Appendix 15 Subdivision information and process

15.1. Introduction

This appendix includes additional information for subdivision resource consent applications. Refer to the Council's website for further information on how to apply for subdivision resource consent.

All references to the Significant Ecological Area Overlay in this Appendix should be read as also including areas on the Kawau Island Rural Subdivision SEA Control.

15.2. Vesting of Assets

(1) Where vesting of any new asset is proposed as part of a subdivision, applicants are strongly encouraged to undertake a pre-application meeting with Council early in the design stages to agree parameters. The pre-application meeting will involve specialists from the relevant council controlled organisations with interests in any proposed future asset.

(2) In respect of new road assets, the 'concept design' (i.e. width and general layout) of any road intended to be vested in the Council will be assessed against the relevant provisions of E38 Subdivision - Urban and E39 Subdivision - Rural and any relevant codes of practice or engineering standards applicable at the time of the subdivision consent application. If a road is approved as part of a subdivision consent, the concept design (i.e. width and general layout) is deemed appropriate for vesting. The 'detailed design and asset specifications' (i.e. pavement thickness etc.) of the road will be considered during the subsequent engineering approvals process.

15.3. Transferable rural site subdivision

15.3.1. Process

(1) A Transferable Rural Site Subdivision (TRSS) is the transfer of the rural - residential development potential of rural sites from one location to the Countryside Living Zone through a subdivision process. This process may be carried out in the following ways:

(a) through the protection of indigenous vegetation or wetland identified in the D9 Significant Ecological Areas Overlay or meeting Significant Ecological Areas factors as set out in the regional policy statement, and established revegetation planting meeting relevant criteria; or

(b) through the amalgamation of donor sites: amalgamating two existing and abutting rural zoned sites (excluding a Rural - Countryside Living Zone site), and transferring the development potential of the 'amalgamated' site to the Countryside Living Zone.

(2) The new or additional site is located in Rural - Countryside Living zoned sites identified on the planning maps by the Subdivision Variation Control.

(3) The process is the same if more than two donor sites are amalgamated, or if more than one block of qualifying indigenous vegetation or wetland is protected.

Table 15.3.1.1 Transferable rural site subdivision process

Step	Transferable rural site subdivision process through the amalgamation of donor sites	Transferable rural site subdivision process through the protection of indigenous vegetation or wetland identified in the Significant Ecological Areas Overlay or meeting the Significant Ecological Areas factors or established revegetation planting meeting relevant criteria
1	Identify the following: a. two donor sites abutting each other, one of which is vacant; b. a site zoned Rural - Countryside Living Zone identified as suitable as a receiver site for TRSS – see Table E39.6.5.2.1 Minimum and minimum average net site areas in E39 Subdivision - Rural	Identify the following: a. an area of indigenous vegetation or wetland (on the donor site) that: - is identified in the Significant Ecological Areas overlay; - meets the Significant Ecological Areas factors set out in Policy B7.2.2(1); or - is established with revegetation planting meeting relevant criteria. b. a site zoned Rural - Countryside Living Zone identified as suitable as a receiver site for TRSS – see Table E39.6.5.2.1 Minimum and minimum average net site areas in E39 Subdivision - Rural.

Step	Transferable rural site subdivision process through the amalgamation of donor sites	Transferable rural site subdivision process through the protection of indigenous vegetation or wetland identified in the Significant Ecological Areas Overlay or meeting the Significant Ecological Areas factors or established revegetation planting meeting relevant criteria
2	Application made to Council: a. to amalgamate two donor sites into one new site; and b. to subdivide the receiver site.	Application made to Council: a. subdivide the property containing indigenous vegetation, wetland or revegetation planting to create the residential development opportunity; and b. transfer the residential development opportunity to the receiver site in a Countryside Living Zone.
3	Gain subdivision consent approval	Gain subdivision consent approval
4	Comply with consent conditions	Comply with consent conditions
5	Apply to Land Information New Zealand to: a. issue one new certificate of title in place of the original donor sites; and b. issue two new certificates of title for the new sites created from the receiver site after the title for the donor sites has been issued.	Apply to Land Information New Zealand to: a. attach an appropriate legal protection mechanism to the donor site for the protection of the indigenous vegetation, wetland or revegetation planting; and b. issue two new certificates of title for the new sites created from the receiver site.

15.3.2. Explanation of terms

(1) A donor site may be one of the following:

(a) two abutting rural sites being amalgamated;

(b) a rural site containing rural-residential development potential created from one of the following situations:

(i) a site containing indigenous vegetation or wetland identified in the D9 Significant Ecological Areas Overlay;

(ii) A site containing an indigenous vegetation area or wetland meeting the Significant Ecological Areas factors as identified in Policy B7.2.2(1); or

(iii) a site establishing revegetation planting.

(2) A receiver site is a Rural - Countryside Living zoned site identified on the planning maps by the Subdivision Variation Control.

15.3A Te Wāhi Hūnuku Site Subdivision

(1) A Te Wāhi Hūnuku Site provides limited opportunities for the subdivision of rural sites to create one site of up to 4 hectares in rural zones, and one site of up to 1 hectare in the Future Urban Zone. These sites act as a receiving site for existing marae and urupā identified in the provisions, which are likely to be subject to significant natural hazard risks now or in the future. A 4 hectare maximum size limit has been set to allow for the creation of Te Wāhi Hūnuku Sites which are both large enough to accommodate the existing facilities and also allow for some expansion. The 1 hectare maximum size in the Future Urban Zone is specifically to accommodate the urupā of Makaurau Marae which is currently subject to natural hazards.

(2) A natural hazard risk assessment must be undertaken in accordance with Chapter E36 to confirm that the eligible marae and/or associated urupā are subject to a significant level of natural hazard risk. Importantly, this assessment must include the cultural perspectives of the potentially affected iwi, hapū, whānau and haukāinga so the cultural impact of the hazard can be understood in making the risk determination. The marae or urupā trustees convey these perspectives to council.

(3) A decision to relocate a marae or urupā is a culturally significant one. The discussion can extend beyond the haukāinga (home people of the marae) to include all affected iwi, hapū and whānau associated with the site. Decisions are made in accordance with agreed tikanga, which can vary.

(4) Identifying a new location for a marae and urupā is also a culturally significant decision. It can take into account matters such as cultural landmarks, proximity to customary activities, and kōrero tuku iho (stories handed down through generations). The Te Wāhi Hūnuku Site subdivision provisions are intended to provide as much flexibility as possible as to where new sites can be established. This includes recognition that desirable sites can at times include natural and physical resources that have been scheduled in the Auckland Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character.

(5) Each identified marae or urupā eligible for Te Wāhi Hūnuku Site subdivision is a Māori Reservation and must have an active trusteeship as determined by the Māori Land Court. These trusts are the legal entities which make decisions on behalf of the marae or urupā and therefore are the mandated representatives which council engages with during the subdivision process.

(6) It is important to ensure that the newly created Te Wāhi Hūnuku Site is used for the intended cultural purpose of relocating the marae or urupā. There are two legal mechanisms to achieve this in the provisions. These are through the use of encumbrances on the property title or by requiring that the newly created site are classified as a Māori Reservation administered by the existing marae or urupā trust. Māori Reservations are established and amended by the Māori Land Court under Te Ture Whenua Māori Act 1993 and can apply over general title land or Māori Land. It is recommended that independent legal advice is sought by the applicant.

(7) It is similarly important that the original site is no longer used in a manner that will result in significant natural hazard risk. This is done either through registering an encumbrance on the property title, or through an amendment to the purpose of the original Māori Reservation which can be sought through the Māori Land Court. An order can be obtained from the court specifying where development sensitive to natural hazards should not occur within the reservation. Activities on the Māori Reservation are administered by the appointed trusteeship to comply with the terms of the reservation. Again, independent legal advice is recommended.

(8) While it is possible to develop marae and urupā in Rural zone and Future Urban Zone land, classifying the resultant site as Māori Land under Te Ture Whenua Māori Land Act 1993 or rezoning the site to the Special Purpose – Māori Purpose Zone will provide more flexibility for these cultural land uses. The entire process of relocating a marae or urupā is expected to take approximately 2 years, allowing time for classification of Māori Land, or rezoning to occur.

15.3B Te Wāhi Hūnuku Boundary Relocation

(1) Boundary relocation is another option open to the identified existing marae and urupā in rural areas. It allows for existing marae and/or urupā sites to be enlarged so sensitive activities can be relocated out of hazard risk areas.

(2) There is no limit to the size of the boundary adjustment, but there is a requirement for the adjusted marae and/or urupā site to be used for the intended cultural purpose. This can be through the registration of an encumbrance or through amending the existing Māori Reservation by Māori Land Court order. There is similarly a requirement to apply a suitable legal mechanism to avoid future land use or development which will result in significant natural hazard risk.

15.4. Protection of existing indigenous vegetation

(1) All subdivision plans, excluding subdivision plans for boundary adjustments, must show any of the following features that exist on, or on the boundary of, the land being subdivided:

(a) any areas identified as Significant Ecological Area in the D9 Significant Ecological Areas Overlay; or

(b) any other areas of indigenous vegetation, wetlands, waterways, streams, rivers and lakes.

(2) Three yearly monitoring of the critical determinants for the health of any Significant Ecological Area by an independently approved person which may include, but not be limited to, all of the following:

(a) effectiveness of fencing;

(b) presence of animal and plant pests;

(c) health of the Significant Ecological Area;

(d) presence of pollutants;

(e) vegetation clearance;

(f) effectively managing animal and plant pests~~; and~~

(g) providing appropriate access to any sites and places of significance to Mana Whenua; and

(h) wildfire risk mitigation.

(3) Require monitoring results to be forwarded to Council for audit.

15.5. Legal protection mechanism to protect indigenous vegetation, wetland or revegetation planting:

(1) The legal protection mechanism must include all of the following:

(a) permanent protection of the vegetation or wetland on the site;

(b) implementation of a management plan;

(c) permanent exclusion of all livestock from the protected area; and

(d) the protected area to be maintained in perpetuity, including carrying out pest control measures~~.~~ and wildfire risk mitigation.

