

Chapter 5 Natural Hazards (part)

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5.1 Natural hazards objectives

5.1.1 Objective - Reduced risk

- a. Reduced risk to people, property, infrastructure and the environment from the effects of natural hazards, including:
 - i. intense rainfall events causing flooding from rivers, streams, overland flow and lakes;
 - ii. liquefaction during earthquake shaking;
 - iii. cliff collapse, rockfall or boulder roll, and mass movement;
 - iv. tsunami;
 - v. inundation from the sea and storm surge;
 - vi. coastal erosion;
 - vii. exacerbation of hazards (i) to (vi) through climate change and sea level rise; and
 - viii. multiple hazards consisting of combinations of the above.

5.1.2 Objective - Awareness of natural hazards

- a. Increased public awareness of the range and scale of natural hazard events that can affect the District.

5.1.3 Objective - Repair of earthquake damaged land

- a. Repair of earthquake damaged land used for residential purposes is facilitated as part of the recovery.

5.2 General natural hazards policies

5.2.1 Policy - Avoid development where there is unacceptable or intolerable risk

- a. Avoid new subdivision, use and development, particularly new urban zonings, where:
 - i. there is intolerable risk of loss of life or serious injury in the event of a natural hazard occurrence; or
 - ii. other potential adverse effects arising from a natural hazard event are serious and the natural hazard cannot be mitigated to an acceptable level.

5.2.2 Policy - Critical infrastructure

- a. Avoid new critical infrastructure locating where it is at risk of being affected by a significant natural hazard unless there is no reasonable alternative location, and infrastructure is designed,

maintained and managed to function to the fullest extent possible during and after natural hazard events.

5.2.3 Policy - Restrict land use to avoid or mitigate hazards

- a. Apply different levels of control on subdivision, use and development in areas at risk of natural hazards, depending on the level of risk, to ensure that the adverse effects of natural hazards are avoided or adequately mitigated.

5.2.4 Policy - Precautionary approach

- a. Adopt a precautionary approach to subdivision, use and development where:
 - i. there is uncertainty as to likelihood and scale of a natural hazard; or
 - ii. there are multiple natural hazards, with potential cumulative effects; or
 - iii. there is potential for serious or irreversible effects from a natural hazard.

5.2.5 Policy - Worsening, adding or transferring hazard

- a. Ensure that subdivision, use and development, or hazard mitigation proposals do not:
 - i. worsen the adverse effects of any known natural hazard;
 - ii. create a new hazard; or
 - iii. transfer or increase risk to other people, property, infrastructure or the environment.

5.2.6 Policy - Natural features providing hazard resilience

- a. Ensure that natural features which assist in avoiding or reducing the effects of natural hazards, such as natural ponding areas, coastal dunes, wetlands, waterway margins and riparian vegetation, are protected from inappropriate subdivision, use and development.

5.2.7 Policy - Awareness of natural hazards

- a. Ensure people are informed about the natural hazards relating to their properties and surrounding area.
- b. Encourage property owners to incorporate additional measures into the rebuild of earthquake damaged buildings beyond existing use rights to avoid or mitigate natural hazards affecting their property.

5.3 Policies for flooding

5.3.1 Policy - High flood hazard



- a. Avoid subdividing or developing new residential units, other habitable buildings, buildings for concentrations of people and additions to those buildings, in areas where there is a high flood hazard.

5.3.2 Policy - Flood protection works

- a. Avoid activities locating where they could undermine the integrity of the Waimakariri River primary stopbank system.
- b. Restrict activities locating where they could undermine the integrity of the Waimakariri River secondary stopbank system.
- c. Ensure that activities located near stopbank systems do not exacerbate or transfer flood risk elsewhere.

5.3.3 Policy - Protection of flood storage and overflow areas

- a. Maintain the flood storage capacity and function of natural floodplains, wetlands and ponding areas, including the Hendersons Basin, Cashmere Stream Floodplain, Hoon Hay Valley, Cashmere-Worsleys Ponding Area, Cranford Basin, and Lower Styx Ponding Area.
- b. Limit filling in urban areas at risk of flooding in a major flood event, where that filling activity could transfer risk to other properties.

5.3.4 Policy - Flood damage mitigation by raising floor levels

- a. Reduce potential flood damage by ensuring floor levels for new buildings or additions to buildings are above flooding predicted to occur in a major flood event, including an allowance for sea level rise.

Interim Policy for specific areas

- b. Provide for variations in minimum floor levels and their application only in the Waimakariri Stopbank Floodplain, within the Open Space 3D (Clearwater) zone, and around Te Waihora (Lake Ellesmere) and Wairewa (Lake Forsyth).

5.3.5 Policy - Repair of earthquake damaged land

- a. Facilitate recovery by enabling property owners to make immediate repairs to earthquake damaged land for residential purposes in areas at risk of flooding, where these repairs will have minimal adverse effects.

5.4 Policies for geotechnical hazard and risks for flat areas of the district



5.4.1 Policy - Geotechnical risk including liquefaction susceptibility

- a. In flat areas of the district ensure that geotechnical site suitability is assessed, including liquefaction susceptibility, before new areas are zoned for urban activities or where they are already zoned, before subdivision, use and development take place.
- b. Ensure that the level of assessment undertaken for subdivision reflects the potential scale and significance of the liquefaction hazard that could occur during ground shaking, acknowledging that some areas are more susceptible to these hazards than others.

5.4.2 Policy – Management of geotechnical risks on flat land

- a. Ensure subdivision, use and development is able to occur where geotechnical hazards have been appropriately identified and assessed and risks can be adequately remedied or mitigated.
- b. Avoid subdivision, use and development, where the risk arising from geotechnical hazard cannot be mitigated and the site would not be suitable for reasonable use.

5.5 Policies for slope instability areas

5.5.1 Policy - Areas subject to an intolerable risk to life-safety from potential cliff collapse

- a. Avoid subdivision, use and development at the top of and/or base of cliffs in areas subject to an intolerable risk to life-safety from the effects of cliff collapse.

5.5.2 Policy - Areas potentially affected by rockfall or boulder roll

- a. Avoid subdivision, use and development in areas subject to an intolerable risk to life-safety from the effects of rockfall or boulder roll.
- b. Control subdivision, use and development in areas subject to life-safety risk from the effects of rockfall or boulder roll, where the life-safety risk can be reduced to a tolerable level.

5.5.3 Policy - Areas potentially affected by mass movement

- a. Avoid subdivision, use and development in areas subject to an intolerable risk to life-safety from the effects of mass movement.
- b. Control subdivision, use and development in areas subject to a heightened risk from the effects of mass movement, where there is a potential for damage to property and infrastructure.

5.5.4 Policy - Slope instability in areas not already identified as cliff collapse, rockfall or mass movement (remainder of Port Hills and Banks Peninsula)

- a. In areas not already identified as subject to cliff collapse, rockfall or mass movement, require proposals for subdivision, use and development to be assessed by a geotechnical expert, to evaluate the type of hazard and level of risk to people and property from slope instability hazards, and only allow subdivision, use and development where risk can be reduced to an acceptable level.

