

BEFORE THE FAR NORTH DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the submissions and further submission made by
Bentzen Farm Limited

AND

IN THE MATTER Hearing Nine: Rural, Horticulture & Horticulture
Processing

**STATEMENT OF EVIDENCE OF ROBERT WILLIAM CATHCART (LAND
USE CAPABILITY) ON BEHALF OF BENTZEN FARM LIMITED**

18 November 2024

1.0 EXECUTIVE SUMMARY

An Introduction to the Land Use Capability (LUC) Classification System

- 1.1 The Land Use Capability (LUC) Classification system as used in New Zealand has eight LUC Classes. Classes 1 to 4 are classified as arable land, while classes 5 to 8 are non-arable. The limitations or hazards to use increase and the versatility of use decrease from LUC Class 1 to LUC Class 8. LUC Class 4 land has severe physical limitations to arable use. In general, Class 4 land is suitable only for occasional cropping, once in five years or less frequently although it is suitable for pasture, some tree crops or production forestry. In Northland, cropping on LUC Class 4 land is restricted to a short season (early maturing) fodder crop as part of a pasture renewal programme, the aim being to ensure new pasture is well established to protect the soil from winter rain.

The Importance of Versatility in Determining Highly Productive Land

- 1.2 As noted, hazards or limitations increase, and versatility decreases from Class 1 to Class 4. While Class 1 land is very versatile and may be used to produce a wide range of crops, as well as pasture, tree crops and production forestry, Class 4 land is marginal arable land, better suited to pastoral farming or forestry. With climate change increasing climatic extremes, both wetter and drier years, and an increasing risk of new pests and diseases, and the demand for primary produce (fruit and vegetables) increasingly affected by volatile consumer demands, versatile land on which a wide range of new crops can be grown becomes increasingly important. LUC Class 4 land is the least versatile of the arable (land that can be physically cultivated) land.

Whether LUC Class 4 Land should be included in Policies Relating to Highly Productive Land in the Proposed Plan

- 1.3 Reports prepared for the Council by its consultants recommend including Class 4 land within the ‘highly productive land’ category because they believe new technology or management practices may increase the productivity or versatility of some Class 4 land. In assessing land use capability, it is assumed that all known technology and management practices will be implemented. It is, therefore, highly unlikely that any review of land use capability will increase the actual or potential productivity of Class 4 land to the extent that it is considered highly productive land.

Whether Land Use Capability Assessments can be Upgraded.

- 1.4 If LUC assessments are soundly based and have followed the protocols set out in the Handbook(1), any potential for improvement, any measures required to raise the potential for increasing the level of sustainable production should have been identified and the land assessed as to its potential when those measures are implemented. Rarely will LUC assessments be upgraded.

Minimum Lot Size in the Rural Production Zone

- 1.5 It is extremely difficult to define a minimum lot size for primary production. Depending on the particular LUC Unit or soil type, the types of crops that it is planned to grow, or the land is able to sustain, the need for shelter or not, and a whole range of other crop-specific requirements, the ‘ideal’ lot size will differ. While Northland has an oversupply of undersize holdings, largely because of its settlement pattern, there is not definitive formula to determine an ideal rural lot size. The size required to create an economic unit may differ markedly depending on the type of crop grown and the planned scale of operation. Rather than setting a minimum size of holding, the Council may consider measures to assist landholders to amalgamate titles to provide the size of unit they require for their enterprise. That is, remove barriers to easy amalgamation of titles so that those

wishing to group together two or more titles to create what they consider an economic unit for their enterprise.

2.0 INTRODUCTION

Qualifications and expertise

2.1 My name is Robert William Cathcart. I am a Land and Environmental Management Consultant working with AgFirst Consultants Northland Ltd . I have 60 years' experience working in the field of land use capability assessment and mapping the land resource inventory parameters which influence land use capability, particularly soil type. Fifty-five of those sixty years have been spent in Northland.

2.2 My qualifications are:

- i. Bachelor of Agricultural Science from Massey University, majoring in soil science and soil and water management.
- ii. Diploma in Business Studies (Massey).
- iii. Certificate of Soil Conservation issued by the Soil Conservation and Rivers Control Council and Lincoln College (University).

