

Reece Hill PhD (Soil Science)
Landsystems
PO Box 4348
Hamilton East 3247
Hamilton
M: 022 191 3695
E: reece@landsystems.co.nz



Technical Memo

To: Ms Katherine Overwater, Waikato District Council
From: Dr Reece Hill, Soil Consultant – Landsystems
File: The Proposed Waikato District Plan – Stage 1, Hearing 18 Rural Topic; high class soil technical information for S42A rebuttal evidence.
Date: 23 September 2020

Reference: The Proposed Waikato District Plan – Stage 1, Hearing 18 Rural Topic; high class soil technical information for S42A rebuttal evidence.

1. Purpose

The purpose of the Memo is to provide additional technical information to assist Council's S42A planner on issues relating to high class soil and land fragmentation, specifically with regard to Rules 22.1.4.5 and 22.1.4.6 in the Proposed Waikato District Plan – Stage 1, Hearing 18 Rural Topic. The additional technical information provided in this memo is in response to points raised in various submitter evidence not covered in my initial technical report.

- a) The scope of the memo includes information on the following:
- b) Use of hamlets in the rural zone.
- c) Use of regional scale map information.
- d) Existing dwellings on high class soil.
- e) Use of a high class soil 15% threshold and presence of a dwelling/curtilage.
- f) Titles and high class soil.
- g) Rule 22.4.1.4 Boundary relocation.
- h) Comment on consistency across rules.
- i) Conclusions.

2. Previous information supplied by Dr Reece Hill, Landsystems

- A review of high class soils in the Waikato District - technical information to support the S42a Report¹.

¹ Hill, R.B. (2020). A review of high class soils in the Waikato District. Report for Waikato District Council. Waikato District Council. Ngaruawahia.

Use of hamlets in the rural zone

The use of hamlets (containing 3-5 lots) has merit with regard to reducing broader land fragmentation and retaining the productive capacity of land irrespective of whether the land has high class soil or not.

By grouping lots for a Rural Hamlet subdivision together and amalgamating the balance of the Records of Title, the new balance area is likely to increase the land area for primary productive activities when compared to either a status quo situation in terms of how the lots are currently placed on the land or by placing a child lot in each of the rural titles as a result of the general subdivision provisions.

By grouping lots for a rural hamlet there may be a reduction in the loss of land associated with the accessways. A minor benefit may result from reduced soil disturbance and risk of erosion associated with accessway creation due to reduced earthworks.

Use of regional scale map information

Submitters have raised concerns in respect to the rule recommended in the planner's S42A report which prevents all rural hamlet lots from locating on high class soils. This is a step up from the notified version rule that did not provide any restrictions on high class soils.

Applying regional scale soil and LUC map information (generally 1:50,000 scale) does not provide sufficient certainty to ensure the loss of high class soil is achieved when placing lots in a rural hamlet subdivision.

My experience undertaking property scale Land Use capability (LUC) classification assessments has indicated that at this finer scale of mapping it is possible to identify areas of high class soil in areas that are predominantly not high class; the reverse situation is also possible. The point was illustrated in my technical report (Figure 2, page 27)².

This means that having a rule that restricts all lots with any amount of high class soil present is likely to be overly restrictive, as it would apply even if the area of high class soil is minimal. The use of a % threshold for high class soil allows for some areas of high class soil to be included in lots, while minimising the loss of high class soil through subdivision.

Existing dwellings on high class soil

A property scale site specific Land Use Capability Assessment Classification assessment should be undertaken based on the current condition of the land and include any areas of modified soil or areas that would be excluded from productive use. Some permanent changes to the land (e.g. the placement of tracks, excavation for buildings, excavation of drains and soil remediation for soil contamination) irreversibly change the soil and land. These areas are defined as modified soils. To the best of my knowledge there is no definitive guidance published on the application of modified soil areas. The best guidance is based on the definition provided by the New Zealand Soil Classification definition for Anthropic Soils³.

In practice I have adopted this as a guide for identifying modified soils for property scale soil and LUC Classification assessments.

² Hill, R.B. (2020). A review of high class soils in the Waikato District. Report for Waikato District Council. Waikato District Council. Ngaruawahia

³ Anthropic soils – "Other soils that have been formed by the direct action of people by either truncation, drastic mixing or by deposition of material 30 cm or more thick" in Hewitt AE. (2010) New Zealand Soil Classification. 3rd ed. Landcare Research Science Series No. 1. Lincoln, Manaaki Whenua Press.