5.5.5 Policy - Hazard mitigation works for slope instability in the Port Hills and across Banks Peninsula

- a. Avoid hazard mitigation works in areas of the Port Hills and across Banks Peninsula where cliff collapse or mass movement is likely to destroy or significantly damage such mitigation works, or where construction or maintenance of hazard mitigation works creates a safety hazard.
- b. Control hazard mitigation works for slope instability across all other areas of the Port Hills and Banks Peninsula, to ensure that hazard mitigation proposals:
 - i. are effective; and
 - ii. do not worsen any existing natural hazard; and
 - iii. do not transfer or increase the risk to other people, property, infrastructure or the environment.

5.6 Interim policy for coastal hazards (to be further considered in Phase 2 of the District Plan Review)

5.6.1 Policy - Climate change and sea level rise

- a. Avoid intensification of built development in areas that are projected to be subject to flooding and/or inundation as a result of the effects of climate change, including sea level rise.
- b. Limit intensification of development in locations where the effects of climate change, including sea level rise, are likely to result in decreasing levels of service from drainage or other infrastructure.

5.7 Policy - Multiple natural hazard areas

- a. Where multiple natural hazards have been identified on a site and result in an elevated overall risk profile, adopt a precautionary approach to subdivision, use and development.

5.8 Flood hazard rules

5.8.1 Residential zones - Activities and earthworks in Floor level and Fill Management Areas

[Click here for Planning Maps](#)

5.8.1.1 Permitted activities

The activities listed below are permitted in all residential zones where the activity is located in a Floor Level and Fill Management Area subject to compliance with:

1. activity status rules and any standards specified elsewhere in the Plan for that activity, and
2. the standards specified in this Rule 5.8.1.1.

Activity		Activity specific standards
P1	New buildings located within the Fixed Minimum Floor Overlay, unless specified in P3, P4, P5 and P6 in Rule 5.8.1.1.	a. Minimum floor levels shall be the highest of the following: <ol style="list-style-type: none"> i. flooding predicted to occur in a 1 in 200-year <u>rainfall</u> event concurrent with a 1 in 20-year tidal event¹, including 1m sea level rise plus 400mm <u>freeboard</u>, as predicted by the relevant Christchurch City Council model and version identified in Table 5.8.1.1.a; or ii. flooding predicted to occur in a 1 in 200-year <u>tidal</u> event concurrent with a 1 in 20-year rainfall event², including 1m sea level rise plus 400mm <u>freeboard</u>, as predicted by the relevant Christchurch City Council model and version identified in Table 5.8.1.1.a; or iii. 12.3m above <u>Christchurch City Council Datum</u>. <p>(Link to table with floor levels)</p>
P2	Additions to existing buildings which increase the ground floor area of the building located within the Fixed Minimum Floor Overlay, except those specified in P4, P5 and P6 in Rule 5.8.1.1.	

Table 5.8.1.1.a Hydrologic and Hydraulic Models Used to Provide Minimum Floor Levels

Floor Level and Fill Management Area Catchment	Model	Version
Styx	Styx River Hydrologic and Hydraulic Model	R004
Avon	Avon River Hydrologic and Hydraulic Model	D13

Activity		Activity specific standards
Heathcote		Heathcote River Hydrologic and Hydraulic Model 2012 Design
P3	Additions to existing buildings that do not increase the ground floor area of the building.	a. Nil
P4	Additions which do not increase the ground floor area of an existing building by more than 25m ² within any continuous period of 10 years.	a. Nil
P5	Garages of 40m ² or less in area, and any other accessory building of 25m ² or less in area.	a. Nil
P6	Decks, swimming pools, and unenclosed buildings without floors.	a. Nil
P7	Support structures for overhead transmission lines including lattice towers.	a. Nil
P8	<u>Filling</u> for <u>residential building platforms</u> only to the extent necessary to achieve the minimum floor levels specified for P1 and P2 in Rule 5.8.1.1 for new buildings and for additions to buildings.	a. Nil
P9	<u>Filling</u> or excavation associated with the maintenance of flood protection and bank erosion protection works; and the maintenance of existing drains or ponds.	a. Nil
P10	<u>Filling</u> or excavation associated with permitted utilities, or their replacement, repair or maintenance.	a. Nil
P11	Any other <u>filling</u> or excavation.	a. A maximum height of 0.3m of fill above ground, and 0.6m depth of excavation below

Activity	Activity specific standards
<p>With regard to P1 and P2, irrespective of anything to the contrary in this Plan, recession plane breaches created directly by the need to raise floor levels to meet the minimum floor level standards set in Rule 5.8.1.1 are exempt from compliance with:</p> <p>Rule 14.2.3.6 Daylight Recession Planes - Residential Suburban Zone and Residential Suburban Density Transition Zone; Rule 14.3.3.5 Daylight Recession Planes - Residential Medium Density Zone; and Rule 14.6.3.5 Daylight Recession Planes - New Neighbourhood Zone.</p> <p>Recession plane breaches in excess of those created by the need to raise floor levels are not exempt from these rules.</p>	<p>ground; and</p> <p>b. A maximum volume of <u>filling</u> above ground level of 10m³ per site, and a maximum cumulative volume of <u>filling</u> and excavation of 25m³ per site, in each case within any continuous period of 10 years.</p>

Note: For filling or excavation (before 31 December 2018) for repair of land used for residential purposes and damaged by earthquakes, see [Rule 5.8.2](#).

¹ 1 in 200 year event = 0.5% AEP event; 1 in 20 year event = 5% AEP event.

² As for footnote 1.

5.8.1.2 Restricted discretionary activities

The activities listed below are restricted discretionary activities in all residential zones where the activity is located in a Floor Level and Fill Management Area.

Activity	The Council's discretion shall be limited to the following matters:
<p>RD1 New buildings located within the Fixed Minimum Floor Overlay which do not meet the standards set out in P1 under Rule 5.8.1.1 and are not permitted by P3, P4, P5 or P6 in Rule 5.8.1.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	<p>a. The setting of the minimum floor level of the building and/or addition.</p> <p>b. The frequency at which any proposed building or addition is predicted to be flooded and the extent of damage likely to occur in such an event.</p> <p>c. Any proposed mitigation measures, and their effectiveness and</p>

RD2	<p>New buildings not located within the Fixed Minimum Floor Overlay and not permitted by P3, P4, P5 or P6 set out in Rule 5.8.1.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	<p>environmental impact, including any benefits associated with flood management.</p> <p>d. Any adverse effects of the scale and nature of the building and its location in relation to neighbouring buildings, including effects on the privacy of neighbouring properties as a result of the difference between minimum and proposed floor levels, and effects on streetscape.</p>
RD3	<p>Additions to existing buildings located within the Fixed Minimum Floor Overlay, which increase the ground floor area of the building, but which do not meet the standards set out in Rule 5.8.1.1 - P2 and are not permitted by P4, P5 or P6 set out in Rule 5.8.1.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	
RD4	<p>Additions to existing buildings not located within the Fixed Minimum Floor Overlay, which increase the ground floor area of the building, but are not permitted by P4, P5 or P6 set out in Rule 5.8.1.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	
RD5	<p><u>Filling</u> or excavation which is not a permitted activity under P8, P9 or P10 set out in Rule 5.8.1.1, or <u>filling</u> or excavation that exceeds the standards in P11 set out in Rule 5.8.1.1.</p>	<p>a. The effects of <u>filling</u> or excavation on flooding, waterways, groundwater and natural ground levels on and/or off site, including:</p> <ul style="list-style-type: none"> i. Any likelihood of exacerbation of flooding, erosion, or siltation either upstream or downstream of the site. ii. Any adverse effects on other properties from disturbances to surface drainage patterns. iii. Effects on flood storage capacity and function in the immediate area,