(2) Where the Plan refers to indigenous vegetation or wetland to be subject to a legal protection mechanism, that mechanism must include the following:

(a) legal protection of the indigenous vegetation or wetland and any area of required revegetation plantings in perpetuity. An agreement to the satisfaction of the council regarding an encumbrance, bond, consent notice, covenant or vesting as reserve must be entered into before the issue of the section 224(c) certificate under the Resource Management Act 1991;

(b) where applicable the legal protection mechanism must be in accordance with the relevant terms of the Reserves Act 1977 or the Queen Elizabeth II National Trust Act 1977. The legal instrument must provide protection in perpetuity, and must include enforcement and penalty provisions;

(c) where revegetation planting is required as a condition of the subdivision consent, the section 224(c) certificate will be issued only after the required works have been undertaken and the planting has satisfied the required consent conditions. This includes implementation of an animal and plant pest management plan. 'Animal pests' are those animal species listed as 'total control pests', 'containment pests', or 'surveillance pests' in the Auckland Council's current Regional Pest Management Strategy;

(d) all certification required must be carried out by a suitably qualified and experienced person and at the applicant's expense, and a report must be provided to Council. In this context, a person will not be considered to be suitably qualified and experienced unless they are a qualified ecologist with appropriate experience in this type of work.

(3) The indigenous vegetation or wetland and any area of required revegetation plantings to be protected must be maintained free of livestock through appropriate stock proof fencing, or if livestock access to the vegetation is prevented by topographical or natural features then stock proof fencing may not be required.

15.6. Revegetation planting

(1) A planting plan for any revegetation planting is required prior to a section 224(c) certificate being issued and must identify the following:

(a) the ecological district of the site;

(b) the characteristics of the soil (i.e. clay, silt, loam etc.);

(c) soil drainage;

(d) topography of the area to be planted;

(e) location and extent of the area to be planted;

(f) exposure of the site to wind, frost, sunlight and salt spray;

(g) presence of plant and animal pests;

(h) presence of any threatened species and if necessary the process for the translocation of threatened species,

(i) stock-proof fencing that should be at least a full seven wire, post and batten fence, planting areas, weed and animal pest control;

(j) extent of the existing Significant Ecological Areas (indigenous vegetation) and an outline of the biodiversity of the Significant Ecological Areas (indigenous vegetation) and the land in the subdivision;

(k) any restrictions on planting, such as existing infrastructure, <u>wildfire risk mitigation,</u> safety or existing access issues;

(l) how revegetation planting will be ecologically linked to an area of contiguous Significant Ecological Areas (indigenous vegetation) and if possible any other additional existing ecological corridors or connections;

(m) how revegetation planting will provide robust and high value ecological connections without gaps to the Significant Ecological Areas;

(n) how revegetation planting will buffer the Significant Ecological Areas and ensure long term viability and resilience of the Significant Ecological Areas;

(o) site planting, including species to be planted, size and spacing of plants and where they are to be planted, requirements for replacement of pest plants with appropriate native species and measures to minimise reinvasion of pest plants and mitigate wildfire risk;

(p) measures for the maintenance of planting, including releasing plants, fertiliser, plant and animal pest control and mulching and replacement of plants which do not survive, and measures for animal and plant pest control;

(q) protective measures proposed to ensure the Significant Ecological Areas (indigenous vegetation) and any proposed revegetation planting remain protected in perpetuity;

(r) details confirming that revegetation planting is only to be carried out contiguous to the Significant Ecological Areas (consisting of indigenous vegetation)

(s) confirmation that the assessment of whether the maintenance of plantings has been achieved shall be undertaken by a suitably qualified independent ecologist according to a quantitative monitoring programme

(2) The location and species composition of the restoration planting is to achieve the following:

(a) provide necessary protection and restoration of the Significant Ecological Areas to ensure its long term viability, health, and significance;

(b) facilitate the use of natural regeneration processes to ensure that in the long term these natural regeneration processes take over;

(c) provide for the protection and restoration of the Significant Ecological Areas and provide robust linkages between ecological features;

(ca) wildfire risk mitigation;

(d) provide a sustainable, potentially significant forest, wetland or shrubland.

(3) The following matters must be implemented prior to a section 224(c) certificate is issued and confirmation is provided:

(a) the establishment of secure stock exclusion that is at least a full seven wire, post and batten fence;

(b) the planting of native vegetation at a density detailed below or at some other density considered more appropriate for the site circumstances by Council:

(i) an average density of 1.4 metre centres (5,100 stems per hectare) reducing to 1 metre centres (10,000 stems per hectare) in kikuyu and wetland and riparian margins;

(ii) sourced from the ecological district and to be appropriate for the soil, aspect, exposure and topography; and

(iii) reflect the composition of former natural vegetation likely to have occupied the site and include appropriate native species that will enable natural processes of succession;

(c) the maintenance of any plantings must occur until the plantings have reached a sufficient maturity to be self-sustaining, and have reached 80 per cent canopy closure. The survival rate must ensure a minimum 90 per cent of the original density and species;

(d) the maintenance of any plantings must include the ongoing replacement of plants that do not survive;

(e) the maintenance of any plantings must ensure that all invasive plant pests are eradicated from the planting site both at the time of planting and on an on-going basis and plants released from kikuyu as necessary to ensure adequate growth; and

(f) the maintenance of any plantings must ensure animal and plant pest control occurs.

(4) The planting plan must be prepared and confirmed by a suitably qualified and experienced person.

Appendix 16 Guideline for native revegetation plantings

16.1. Introduction

These guidelines explain what specific information is needed for native revegetation plantings, why the information is necessary and why Council expects certain actions to be undertaken to ensure planning is successful. When applying to Council for consent to subdivide based on the replanting of native vegetation (see E39 Subdivision - Rural), Council requires the following:

(1) pre-planting site assessment;

(2) planting plan assessment; ~~and~~

(2a) wildfire vegetation risk assessment; and

(3) annual monitoring programme.

16.2. Pre-planting plant assessment

(1) Plants are adapted to survive in specific areas. Not every plant will do well in the same environment. In order to ensure the survival of revegetation planting, it is important that the appropriate plants are selected for the site. There are two aspects to selecting appropriate plants for a site. They are:

(a) sourcing from the Ecological District (i.e. eco-sourcing):
New Zealand has been divided into ecological districts based on the underlying geology, landforms, and soils which affect the plant species found within an area. Within these ecological districts the same plant species often have slight variations, which are adapted to the specific conditions of the area. In order to retain these variations and in essence the genetic diversity, it is important that plants which are sourced in the specific ecological district are used.

(b) appropriate plants for the locality of the planting:
Plants grow best on sites for which they are best adapted. Therefore, in order to ensure the success of a revegetation programme it is important that plants which are used are appropriate to the following:

(i) slope (i.e. steepness affects the species which will survive);

(ii) characteristics of the soil (i.e. certain species do not grow well in certain soils);

(iii) wind (i.e. certain species are not wind tolerant);

(iv) aspect (i.e. direction the slope faces, as this affects the dryness of a slope);

(v) degree of shading (i.e. certain species are light intolerant (i.e. secondary succession plants such as nikau and ferns), whereas others cannot

survive in low light conditions, (i.e. primary succession plants such as manuka and kanuka));

(vi) distance from the coast (i.e. this affects salt spray and wind conditions. Many plants are not tolerant to salt spray and therefore struggle to survive in coastal environments);

(vii) wetness of the site (i.e. many plants either do not grow in wet conditions (e.g. kauri) or only grow in wet soil conditions (e.g. kaihikatea); and

(viii) frost zones (certain species are frost intolerant).

In order for the Council to ensure that appropriate plant species are being selected for planting the Council expects a Pre-planting Plant Assessment with the following information to be provided with each application for native revegetation plantings:

(i) the ecological district of the site;

(ii) the characteristics of the soil (i.e. clay, silt, loam etc.);

(iii) soil drainage;

(iv) topography and aspect of the area to be planted;

(v) exposure of the site to wind, frost, sunlight and salt spray;

(vi) extent of existing bush or native vegetation on the site and its species composition; and

(vii) distance from established bush and the state of the established bush if there is none on the site.

16.2A Wildfire vegetation risk assessment

(1) Human activities cause the majority of wildfires in New Zealand. Therefore, where the proposed vegetation is close to existing or proposed more vulnerable activities and significant ecological areas, it is important that species are selected with a low flammability to mitigate wildfire risk. This applies to the wildfire risk of proposed planting to both more vulnerable activities and significant ecological areas. The following information assists in assessing that risk:

(a) whether there are any more vulnerable activities (including access routes), significant ecological areas or other forest vegetation within 20m of the proposed planting;

(b) the flammability rating of the more prevalent species in the proposed or existing forest vegetation with reference to the flammability ratings of very low, low/moderate, moderate, moderate/high, high or very high (refer to the Fire and Emergency New Zealand Plant Flammability Directory or equivalent) and the distance of that vegetation to the more vulnerable activities;

(c) any other information relevant to wildfire risk;

(d) plans showing the above and contours and waterbodies

16.3. Planting plan assessment

(1) In order to assist Council in establishing whether the planting proposed is adequate a Planting Plan Assessment needs to be produced containing the following information:

(a) the purpose of the planting, which could include: hill country erosion control, stream bank erosion, habitat control, habitat restoration, ecological corridor creation, buffer planting to protect the edges of exiting bush and/or water quality enhancement, and wildfire risk mitigation;

(b) location and extent of planting on a plan;

(c) site preparation for planting, including stock-proof fencing of areas, weed and animal pest control;

(d) site planting, including species to be planted, size of plants and where they are to be planted, density of planting, plant species flammability, sourcing of plants and fertilisers; and

(e) maintenance of planting, including fertiliser, releasing plants, animal and plant pest control, and mulching.