2.3 My professional memberships include being:

- i. A Fellow of the New Zealand Institute of Primary Industry Management.
- ii. An Honorary Member of the New Zealand Association of Resource Management.
- iii. A Member of the New Zealand Soil Science Society.
- iv. Recognised as a 'Suitably Competent Mapper' under the National Environmental Standards for Plantation Forestry.

2.4 I have had a range of land use capability assessment, soil conservation works and land management experience during my

professional career, with a large portion of that experience gained in Northland. This experience has involved mapping, at a catchment scale, which was commissioned by the Northland Catchment Commission and published by the Ministry of Works and Development as the 1st Edition of the National Land Use Capability Worksheets.

- 2.5 At the other end of the scale, I have mapped properties at a farm-scale (1:3,000 to 1:7,500) assessing and recording land resource inventory and Land Use Capability and continue to do so now.

Code of conduct

- 2.6 I confirm that I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the Hearings Panel. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

3.0 SCOPE OF EVIDENCE

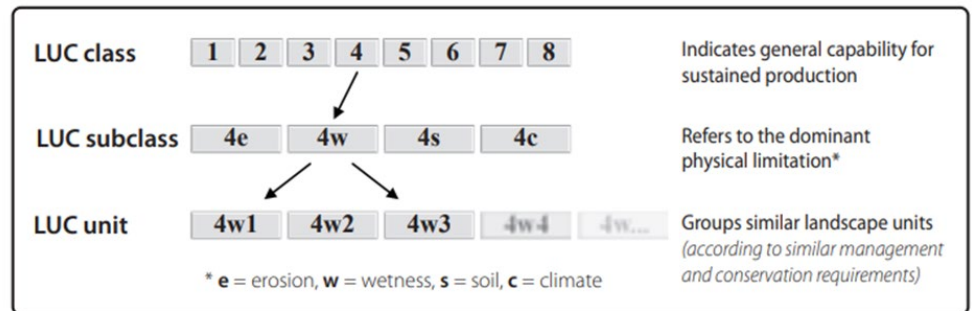
- 3.1 I present this evidence on behalf of Bentzen Farm Limited (**Bentzen**) in support of its submission in relation to Hearing 9 (Rural Topic) on the Proposed Far North District Plan (**PDP**).
- 3.2 Having promoted the protection of highly versatile and potentially highly productive land for the production of food throughout my 60-year professional career, my professional opinion is that the desired outcome of the PDP review in relation to highly productive land is for the Far North District Council (**Council**) introduce effective and soundly based district plan rules to protect actual and potential primary production from the District's most versatile and potentially most productive land.
- 3.3 My evidence addresses the following:

- i. An Introduction to the Land Use Capability (**LUC**) system.
 - ii. The importance of versatility in determining highly productive land.
 - iii. Whether LUC 4 land should be included in policies relating to Highly Productive Land in PDP.
 - iv. Whether Land Use Capability assessments can be upgraded.
 - v. Minimum lot sizes in the Rural Production Zone.
- 3.4 References for the reports relied on are contained in Appendix One to my statement of evidence.
- 3.5 Overall, I support the changes to the PDP sought by Bentzen in relation to LUC 4 and minimum lot sizes in the PDP.

4.0 WHAT IS LAND USE CAPABILITY?

- 4.1 Originally developed in the United States of America, the 8-Class LUC system used in New Zealand was adapted to suit New Zealand conditions and has been in use here since the mid-1950s. The current standard protocols for assessing and describing land use capability are contained in the New Zealand Land Use Survey Handbook (1) (**Handbook**). It is this Handbook and the definitions and its descriptions of land use capability that are referred to in the National Policy Statement for Highly Productive Land 2022 (**NPS-HPL**).
- 4.2 Land Use Capability, as described in the Handbook, is an 8-Class method of ranking New Zealand land according to its capability for sustained primary production. The Land Use Capability Classification is **a systematic arrangement of different kinds of land according to those properties that determine its capacity for long-term sustained production. ‘Capability’ is used in the sense of suitability for productive use or uses** after considering the physical limitations of the land.