	<p>and any wider effects on the flood storage in the catchment; and any effects on existing stormwater and flood protection works.</p> <ul style="list-style-type: none"> iv. Any implications for groundwater and the water table, on or off site. v. Any benefits associated with flood management. <ul style="list-style-type: none"> b. Any proposed mitigation measures, and their effectiveness and environmental impact. c. The effects of the scale and nature of the <u>filling</u> or excavation, and location in relation to neighbouring sites, including: <ul style="list-style-type: none"> i. Effects on privacy of neighbouring properties and effects on streetscape. ii. The stability of adjoining land, and its susceptibility to subsidence or erosion upon excavation or <u>filling</u> taking place. d. Effects on access, character, ecology and amenity, and on sites of archaeological and cultural value, including: <ul style="list-style-type: none"> i. Any adverse effects or benefits for public access, natural character, or ecology of waterways and wetland areas. ii. Any adverse effects on amenity values including dust nuisance, visual impact, noise, vibration and traffic associated with the <u>filling</u> or excavation. iii. Effects on sites of archaeological value including consideration of the need to impose an Accidental Discovery Protocol.
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5.8.1.3 Discretionary, non-complying and prohibited activities

Note: There are no discretionary, non-complying or prohibited activities in respect of Rule 5.8.1.

5.8.2 Repair of land used for residential purposes damaged by earthquakes within a Floor Level and Fill Management Area (provisions previously introduced under s27 Canterbury Earthquake Recovery Act to the Operative Plan).

5.8.2.1 Permitted activities

The activities listed below are permitted activities in Floor Level and Fill Management Areas provided the activity:

1. complies with all of the activity specific standards set out in a to j in P1 and P2 in Rule 5.8.2.1.
2. occurs in the Suburban Residential (except for the Suburban Residential Zone on the corner of Hendersons and Sparks Road), Medium Density Residential and New Neighbourhood zones only
3. is commenced prior to the expiry date of this rule on 31 December 2018

Activity	Activity specific standards
<p>P1 Any <u>filling</u> or excavation activity undertaken to repair land used for residential purposes and damaged by the earthquakes, where any site or part of a site is located within a Floor Level and Fill Management Area unless specified by P2 in Rule 5.8.2.1.</p>	<p>a. Any <u>filling</u>, excavation or disturbance of soils shall not exceed the criteria in Table 1 or 2 under Rule 5.8.2.1.</p> <p>b. There shall be no <u>filling</u>, excavation or disturbance of soil within:</p> <ul style="list-style-type: none"> i. 3m from any utility waterway to be piped; ii. 5m from any open utility waterway; iii. 7m from any environmental asset waterway; iv. 10m from any other waterway; and v. 20m from Mean High Water Springs except where works within these riparian area setbacks are permitted under the Canterbury Regional Council rules for repair to earthquake damaged land or where the earthworks are authorised by a land use consent granted by the Canterbury Regional Council.
<p>P2 Any <u>filling</u> or excavation activity undertaken to repair land used for residential purposes and damaged by the earthquakes involving soil mixing, aggregate piers, or <u>grout</u>, where any site or part of a site is located within a Floor Level and Fill Management Area.</p>	<p>c. All <u>filling</u>, excavation or disturbance of soil:</p> <ul style="list-style-type: none"> i. is not within the dripline of a listed heritage or notable tree; or ii. does not alter the finished ground level by more than 0.25m within 5m of the dripline of a listed heritage or notable tree; or iii. is not within an Ecological Heritage Site; or iv. is not at or within 5m of a listed heritage item, including items of significance to

Activity	Activity specific standards
	<p>tangata whenua, where the heritage item is on the same site.</p> <p>d. All <u>filling</u>, excavation or disturbance of soil greater than 10m³ in volume and 0.6m in depth or within the waterway setbacks at activity specific standard b in Rule 5.8.2.1 shall be undertaken in accordance with the Erosion and Sediment Control Guidelines for Small Sites and Section 6.1 of the Erosions and Sediment Control Guidelines (both prepared by Environment Canterbury).</p> <p>e. All <u>filling</u>, excavation or disturbance of soil greater than 0.3m in depth shall be in accordance with New Zealand Standard NZS 4431:1989 Code of Practice for Earth Fill for Residential Development. Certification is not required except as specified at activity specific standard g in Rule 5.8.2.1.</p> <p>f. All <u>filling</u>, excavation or disturbance of soil is to be undertaken in accordance with New Zealand Standard NZS 6803:1999 Acoustics – Construction Noise and DIN 4150 1999-02 Structural Vibration.</p> <p>g. For <u>filling</u>, excavation or disturbance of soil completed under Table 2 in Rule 5.8.2.1, PS-4 certification completed by a suitably qualified and experienced chartered geotechnical engineer must be provided to the Council within 3 months of the land repair being completed. This shall include as-built plans of the works.</p> <p>h. Land repair works involving mixing or insertion of <u>grout</u> shall not involve:</p> <ul style="list-style-type: none"> i. mixtures with a flow time greater than 30 seconds when tested in accordance with the <u>grout</u> flow test at NZS 3112: Part 1:1986 (Test 3) or a flowable concrete/ <u>grout</u> including cement and inert additives which exceed a diameter of 300mm when tested in accordance with the inverted cone test at NZS 3112: Part 1:1986 (Test 11) except for in-situ mixing; or ii. <u>pressurised injection of grout</u> into the ground. <p>i. Where <u>grout</u> is deposited into land:</p>

Activity	Activity specific standards
	<ul style="list-style-type: none"> i. using in-situ mixing the <u>grout</u> shall be mixed evenly through the augured soil column and the percentage of <u>grout</u> within the augured soil column shall not exceed 20%; or ii. Where <u>grout</u> is deposited into land using methods other than in-situ mixing, the percentage of cement in the dry <u>grout</u> mixture shall not exceed 30%. j. Land repair materials shall consist only of: <ul style="list-style-type: none"> i. soil, gravel, rocks, concrete, sand, silt (such as exists on site already), or clean, inert material; or ii. cement and/or bentonite <u>grout</u> including inert additives.

Table 1: Standards where the land repair and earthworks are not designed, supervised or certified by a Chartered Professional Engineer with experience in geotechnical engineering.

	Column A Max. Volume (Cumulative)	Column B Max. depth (m)	Column C Max. depth of fill (m) [below ground level]	Column D Fill (m) [above ground level]	Column E Setback from boundary
P1	50m ³ /site	0.6	0.6	0.3 max. depth; and 10 m ³ /site max. volume	Setback from boundary must be equivalent to or greater than the depth of <u>filling</u> or excavation.
P2	10m ³ /site	1.0	1.0	0.3m max. depth	

Table 2: Standards where the land repair and earthworks are designed, supervised or certified by a Chartered Professional Engineer with experience in geotechnical engineering.