(2) The reasons for the detail required in the Planting Plan Assessment are discussed below under the following headings:

(a) site preparation (including identifying and removing weeds, animal pest control, and stock control);

(b) site planting (including canopy closure and plant spacing, fertiliser, size of plants to be planted, time of planting); and

(c) site maintenance (including mulching and animal and plant pest control).

16.4. Explanation of required information

(1) Site preparation:

(a) many of the areas that are to be replanted have relatively harsh conditions for native plants to grow because of animal pests, stock and weeds and grasses, which compete with the new plants. Therefore, it is important to ensure that the effects of these are minimised. This includes the following:

(i) identifying and removing weeds. Weeds compete with native plants which are planted by reducing moisture and nutrients available. Because the weeds are usually better able to do this than many natives, especially in open and exposed situations, they need to be removed, either manually or with sprays before planting occurs. Continual management needs to occur

after the planting to ensure that the replanting site is not re-infested. Then it is important that canopy closure occurs as soon as possible after planting, as most weed species do not survive in shady conditions. Mulching can have an effective means of suppressing weed growth in the initial phases of the revegetation, reducing the need for weed control;

(ii) animal pest control. Browsers, such as possums, feral goats and feral deer are a large threat to native plantings. Therefore it is important that they are controlled and eliminated to levels where the plantings are not severely affected. In the case of possums this entails eradicating them using bait stations, trapping or shooting. In the case of feral deer and goats this entails fencing the area around the plantings to keep them out or eradicating them. After the planting is established it is important that animal pest control continues in order to ensure the long-term survival of the plants and also so that undergrowth can generate beneath the planted species; and

(iii) stock control. Stock can cause a huge amount of damage to native planting through the browsing of the plants or trampling them. Therefore it is important that the planting area is fenced with a stock proof fence to keep the stock out. The fence needs to be maintained in the long term to prevent stock entering into the area so that under growth regeneration can occur, allowing for a diversity of species to establish.

(2) Site planting:

(a) canopy closure and planting spacing. Once the site preparation has occurred then the plants can be planted. Ensuring canopy closure as quickly as possible is vital. Canopy closure has the following advantages:

(i) many weeds and kikuyu are more easily suppressed and controlled, as they tend to be shade intolerant;

(ii) summer water stress is greatly reduced;

(iii) frost intensity is greatly reduced or eliminated;

(iv) the problems caused by wind are reduced (i.e. wind and cold); and

(v) a closed canopy is more likely to attracted seed eating birds which nest and roost in trees and therefore increases the number of seeds deposited in the floor beneath the trees.

(b) all of the above results in greater species diversity, especially for sensitive plants which require shade and conditions free of extreme conditions such as wind and frost. Plant species are more likely to survive once they germinate as well;

(c) in order for there to be rapid canopy closure the native plants should be planted at a density of 1.4 metre centres (5,100 stems per hectare), except when planting into kikuyu; and

(d) in the case of planting into kikuyu plants should be planted at 1 metre centres (10,000 stems per hectare) to shade out the kikuyu and ensure the long-term survival of the native trees. Canopy closure should occur within 3 years in this situation. Where it can be demonstrated that blanket spraying of the kikuyu with a bio- degradable herbicide prior to planting or suppression by physical means will be an effective means of control and that such control is suitable for use on the subject site, then the density of 1 metre centres (10,000 stems per hectare) might be relaxed to a maximum of 1.4 metre centres (5,100 stems per hectare).

(3) Size of plants:

(a) the size of plants affects their ability to survive when planted out. Very small plants are less likely to survive, as their root system is not well established. Very large plants are also less likely to survive because of the physical conditions of most revegetation sites, including wind and salt exposure, extremes of conditions, drought and damp conditions. Larger plants take longer to establish extensive root system to anchor the plants and to provide nutrients for growth, often resulting in their being toppled over by wind or damaged;

(b) based on the above, the most appropriate sizes for planting out are considered to be root trainers, PB3/4 or PB2s and PB5s.

(4) Fertiliser:

(a) the decision to apply fertiliser, what type and in what quantity, will vary depending on the site. The following are basic considerations:

(i) the application of a suitable fertiliser can proactively assist the native plants to establish, grow quickly and close the canopy, especially in coastal environments or where they are planted into kikuyu. Too much fertiliser however can be toxic to native plants and can lead to poor growth;

(ii) in many cases the ground will already be quite fertile and support good growth. It is worth considering however, that although many areas where native revegetation is occurring have been fertilised in the past for pasture growth, this is not appropriate for native tree establishment as these fertilisers tended to be nitrogen based. Trees require trace elements, minerals and phosphorous based fertilisers;

(iii) certain environments will be adversely affected by the application of fertiliser. Consideration should be given to the proximity of plantings to waterways and riparian areas. In some circumstances there will be good

reason to avoid the application of fertiliser or a particularly cautious approach adopted;

(iv) a conservative method for the application of fertiliser is the use of slow release tablets in each planting hole. The advantage of this method is the utilisation of the soil as a natural filter; and

(v) a cautious approach needs to be applied where fertiliser is to be a side dressing. In particular, the timing of application needs to be considered. Application should coincide with the plants growth spurts during spring and autumn to maximise nutrient uptake and prevent nutrient enrichment of receiving water bodies.

(5) Time of planting:

(a) the timing of the planting is important. Late autumn and winter (i.e. late April to September) are the best months as most native plants are adapted to moist conditions and watering is required at the time of planting. Rainfall is the best means of ensuring adequate watering as it encourages the development of deep roots. Hand or surface watering can encourage the development of surface roots, resulting in the plants being more adversely affected in low rainfall periods;

(b) the disadvantage of planting in winter is the exposure to frost, particularly on level, exposed sites in inland areas. Therefore it is important to use hardier pioneer species to provide shelter before planting more sensitive species; and

(c) mulching greatly increases the chances of survival as it assists in retaining soil moisture by reducing evapotranspiration.

(6) Maintenance planting:

(a) mulching involves spreading permeable material around newly planted trees to:

(i) protect the roots;

(ii) reduce moisture loss from the soil;

(iii) insulate the soil, thus stabilising soil temperatures; and

(iv) suppress weed growth.

(b) mulches can be either organic (e.g. straw, sawdust, bark chip, wood shavings, compost, grass, leaves) or synthetic (e.g. wet paper / cardboard, and tar paper);

(c) mulching greatly increases the chances of survival for plants on dry, open, exposed sites;

(d) the disadvantages of mulch are that they can:

(i) introduce plant diseases or insect pests to the site;

(ii) introduce weed species;

(iii) prevent water from reaching the roots and therefore it is important to wet the soil before applying mulches; and

(iv) increase costs.

(e) certain mulches also can be toxic to plants, such as sawdust and bark chip which need to be well rotted down;

(f) mulches comprising compost and grass clippings should be treated with caution. Unless temperatures high enough to 'cook' the seeds have been reached the mulch has the potential to introduce unwanted weed species to the area; and

(g) cheap mulches should be treated with caution. They have a tendency to rob the soil of nitrogen, stunting adjacent plant growth unless compensated for with fertiliser application.

(7) Weed control and animal control:

(a) this involves the ongoing plant and animal pest control to ensure the survival of the planting.

16.5. Monitoring Programme:

(1) Monitoring needs to be undertaken for five years, as it takes between 3-5 years before native replanting are well established and their certainty of survival is assured. The following needs to be monitored:

(a) survival rates: this is because the council requires a 90 per cent survival rate which is thought appropriate to ensure that the replanting will become ecologically viable;

(b) size of plants: this is an indication of the health of the plantings. The greater the growth, the healthier the planting and therefore the more likely a planting is to survive; and

(c) canopy closure: if a planting is healthy, canopy closure should occur at year three, although it can take to year five if the conditions of the site are particularly harsh. Therefore, this is an important indication of the health of the planting.

(2) Replacement of plants which do not survive is important to ensure that gaps are not created which could allow weeds to enter the planting and to ensure that there is an adequate canopy cover in the long term.

Appendix 17 Documents incorporated by reference

An indicative list of documents incorporated by reference into the Plan is set out below. Documents are listed under the heading of the section they are found in. References to Acts of parliament and national policy statements are not included.

B1 Issues

The Local Government (Auckland Regional Parks) Order 2008

National Code of Practice for Utility Operators' Access to Transport Corridors under the Utilities Access Act 2010

New Zealand Code of Practice for Electrical Safe Distances 2001 under the Electricity Act 1992

Auckland Plan under the Local Government (Auckland Council) Act 2009

Long-term Plan under the Local Government Act 2002

Regional Land Transport Plan under the Land Transport Management Act 2003

B3 Infrastructure, transport and energy

Regional Land Transport Plan made under the Land Transport Management Act 2003

B10 Environmental risk

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Wellington, Ministry for the Environment (2011)

D1 High-use Aquifer Management Areas Overlay

Geology of the Auckland Area, 1:250,000 Geological Map 3, Institute of Geological and Nuclear Sciences, Edbrooke (2001)

D12 Waitākere Ranges Heritage Area Overlay

Auckland Council Trading and Events in Public Places Bylaw 2015

D17 Historic Heritage Overlay

New Zealand Heritage List/Rārangi Kōrero

D24 Aircraft Noise Overlay

Part G4 of the New Zealand Building Code

New Zealand Standard on Ventilation for Acceptable Indoor Air Quality (NZS 4303:1990)

D25 City Centre Port Noise Overlay

New Zealand Standard on Acoustics - Measurement of environmental sound (NZS 6801: 2008)

New Zealand Standard on Acoustics - environmental noise (NZS 6802: 2008).