- 4.3 While LUC Class 1, 2 or 3 land may not currently be used for intensive market gardening, horticulture, arable and/or pastoral farming, some of it has the potential to be used that way by application of known technology and management practices, using irrigation, for example. That is, in assessing LUC, the potential productivity and versatility of the land is assessed having implemented all known technology, including drainage, irrigation, use of fertilisers to correct nutrient deficiencies, etc. The NPS-HPL interprets potential for use as ‘within 35 years’, that is, if the known technology, irrigation water can be accessed and the land developed within 35 years.
- 4.4 There are three levels within the LUC system – Classes, being Subclasses and Units



- i. **LUC Classes** - The system uses four arable classes, Classes 1 to 4, with Class 1 being the most versatile and potentially productive land for all forms of primary production, and Class 4 suited to much fewer crops or horticultural uses, and only marginally suited to arable use. Classes 5, 6 and 7 are not suited to arable uses but are suited to pastoral farming, some tree crops, and to forestry. Class 8 land, by definition, has no productive value, being too steep, stony, wet or erosion-prone, but may have important watershed protection or biodiversity values.
- ii. **LUC Subclasses** - The 8 Classes are further subdivided according to the dominant limitation to use of the land, whether that be ‘e’ (erosion), ‘w’ (wetness), ‘s’ (a soil limitation such as stoniness or some other inherent characteristic of the soil) and ‘c’ (climate). If, for example, a piece of land is

assessed as Class 4w, it means that it will still have wetness limitations after all land drainage or flood mitigation measures have been implemented.

- iii. **LUC Units** - The most detailed level of LUC assessment is the LUC Unit. This level identifies land types that have the same potential level of production, other attributes and limitations, and require the same forms of management. While an attempt was made, initially, to place the LUC Units within a region in some order of productivity, that is Class 4e1 has the potential to produce more primary products than Class 4e2, and so on, this has proven impractical, and even more so to attempt a national 'order of merit'.

- 4.5 Also, LUC Unit numbers in one Class do not necessarily match unit numbers in another Class, that is, Class 2e1 does not lead on to Class 3e1 and then 4e1 as the land becomes steeper or more erodible. It is, therefore, very important to read the full Unit descriptions and take note of the LUC succession shown in extended legends as LUC 'sub-suites.' A detailed description of Northland LUC Units is found in Harmsworth(2), but the unit number needs to be correlated with the latest national Land Resource Inventory – Land Use Capability digital database (**NZLRI-LUC**) (nzcu) unit numbers.(3)

5.0 THE IMPORTANCE OF VERSATILITY

- 5.1 While some LUC Units are highly versatile, suited to a wide range of land uses and crop-types, others are only suited to a narrow range of uses. Class 1 land is highly versatile, it is suited to a very wide range of vegetable crops, orchard plants and tree species. On the other hand, Class 4 land, while it may be highly productive in one crop, its range of uses is much more limited.
- 5.2 With forecast wider swings in rainfall and temperatures as a consequence of climate change, it is the most versatile soils, Classes 1 and 2, which must be protected for food production. Consumer demands change over time and new diseases and pests threaten crops and animals. It is important to protect the more versatile land

to enable new crops to be grown, those which can best cope with the new Northland climate and pests, and to meet both domestic and export demands.

6.0 LAND USE CAPABILITY SURVEYS

- 6.1 The New Zealand Land Use Capability System was introduced as a soil conservation ‘tool’ in the 1950s, a method of assessing the potential of different types of land for sustainable primary production. It has been used by catchment boards, one of the predecessors of regional councils at a farm-scale and river-catchment scale to assist landholders to use their land productively while avoiding soil erosion, nutrient depletion and flooding, as well as protecting groundwater, streams, lakes and harbours from contamination.
- 6.2 The whole of the Northland Catchment Area, the territory of the former Northland Catchment Commission was mapped by the Commission’s soil conservators, with maps and reports being published, between 1964 and 1967.(4) At the request of the former Bay of Islands County Council, the Catchment Commission officers also mapped and prepared a soil conservation report on the Kawakawa River catchment in 1967.(5)
- 6.3 Northland was the only region in the country to have such extensive coverage, at a scale of 1:63,360 (1inch to 1 mile). Staff from the Ministry of Works and Development’s Water and Soil Division surveyed the rest of the Far North District in the late 1970s as part of a nation-wide survey, their maps being published in the early 1980s as ‘Land Use Capability Worksheets’ and republished between 1985 and 1990 at a scale of 1:50,000, along with the Northland Catchment Commission’s survey of the southern part of the former Otamatea County and part of Rodney County (now within Kaipara District) as the 2nd Edition of the Ministry of Works and Development Water and Soil Division Land Use Capability Worksheets.
- 6.4 A comprehensive legend and report for the North Auckland Peninsula, the area north of the Auckland urban boundary, was published by Harmsworth (2) of Landcare Research Ltd in 1996.