	Column A Max. Volume (Cumulative)	Column B Max. depth (m)	Column C Max. depth of fill (m) [below ground level]	Column D Fill (m) [above ground level]	Column E Setback from boundary
P1	250m ³ /site	2.0	2.0	0.3 max. depth; and 10m ³ /site max. volume	Nil

P2	250m ³ /site , where not more than 50m ³ may be <u>grout</u>	4.0	4.0	Nil	1.5m
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5.8.2.2 Restricted discretionary activities

The activities listed below are a restricted discretionary activity. Discretion to grant or decline consent or impose conditions is restricted to the matters for discretion identified below.		
Activity		The Council’s discretion shall be limited to the following matters:
RD1	<p>Any <u>filling</u> or excavation undertaken to repair land used for residential purposes damaged by earthquakes that does not comply with P1 or P2 set out in Rule 5.8.2.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	The matters for discretion reserved for RD5 set out in Rule 5.8.1.2 .

5.8.2.3 Discretionary, non-complying and prohibited activities

Note: There are no discretionary, non-complying or prohibited activities in respect of Rule 5.8.2.

5.8.2.4 Exemptions to Rules 5.8.2.1 and 5.8.2.2

- a. Works involving the establishment, repair or replacement of any permitted utilities or the maintenance of existing drains or ponds by a utility operator.
- b. Works permitted by a building consent do not require resource consent under Rules [5.8.2.1](#) or [5.8.2.2](#) where;
 - i. they comply with the criteria in column D of Tables 1 and 2 in [Rule 5.8.2.1](#) controlling fill above ground level in Floor Level and Fill Management Areas; or
 - ii. they are designed, supervised and certified by a Chartered Professional Engineer with experience in geotechnical engineering, including where they exceed the criteria at columns A,

- B, C or E of Tables 1 and 2 in [Rule 5.8.2.1](#); or
- iii. they comply with activity specific standards b – j of P1 and P2 in [Rule 5.8.2.1](#); or
- iv. for the purposes of this rule, the building consent platform extends to a maximum of 2.5m from the exterior wall of an enclosed structure or support structures of open structures.
- c. Testing or investigation preceding land repairs or remediation as a result of land damaged by earthquakes is permitted provided it meets the activity specific standards b, c, e, f, h and i of P1 and P2 in [Rule 5.8.2.1](#).
- d. Filling or excavation associated with the maintenance of flood protection works.
- e. Post holes for the erection of fences or for permitted or approved buildings and signs.
- f. Planting holes for trees and plants.

Advice Notes:

1. Where the earthworks are associated with the repair of land damaged by earthquakes and used for residential purposes in the zones listed in [Rule 5.8.2.1](#), [Rule 5.8.2](#) substitutes for all other earthworks rules in this Plan.
2. For the purposes of this rule, “repair of land used for residential purposes damaged by earthquakes” does not include repair of land on the Port Hills or Banks Peninsula.
3. Those intending to do land repair earthworks are responsible for complying with the [National Environmental Standard \(NES\) for Assessing and Managing Contaminants in Soil to Protect Human Health \(2011\)](#). Such persons should contact the Christchurch City Council or Environment Canterbury to find out whether their land has been used for hazardous activities which might trigger the need for compliance with the [NES](#).
4. Any vegetation removed during land repairs should not be replaced with pest species as listed in Appendix 1 to the [Infrastructure Design Standard](#) (Part 10). The Council prefers that replanting occurs in accordance with its Streamside Planting Guideline to ensure bank stability is not compromised.
5. Information regarding the disposal of excavated material and the Standards and Guidelines referenced in the rule is available from the Council.
6. Measurement of volume shall include only areas which have been disturbed, including by filling, excavation, soil mixing or injection of materials. Soil above or between these areas which remains undisturbed does not form part of the allowable volume, including where those undisturbed soils are compacted or otherwise altered by the works.
7. The injection of grout under pressure should be undertaken by competent practitioners in line with current best practice guidelines. The practitioner should be aware of buried services when undertaking works.

5.8.3 Commercial and industrial zones - Activities and earthworks in Floor Level and Fill Management Areas

5.8.3.1 Permitted activities

The activities listed below are permitted activities in all commercial and industrial zones where the activity, is located in a Floor Level and Fill Management Area subject to compliance with:

1. activity status rules and any standards specified elsewhere in the Plan for that activity, and
2. the standards specified in this Rule 5.8.3.1

Activity		Activity specific standards
P1	New buildings located within the Fixed Minimum Floor Overlay, unless specified in P3 and P4 as set out in Rule 5.8.3.1.	<ol style="list-style-type: none"> a. Minimum floor levels shall be the highest of the following: <ol style="list-style-type: none"> i. flooding predicted to occur in a 1 in 200-year <u>rainfall</u> event concurrent with a 1 in 20-year tidal event², including 1m sea level rise plus 400mm <u>freeboard</u>, as predicted by the relevant Christchurch City Council model and version identified in Table 5.8.3.1.a; or ii. flooding predicted to occur in a 1 in 200-year <u>tidal</u> event concurrent with a 1 in 20-year rainfall event², including 1m sea level rise plus 400mm <u>freeboard</u>, as predicted by the relevant Christchurch City Council model and version identified in Table 5.8.3.1.a; or iii. 12.3m above <u>Christchurch City Council Datum</u> <p>Link to table with floor levels</p>
P2	Additions to existing buildings located within the Fixed Minimum Floor Overlay, which increase the ground floor area of the building unless specified in P4 in Rule 5.8.3.1.	

Table 5.8.3.1.a Hydrologic and Hydraulic Models Used to Provide Minimum Floor Levels

FMA Catchment	Model	Version
Styx	Styx River Hydrologic and Hydraulic Model	R004
Avon	Avon River Hydrologic and Hydraulic Model	D13
Heathcote	Heathcote River Hydrologic and Hydraulic Model	2012 Design

P3	Additions to existing buildings that do not increase the ground floor area of the building.	a. Nil
P4	Additions which do not increase the ground floor area of an existing building by more than 25m ² within	a. Nil

Activity		Activity specific standards
	any continuous period of 10 years.	
P5	Support structures for overhead transmission lines including lattice towers.	a. Nil
P6	<u>Filling</u> for building platforms only to the extent necessary to achieve the minimum floor levels specified in P1 and P2 in Rule 5.8.3.1, for new buildings and for additions to existing buildings.	a. Nil
P7	<u>Filling</u> or excavation associated with the maintenance of flood protection and bank erosion protection works; and the maintenance of existing drains or ponds.	a. Nil
P8	<u>Filling</u> or excavation associated with permitted utilities, or their replacement, repair or maintenance.	a. Nil
P9	Any other <u>filling</u> or excavation.	a. A maximum height of 0.3m of fill above ground, and 0.6m depth of excavation below ground, and b. A maximum volume of <u>filling</u> above ground level of 20m ³ per site, and a maximum cumulative volume of <u>filling</u> and excavation of 50m ³ per site in each case within any continuous period of 10 years.