D26 National Grid Corridor Overlay

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E1 Water quality and integrated management

New Zealand Macroinvertebrate Working Group Report No. 1, Stark, J.D. et al., Prepared for the Ministry for the Environment 2001

E2 Water quantity, allocation and use

New Zealand Building Code

New Zealand Standard on the Environmental Standard for Drilling of Soil and Rock (NZS 4411:2001)

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Good Practice Biodiversity Offsetting in New Zealand, New Zealand Government et al, August 2014

Auckland Council Navigational Safety Bylaw 2014

Auckland Council Technical Publication 108

Guideline for stormwater runoff modelling in the Auckland Region, April 1999

Farm Technical Manual – Lincoln University; Fleming, P. (Ed.); 2011

E3 Lakes, rivers, streams and wetlands

Auckland Council Technical Report 2011/009: Stream Ecological Valuation (SEV): a method for assessing the ecological functions of Auckland Streams (October 2011)

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Farm Technical Manual – Lincoln University; Fleming, P. (Ed.); 2011

E4 Other discharges of contaminants

Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC 2000 Guidelines)

E5 On-site and small scale wastewater treatment and disposal

Technical Publication 58 On-site Wastewater Systems: Design and Management Manual 2004

E6 Wastewater network management

Drinking-water Standards for New Zealand 2005 (revised 2008)

E7 Taking, using, damming and diversion of water and drilling

Dam Safety Guidelines – Auckland Council Technical Publication 109

New Zealand Dam Safety Guidelines – New Zealand Society of Large Dams 2000

NZS 4411:2001 Environmental Standard for Drilling of Soil and Rock

New Zealand Building Code

E9 Stormwater quality - High contaminant generating car parks and high use roads

'Guidance Document 2017/001 Stormwater Management Devices in the Auckland Region (GD01) December 2017'

E11 Land disturbance - Regional

Resource Management (National Environmental Standards for Electricity Transmission Activities) Regulations 2009

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'Guidance Document 2016/005 Erosion and Sediment Control Guideline for Land Disturbing Activities (GD05)'

Erosion and Sediment Control Guidelines for Vegetable Production Horticulture New Zealand (June 2014)

E12 Land disturbance - District

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New Zealand Electrical Code of Practice for Electrical Safe Distances NZECP34:2001

Auckland Council's Code of Practice for Land Development and Subdivision

E13 Cleanfills, managed fills and landfills

Australian and New Zealand Environment and Conservation Council Guidelines for Fresh and Marine Water Quality 2000

E14 Air quality

Resource Management (National Environmental Standards for Air Quality) Regulations 2004

NSW Environment Protection Agency Guidelines for estimating Chimney Heights for small and medium sized Fuel Burning Equipment February 1993

E15 Vegetation management and biodiversity

Auckland Council District Plan – Hauraki Gulf Islands section

Auckland Council's Code of Practice for Land Development and Subdivision

E17 Trees in roads

Electricity (Hazards from Trees) Regulations 2003

E23 Signs

Auckland Transport/Auckland Council Signage Bylaw 2015

Auckland Transport Elections Signs Bylaw 2013

Austroads Guide to Road Design

Australian Standards AS 4282 - 1997 (Control of the Obtrusive Effects of Outdoor Lighting)

E24 Lighting

Standard AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting

CIE 150:2003 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations – International Commission on Illumination ISBN 3 901 906 19 3

PC 79 (see Modifications)

[new text to be inserted]

E25 Noise and vibration

NZS 6801:2008 Measurement of environmental sound

NZS 6802:2008 Acoustics - Environmental noise

NZS 6803:1999 Acoustics – Construction noise

NZS 6808: 2010 Acoustics – Wind farm noise

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NZS 6806: 2010 Acoustics – Road traffic noise

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BS EN 15251:2007 – Indoor environmental input parameters for design and assessment of energy performance of buildings

E26 Infrastructure

National Code of Practice for Utility Operators' Access to Transport Corridors

Resource Management (National Environmental Standards for Electricity Transmission Activities "NESETA") Regulations 2009

Resource Management (National Environmental Standards for Telecommunication Facilities "NESTF") Regulations ~~2008~~ 2016

Resource Management (National Environmental Standards for Freshwater) Regulations 2020

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World Health Organisation monograph Environmental Health Criteria (No 238, June 2007)

New Zealand Standard for Radiofrequency Fields Part 1: Maximum Exposure Levels 3 kHz to 300GHz (NZS 2772.1: 1999)

E27 Transport

Regional Land Transport Plan

New Zealand Building Code D1/AS1 New Zealand Standard for Design for Access and Mobility – Buildings and Associated Facilities (NZS: 4121-2001)

New Zealand Standard for Off-Street Parking - Parking Facilities Part 1: Off-Street Car Parking (AS/NZS 2890.1 2004)

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[new text to be inserted]

E30 Contaminated land

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011

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Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Ministry for the Environment (Revised 2011)

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E32 Biosolids

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E33 Industrial and trade activities

Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand, Ministry for the Environment, December 1998

Stormwater Management Devices: Design Guidelines Manual second edition, May 2003, Auckland Council Technical Publication 10

Hazardous Substances (Emergency Management) Regulations 2001

E34 Agrichemicals and vertebrate toxic agents

New Zealand Standard - Management of Agrichemicals (NZS 8409: 2004)

E35 Rural production discharges

Dairy Effluent Storage Calculator for the Auckland Region 2012

The Fertiliser Association of New Zealand's Code of Practice for Nutrient Management (2013)

A Code of Practice for The Management of Greenhouse Nutrient Discharges Horticulture New Zealand (June 2007)

Resource Management (Exemption) Regulations 2017 - Schedule 2 Conditions on exemptions

E36 Natural hazards and flooding

~~National Rural Fire Authority New Zealand Wildfire Threat Analysis~~

New Zealand Electrical Code of Practice for Electrical Safe Distances NZECP 34:2001

Auckland Council's Code of Practice for Land Development and Subdivision

Auckland Council Guidance Document 15: Climate change scenarios (GD15) November 2024

E38 Subdivision – Urban

NZ Fire Service Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2008

Auckland Council's Code of Practice for Land Development and Subdivision

Auckland Council Guidance Document 15: Climate change scenarios (GD15) November 2024

E39 Subdivision – Rural

NZ Fire Service Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2008

Auckland Council's Code of Practice for Land Development and Subdivision

Auckland Council Guidance Document 15: Climate change scenarios (GD15) November 2024

E40 Temporary activities

New Zealand Standard on Acoustics – Construction Noise (NZS 6803:1999)

H4 Residential – Mixed Housing Suburban Zone

Auckland Council Solid Waste Calculator (Taken from the Auckland Design Manual, specifically the spreadsheet 'Multi-unit Development Waste Space Calculator V3R2 Beta.xlsx')

H5 Residential – Mixed Housing Urban Zone

Auckland Council Solid Waste Calculator (Taken from the Auckland Design Manual, specifically the spreadsheet 'Multi-unit Development Waste Space Calculator V3R2 Beta.xlsx')

H6 Residential – Terrace Housing and Apartment Buildings Zone

Auckland Council Solid Waste Calculator (Taken from the Auckland Design Manual, specifically the spreadsheet 'Multi-unit Development Waste Space Calculator V3R2 Beta.xlsx')

H28 Special Purpose - Quarry Zone

Australian Standard AS 2187 2006

German standard DIN 4150-3 1999: Structural vibration - Part 3

I101 Motorsport Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

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IEC 6511979, Type 2 or better (IEC - International Electrotechnical Commission)

Auckland Transport Code of Practice

I102 Rowing and Paddling Precinct

Navigation Safety Bylaw 2014

I201 Britomart Precinct

Britomart Precinct Urban Design Guidelines - Chapter 4 Buildings

I208 Port Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008).

I211 Viaduct Harbour Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008).

I214 Wynyard Precinct

NZ Building Code

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008).

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I300 Alexandra Park Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

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Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

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I301 ASB Showgrounds Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I302 ASB Tennis Arena Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I304 Auckland Zoo Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I307 Avondale Racecourse Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I310 Eden Park Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I313 Ellerslie Racecourse Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I318 Monte Cecilia Precinct

Pah Farm Conservation Plan

I319 MOTAT Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I321 Mount Smart Stadium Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I322 Mount Wellington 5 Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

I327 Ōrakei 2 Precinct

Whenua Rangatira Reserve Management Plan

Ngāti Whātua Iwi Management Plan 2012

I328 Ōrakei Point Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

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NZS 4121:2001 Design for access and mobility: buildings and associated facilities

ARTA Guidance Note for Cycle Parking Facilities 2007

ANSI A300 Pruning Standards

Trees and Development: A Technical Guide to Preservation of Trees During Land Development". (Champaign IL: International Society of Arboricultural. Matheny, N., & Clark J.R, (1998))

I335 Western Springs Stadium Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I400 Ardmore 3 Precinct

International Civil Aviation Organization standard for a Type A obstruction light

I402 Auckland Airport Precinct

Auckland Council Technical Publication 90 Erosion and Sediment Control Guideline for Land Disturbing Activities in the Auckland Region

I405 Big Bay Precinct

British Standards BS5252 – standard specification colour ranges

I407 Bruce Pulman Park Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I408 Clevedon Precinct

NZS HB8630:2004 – Design of Walking Tracks

I409 Clevedon Waterways Precinct

NZ Fire Service Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2008

I410 Drury South Industrial Precinct

New Zealand Standard NZS6806:2010 "Acoustics – Road Traffic Noise – New and Altered Roads

I411 ECOLight Stadium Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I413 Franklin A&P Showgrounds Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I414 Franklin Trotting Club Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I415 Glenbrook Steel Mill Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

I418 Kingseat Precinct

TP 10 – Stormwater Management Devices: Design Guidelines Manual (May 2003)

ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value

Auckland Transport Code of Practice

I426 Matingarahi Precinct

British Standards BS5252 – standard specification colour ranges

I427 Pacific Events Centre Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I430 Patumahoe Precinct

Patumahoe Integrated Catchment Management Plan

I432 Puhinui Precinct

NZTA Code of Practise for Temporary Traffic Management

I434 Pukekohe Park Precinct

Land Transport Rule – Vehicle Equipment Amendment 2007 (Rule 32017/2)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I438 Takanini Precinct