6.5 It is these 1985-90 maps, and 1991 Northland LUC Units described by Harmsworth in 1996 that comprise the NZLRI-LUC database for Northland.

7.0 NPS - HPL

7.1 The NPS-HPL identifies all land shown as Class 1, 2 or 3 on the NZLRI-LUC as 'highly productive land'. This is a default position until regional councils adopt a regional plan change to more accurately define what is meant by highly productive land within their respective regions and identify such land on planning maps.

7.2 The Northland Regional Council, for example, has until October 2025 to adopt such a Plan Change for the Northland Region, after which, the Far North, Whangarei and Kaipara Districts must introduce rules to implement these policies in their respective regions. I understand from the Council's s42A report on Hearing 9, that this work is on hold in Northland pending a central Government signalled amendment to the NPS-HPL.

7.3 In the meantime, any land identified as Class 1, 2 or 3 on the NZLRI-LUC database is considered highly productive land, an interpretation of the NPS-HPL adopted by decisions of the Environment Court and an Amendment to the NPS-HPL in September 2024. That is, if land is shown on the NZLRI-LUC digital database as Class 1, 2 or 3, it is by definition highly productive land, regardless of fact evidence to the contrary.

7.4 There are opportunities within Clause 3.10 of the NPS-HPL for Councils to approve subdivision of land shown on the NZLRI-LUC as Classes 1, 2 or 3.

7.5 Given that there is some land currently identified as Classes 2 or 3 on the NZLRI-LUC database that, if assessed at a more detailed scale and within the standards set by the Handbook would not qualify as actually or potentially highly productive land, the use of this land for other than intensive primary production would not reduce the actual or potential productivity within the immediate locality or within the

wider district. That is, because this land is not, in reality, actual or potentially highly productive land. Its use for other than primary production will not affect over-all production.

- 7.6 My observation is based on more detailed surveys within the Far North District by myself(6) and Hanmore(7), both of whom have identified errors, both in original LUC assessments and in the definition of boundaries of different LUC units. Time and experience has shown that these assessments were 'optimistic' as to potential productivity, and simple data recording mistakes which placed the land within the wrong LUC units.
- 7.7 An unpublished review of the District-wide NZLRI-LUC data by myself (pers. com.) has identified similar anomalies and mistakes across the district.
- 7.8 Remote sensing surveys by Manaaki Whenua - Landcare Research (pers. com.) have also identified impediments to soil drainage and to the rooting depths of plants due to basaltic lava flows buried beneath alluvial sediment, limitations not identified by the original LUC field surveys.
- 7.9 On the other hand, the more detailed surveys by myself and by Hanmore have identified pockets of land with highly versatile soils and/or which would qualify as highly productive land with the implementation of modern technology and land management practices.
- 7.10 These are not necessarily within Class 4, so the inclusion of Class 4 land generally within a 'controlled' area will not protect this land for potential development. Only accurate field and remote sensing surveying, and assessment according to the Handbook protocols would identify such land.