³ 1 in 200 year event = 0.5% AEP event; 1 in 20 year event = 5% AEP event.

⁴ As for footnote 3.

5.8.3.2 Restricted discretionary activities

The activities listed below are restricted discretionary activities in all commercial or industrial zones where the site or part of the site is located in a Floor Level and Fill Management Area.

Activity	The Council's discretion shall be limited
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		to the following matters:
RD1	<p>New buildings located within the Fixed Minimum Floor Area Overlay which do not meet the standards specified for P1 as set out in Rule 5.8.3.1 and are not permitted by P3 or P4 of Rule 5.8.3.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	<p>a. The setting of the minimum floor level of the building and/or addition.</p> <p>b. The frequency at which any proposed building or addition is predicted to be flooded and the extent of damage likely to occur in such an event.</p> <p>c. Any proposed mitigation measures, and their effectiveness and environmental impact, including any benefits associated with flood management.</p> <p>d. Any adverse effects of the scale and nature of building and/or addition and its location in relation to neighbouring buildings, including effects on privacy of neighbouring properties as a result of the difference between minimum and proposed floor levels, and effects on streetscape.</p>
RD2	<p>New buildings not located within the Fixed Minimum Floor Area Overlay and which are not permitted by P3 or P4 of Rule 5.8.3.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	
RD3	<p>Additions to existing buildings located within the Fixed Minimum Floor Area Overlay which increase the ground floor area of the building, but which do not meet the standards specified for P2 set out in Rule 5.8.3.1 and are not permitted by P4 of Rule 5.8.3.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	
RD4	<p>Additions to existing buildings not located within the Fixed Minimum Floor Area Overlay which increase the ground floor area of the building and are not permitted by P4 of Rule 5.8.3.1.</p> <p>Any application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	
RD5	<p><u>Filling</u> and excavation which is not a permitted activity under P6, P7, or P8 set out in Rule 5.8.3.1 or <u>filling</u> and excavation which exceeds the standards</p>	
		<p>a. The effects of <u>filling</u> or excavation on flooding, waterways, groundwater and natural ground levels on and/or off site, including:</p>

Activity	The Council's discretion shall be limited to the following matters:
<p>in P9 of Rule 5.8.3.1.</p>	<ul style="list-style-type: none"> i. Any likelihood of exacerbation of flooding, erosion, or siltation either upstream or downstream of the site. ii. Any adverse effects on other properties from disturbances to surface drainage patterns. iii. Effects on flood storage capacity and function in the immediate area, and any wider effects on the flood storage in the catchment; and any effects on existing stormwater and flood protection works. iv. Any implications for groundwater and the water table, on or off site. v. Any benefits associated with flood management. b. Any proposed mitigation measures, and their effectiveness and environmental impact. c. The effects of the scale and nature of the <u>filling</u> or excavation, and location in relation to neighbouring sites, including: <ul style="list-style-type: none"> i. Effects on privacy of neighbouring properties and effects on streetscape. ii. The stability of adjoining land, and its susceptibility to subsidence or erosion upon excavation or <u>filling</u> taking place. d. Effect on the reasonable use of the site. e. Effects on access, character, ecology and amenity and sites of archaeological and cultural value, including: <ul style="list-style-type: none"> i. Any adverse effects or benefits for public access, natural character, or ecology of waterways and wetland areas. ii. Any adverse effects on amenity values including dust nuisance, visual impact, noise, vibration and traffic associated with the <u>filling</u> or excavation.

<p>Activity</p>	<p>The Council's discretion shall be limited to the following matters:</p> <ul style="list-style-type: none"> iii. Effects on sites of archaeological value including consideration of the need to impose an Accidental Discovery Protocol.
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5.8.3.3 Discretionary, non-complying and prohibited activities

Note: There are no discretionary, non-complying or prohibited activities in respect of [Rule 5.8.3](#).

5.9 Liquefaction rules

[Click here for Planning Maps](#)

[Click here for Liquefaction assessment area maps](#)

5.9.1 Permitted activities - Liquefaction Assessment Areas 1 and 2

Note: There are no permitted activities in respect of Rule 5.9.

5.9.2 Restricted discretionary activities - Liquefaction Assessment Areas 1 and 2

The activities listed below are restricted discretionary activities in any zone within the area shown on the Planning Maps as “Liquefaction Assessment Areas 1 and 2” and are subject to compliance with any standards specified elsewhere in the Plan for that activity.

Note for clarification: Liquefaction is a process that can occur during strong earthquake shaking which causes loss of stiffness and strength in generally loosely consolidated fine grained water saturated soils and can result in ground damage from lateral spreading, settlement, ground cracking, sand boils and deposition of sediment, as well as localised flooding.

For all resource consent applications under Rule 5.9.2 a geotechnical assessment is required to be undertaken by a Chartered Professional Engineer with experience in geotechnical engineering or a Professional Engineering Geologist (IPENZ registered). Assessments must provide the relevant information set out in [Clause 5.11](#) for resource consent applications in areas of liquefaction potential, and address the relevant matters set out below for which discretion is restricted.

	Activity	The Council's discretion shall be limited to the following matters which are in addition to those matters of discretion stated for these activities elsewhere in this Plan:
RD1	<p>Any subdivision which creates an additional vacant lot or lots.</p> <p>Any resource consent application arising from this rule will not require written approvals and shall not be publicly or limited notified.</p>	<p>a. All matters which discretion has been reserved over for restricted discretionary activity subdivision in Chapter 8 (Subdivision).</p> <p>b. The nature and extent of the liquefaction hazard identified for the site.</p> <p>c. Techniques proposed for mitigation of the effects of any liquefaction hazard identified, including but not limited to:</p> <ul style="list-style-type: none"> i. Measures proposed for ground strengthening and foundation design, and the ability of these proposals to be incorporated into the subdivision consent as conditions. ii. Any geotechnical setbacks provided in relation to size of any waterway or waterbody, or alternatively, ground strengthening or other proposed engineering or geotechnical solutions to address any identified potential for lateral spread. <p>d. The layout of the subdivision with respect to the extent of liquefaction hazard, including:</p> <ul style="list-style-type: none"> i. The proposed location of earthworks, servicing and building platforms in regard to the liquefaction hazards identified including, where appropriate: <ul style="list-style-type: none"> A the location of services and buildings where there is liquefaction susceptibility variability across the site; and B the ability to relocate services affected by liquefaction to more desirable locations. <p>e. The suitability of the site for the range of uses anticipated, given the nature and extent of any geotechnical constraints identified and mitigation measures proposed.</p> <p>f. The overall effect on the reasonable use of the site.</p> <p>g. Potential environmental effects of any mitigation measures on adjoining sites.</p>

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Note: See Clause 5.11 for additional information requirements in respect to liquefaction potential, for all applications for subdivision, and for all resource consent applications for land use activities where a geotechnical report is required.

5.9.3 Restricted discretionary activities - Liquefaction Assessment Area 1

The activities listed below are restricted discretionary activities in any zone within the area shown on the [Planning Maps](#) as "Liquefaction Assessment Area 1" and are subject to compliance with any standards specified elsewhere in the Plan for that activity.