New Zealand Standard NZS6802:1991 “Assessment of Environmental Sound

New Zealand Building Code

Catchment Management Plan

I439 Waiuku Precinct

Health and Safety in Employment (Pipelines) Regulations 1999

Standard NZ/AS2885 Pipelines– Gas and Liquid petroleum

I441 Whitford Precinct

Electricity (Hazards from Trees) Regulations 2003

Whitford Precinct guidelines for native revegetation planting

I442 Whitford Village Precinct

Whitford Integrated Catchment Management Plan

New Zealand Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2003

Whitford Village Design Guidelines

New Zealand Tracks and Outdoor Visitor Structures Standard (SNZ)

I503 AUT Millennium Institute of Sport Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I511 Hatfields Precinct

New Zealand Cycle Trail Design Guide (prepared for MBIE), February 2015 (4th Edition)

I513 Kaipara Flats Airfield Precinct

New Zealand Standard on Airport Noise Management and Land Use (NZS6805:1992)

FAA Integrated Noise Model (INM)

New Zealand aeronautical information publication – Visual Flight Guide, dated June 2011

I524 North Harbour Stadium and Domain Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I525 North Shore Airport Precinct

New Zealand Standard on Airport Noise Management and Land Use (NZS6805:1992)

FAA Integrated Noise Model (INM)

New Zealand aeronautical information publication – Visual Flight Guide, dated June 2011

I526 North Shore Events Centre Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

I535 Rodney Landscape Precinct

BS5252 standard colour palette

I537 Silverdale 3 Precinct

Council's Standards for Engineering Design

Auckland Transport's Code of Practice

I539 Smales 2 Precinct

2013 Integrated Transport Assessment

I547 Wēiti Precinct

SNZ HB8630:2004 for Walking Tracks (1 January 2004)

I603 Hobsonville Corridor Precinct

Auckland Council Technical Publication 10: Design Guideline Manual for Stormwater Treatment Devices (2003)

I605 Hobsonville Point Precinct

New Zealand Building Code

Energy Efficiency and Conservation Authority Water Heating Assessment Tool

Water Efficiency Labelling Scheme

I606 Lincoln Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

I610 Redhills Precinct

New Zealand Electrical Code of Practice for Electrical Safe Distances NZECP34:2001

I613 Trusts Arena Precinct

New Zealand Standard on Acoustics - Measurement of Environmental Sound (NZS 6801:2008)

New Zealand Standard on Acoustics – Environmental Noise (NZS 6802:2008)

Standard AS 4282-1997 (Control of the Obtrusive Effects of Outdoor Lighting)

CIE 150:2003 (Guide on the limitation of the effects of obtrusive light from outdoor lighting installations) – International Commission on Illumination ISBN 3 901 906 19 3

1615 Westgate Precinct

Totara Integrated Catchment Management Plan

J1 Definitions

NESETA National Environmental Standards for Electricity Transmission Activities

NESTF National Environmental Standards for Telecommunication Facilities

NZECP 34:2001 New Zealand Electrical Code of Practice for Electrical Safe Distances

Auckland Transport Auckland Council Signage Bylaw 2015

Auckland Transport Election Signs Bylaw 2013

New Zealand Building Code for residential buildings

Contaminated Land Management Guidelines No.5 Site investigation and Analysis of Soils Wellington Ministry for the Environment (2011)

Contaminated Land Management Guidelines No.1 Reporting on Contaminated Sites in New Zealand Wellington Ministry for the Environment (2011)

New Zealand Land Resource Inventory (NZLRI)

GNS Sciences Qmaps

Geology of Auckland (compiled by Edbrooke for IGNS 2001)

Land Use Capability Survey Handbook 3rd Edition 2009

New Zealand Standard 6801:2008 Acoustics - Measurement of environmental sound

New Zealand Standard 6802:2008 Acoustics - Environmental noise

Auckland Regional Plant Pest Strategy

Department of Conservation Pest Plants List

National Pest Plant Accord Under the Biosecurity Act 1993

Food Hygiene Regulations 1974

Landslide Planning Guidance: Reducing Landslide Risk through Land-Use Planning GNS Science (January 2024)

Technical Report 2025/7 Auckland Region Landslide Susceptibility Assessment May 2025

Earth Sciences New Zealand Geological Map of New Zealand Collection

Natural Hazards Commission Claims Map

Earth Sciences New Zealand New Zealand Landslide Database

Appendix 1 Structure plan guidelines

The Auckland Plan

Regional Land Transport Plan

Auckland Transport's Integrated Transport Programme

Watercare's Asset Management Plan

Auckland Council's Parks and Open Space Strategy Action Plan

Auckland Council's Auckland Design Manual

Auckland Council's Code of Practice for Land Development and Subdivision

Appendix 8 Biodiversity offsetting

New Zealand government Guidance on Good Practice Biodiversity Offsetting in New Zealand, New Zealand Government et al, August 2014

Appendix 15 Subdivision information and process

Auckland Council's current Regional Pest Management Strategy

Appendix 18 Qualifications required for the application of agrichemicals and vertebrate toxic agents

New Zealand Standard - Management of Agrichemicals (NZS 8409:2004)

Appendix 24 Landslide hazard risk assessment methodology

Auckland Council Guidance Document 15: Climate change scenarios (GD15) November 2024

Guidelines for the development and application of engineering geological models on projects International Association of Engineering Geology and the Environment Commission (2024)

Guidelines for natural hazard risk analysis on public conservation lands and waters – Part 3: analysing landslide risk to point and linear sites GNS Science (2024/37), 2024

Earth Sciences New Zealand Geological Map of New Zealand Collection

Natural Hazards Commission Claims Map

Earth Sciences New Zealand New Zealand Landslide Database

Immediate legal effect under s86B(3)(f) RMA

Appendix 24 - Landslide hazard risk assessment methodology

Introduction

This landslide hazard risk assessment methodology is intended for use by suitably qualified and experienced practitioners undertaking landslide risk assessments for land use and land use changes in a resource management planning context (hereon referred to as the 'landslide hazard risk assessment area').

For the benefit of land use planners and others who need to understand the process described in this Appendix, the process is summarised in the flowchart below (Figure 1), which is a simplification of the more detailed process shown later in the Appendix.

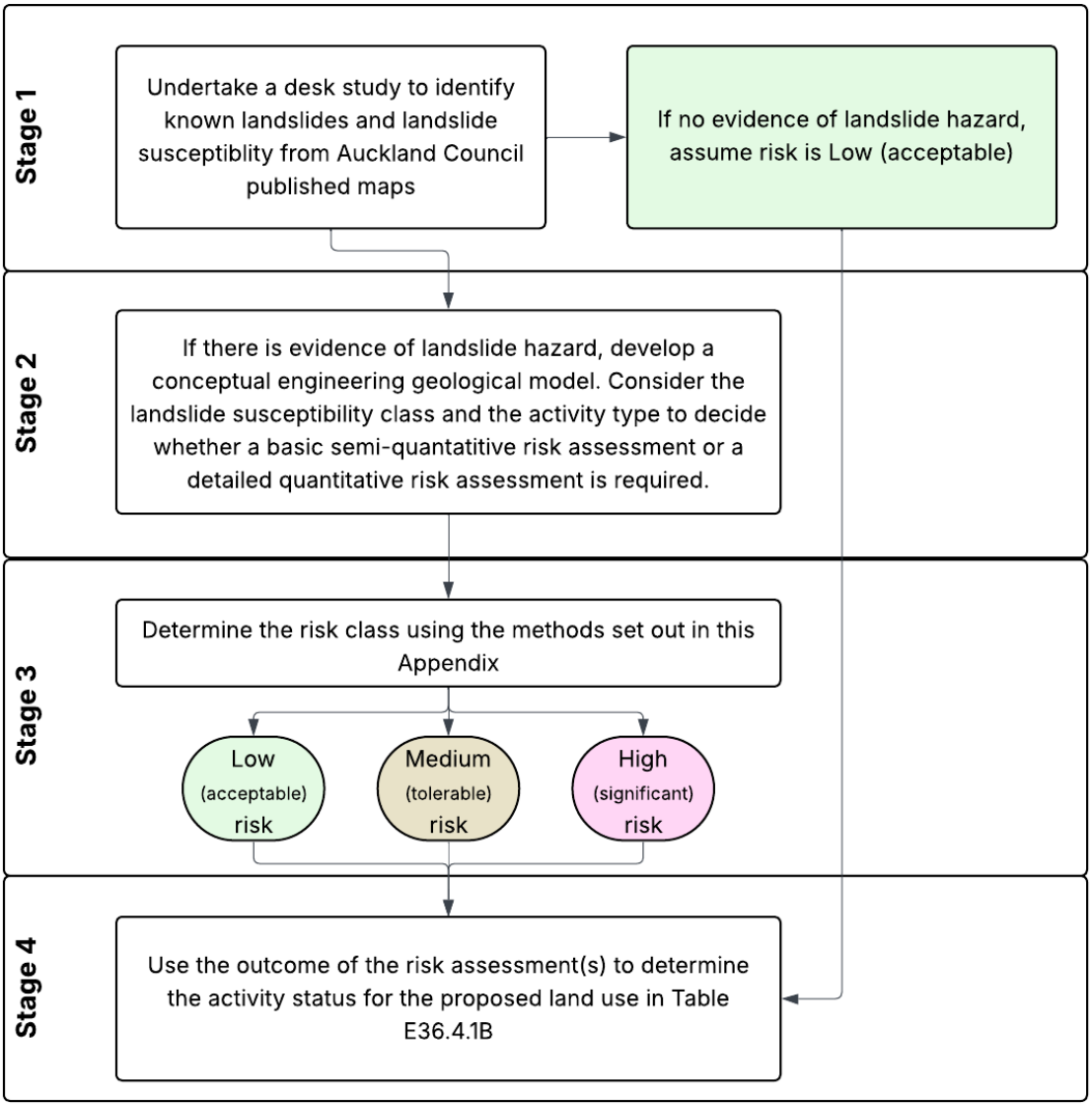

Figure 1 Simplified landslide risk assessment process

Appendix 24 - Landslide hazard risk assessment methodology

Immediate legal effect under s86B(3)(f) RMA

The process follows four stages:

1. **Stage 1** - A desk study assessment to identify if there is any evidence of landslide hazard that could affect the site(s) and proposed land use
2. **Stage 2** - Selection of an appropriate risk assessment methodology, which is a function of the potential severity of the landslide hazard and the potential sensitivity of the proposed land use
3. **Stage 3** - Risk assessment
4. **Stage 4** - Use of the assessed risk to determine the activity status for the proposed land use in Table E36.4.1B.

