly due to former underground coal mining and is identified as a Mine Subsidence Risk Area. Risk to new dwellings in this area is regulated through a ~~discretionary~~ activity resource consent process.

*(Shand Properties 2136.1 – consequential)*

### 15.2 Objectives and policies

Objective 15.2.1 – Resilience to natural hazard risk

A resilient community where the risks from natural hazards on people, property, infrastructure and the environment from subdivision, use and development of land are avoided or appropriately mitigated.

#### Policy 15.2.1.19 – Development on land subject to instability or subsidence

- (a) Avoid locating new subdivision, use and development, including rezoning, on land assessed as being subject to, or likely to be subject to, instability or subsidence, unless appropriate mitigation is provided and the activity does not increase the risk to people, property or infrastructure.

#### Policy 15.2.1.20 – Development of land in the Mine Subsidence Risk Area

- (a) On land identified within the Mine Subsidence Risk Area, ensure that:
  - (i) an assessment by an appropriately qualified engineer occurs before subdivision, use or development takes place to confirm that the land is suitable for development; and
  - (ii) buildings are designed and constructed, and uses appropriate materials, to effectively minimise the risk of damage to the buildings from ground subsidence.

**Policy 15.2.1.21 – Stormwater management in areas subject to risk of land instability or subsidence**

- (a) Avoid discharge of stormwater directly to ground on land that is potentially at risk of land instability or subsidence unless:
  - (i) an assessment has been undertaken by an appropriately qualified geotechnical specialist, indicating that the site is suitable for the proposed discharges; and
  - (ii) any adverse effects on the site and receiving environment can be appropriately mitigated.

**Policy 15.2.1.22 – Liquefaction-~~susceptible~~ ~~prone~~ land risk assessment**

- (a) On land ~~assessed as~~ potentially ~~susceptible~~ ~~prone~~ to liquefaction, ensure that:
  - (i) an assessment by a geotechnical specialist occurs before new subdivision, use or development takes place; and
  - (ii) the level of assessment reflects the type and scale of the subdivision, use or development and the overall vulnerability of the activity to the effects of liquefaction; and
  - (iii) the assessment confirms that the land is suitable for the proposed development.

(Waikato Regional Council [2102.44], Transpower New Zealand [2101.10], Waikato District Council [2146.8])

**Policy 15.2.1.23 – Control activities on land susceptible to damage from liquefaction**

- (a) Control subdivision, use and development on land assessed as being susceptible to liquefaction induced ground damage, to ensure that appropriate mitigation is provided so that the level of risk to people, property, infrastructure and the environment is acceptable.

**15.11 Mine Subsidence Risk Area**

**Rule 15.11.1 Permitted Activities**

- (a) The activities listed below are permitted activities within the Mine Subsidence Risk Area shown on the Planning Maps if they meet the activity-specific conditions set out in this table.
- (b) Activities may also be restricted discretionary activities or discretionary activities, as specified in Rules 15.11.2 and 15.11.3.

Activity		Activity-specific conditions
P1	Additions to an existing building	<ul style="list-style-type: none"> <li>(a) Additions do not increase the gross floor area of the building by more than 15m<sup>2</sup>; and</li> <li>(b) Additions do not result in the length of any wall of the building exceeding 20m.</li> </ul>
P2	Standalone garage	<ul style="list-style-type: none"> <li>(a) The gross floor area of the building does not exceed 55m<sup>2</sup>; and</li> <li>(b) The maximum length of any wall does not exceed 20m.</li> </ul>
P3	Construction, replacement, repair, minor upgrading, upgrading or maintenance of utilities <u>and associated earthworks</u> (WEL Networks [2106.26] and Kiwirail Holdings [FS3010.7])	Nil

P4	Earthworks	<p>(a) The maximum volume of filling does not exceed 20m<sup>3</sup> per site; and</p> <p>(b) The maximum depth of any excavation or filling does not exceed 1m above or below ground level.</p>
----	------------	--

### **Rule 15.11.1A Controlled Activities**

<b>(a) The activity listed below is a Controlled Activity in the Mine Subsidence Risk Area.</b>		
<b>Activity</b>	<b>Matters of Control</b>	
<b>CI</b>	<u>The construction or alteration of a building that is not provided for under Rule 15.11.1 where a Consent Notice is registered against the Record of Title confirming that a geotechnical assessment has been approved at the time of subdivision and the approved geotechnical report confirms that the ground is suitable for development and the development is in accordance with any recommendations of the geotechnical report.</u>	<p><u>The requirements and recommendations of the geotechnical report approved at the time of subdivision.</u></p> <p><u>That confirmation is provided from a suitably experienced and qualified geotechnical engineer that confirms the proposed development is consistent with the recommendations and requirements of the geotechnical report approved at the time of subdivision.</u></p>

*(Shand Properties 2136.1)*

### **15.11.2 Restricted Discretionary Activities**

- (a) The activities listed below are restricted discretionary activities in the Mine Subsidence Risk Area.
- (b) Discretion to grant or decline consent and impose conditions is restricted to the matters of discretion set out in the following table.