Note for clarification: Liquefaction is a process that can occur during strong earthquake shaking which causes loss of stiffness and strength in generally loosely consolidated fine grained water saturated soils and can result in ground damage from lateral spreading, settlement, ground cracking, sand boils and deposition of sediment, as well as localised flooding.

For all resource consent applications under Rule 5.9.3 a geotechnical assessment is required to be undertaken by a Chartered Professional Engineer with experience in geotechnical engineering or a Professional Engineering Geologist (IPENZ registered). Assessments must provide the relevant information set out in Clause 5.11 for resource consent applications in areas of liquefaction potential, and address the relevant matters set out below for which discretion is restricted.

	Activity	The Council's discretion shall be limited to the following matters which are in addition to those matters of discretion stated for these activities elsewhere in this Plan:
RD2	<p>Any activity located on a site with an area of 1500m² or more, qualifying as a restricted discretionary activity under any of the following residential rules:</p> <ol style="list-style-type: none"> 1. Enhanced Development Mechanism - Rule 14.7.2.1 RD1, RD2; 2. Community Housing Redevelopment Mechanism - Rule 14.8.2.1 RD1, RD2; 3. Residential Suburban Zone and Residential Suburban Density Transition Zone - Rule 14.2.2.3 RD7, RD8, RD9; 4. New Neighbourhood Zone - Rule 14.6.2.3 RD5; 5. Residential Medium Density Zone - 	<ol style="list-style-type: none"> a. The nature and extent of the liquefaction hazard identified for the site. b. The siting and layout of buildings, carparking areas, access and services proposed for the site, including the ability to locate buildings and services on land of lesser liquefaction potential where there is variability across the site. c. Techniques proposed for mitigation, including, but not limited to, measures for ground strengthening and foundation design. d. The effectiveness and environmental

<p>Activity</p> <p>Rule 14.3.2.3 RD7;</p> <p>6. Residential Banks Peninsula Zone - Rule 14.4.2.3 RD3;</p> <p>7. Residential Conservation Zone - Rule 14.5.2.3 RD3.</p> <p>Resource consent application/s arising from this rule in respect to the Enhanced Development Mechanism or the Community Housing Redevelopment Mechanism will not require written approvals and shall not be publicly or limited notified.</p>	<p>The Council's discretion shall be limited to the following matters which are in addition to those matters of discretion stated for these activities elsewhere in this Plan:</p> <p>impact of any mitigation measures proposed.</p>
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Note: See Clause [5.11](#) for additional information requirements in respect to liquefaction potential, for all applications for subdivision, and for all resource consent applications for land use activities where a geotechnical report is required.

5.9.4 Discretionary, non-complying and prohibited activities - Liquefaction Assessment Areas 1 and 2

Note: There are no discretionary, non-complying or prohibited activities in respect of Rule 5.9.

5.10 Port Hills and Banks Peninsula slope instability rules

[Click here for Planning Maps](#)

5.10.1 Activity status for Port Hills and Banks Peninsula Slope Instability Management Areas

The activities listed below have the activity status listed within each slope instability management area, and are subject to compliance with any standards specified elsewhere in the Plan for that activity.

For all resource consent applications under [Rule 5.10.1](#) a geotechnical assessment is required to be undertaken by a Chartered Professional Engineer with experience in geotechnical engineering or a Professional Engineering Geologist (IPENZ registered). Assessments must provide the relevant information set out in [Clause 5.11.4](#) for resource consent applications in slope instability management areas, and address the relevant assessment matters below.

The design of rockfall protection structures, must be carried out by a Chartered Professional Engineer with specific experience in the investigation, design and/or construction of rockfall protection structures, who has registered with the Christchurch City Council.

		Slope Instability Management Areas						
Activity	Cliff Hazard Mgmt Area 1	Cliff Hazard Mgmt Area 2	Rockfall Hazard Mgmt Area 1	Rockfall Hazard Mgmt Area 2	Mass Movement Hazard Mgmt Area 1	Mass Movement Hazard Mgmt Areas 2 & 3	Remainder of Port Hills and Banks Peninsula Slope Instability Mgmt Area	
Key: P = Permitted; RD = Restricted Discretionary; D = Discretionary; NC = Non-complying; PR = Prohibited.								
a.	Subdivision	PR1/NC1*	NC2	NC3	D1	NC4	D2	RD1
b.	Earthworks except as provided in activities c, d and g in Rule 5.10.1	PR2	NC5	NC6	D3	NC7	D4	PHASE 2 REVIEW
c.	<u>Hazard mitigation works</u> , including earthworks associated with those works unless provided for in d.	PR3	NC8	D5	D6	NC9	D7	RD2
d.	<u>Hazard mitigation works</u> to protect <u>infrastructure</u> including earthworks associated with those works.	D8 includes works to protect Brittan Terrace Port related activities.	D9	D10	D11	D12	D13	RD3
e.	Demolition of	D14	D15	D16	D17	D18	D19	P1

	buildings							
f.	Repair of roads and other infrastructure.	D20	D21	P2	P3	D22	P4	P5
g.	Retaining walls which are both less than 6m ² in area and less than 1.8m in height including earthworks associated with those works.	P6	P7	P8	P9	P10	P11	P12
h.	Any building or structure not listed in activities a to g of Rule 5.10.1.	PR4	NC10	NC11	D23	NC12	D24	PHASE 2 REVIEW
i.	Any other activity not otherwise listed in this table.	NC13	NC14	NC15	D25	NC16	D26	PHASE 2 REVIEW

* Prohibited where site subject to proposed subdivision is solely located within Cliff Hazard Management Area1; non-complying activity where it is proposed to subdivide off land within Cliff Hazard Management Area 1 from an area of land not within Cliff Hazard Management Area 1.

Any resource consent application arising from RD1, RD2 and RD3 set out in Rule 5.10.1 above will not require written approvals and shall not be publicly or limited notified.

Note: See Clause 5.11.4 for additional information requirements for all resource consent applications within Port Hills and Banks Peninsula Slope Instability Management Areas.

5.10.2 Remainder of Port Hills and Banks Peninsula Slope Instability Management Areas - RD1, RD2 and RD3 matters of discretion

- a. The Council’s discretion shall be limited to the following matters:
 - i. With respect to subdivision applications: All matters which discretion has been limited to for restricted discretionary activity subdivision in [Chapter 8](#).
 - ii. The nature and extent of the natural hazard and the associated risks posed to subdivision, use and development, both on and off site.
 - iii. The nature and scale of any existing or proposed development, including engineering works, and its design, effects and levels of risk.

- iv. Proposed hazard mitigation works, the effects on levels of risk and proposed monitoring procedures and maintenance.
- v. Suitability of proposed building platforms and access to the site.
- vi. The visual impact of any proposed earthworks or hazard mitigation/protection works.
- vii. Drainage and sediment control measures, both during and after the development.