The methods used assess and classify the risk level associated with a proposed land use activity or land use change within mapped landslide susceptibility areas.

Immediate legal effect under s86B(3)(f) RMA

Process overview

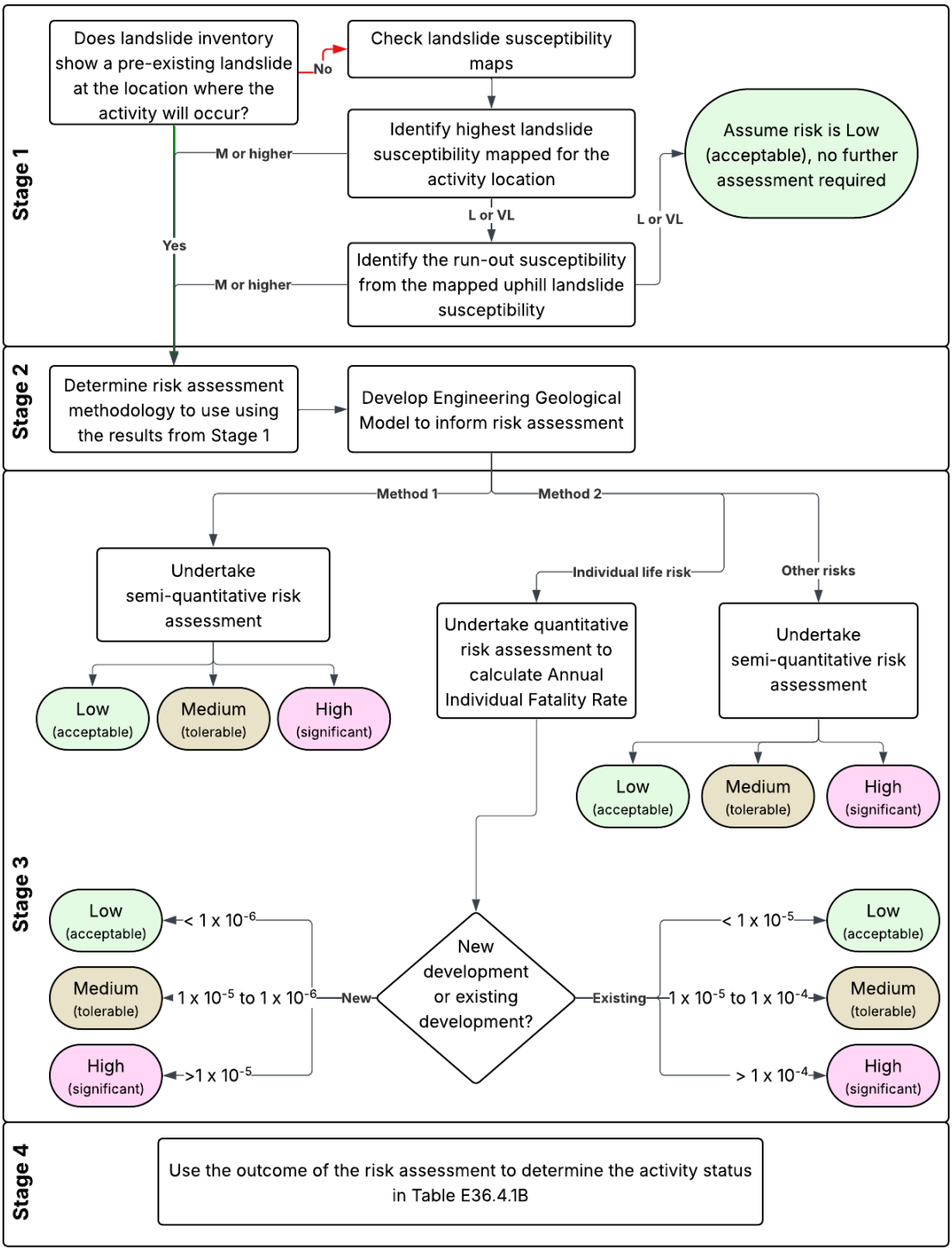

Figure 2 Detailed process map

Figure 2 shows a more detailed explanation of the stages required for a landslide risk assessment undertaken for the purposes of land use planning in Auckland.

Immediate legal effect under s86B(3)(f) RMA

Stage 1 – Desk study hazard assessment

The initial desk study identifies if there is evidence of a landslide hazard that could affect the site, or the location in which an activity is proposed. This is an initial triage to inform the decision about which risk assessment method is most appropriate.

Stage 1 requires the following steps to be undertaken:

(1.1) Review published Landslide Inventories. Mapped landslides can be found on Auckland Councils GeoMaps portal under the Natural Hazards Theme. Other evidence of the presence of landslides should also be used where available. These may include information in the property file, on the Natural Hazards Commission claims portal, the Earth Sciences New Zealand Landslide Database, Earth Sciences New Zealand Geological Maps or other sources of information.

(1.2) If there is a landslide shown on a Landslide Inventory, assess the activity of the landslide (i.e. the likely date of its most recent movement). This will involve reviewing information from the sources listed in 1.1, and if these are inconclusive making an assessment based on the geomorphology[1]. If the landslide is more likely than not to have been active in the last 1,000 years, move to Stage 2. If the evidence indicates that it is not likely to have been active in the last 1,000 years, move on to Stage 1.3.

(1.3) Review Landslide Susceptibility maps for landslide susceptibility at the site. Mapped susceptibility areas can be found on Auckland Councils GeoMaps portal under the Natural Hazards Theme. Identify the highest landslide susceptibility class mapped for the site.

(1.4) Review Auckland Council Landslide Susceptibility maps (deep-seated landslides and shallow landslides) for susceptibility to landslide run-out. Mapped susceptibility areas can be found on Auckland Councils GeoMaps portal under the Natural Hazards Theme. Where these maps do not explicitly include run-out as part of the modelled susceptibility class, identify the highest landslide susceptibility class mapped within 150 m of the site in any direction from which debris could reach the site (i.e. directly uphill from the site, including along gully paths). See Figure 3 for an example.

(1.5) If there is a Medium, High or Very High susceptibility at the site, or if there is a Medium, High or Very High susceptibility area identified in the run-out check, move to Stage 2.

[1] An example of a geomorphological approach is presented in Bell, R et al (2012) DOI:10.1111/j.1468-0459.2012.00454.x : https://homepage.univie.ac.at/thomas.glade/Publications/BellEtAl2012.pdf

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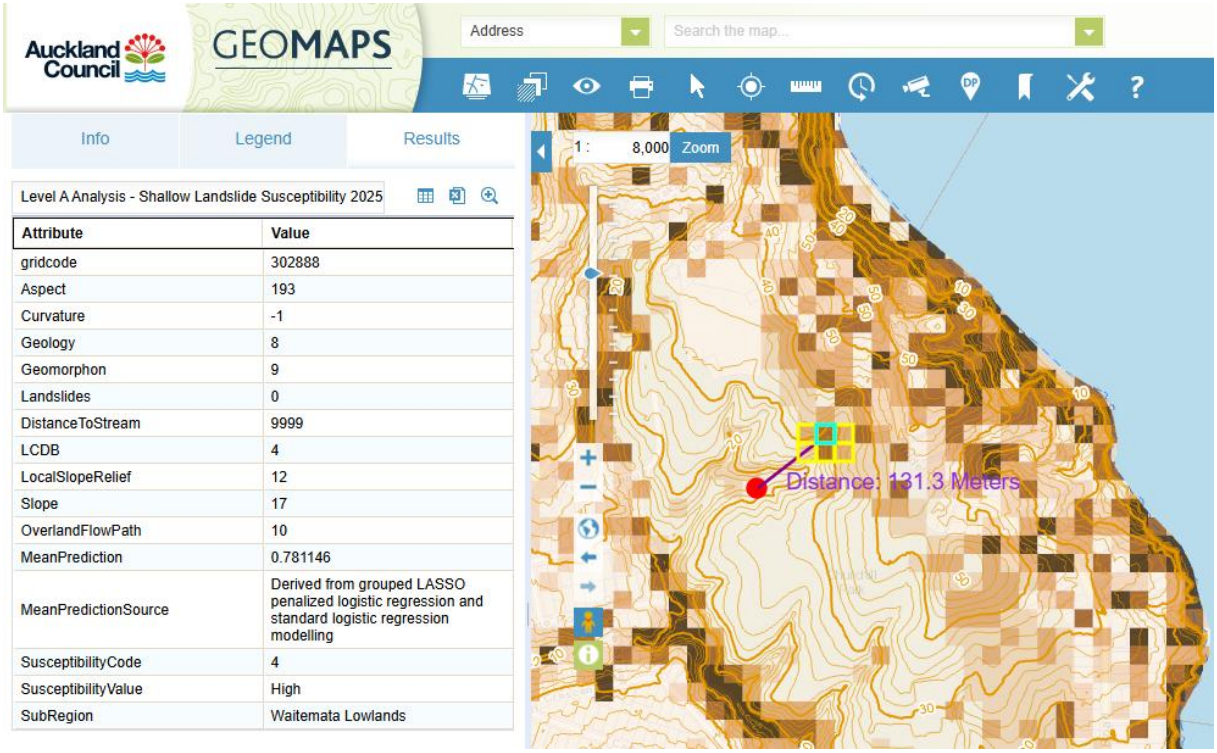

Figure 3 Example of runout assessment. Site (red dot) has low landslide susceptibility but there is a high landslide susceptibility area 131 m in an uphill direction. Therefore the run-out susceptibility is High.

Stage 2 – Risk assessment method selection

Stage 2 takes the findings of the desk study and uses these, in conjunction with details of the proposed land use activity or proposed land use change, to determine the appropriate landslide risk assessment method to use.