8.0 INCLUDING CLASS 4 LAND WITHIN THE ‘HIGHLY PRODUCTIVE LAND’ POLICIES

- 8.1 I understand that the Council wishes to restrict subdivision on Class 4 land, as well as Classes 1, 2 and 3, believing that there may be some Class 4 land that is more versatile and/or suited to specialist crops and may, on reassessment by the Northland Regional Council, be identified as highly productive land.
- 8.2 As noted, however, the assessment of LUC should identify what causes limitations to more productive use of the land and, if technology or management practices are available to mitigate those effects, the land is assessed accordingly. That is, the assessment of LUC provides for the implementation of those measures.
- 8.3 Being very familiar with all the Class 4 LUC Units in Northland, in my opinion it is highly unlikely that Land currently assessed as Class 4 will be ‘upgraded’ to Class 3 by the discovery of some new technology or management system. If the Government amends the NPS-HPL, restricting it to Classes 1 and 2 only, there may, however, be specific more highly versatile Class 3 Units which should be identified and protected for future food (fuel, fibre and pharmaceutical) production.
- 8.4 By definition in the Handbook, Class 4 land is not ‘highly versatile’. Two Class 4 LUC Units commonly found in Northland are Class 4w1, alluvial soils on floodplains, and Class 4e12, easy to gently rolling ‘gumland’. Harmsworth’s Northland LUC Legend records 23 % of Northland as Class 4 land and these two, together, occupy 14% of the total area of the region (Class4w1, 10%, Class 4e12, 4%).
- 8.5 Class 4w1 floodplains and heavy clay soils on river terraces are well suited to grazing and while wet and prone to pugging in winter and spring, they retain moisture and provide valuable summer feed for livestock. While they are usually more fertile because they receive regular deposits of sediment from floodwaters, because they are prone to frequent flooding and/or because their heavier clay soils are difficult to effectively drain, they are inherently wet and summer crops

are at risk of flood damage, a farmer may take the risk and grow a summer fodder crop, but the risk of flood damage would be too great for market gardening, vine crops or orchards. The pockets of LUC4 land on the river flats at Bentzen Farm are an example of this Class 4w1 Unit.

- 8.6 Class 4e12 easy to gently rolling gumland is found on a wide range of rock types in Northland. This is land, usually on sedimentary rocks, on which generations of dense kauri forest leached all the nutrients from the soil and the acid litter dropped by the trees destroyed soil structure. While most of it was in short, heath-land scrub and not developed for farming until the 1950s, it is now some of our most productive dairying and beef-finishing land.
- 8.7 Under careful management, pastoral farming builds up organic matter and improves soil structure to increasingly greater depths. Careful management is required as soil structure and organic matter can be easily destroyed by over-cultivation or heavy pugging by cattle. While an occasional summer fodder crop may be grown, maize for silage for example, this is usually only as part of a pasture renewal rotation. It is very important to have the land back in pasture to protect the soil surface from winter rain and subsequent erosion.
- 8.8 Including Class 4 land in a protected 'highly productive land' category in the PDP risks bringing the whole objective of the policy framework into disrepute.
- 8.9 Neither of these two soils would qualify as 'highly productive land' in terms of the NPS-HPL. Similarly, a review of all 23 Northland Class 4 LUC Units recorded by Harmsworth occupying 25% of the region, identifies no obvious units that may be candidates for an upgrade to a 'highly productive land' status.

9.0 LIMITATIONS OF SCALE

- 9.1 As advised in both the LUC Survey Handbook and the New Zealand Soil Survey Handbook, the smallest area that can be separately mapped and accurately depicted on a 1:50,000 scale map, like the

NZLRI-LUC database is 10 hectares. While it is very easy to enlarge digital data on the computer screen, these databases should not be used to identify or differentiate areas of land of less than 10 hectares.

9.2 Even within separately identified polygons, areas of land with all the same soil type and other attributes, and so identified as such on a map, wide variations may be identified with a careful field inspection.

9.3 The pedologists who prepared the very accurate soil maps of Northland(8) during the 1940s and 50s kept field notes listing up to 10 or more 'variants of some of the recorded 'soil types' (Pers. com.). Field mapping at a farm scale, 1:3,000 or similar, records wide variation even within individual paddocks, findings verified by farmers cultivating, cropping or grazing those paddocks. For example:

i. **Class 4e12** - Because it is impractical and sometimes unnecessary to record these wide variations, soil maps and land use capability maps record the dominant soil or LUC Unit, although accompanying reports may explain the variability. On the Class 4e12 gumland described above, there will be some land, where there were the densest stands of mature kauri, where the soil is a mature podzol with a 2metre-thick silica pan. 20 metres or so away, there could be an area with no silica pan. If mapping soil type and assessing land for horticulture, these variations become very important.

ii. **Class 4w1** - The other example described above is Class 4w1, floodplains with alluvial soils:

a. The narrow valleys draining to the eastern Bay of Islands have land assessed as Class 4w1 on the valley floors and terraces. If these were mapped at a farm scale, they would have some confined areas of floodplain assessed as Class 6w1 because of the velocity of flood flow, potential damage to infrastructure, vegetation and livestock, and the risk of streambank erosion.

b. Further down the valley, as it widens, floodwaters spread and become shallower, the land would be recorded as

Class 4w1, making up a major proportion of the valley floor.