5.10.3 Slope Instability Management Areas – D5 (Discretionary Activity 5) to D26 (Discretionary Activity 26) assessment matters for land use resource consent applications

- a. The land use activities listed in [Rule 5.10.1](#) as discretionary activities will be assessed against the relevant assessment matters below, together with other matters specified in section 104 of the Resource Management Act 1991.
 - i. The risk to life, property and the environment posed by the natural hazard, either on the site of the activity, or elsewhere such as downhill.
 - ii. The extent to which hazard mitigation works, or conditions on the activity, would enable the effects of the hazard, either on site or elsewhere, to be remedied or mitigated.
 - iii. The suitability of the site for the activities proposed.
 - iv. Whether or not the work would be carried out under the supervision of either a Chartered Professional Engineer with experience in geotechnical engineering or a Professional Engineering Geologist (IPENZ registered).
 - v. For hazard mitigation measures, whether the works:
 - A can be shown, based on evaluation by a Chartered Professional Engineer with experience in geotechnical engineering, using best practice methods, to increase the stability of land and/or protect structures and buildings and their occupants;
 - B can be shown, based on evaluation by a Chartered Professional Engineer with experience in geotechnical engineering, using best practice methods, to reduce risk to life to a tolerable level, including the extent to which an Annual Individual Fatality Risk of 10^{-4} (1 in 10,000) or better can be achieved;
 - C will have appropriate monitoring procedures applied, with inspections and maintenance undertaken and reported to the Council.
 - vi. The extent to which the activity or works will lead to removal of vegetation or topsoil, or modification of ecosystems or natural character, or adverse landscape and visual effects.
 - vii. The extent to which the activity or works would impact on recreational access, where available, or historical or cultural heritage.

5.10.4 Slope Instability Management Areas - D1 (Discretionary Activity 1) to D13 (Discretionary Activity 13) assessment matters for subdivision or earthworks resource consent applications

- a. Where subdivision or earthworks are listed in [Rule 5.10.1](#) as Discretionary Activities, they will be assessed against the relevant assessment matters below together with other matters specified in

section 104 of the Resource Management Act 1991.

- i. The implications of any proposed works on hydrological and geological features, both underlying and surface and on site and on adjoining sites.
- ii. The nature, extent and implications of hazards relevant to the site e.g. slope instability or stream bank erosion.
- iii. The effectiveness of mitigation measures proposed, and whether they will lower risk to an acceptable level.
- iv. The design of proposed works including buildings and retaining walls, and access roads.
- v. The nature of any existing or proposed fill or earthworks, engineering design, and their effects on the stability of the site and adjacent sites.
- vi. Effects of development on surface and subsurface drainage patterns and stormwater management.
- vii. The adequacy of drainage and sediment control measures; for example, the extent to which the works will retain excavations as soon as possible, drain stormwater into an approved stormwater system, and when excavating, be undertaken outside of periods of water saturation.
- viii. The ability of the site to accommodate specific, stable, accessible and serviceable building platforms for each site.
- ix. The extent to which the works will lead to removal of vegetation or topsoil, or modification of ecosystems or natural character, or adverse landscape and visual effects.
- x. The extent to which the activity or works would impact on recreational access, where available, or historical or cultural heritage.
- xi. Any planting proposed and the usefulness of that planting as a mitigation measure.

5.11 General procedures - Information requirements

5.11.1 Information requirements for all plan changes

Liquefaction potential

- a. Plans and accompanying information will be required to show the results of a geotechnical site suitability assessment, in accordance with the densities, depths, methods and reporting specified for plan changes, in Ministry of Business, Innovation and Employment (MBIE) (December 2012): Part D of "Guidance: Repairing and rebuilding houses affected by the Canterbury Earthquakes": Guidelines for the geotechnical investigation and assessment of subdivisions in the Canterbury region: Minimum requirements for geotechnical assessment for land development ('flatland areas' of the Canterbury region). This will be required to include an indication of liquefaction susceptibility across the site in terms of performance characteristics, as well as a broad classification of the land in accordance with those guidelines. The level of investigation should correspond with the scale and significance of the hazard and the requirements of the MBIE guidelines. Plans and information shall also:
 - i. identify any areas which require particular ground strengthening or other mitigation measures, and recommendations for such mitigation;
 - ii. identify any areas which should be excluded from built development, due to geotechnical constraints, or which require geotechnical setbacks, including areas near the edges of rivers,

streams, lakes, wetlands, stormwater detention areas and swales where lateral spread may occur;

- iii. indicate any options and recommended locations for the proposed land uses, transport features and other infrastructure recommended by the geotechnical engineer.
- b. All geotechnical reports with respect to liquefaction potential are to be prepared by a Chartered Professional Engineer with experience in geotechnical engineering, or a Professional Engineering Geologist (IPENZ registered), and should contain all relevant geotechnical information, presented in both a factual and interpretive manner.

Advice Notes

1. The Council reserves the right to obtain peer reviews of geotechnical reports.
2. The Council encourages the provision of geotechnical data and assessments to the Canterbury Geotechnical Database.

5.11.2 Additional information requirements for all resource consent applications for subdivision

5.11.2.1 Liquefaction Assessment Areas 1 and 2

Liquefaction potential

- a. At subdivision consent application stage, detailed liquefaction susceptibility assessment and reporting will be required in accordance with the densities, depth, methods and reporting specified in Ministry of Business, Innovation and Employment (December 2012): Part D of "Guidance: Repairing and rebuilding houses affected by the Canterbury Earthquakes": Guidelines for the geotechnical investigation and assessment of subdivisions in the Canterbury region: Minimum requirements for geotechnical assessment for land development ('flatland areas' of the Canterbury region).
- b. Subdivision consent applications will be required to include sufficient information and proposed measures to satisfy the Council that liquefaction risk (if present) can be adequately avoided, remedied or mitigated, including the potential effects of lateral spread within 200 metres of the edges of rivers, streams, lakes, wetlands, stormwater detention areas and swales.
- c. Subdivision plans shall show:
 - i. any areas which require particular ground strengthening or other mitigation measures, and recommendations for such mitigation;
 - ii. any areas which should be excluded from built development due to geotechnical constraints, or which require geotechnical setbacks; and
 - iii. any features of subdivision layout recommended by the geotechnical engineer, for example any recommended locations for proposed land uses, transport features and other infrastructure as a result of geotechnical constraints.
- d. All geotechnical reports with respect to liquefaction potential are to be prepared by a Chartered Professional Engineer with experience in geotechnical engineering, or a Professional Engineering Geologist (IPENZ registered), and should contain all relevant geotechnical information, presented in both a factual and interpretive manner.

- e. Where land within Liquefaction Assessment Area 2 is to be subdivided, it is likely to require a lower level of detail of geotechnical assessment than for Liquefaction Assessment Area 1. The density of deep investigation and mix of methods used in characterisation should be appropriate to the geomorphology of the site, the scale of the proposed development, the importance of the infrastructure and the nature of the community facilities planned for the site, and the level of risk to people and property arising from structural failure. More detailed assessment may be required where visual assessment and reasonable enquiry suggests that the land or parts of the land should be subject to the same level and intensity of deep geotechnical investigation as for Liquefaction Assessment Area 1.

Other geotechnical risks

- f. All applications for subdivision consent will be required to include assessment and reporting on normal geotechnical investigations for the purpose of evaluating all other potential geotechnical risks, including information on soil types, static bearing capacities, settlements, stability, and section 106 of the Act matters.