Stage 2 requires the following steps to be undertaken:

(2.1) Determine the appropriate risk assessment methodology using the results from Stage 1. The initial method used will be a function of the susceptibility of the land, and the type of land use activity or land use change being proposed which apply within the landslide hazard risk assessment area and influence associated risk assessment parameters. Use Table 1 (land use activity) and/or Table 2 (land use change) to identify the appropriate methodology. For the purposes of this assessment "ancient" means likely not active within the last 1,000 years, and "recent" means likely active within the last 1,000 years. Where there is a mapped landslide, this supersedes the mapped susceptibility.

Land use activity	Landslide susceptibility class from Auckland Council published landslide susceptibility and landslide inventory maps				
	Mapped landslide		VH	H	M
	Recent	Ancient			
Activities sensitive to natural hazards	2	1	2	2	1
Subdivision	2	1	2	2	1

Immediate legal effect under s86B(3)(f) RMA

Land use activity	Landslide susceptibility class from Auckland Council published landslide susceptibility and landslide inventory maps				
	Mapped landslide		VH	H	M
	Recent	Ancient			
Activities potentially sensitive to natural hazards	2	1	1	1	1
Activities less sensitive to natural hazards	1	1	1	1	N/A
On-site septic tanks, wastewater treatment and disposal systems, effluent disposal fields, underground storage tanks, water tanks (including rainwater tanks) or stormwater pipes or soakage fields, accessways and private roads	2	1	2	2	1
Re-building of materially damaged or destroyed buildings	2	1	2	2	2
Storage of hazardous substances	2	1	1	1	1
Earthworks	1	1	1	1	1
Vegetation alteration or removal	1	1	1	1	1
Discharge of stormwater and/or wastewater directly to ground	1	1	1	1	1

Table 1 - Initial method (1 or 2) to be used to assess landslide risk for each combination of mapped landslide susceptibility and land use activity . Where the method shown is N/A, no further risk assessment is required and the risk can be taken as Low.

Land use changes	Landslide susceptibility class from Auckland Council published landslide susceptibility and landslide inventory maps				
	Mapped landslide		VH	H	M
	Recent	Ancient			
Plan Change proposal to residential zoning (not including large-lot and rural and coastal settlements)	2	1	2	2	1
Plan change proposal to rural (countryside living, Waitakere Ranges and foothills), business, future urban or residential (large lot and rural and coastal settlements) zoning	1	1	1	1	N/A
Plan change proposal to rural (rural production, mixed rural, rural conservation and rural coastal) and open space zoning	1	1	1	N/A	N/A

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Table 2 - Initial method (1 or 2) to be used to assess landslide risk for each combination of mapped landslide susceptibility and land use change. Where the method shown is N/A, no further risk assessment is required and the risk can be taken as Low.

Note 1 - Applicants can choose to use a more comprehensive method than the minimum given in Table 1or Table 2 to provide a more robust level of analysis and greater certainty of risk level; in some cases this may achieve a preferred outcome (e.g. a lower risk class).

(2.2) Develop an Engineering Geological Model[2] for the landslide hazard risk assessment area, incorporating the information gathered in the Desk Study (Stage 1) and any other relevant information, to develop credible landslide hazard scenarios to inform the risk assessment process.

Stage 3 Overview

For Stage 3 and in relation to the landslide hazard risk assessment area, the risk will be assessed:

- semi-quantitatively (for planning applications with lower anticipated landslide risk significance) using Method 1
- both semi-quantitatively and quantitatively (for planning applications with higher anticipated landslide risk significance) using Method 2

Stage 3 - Method 1

(3.1.1) Use the Engineering Geological Model to identify three landslide hazard scenarios. These should represent a high likelihood, median likelihood, and the maximum credible event, using the best available information.

(3.1.2) Use the likelihood table (Table) to assign a likelihood category to each landslide hazard scenario. The likelihood assessment shall include consideration of the effect of climate change and should use the Shared Socio-Economic Pathway (SSP) scenario SSP5-8.5 presented in Auckland Council Guidance Document 15:Climate Change Scenarios(GD15) November 2024 and any subsequent replacement or revisions of this document..

(3.1.3) Use the applicable consequences table (Table 4 or Table , depending on the size of the proposed landslide hazard risk assessment area) to assess the consequences for each of the three landslide hazard scenarios by selecting the highest applicable consequence category for every relevant assessment category.

Note 2 - Where the consequence category descriptions are not directly applicable to the proposed development or scenario, it is acceptable to develop equivalent category descriptions that are similar in relation to the overall risk level being described.

(3.1.4) Assess the risk classification for each landslide hazard scenario using Table 6 to combine the likelihood category of the scenario and the highest consequence category

[2] The model should be consistent with the methods and approaches described in the International Association of Engineering Geology and the Environment Commission 25 report (Baynes & Parry, 2024). https://iaeg.info/c25egmguidelines/

Immediate legal effect under s86B(3)(f) RMA

assessed for that scenario to identify its risk classification. The landslide hazard scenario with the highest risk classification level shall be carried through to Stage 4.

Likelihood category	**Likelihood descriptor**	**Indicative value of approximate annual probability**		**Equivalent AEP**
Almost certain	The event is expected to occur over the likely duration of the activity	10^{-1}	1 in 10	10%
Likely	The event will probably occur under adverse conditions over the likely duration of the activity	10^{-2}	1 in 100	1%
Possible	The event could occur under adverse conditions over the likely duration of the activity	10^{-3}	1 in 1000	0.1%
Unlikely	The event might occur under very adverse circumstances over the likely duration of the activity	10^{-4}	1 in 10,000	0.01%
Rare	The event is conceivable but only under exceptional circumstances over the likely duration of the activity	10^{-5}	1 in 100,000	0.001%
Barely credible	The event is inconceivable or fanciful over the likely duration of the activity	10^{-6}	1 in 1,000,000	0.0001%

Table 3 - Likelihood categories (in case of any contradiction between the likelihood descriptor and the numerical values of probability or AEP, the written descriptor takes precedence)

Appendix 24 - Landslide hazard risk assessment methodology

Consequence table for a landslide hazard risk assessment area of 5ha or greater

		Assessment category				
		Human safety	**Lifeline utilities**	**Critical buildings**	**Community buildings**	**Buildings accommodating activities sensitive to natural hazards or potentially sensitive to natural hazards (not including critical buildings or community buildings)**
Consequence category	**Catastrophic**	>10 dead and/or >1000 injured	Out of service for > 1 month (affecting ≥20% of the town/city population) OR suburb out of service for > 6 months (affecting < 20% of the town/city population)	Building unusable for >1 week	Building unusable for more than 1 month	N/A
	Major	1-10 dead and/or 101-1000 injured	Out of service for 1 week – 1 month (affecting ≥20% of the town/city population) OR suburb out of service for 6 weeks to 6 months (affecting < 20% of the town/city population)	Evacuation of building required and/or building unusable for 1 week or less	Building unusable for 1 week to 1 month	More than 10 buildings unusable for more than 1 month OR More than 100 buildings evacuated

Appendix 24 - Landslide hazard risk assessment methodology

Immediate legal effect under s86B(3)(f) RMA

		Assessment category				
		Human safety	**Lifeline utilities**	**Critical buildings**	**Community buildings**	**Buildings accommodating activities sensitive to natural hazards or potentially sensitive to natural hazards (not including critical buildings or community buildings)**
	Medium	0 dead, 11-100 injured	Out of service for 1 day to 1 week (affecting ≥20% of the town/city population) OR suburb out of service for 1 week to 6 weeks (affecting < 20% of the town/city population)	Building in landslide hazard risk assessment area but useability not affected	Evacuation of building required and/or building unusable for 1 week or less	Fewer than 10 buildings unusable for more than 1 month OR More than 10 buildings evacuated
	Minor	0 dead, 1-10 injured	Out of service for 2 hours to 1 day (affecting ≥20% of the town/city population) OR suburb out of service for 1 day to 1 week (affecting < 20% of the town/city population	N/A	Building in landslide hazard risk assessment area but useability not affected	Evacuation of 10 or fewer buildings required and/or 1 building unusable for 1 week or less

Appendix 24 - Landslide hazard risk assessment methodology

Immediate legal effect under s86B(3)(f) RMA

		Assessment category				
		Human safety	**Lifeline utilities**	**Critical buildings**	**Community buildings**	**Buildings accommodating activities sensitive to natural hazards or potentially sensitive to natural hazards (not including critical buildings or community buildings)**
	Insignificant	0 dead, 0 injured	Out of service for up to 2 hours (affecting ≥20% of the town/city population) OR suburbs out of service for up to 1 day (affecting < 20% of the town/city population	Building outside landslide hazard risk assessment area and useability not affected	Building outside landslide hazard risk assessment area and useability not affected	Building useability not affected

Table 4 - Consequence table for a landslide assessment area of 5ha or greater

Consequence table for a landslide hazard assessment area less than 5ha

Immediate legal effect under s86B(3)(f) RMA

		Assessment category			
		Human safety	**Critical buildings**	**Community buildings**	**Buildings accommodating activities sensitive or potentially sensitive to natural hazards (not including critical buildings or community buildings)**
Consequence category	**Catastrophic**	>10 dead and/or >1000 injured	Building unusable for >1 week	Building unusable for more than 1 month	Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage.
	Major	1-10 dead and/or 101-1000 injured	Evacuation of building required and/or building unusable for 1 week or less	Building unusable for 1 week to 1 month	Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage.
	Medium	0 dead, 11-100 injured	Building in landslide hazard risk assessment area but useability not affected	Evacuation of building required and/or building unusable for 1 week or less	Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage.
	Minor	0 dead, 1-10 injured	N/A	Building in landslide hazard risk assessment area but useability not affected	Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.
	Insignificant	0 dead, 0 injured	Building outside landslide hazard risk assessment area and useability not affected	Building outside landslide hazard risk assessment area and useability not affected	Little damage.