<b>Activity</b>	<b>Matters of Discretion</b>	
<b>RD1</b>	Earthworks that do not comply with Rule 15.11.1 P4.	<p><b>Discretion is restricted to:</b></p> <p>(a) Location and scale of earthworks;</p> <p>(b) Geotechnical and geological stability of the site following the completion of earthworks;</p> <p>(c) Risk to people and property from subsidence as a result of earthworks.</p> <p>(d) Any other mitigation measures to reduce risk.</p>
<b>RD2</b>	<u>Construction of a building or accessory building or the reconstruction of or additions to an existing building not provided for in Rule 15.11.1 P1-P3 or CI.</u> <i>(Kainga Ora [2094.9])</i>	<p><b>Discretion is restricted to:</b></p> <p>(a) <u>Construction standards and materials.</u></p> <p>(b) <u>Suitability of the site for development.</u></p> <p>(c) <u>The potential effects on health and safety.</u></p>

### 15.11.3 Discretionary Activities

#### Stage 2 Content

- (a) The activities listed below are discretionary activities in the Mine Subsidence Risk Area

<del>D1</del>	<del>Construction of a building or additions to an existing building not provided for in Rule 15.11.1 P1-P3. (Kainga Ora [2094.9])</del>
<del>D2D1</del> (Kainga Ora [2094.9] consequential	Subdivision to create one or more additional vacant lot(s) other than a utility allotment, access allotment or subdivision to create a reserve allotment.

### 15.12 Liquefaction

#### 15.12.1 Overview of method

(1) Areas in the district susceptible to liquefaction have not been identified on the planning maps as a natural hazard overlay as is the case with the other natural hazards in this chapter. Where specific land uses have already been identified as restricted discretionary activities in the activity status tables in the relevant zone, liquefaction risk has been added as a matter over which the Council will reserve its discretion, where it is considered relevant for that activity. To satisfy the requirements of sections 104 and 106 of the RMA, identification of appropriate mitigation may be required where the site and proposed development are considered vulnerable to liquefaction based on site specific characteristics. It is expected that best practice geotechnical and engineering methods will be used to ensure that the site is suitable for the intended use.

(2) Where potential liquefaction risk is identified as a matter that the Council restricts its discretion to, the additional matters outlined in Rules 15.12.2 and 15.12.3 below apply where relevant.

#### 15.12.2 Additional matters of restricted discretion for subdivision to create one or more additional vacant lots – liquefaction risk

(1) Where potential liquefaction risk is identified as a matter that the Council will restrict its discretion to in a subdivision rule elsewhere in this Plan, and where that proposal involves subdivision to create one or more additional vacant lots, the Council restricts its discretion to the following additional matters (note: these matters will also be relevant to the assessment of a discretionary or noncomplying resource consent application where a potential liquefaction hazard has been identified on a site):

- (a) Geotechnical assessment and/or investigation of any potential liquefaction hazard on the site at a level sufficient to confirm the level of risk and its suitability for the proposed activity (see information requirements in section 15.13);
- (b) Measures proposed to mitigate the effects of liquefaction hazard if present including:
  - (i) Location, size, layout and design of allotments, structures, and building platforms, including consideration given to alternative siting away from where liquefaction risk is greatest;
  - (ii) Location, timing, scale and nature of earthworks;
  - (iii) Provision for ground strengthening and foundation design;
  - (iv) Provision for resilient services and infrastructure, including wastewater, water supply, roads and access;
  - (v) Setbacks in relation to waterways, waterbodies or any steep change in ground elevation, sloping ground or free face, or alternative geotechnical measures to address any identified potential for lateral spread;

- (vi) Effects on adjoining properties.

### 15.12.3 Additional matters of restricted discretion for new land use (e.g. multiunit development) – liquefaction risk

(1) Where potential liquefaction risk is identified as a matter that the Council will restrict its discretion to in a rule elsewhere in this Plan for new land use, the Council restricts its discretion to the following additional matters (note: these matters will also be relevant to the assessment of a discretionary or noncomplying resource consent application where a potential liquefaction hazard has been identified on a site):

- (a) Geotechnical assessment and/or investigation of any potential liquefaction hazard on the site at a level sufficient to confirm the level of risk and its suitability for the proposed activity (see information requirements in section 15.13);
- (b) Measures proposed to mitigate the effects of liquefaction hazard, if present, including:
  - (i) Location, size, layout and design of buildings, structures, car parking areas, access and provision for resilient infrastructure and services, including wastewater, stormwater and water supply;
  - (ii) Location, timing, scale and nature of earthworks;
  - (iii) Provision for ground strengthening and foundation design;
  - (iv) Setbacks in relation to waterways, waterbodies or any steep change in ground elevation, sloping ground (or free face, or alternative geotechnical measures to address any identified potential for lateral spread);
  - (v) Consideration given to ease of repair (including access to repair damaged structures) of liquefaction induced damage;
  - (vi) Effects on adjoining properties.