Advice notes:

1. The Christchurch City Council has subdivision guidance entitled Subdivision Bulletin 23.2. May 2013 "Geotechnical Assessment to Satisfy Section 106 of the Act matters". The Council's Infrastructure Design Standard includes a chapter on geotechnical requirements for the design and construction of infrastructural assets.
2. The Council reserves the right to obtain peer reviews of geotechnical reports.
3. The Council encourages the provision of geotechnical data and assessments to the Canterbury Geotechnical Database.

5.11.3 Additional information requirements for resource consent applications for land use activities in flat areas where a geotechnical report is required.

Liquefaction potential

- a. Applicants will be required to supply the results of a detailed geotechnical investigation and interpretation. The level of investigation should correspond with the scale and significance of the liquefaction hazard. Plans and information shall:
 - i. identify any areas which require particular ground strengthening or other mitigation measures, and recommendations for such mitigation;
 - ii. identify any areas which should be excluded from built development, due to geotechnical constraints, or which require geotechnical setbacks, including areas near the edges of rivers, streams, lakes, wetlands, stormwater detention areas and swales where lateral spread is likely to occur; and
 - iii. indicate any options and recommended locations for the proposed land use, transport features and other infrastructure recommended by the geotechnical engineer.
- b. All geotechnical reports in respect of liquefaction potential are to be prepared by a Chartered Professional Engineer with experience in geotechnical engineering or a Professional Engineering

Geologist (IPENZ registered), and should contain all relevant geotechnical information, presented in both a factual and interpretive manner.

Advice notes:

1. Where land is within the area shown on the Planning Maps as “Liquefaction Assessment Area 2”, or where land has already been subject to recent significant geotechnical assessment, existing geotechnical information may be adequate for land use consent application purposes. Identifying geotechnical issues other than liquefaction potential, e.g. the presence of peat, is also part of normal geotechnical investigations.
2. Land to be used for commercial or other non-residential purposes may require more substantial investigations, ground strengthening, and foundation design measures than for residential lots, depending on the activities proposed and the size and weight of the proposed structures.
3. The Council reserves the right to obtain peer reviews of geotechnical reports.
4. The Council encourages the provision of geotechnical data and assessments to the Canterbury Geotechnical Database.

5.11.4 Additional information requirements for resource consent applications within Port Hills and Banks Peninsula Slope Instability Management Areas

- a. Plans and accompanying information shall show:
 - i. the geological and geotechnical constraints across the site, including any relationship to or effect on areas of actual or potential instability off the site, including the location of any inferred faults.
 - ii. the location of the site in relation to the natural hazard, or the location of the hazard on the site itself, and the location of building platforms in relation to the hazard.
 - iii. the nature of the proposed activities on the site and the impact on other sites potentially affected by the natural hazard, and the effect of the hazard on the activity and vice versa.
- b. All geotechnical reports are to be prepared by a Chartered Professional Engineer with experience in geotechnical engineering or a Professional Engineering Geologist (IPENZ registered), and should contain all relevant geotechnical information, presented in both a factual and interpretive manner. The design of rockfall protection structures must be carried out by a Chartered Professional Engineer as set out in [Rule 5.10.1](#).

Advice Notes:

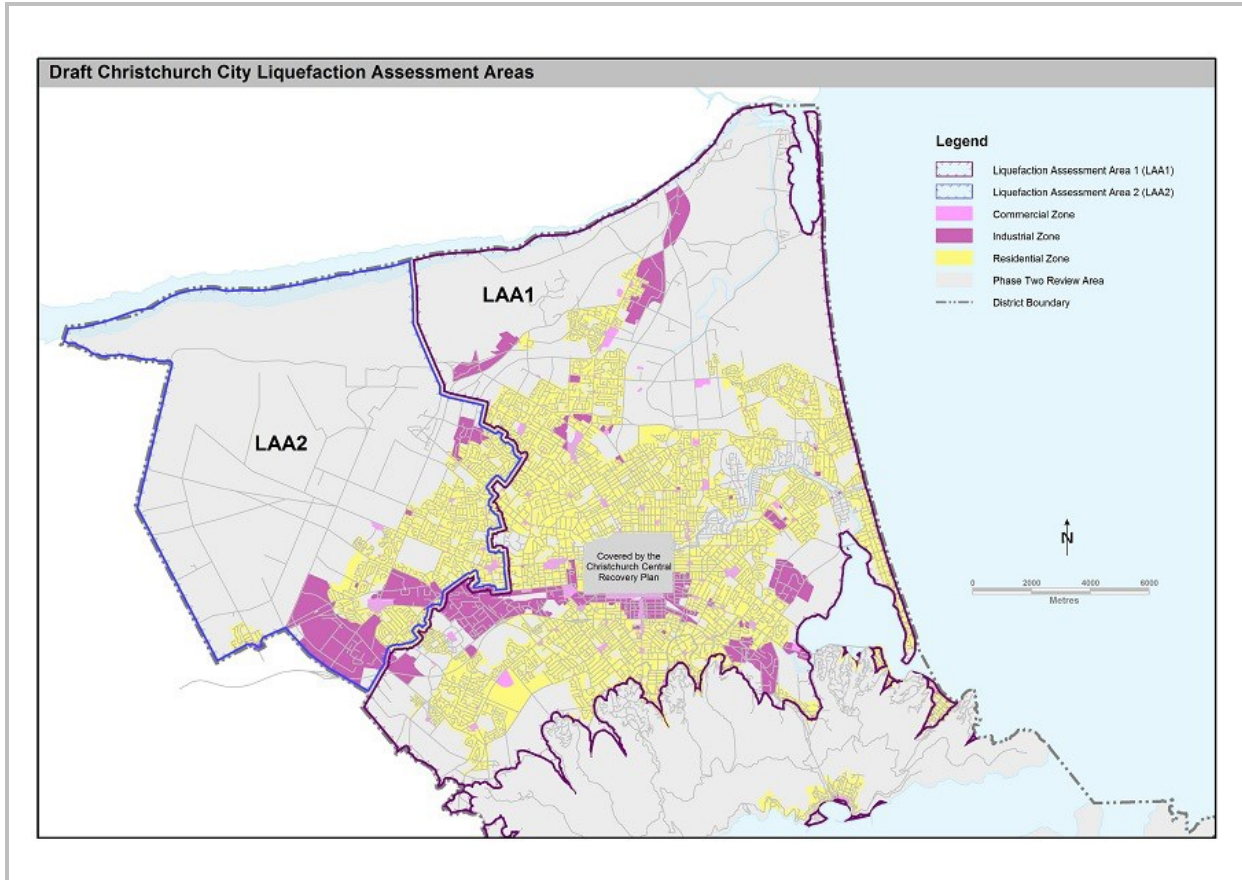
1. The Council reserves the right to obtain peer reviews of geotechnical reports.
2. The Council encourages the provision of geotechnical data and assessments to the Canterbury Geotechnical Database.

5.12 General procedure - Compliance with other chapters

- a. All subdivision, use and development shall comply with all the provisions of other chapters.

5.13 Appendices

5.13.1 Liquefaction assessment areas in Christchurch



5.13.2 Liquefaction assessment areas on Banks Peninsula