This usually means that existing dwellings and often the curtilage are excluded from the productive area on the basis that their presence will likely mean that the area of soil has been modified or because the area has been removed simply because there is a building present. Curtilage areas have usually been recontoured, have garden paths etc. Larger curtilage areas may not be modified; therefore, curtilage areas should be assessed at a property scale to confirm that they are modified soil. Other modified areas can be included, such as: excavated drains, tracks, other buildings, earthworks, and some areas where large trees have been removed and the area has been disturbed to depth. The implications are that if an existing dwelling is located in high class soil then the area is no longer considered high class soil it is mapped as modified soil and classified as not being high class soil.

It is possible with the rural hamlet rule that it may be desirable to position a hamlet in order to utilise the existing dwelling. Historical placement of dwellings is likely to have been irrespective of whether the soil was high class soil – i.e. dwellings are present on high class soil and may be surrounded by high class soil. In this situation justifying the placement of a hamlet on high class soil surrounding a dwelling is in my opinion to be avoided and the presence of the dwelling does not provide justification for the loss of the surrounding high class soil. In my opinion retaining the high class soil % threshold should still apply.

Titles and high class soil

Another consideration is that the rural titles that potentially qualify for hamlets is not restricted by the 6th December 1997 date or minimum title size (whether it be 20 ha or 40 ha or any other minimum).

The proposed Rule 22.4.1.2 General Subdivision has provisions for protecting high class soil by requiring a property scale site specific Land Use Capability Classification assessment and restricting the area of high class soil in a lot at a 15% threshold.

The proposed Rule 22.4.1.5 Rural Hamlet Subdivision does not have provisions for the protection of high class soils, which increases the opportunity for the loss of high class soil.

The main high class soil considerations for looking at options are similar to those for Rule 22.4.1.2 General subdivision and 22.4.1.6 Conservation lot subdivision; accurately identifying high class soil and minimising the loss of high class soil.

However, unlike the proposed rule 22.4.1.2 for general subdivision which has restrictions on the number of eligible titles (includes only titles before 6th December 1997, and greater than 40 ha), the number of eligible titles for Rule 22.4.1.5 Rural Hamlet Subdivision potentially includes all titles, that could be combined to form the new lots and provide a balance of 40ha. For comparison, the number of eligible titles for rules 22.4.1.2 General subdivision and 22.4.1.5 Rural Hamlet Subdivision is shown in **Table 1**. The title number estimates were provided by Waikato District Council GIS staff.

Table 1. The number of eligible titles for each rule.

Rule	Number of eligible Rural Titles (approximate %)				Eligible title total
	Total	Fully high class soil	Partially high class soil	No high class soil	
22.4.1.2 General subdivision Assumes 6 th December 1997 date restriction and 20 ha minimum parent title size*	2001	70 (4%)	766 (38%)	1165 (58%)	1931 (excludes fully high class soil titles)

22.4.1.2 General subdivision Assumes 6 th December 1997 date restriction and 40 ha minimum parent title size*	1180	23 (2%)	435 (37%)	722 (61%)	1157 (excludes fully high class soil titles)
22.4.1.5 Rural Hamlet Subdivision [#]	16,656	2056 (12%)	6012 (36%)	8588 (51%)	16,656 (includes fully high class soil titles)

*Excludes titles with no date; # excludes 23 titles with gross area of 0 ha.

The results of Table 1 above are summarised as follows:

1. The number of eligible titles for the 22.4.1.5 Rural Hamlet Subdivision rule is much greater than the number of eligible titles for the 22.4.1.2 General subdivision rule.
2. For the 22.4.1.5 rural hamlet subdivision rule all titles remain eligible irrespective of whether they have high class soil or not. This is because the composition of the rural titles for the hamlet subdivision could include titles with and without high class soil, and so fully high class soil titles could be included.

Use of a high class soil 15% threshold and presence of a dwelling/curtilage

To identify the best approach to rural hamlets given the number of existing titles that can utilise this provision (as opposed to the 22.4.1.2 General subdivision rule) it needs to be determined whether a 15% threshold could apply in the same way as recommended in the general subdivision rule to either individual rural hamlet lots or a combined 15% total area across all resulting rural hamlet lots. The 15% calculation, similar to the general subdivision rule would not apply to the balance area of the subdivision.