## 15.13 Information requirements for all resource consent applications addressing natural hazards

### 15.13.1 General

(1) The following documents, to the extent relevant to the proposal:

- (a) Geotechnical assessment, including identification and assessment of any potentially liquefaction-prone land and land subject to slope instability;
- (b) An assessment of natural hazard risk, including the type of natural hazards present, such as flooding, slope stability, liquefaction, subsidence and coastal hazards. The assessment shall include the level of risk and any increase in risk as a result of the proposal associated with each hazard. Where applicable, the projected effects of climate change over the period to 2120 must be included;
- (c) Remediation and mitigation measures necessary to make the site and any proposed buildings suitable for the proposed use, such as minimum floor levels, foundation design for relocatability, and appropriate time limits and/or triggers for the removal of any building and onsite wastewater disposal systems.

(2) Plans identifying:

- (a) Topographical features within the site and surrounding area;
- (b) The location of natural hazards on all or part of the site.

### 15.13.2 Liquefaction Potential

(1) For land use resource consent applications where the additional matters the Council will restrict its discretion to include liquefaction, as per Rule 15.12.3, the following information is required:

- (a) A preliminary geotechnical assessment in sufficient detail to determine:
  - (i) the liquefaction vulnerability category, being either “liquefaction damage is unlikely” or “liquefaction damage is possible”, as shown in Table 4.4 in “Preliminary Document: Planning and engineering guidance for potentially liquefaction prone land – Resource Management Act and Building Act aspects. Pub MfE and MBIE, September 2017”; or
  - (ii) whether or not the site is susceptible to liquefaction using an alternative accepted method, observation, or desktop study.
- (b) Where a “liquefaction damage is possible” category has been identified for the site as per 15.13.2(1)(a)(i) above, or an alternative accepted method, observation or desktop study indicates that the site is susceptible to liquefaction as per 15.13.2(1)(a)(ii) above, the assessment will be required to determine the liquefaction vulnerability in more detail, and in proportion to the scale and significance of the liquefaction hazard, and must:
  - (i) Identify any areas which require particular ground strengthening or other mitigation measures, and recommendations for such mitigation; and
  - (ii) Identify areas to be excluded from built development, due to liquefaction hazard constraints (which includes lateral spread), or which require geotechnical setbacks; and
  - (iii) Indicate options and recommended locations for the proposed activities and infrastructure recommended by the geotechnical engineer.
- (c) All geotechnical assessments in respect of liquefaction risk are to be prepared by a suitably qualified and experienced engineer with experience in geotechnical engineering or a Professional Engineering Geologist (IPENZ registered).

(2) For subdivision consent applications that create one or more additional vacant lots as per Rule 15.12.2:

- (a) an assessment in accordance with 15.13.2(1)(a) above will be required to be provided.
- (b) Where a “liquefaction damage is possible” category has been identified for the site as per 15.13.2(1)(a)(i) above, or an alternative accepted method, observation, or desktop study indicates that the site is susceptible to liquefaction as per 15.13.2(1)(a)(ii) above, the subdivision application will be required to include sufficient information and proposed measures to satisfy that liquefaction risk can be adequately avoided, remedied or mitigated, including the potential effects of lateral spread.
- (c) Subdivision plans shall show, to the extent relevant or appropriate to the scale and significance of the liquefaction hazard identified:
  - (i) any areas which require particular ground strengthening or other mitigation
  - (ii) measures, and recommendations for such mitigation; and
  - (iii) any areas which should be excluded from built development due to geotechnical constraints, or which require geotechnical setbacks; and any features of subdivision layout recommended by the geotechnical engineer, for example any recommended locations for proposed activities and other infrastructure as a result of geotechnical constraints.
- (d) All geotechnical reports in respect of liquefaction potential are to be prepared by a suitably qualified and experienced engineer with experience in geotechnical engineering or Professional Engineering Geologist (IPENZ registered).

## **15.14 Definitions**

**Mine Subsidence Risk Area**

Means an area identified on the planning maps which is currently at risk of surface subsidence as a result of historic underground coal mining operations.

**Standalone Garage**

Means a roofed and enclosed building which is detached from the main residential unit and designed to accommodate one or more motor vehicles.