Table 5 - Consequence table for a landslide hazard assessment area of less than 5ha

NB for the purpose of Tables 4-5:

Immediate legal effect under s86B(3)(f) RMA

• the term "Critical buildings" means buildings which have a post-disaster function and includes emergency services, hospitals and healthcare facilities.
• the term "Community buildings" means community facilities, correction facilities and educational facilities.
• the terms "Activities sensitive to natural hazards" and "Activities potentially sensitive to natural hazards" are defined in Chapter J of the Auckland Unitary Plan.

Risk classification table:

		Consequence category				
		Insignificant	**Minor**	**Medium**	**Major**	**Catastrophic**
Likelihood category	**Almost certain**	Medium (tolerable)	High (significant)	High (significant)	High (significant)	High (significant)
	Likely	Low (acceptable)	Medium (tolerable)	High (significant)	High (significant)	High (significant)
	Possible	Low (acceptable)	Low (acceptable)	Medium (tolerable)	High (significant)	High (significant)
	Unlikely	Low (acceptable)	Low (acceptable)	Low (acceptable)	Medium (tolerable)	High (significant)
	Rare	Low (acceptable)	Low (acceptable)	Low (acceptable)	Low (acceptable)	Medium (tolerable)
	Barely credible	Low (acceptable)	Low (acceptable)	Low (acceptable)	Low (acceptable)	Low (acceptable)

Table 6 - Risk table combining consequence and likelihood

Stage 3 - Method 2

Method 2 comprises two elements. Both are required to be undertaken in parallel so that the risks to life, society, and property can all be considered:

1. A semi-quantitative risk assessment which covers a wide range of potential impacts. The approach is identical to Method 1. If Method 1 has already been undertaken, the results from this earlier assessment can be used without revision.
2. A quantitative risk assessment which covers individual risk to life.

(3.2.1) Undertake a semi-quantitative risk assessment following steps 3.1.1 to 3.1.4.

(3.2.2) Use the Engineering Geological Model to develop a representative range of at least three landslide hazard scenarios with varying likelihoods to model, including the maximum credible event. These may be the same scenarios used in the semi-quantitative risk assessment.

(3.2.3) The likelihood assessment shall include consideration of the effect of climate change and should use the Shared Socio-Economic Pathway (SSP) scenario SSP5-8.5 presented in Auckland Council Guidance Document 15 "Climate Change Scenarios".

(3.2.4) Calculate the Annual Individual Fatality Risk (AIFR) for the person most at risk in each of the selected landslide hazard scenarios using the quantitative risk assessment equation below. These may be presented as an event tree (see details below) if preferred.

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$$P_{(LoL)} = P_{(H)} \times P_{(S:H)} \times P_{(T:S)} \times V_{(D:T)}$$

Where

- $P_{(LoL)}$ is the annual probability of loss of life (death) of an individual.
- $P_{(H)}$ is the annual probability of the landslide occurring.
- $P_{(S:H)}$ is the probability of spatial impact by the landslide on the property, taking into account the travel distance and travel direction of the given event.
- $P_{(T:S)}$ is the temporal spatial probability (e.g. of the building or location being occupied by the individual) given the spatial impact and allowing for the possibility of evacuation given there is warning of the landslide occurrence.
- $V_{(D:T)}$ is the vulnerability of the individual (probability of loss of life of the individual given the impact).

An Event Tree can be used visually represent the chain of events which could lead to loss and may be easier to understand than the equation-based assessment approach.

For each decision-point on the Event Tree, the probabilities must add up to 1, and the final column must also add up to 1, which assists with checking for completeness and minimising the risk of errors.

Figure 4 below shows a schematic Event Tree representing the same parameters outlined in the risk equation for AIFR which shall be applied and calculated for all the landslide hazard scenarios being assessed.

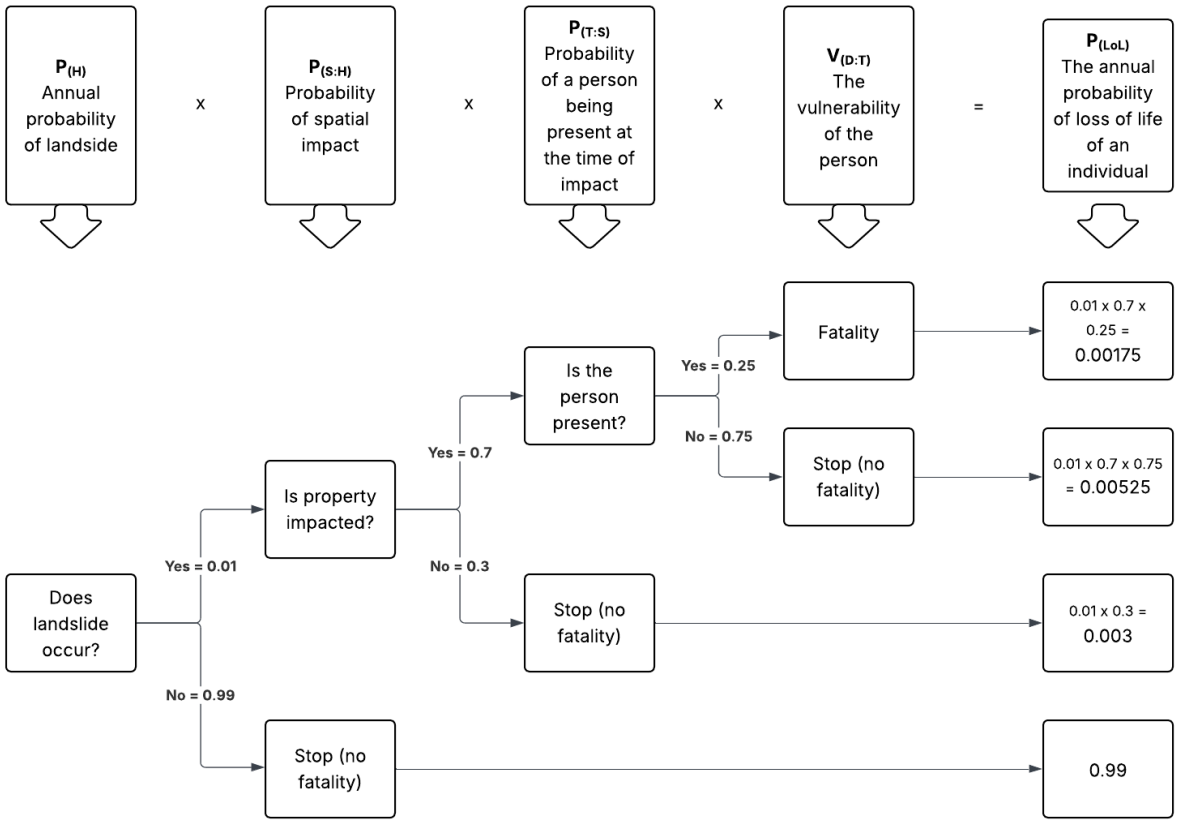

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Figure 4 - Event Tree for calculating AIFR (example only)

Note 3

Additional steps may be added into the tree to represent the specifics of the landslide hazard scenarios being assessed.

(3.2.5) Document the assumptions and evidence used to assign probabilities to each parameter (or representative decision point in the event tree).

(3.2.6) Assess the total risk by summing the AIFR results. For clarity, this means the equation presented earlier can be represented as:

$$\boldsymbol{P_{(LoL)}} = \sum_{i=1}^{n} \boldsymbol{P_{(H)}} \times \boldsymbol{P_{(S:H)}} \times \boldsymbol{P_{(T:S)}} \times \boldsymbol{V_{(D:T)}}$$

Where *n* is the number of landslide hazards assessed. This approach assumes that the hazards are independent of each other, which should be correct if different return periods are assessed. However, if one or more of the hazards may result from the same causative event, for example, a single rain event or earthquake, then the probabilities should be estimated using the theory of uni-modal bounds. Further information on how to achieve this is described in GNS Science Report "Guidelines for Natural Hazard Risk Analysis on Public Conservation Lands and Waters" Section 2.1.1.1[3].

(3.2.7) Use the result in the subsequent quantitative risk level assessment and associated flow chart (Figure 5) below to determine the risk classification.

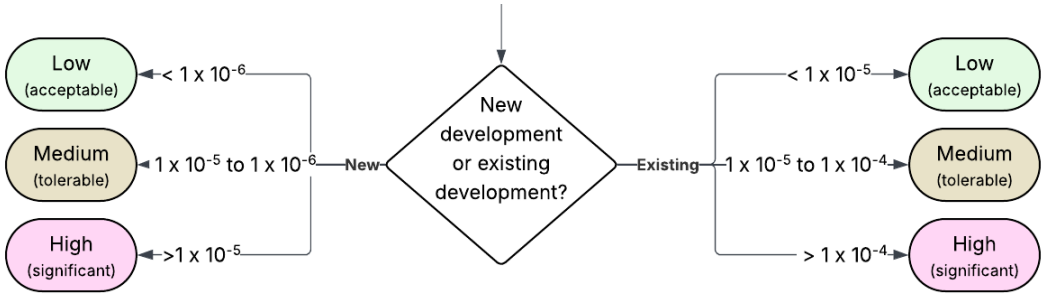

Figure 5 - AIFR quantitative risk assessment for determining final risk classification levels

NB for the purpose of Figure 5:

• the term "new development" applies to the development of land yet to be urbanised.
• the term "existing development" applies to the development of urbanised land.

(3.2.8) The landslide hazard risk classification level shall be carried through to Stage 4.

[3] de Vilder SJ, Massey CI. 2024. Guidelines for natural hazard risk analysis on public conservation lands and waters – Part 3: analysing landslide risk to point and linear sites. Lower Hutt (NZ): GNS Science. 61 p. Consultancy Report 2024/37.

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Stage 4

(4.1) Identify the critical output from the risk assessment(s). Where multiple risk assessment methods are applied, results from Method 2 shall take precedence over those from Method 1.

(4.2) Use this risk classification to identify the Activity Status in Table E36.4.1B.