Submitters have raised concerns in respect to creating rural hamlet lots around existing dwelling and curtilage areas located on high class soils and made have commented that this would appear to be unreasonable particularly where a landowner wants to create a rural hamlet around an existing dwelling.

Table 2 below uses combinations of minimum and maximum lot sizes (0.8 and 1.6 ha) and shows the total loss of high class soil for the different hamlet placement scenarios applying a 15% high class soil threshold to the combined lot area, individual lots. Also, it compares what the implications would be for a title with an existing dwelling using an area of 2,000 m² (approximately ½ an acre) as a guide and comparing the placement of lots on Rural Titles with 100% high class soil, with and without a dwelling and curtilage of 2000 m².

Table 2. The total loss of high class soil for different hamlet placement the scenarios.

Hamlet lot size combinations (excludes balance lot)	Total lot area (ha)	Loss of high class soil (ha)			
		Using a 15% high class soil threshold		Located on 100% high class soil	
		Applied to individual lot areas	Applied to combined lot areas	With dwelling and curtilage of 2000 m ²	With no dwelling and curtilage

4 lots of 1.6 ha size.	6.4	0.96	0.96	6.2	6.4
3 lots of 1.6 ha and 1 lot of 0.8 ha.	5.6	0.84	0.84	5.4	5.6
2 lots of 1.6 ha and 2 lots of 0.8 ha.	4.8	0.72	0.72	4.6	4.8
1 lot of 1.6 ha and 3 lots of 0.8 ha.	4.0	0.6	0.6	3.8	4.0
4 lots of 0.8 ha size.	3.2	0.48	0.48	3.0	3.2

The results of Table 2 above are summarised as follows:

1. The application of the 15% threshold resulted in the least loss of high class soil (0.48 – 0.96 ha compared with 3.2 – 6.4 ha if on 100% high class soil).
2. The application of the 15% threshold to the individual lots in a hamlet or to the combined hamlet lot area has no net effect on the loss of high class soil.
3. The presence or absence of a dwelling when a lot is on 100% high class soil is likely to have minimal impact on reducing the loss of high class soil.

Point 2 above indicates that there is no net difference to the loss of high class soils when applying the 15% threshold to the individual lots in a hamlet or to the combined hamlet lot area. Applying the threshold to the combined lot area could provide some flexibility for the placement of the lots (rather than requiring each lot to have less than 15% high class soil).

However, an implication of this approach is that it would be possible that some combinations could result in one of the lots having entirely high class soils. Based on the scenarios in **Table 2** only the combination of 3 x 1.6 ha + 1 x 0.8 ha without a dwelling/curtilage could result in a lot being 100% high class soils, and only if the high class soil was entirely on the 0.8 ha lot.

Another implication of applying the 15% across the combined lots in the hamlet, could be that large areas of high class soil could be preferentially sought (as in general they provide a better building platform), rather than avoided and result in the greater loss of high class soil. This situation could arise if the combined titles are predominantly not high class soil and there is one area that is predominantly high class soil. I have attempted to illustrate this in **Figure 1**. For the example, I have used four rural titles (three with no high class soil and one with partial high class soil) combined to create four new lots. Note that **Figure 1** is illustrative only and is not drawn to scale.