- c. Adjoining terraces would have older and more leached soils and, being heavier/having a higher proportion of clay, would be wetter for longer periods than the more recent floodplain. There would be areas where water ponded after floods receded, and these may be mapped as Class 5w1 or 6w.
- d. The outlet to these valleys is affected by the tide and some are restricted by the size of road culverts and bridges. Water will pond longer in these areas and greatly reduce pasture production. If, as often happens, the heavy rain is due to ex-tropical cyclones, which, because of their low atmospheric pressure, cause a rise in sea level (tidal surge), the lower part of the valleys may be flooded by salt water and, in some cases, be growing saline vegetation. This would be assessed as Class 7w2 and, at the interface with the sea, Class 8w3* and then estuarine flats as 8w2*.¹ The NZLRI-LUC maps record these valley floors as Class 4w1, within the scope of the PDP, whereas, in reality only small parts of a highly variable floodplain system may be Class 4w1.

10.0 ERRORS AND UNDER-ESTIMATIONS

- 10.1 Amongst the errors identified in the metadata on which LUC has been assessed in the Far North District are two areas of land to the east and to the west of Kerikeri. An area between Puketotara Road and the Kerikeri Airport had the wrong soil type symbol listed on the original MWD Worksheets, PK, which is Papakauri silt loam, a highly productive soil developed on recent volcanic ash and scoria, instead of PG (Pungaere gravelly friable clay, an old, very strongly leached ironstone soil which has developed over a much longer time on older basalt lava flows. Pungaere soils are further limited by the presence

¹ Note - * symbol denotes an LUC unit first described by Cathcart(9).

of iron and aluminium nodules in the subsoil, elements toxic to plant roots and to large boulders. While assessment as Class 3s2 recognises that it is an older soil, the wrong soil type gives a totally different image of the soil and landform.

- 10.2 Areas beyond the edge of the volcanic soils both east of Kerikeri and north of Waipapa have been recorded as having volcanic soils and assessed as Class 2s1 and 3s2 respectively, when both are on gumland soils and should be Class 4e12.
- 10.3 In various places within the Far North District, the depth, duration and velocity of flooding has been under-estimated. One example is the floodplain of the Awanui and Victoria Rivers, south of Kaitaia, which have been assessed as Class 2w1. This is land which is inundated with fast flowing water to a depth of 2 or more metres, several times each year. This is certainly not Class 2w1 land.

11.0 CAN LAND USE CAPABILITY ASSESSMENTS BE UPGRADED?

- 11.1 This question can be answered in two parts:
- i. can land currently assessed as Class 4 on the NZLRI-LUC database be 'improved' by the application of technology; and/or
 - ii. will the LUC change if the land is re-assessed 40 years or more after the original assessment?

Application of technology and management practices

- 11.2 The assessment of LUC is made with the understanding that all known technology and good practice measures will be implemented. Where needed to manage soil water levels, land will be drained or, if dry, will be irrigated. Nutrient deficiencies will be managed by the use of fertilisers and lime will be applied to manage soil pH (acidity).
- 11.3 Appropriate soil husbandry measures will be integrated into management systems. Like building up soil organic matter to better

manage soil structure, drainage and nutrient management.

Cultivation practices will be adapted to reduce the risk of soil erosion, and on steeper country, trees will be planted to stabilise the land. If the land is exposed to strong, cold and/or salt laden winds, shelterbelts will be established, or artificial shelter erected.