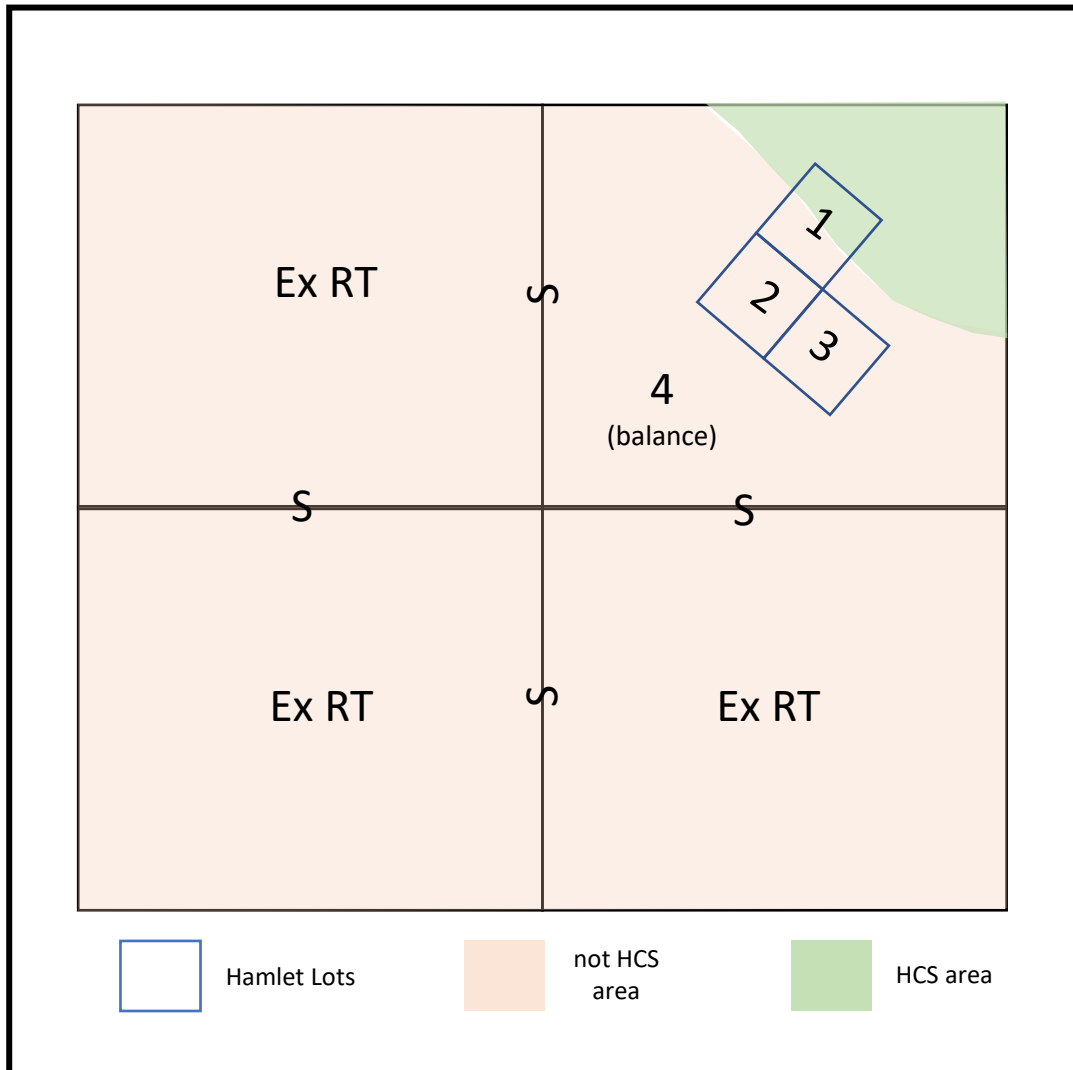


Figure 1. Illustration of preferential placement of new lots on high class soil where Rural Tiles are predominantly not high class soil.

For the scenario presented in **Figure 1**, Lot 1 individually contains >15% high class soil (i.e. 15 % of the high class soil for the combined lots). The lots are also positioned in a way that restricts the use of the area of high class soil remaining in the balance lot.

In my opinion applying the 15% across the combined lots in the hamlet could potentially result in additional losses of high class soil and go against the intent of avoiding or minimising the loss of high class soil we are seeking, which is also recognised in the Waikato Regional Policy Statement⁴ and the proposed National Policy Statement for Highly Productive land (NPS-HPL)⁵.

To provide consistency with the other subdivision rules (22.4.1.2 and 22.4.1.6) and align with the WRPS and the proposed NPS-HPL the best option for addressing the loss of high class soil in Rule 22.4.1.5 rural hamlet subdivision is to use the 15% high class soil area threshold (as in the 22.4.1.2 General Subdivision rule) and apply it to individual lots within each hamlet.

⁴ Waikato Regional Council (2018) Waikato Regional Policy Statement: Te Tauākī Kaupapahere Te-Rohe O Waikato. Waikato Regional Council, Hamilton.

⁵ Ministry for Primary Industries (2019). VALUING HIGHLY PRODUCTIVE LAND: Discussion document. Ministry for Primary Industries, Wellington.

Rule 22.4.1.4 Boundary relocation

As presented in the S42A Report, the notified version of Rule 22.4.1.4 Boundary relocation does not include a provision for the loss of high class soil.

Given the variable sizes of records of title across the district and boundary relocation permutations that are possible under this rule applying a 15% threshold (as used for rules 22.4.1.2, 22.4.1.5 and 22.4.1.6) using a rule similar to the rural hamlet subdivision rule, as discussed above is unlikely to be a practical option. For example, if two Rural Titles were 40 ha each and wanting to undertake a boundary relocation to become a 20 ha and 60 ha title configuration, identifying high class soil on these titles would require a property scale soil and LUC Classification assessment for the entire area, which is neither practical nor necessary given the sizes of these existing titles.

In my Technical Report for the S42A⁶, I have identified that titles below 4 ha are less viable for a range of productive land uses (10.1.3, page 41) and the proposed NPS-HPL⁷ cited a study in 2012 which reported that up to 66 percent of properties that were less than 4 hectares and up to 82 percent of those less than 1.5 hectares, were not being used for any productive purpose⁸.

A practical approach could be based on identifying high class soil where the rural titles involved in the boundary relocation are ≤ 4.0 ha in area, or when titles resulting from the boundary relocation are ≤ 4.0 ha in area. This approach would provide the necessary information to direct resulting titles away from high class soil, therefore, minimising the loss of high class soil associated with the rule.

Comment on consistency across rules

A consistent approach to minimising the loss of high class soil across all rules where there is potential for loss should be sought. This provides equity across rules and prevents a rule, such as the boundary relocation rule that is more permissive being used to an advantage with respect to high class soils. Such a situation could unintentionally result in the greater loss of high class soil in the Rural zone.

Another point is that the cumulative loss of high class soil across all rules needs to be minimised, and to do so, rules need to work individually as well as collectively. I discuss this importance in my S42A Supporting Technical Report (Section 11.3, page 52).

A final point is that a consistent approach to minimising the loss of high class soil across all rules should increase the ease of implementation of the rules, especially for those where multiple subdivision rules may apply. The same applies to the suitability qualified person undertaking the assessment, as there may be situations where multiple rules apply to a single property with multiple titles.

It is further noted that a similar approach to the conservation lot subdivision rule in 22.4.1.6 has also been identified as needing to be consistent with the rural hamlet rule, given the possibility of multiple new lots being created. If a similar approach is taken to the rural hamlet rule this ensures individual lots are calculated, as opposed to a combined total area.

Conclusions

Based on my assessments of high class soil loss and hamlets I conclude the following:

⁶ Hill, R.B. (2020). A review of high class soils in the Waikato District. Report for Waikato District Council. Waikato District Council. Ngaruawahia.

⁷ Ministry for Primary Industries (2019). VALUING HIGHLY PRODUCTIVE LAND: Discussion document. Ministry for Primary Industries, Wellington.

⁸ VALUING HIGHLY PRODUCTIVE LAND: Discussion document, page 17 – citing: Andrew R, Dymond JR. (2012). Expansion of lifestyle blocks and urban areas onto high-class land: An update for planning and policy, Journal of the Royal Society of New Zealand.

1. The use of hamlets (containing 3-5 lots) has merit with regard to reducing broader land fragmentation and retaining the productive capacity of land irrespective of whether the land has high class soil or not.
2. A property scale site specific Land Use Capability Classification assessment remains a fundamental requirement for providing accurate identification of high class soil.
3. In general, dwellings and curtilage areas on high class soil are considered modified soil and are not included as high class soil.
4. The presence or absence of a dwelling when a lot is on 100% high class soil is likely to have minimal impact on reducing the loss of high class soil.
5. Avoiding the loss of high class soils is the key objective. Provisions for this in the rules will only affect a small percentage of the total number of titles and will result in the placement of titles on non-productive land, rather than productive land and high class soil.
6. For rules 22.4.1.2, 22.4.1.5 and 22.4.1.6 using a 15% threshold to for managing high class soil minimises the loss of high class soil, provides consistency across the rules, and is practical for implementation.
7. For Rule 22.4.1.5 Rural Hamlet Subdivision and Rule 22.4.1.6 Conservation Lot Subdivision, the 15% threshold should be applied to individual lots rather than the combined area of the lots.
8. For Rule 22.4.1.4 Boundary relocations, the use of a 15% threshold is not practical. Instead, property scale identification of high class soil for rural titles with ≤ 4.0 ha in area could be used to minimise the loss of high class soil.