- 11.4 Harmsworth's Extended Legend lists risks and recommends these various 'good husbandry' measures.
- 11.5 Accordingly, there should be few changes due to the application of new technology as the need for such technology should have been identified during the original surveys, but we should be prepared to consider the possibility.
- 11.6 The development of more disease-resistant rootstock has encouraged the planting of avocado, for example, on soils previously considered too poorly drained. This development has had mixed results, with some failures in the extended wet period in 2022-23. Decisions by communities or local authorities to build flood protection measures or to store water for irrigation in a previously water-short area can be a reason to alter LUC.
- 11.7 On the other hand, land could be re-assessed and LUC downgraded if decisions were made to lower the level of flood protection or if sea level rise made flood protection impractical or uneconomic.
- 11.8 Land in the Kerikeri area with 'ironstone soils', very strongly leached and with high concentrations of iron and aluminium in their subsoil, and which are currently assessed as Class 2 and Class 3, may need to be reviewed if the recent 'big wet' and subsequent waterlogging of soils becomes more frequent. Waterlogging causes the soil to be deprived of oxygen and plant roots and the various microorganisms on and in the roots, and which are essential for the uptake of plant nutrients, drown or become more susceptible to disease.
- 11.9 In short, we may not be able to grow some plants on some of the soils we currently do. This land would need to be re-assessed as to its LUC, its suitability for sustained production.

Re-assessment after 40 years

- 11.10 The publication of the Handbook in 2009 introduced the opportunity for re-assessment of extensive areas in Northland. In particular, rolling hill country currently recorded on the NZLRI-LUC as either Class 4 or Class 6 w could now include Class 5. Class 5 was previously an anomaly, being land that was actually or potentially highly productive but too steep, wet (flood-prone) or adversely affected by climate to be used for arable purposes.
- 11.11 In mapping the original catchment area of the Northland Catchment Commission, we often recorded large areas of rolling to strongly rolling hill country as ‘Class 4 + Class 6’ or ‘Class 4 – Class 6’. At a farm-scale, 1:1000 to 1:3000, we were able to separate out the easier country and record it as Class 4 and the steeper country as Class 6.
- 11.12 The mixed Classes, Class 4 – Class 6, or Class 4 + Class 6, were not acceptable to the MWD LUC team and we had to decide whether to label polygons as Class 4 or Class 6, knowing that whichever we chose, there would be a range of Classes within that polygon. The DSIR Soil Bureau, which was reviewing its soil maps at about the same time, still accepted mixed soil types within a polygon, because that best explained what could be found on the ground, or they recorded a range of soil types within the same suite or family of soils. Northland is geologically very complex, and the pattern of soil types is even more complex.
- 11.13 A review of LUC now, at a 1:50,000 scale, and working according to the Handbook protocols would result in a more even distribution and definition of land types across Classes, 4, 5 and 6. Some land shown as Class 4 on the nzlri-luc database would become Class 5, as would some land currently recorded as Class 6. **That is, while some Class 4 would become Class 5, in my opinion it is highly unlikely that any Class 4 land would be reassessed as Class 3 or better.** The bar between Class 3 and Class 4 is higher now under the more clearly defined Handbook protocols, with the difference between the various Classes better defined and with greater emphasis on versatility of land use.

12.0 MINIMUM LOT SIZE IN RURAL PRODUCTION ZONES

- 12.1 The search for a method of determining the minimum allowable lot size within a rural production zone has been going on since the beginning of European settlement in New Zealand. Post-WWI development of land and settlement of returned servicemen and another wave of development by the Lands and Surveys Department and settlement in the 1950s and 1960s saw the size of economic dairy farms change from 50acres (20ha) post-WWI to 100acres in the mid to late 1950s. Within 5 years of the 100acre (40ha) dairy farms being settled, every third farm was bought out and subdivided between the other two to lift farm sizes, an 'economic unit', to 60ha.
- 12.2 The same search for a mythical economic unit was occurring within the sheep and beef industry and in orchards. Mechanisation, more efficient farming systems, the use of contractors and the cost of labour all influenced what is and economic unit. Perhaps a more important issue in the minimum size for a farming, orcharding or market gardening block is to consider what will attract someone to invest in a commercial farming venture. This is not a small lot on which someone can run a few stock or harvest from a few fruit trees, a 'hobby farm'. The question is what can sustain a commercial venture, one not subsidised by off-farm income(s)?
- 12.3 Northland, generally, is a victim of far too many Lots being too small, right from the early days of European settlement. When considering land as a horticultural unit, for example, an investor will be interested in the 'productive area' of an available land parcel and whether it will provide sufficient productive land after having provided for:
- i. setbacks around boundaries to reduce reverse sensitivity issues;
 - ii. installation of necessary infrastructure, including farm shelter, water storage and sediment and nutrient management works; and

- iii. the ability to operate crop rotations of paddocks to pasture to restore soil structure and avoid a buildup of disease caused by growing the same crop in the same ground for too long,
- 12.4 All the while, the cost and availability of labour forces those cultivating the land into more and more mechanisation, which often means larger machinery and therefore greater difficulties when working on small blocks.
- 12.5 The days of the 4 and 8 hectare orchards or garden blocks are long gone, as are similar-sized lifestyle blocks where vegetation control often means endless hours on a ride-on mower, a model which would fail all energy efficiency and emission management tests.
- 12.6 This raises the question of whether lifestyle blocks, pieces of land on which people may enjoy a rural lifestyle but not depend on the productivity of the land, should be allowed on 'highly productive land', albeit HPL more accurately defined than the current broad LUC Classes 1,2 or 3? There are extensive areas of Class 4 and less versatile land within easy commuting distance of all Northland urban areas, more than adequate to meet the demand for a rural lifestyle but not impinge on our most versatile land.
- 12.7 In my view, a preferable model, if people wish to live in a rural lifestyle situation is to allow a certain number of houses to be built on pre-approved building sites and the communally owned farmland to be managed as or part of a commercial farm. Such a model assumes that there is a mix of land types which enable different sustainable farming systems to be practiced without becoming involved in a reverse sensitivity conflict. It would be very difficult, for example, to avoid conflict if houses are scattered amongst commercial orchards, vineyards, kiwifruit vines and the like. The model would work particularly well on a typical parcel of stony volcanic soils, the houses, aesthetic plantings and non-productive uses on the stony patches and the less stony but highly versatile soils used for horticulture.

- 12.8 Models such as this require land use assessment at a more detailed scale and decisions as to use made on Land Use Capability Units, not broad LUC Classes.

13.0 COMMENT ON SECTION 42A HEARING REPORT

- 13.1 I have read the Council's s42A Hearing Report on Rural Wide Issues and the Rural Production Zone and also Section 32 Report for the Rural Environment Appendix "Rural Environment Economic Analysis – Update (prepared by 4Sight Consulting and M.E Consulting, dated August 2020)". I have the make the following comments on the Council's s42A Hearing Report.

Productive capability of the Horticulture Zone

- 13.2 At Para 109 the s42A Report states that the highest portion of productive LUC 2 and 3 land in the Far North district is in the Horticulture Zone, as 65% of the zone is LUC 2 or 3 land (just under 95% if you add in LUC 4 land, which also has productive potential given the presence of the irrigation infrastructure).
- 13.3 I disagree with thus statement. A detailed survey of the Horticulture Zone would show that a much lesser area is suited to horticulture than the NZLRI-LUC data suggests. Detailed surveys by Ian Hanmore and myself show that perhaps less than half of the land zone Class 2 and Class 3 is truly highly productive land. The original survey contains errors and over - estimation of horticulture potential.

Far North climate and irrigation

- 13.4 The Section 42A report also states at paragraph 109 that LUC 4 land can also be productive in the context of the Far North climate (referencing the Section 32 Report). Also at paragraph 123, the s42A report states that LUC 4 land in the Far North District is, and has the potential to be, highly productive, particularly when there is access to a water source.
- 13.5 As I have concluded above, very little if any Class 4 land will be suited to horticulture when given access to irrigation water. The only

soils to which this could apply are some very dry and stony volcanic soils with small pockets with less stone. By the time you have extracted the rock from the paddocks, there is little or no soil left in any event.

- 13.6 The older volcanic soils are severely limited by high iron and aluminium levels and are seasonally wet, which has resulted in deaths of vines in kiwifruit orchards. Rather than “some Class 4” land becoming highly productive by gaining access to irrigation water, some Class 3 land may be retained as highly productive while some, with serious limitations, will be excluded.

Bob (Robert William) Cathcart
18 November 2024

APPENDIX ONE: REFERENCES

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