Desktop soil and Land Use Capability assessment

Awanui Links

Prepared for:	Swordfish Projects Limited
Prepared by:	Dr Tanya O'Neill
Reviewed by:	Dr Reece Hill
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Landsystems
22 McNicol Street
Hamilton 3214
reece@landsystems.co.nz

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Contents

1. Introduction

Landsystems undertook a Soil and Land Use Capability (**LUC**) assessment of the Awanui Links site for the Referral Application under the Fast-track Approvals Act (**FTAA**). The assessment was desktop based using regional scale soil and LUC data. The assessment was carried out to provide an overview of the soils and LUC units on the Site, characterise their limitations for productive use, identify the presence of Waikato District Plan-Operative in Part defined high class soils, and identify the presence of highly productive land as defined by the National Policy Statement for Highly Productive Land.

The Project and Site

Awanui Links is a comprehensively master planned, mixed-use development in the Waikato region that combines high-end tourism, lifestyle living, retirement accommodation, and employment-generating industrial land uses within a rural setting. Anchored by an 18-hole golf course, the development includes extensive visitor infrastructure such as a clubhouse, proshop, virtual golf centre, driving range, wellness centre, fine dining venue, hotel and event centre, and a café. Accommodation offerings comprise 10 large and 52 small luxury villas. The residential component includes 63 rural residential lots and a retirement village with a dedicated care facility. The project also features 9 light industrial lots, a solar farm, landscaped open spaces, wetlands, and integrated infrastructure, delivering a destination that supports regional growth, tourism, housing diversity, and environmental resilience.

The Awanui Links site (the **Site**) is approximately 121 hectares and is situated within the Waikato District, 28 Telephone Road, approximately 5 km to the east of Hamilton City, as shown in **Figure 1**.

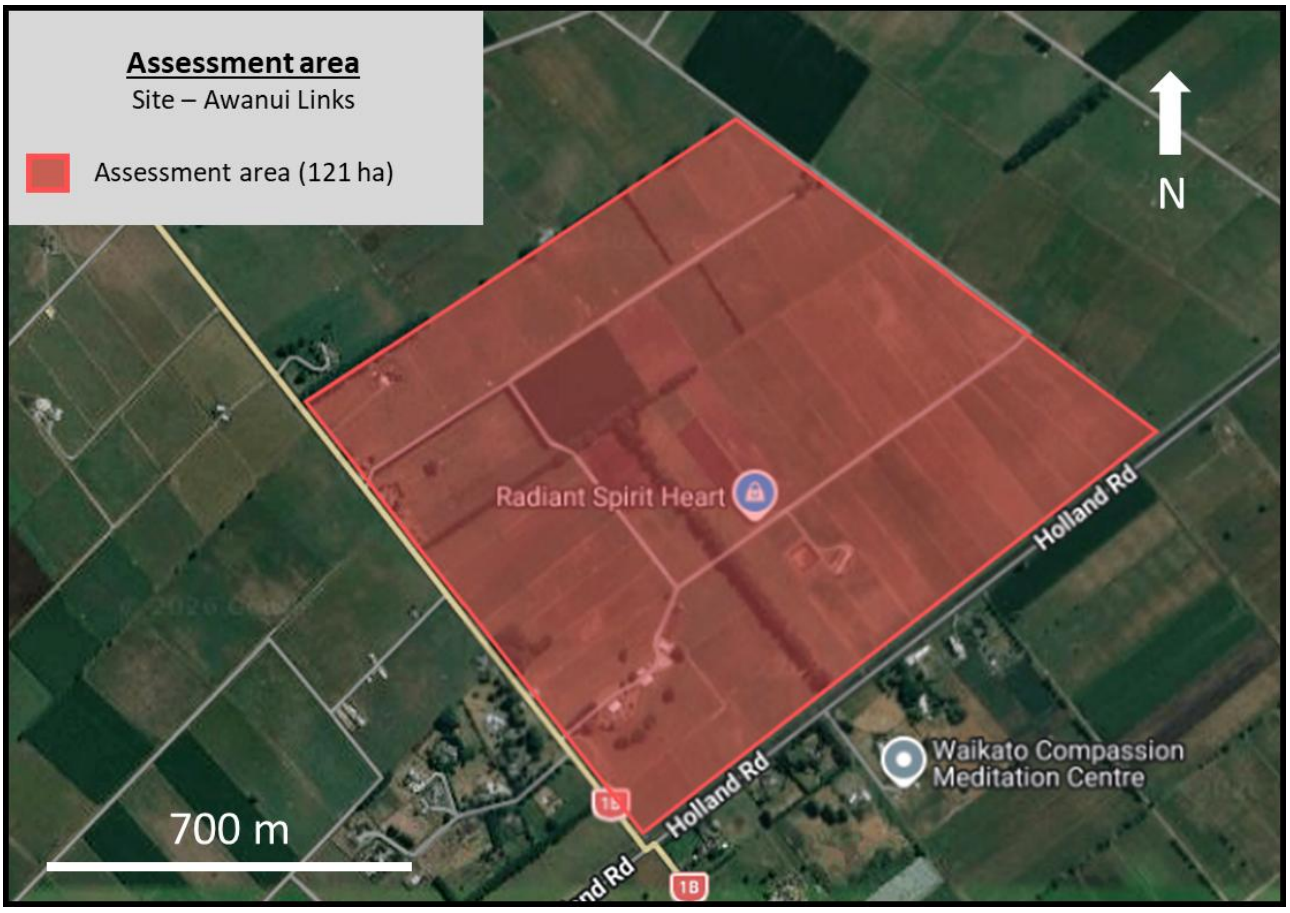

Figure 1: The Site – Awanui Links.

2. LUC background

LUC classification is the common method for assessing land in New Zealand; it uses the Land Use Capability System, which is part of the New Zealand Land Resource Inventory (**NZLRI**) produced by the Water and Soil Division of the Ministry of Works, for the National Water and Soil Conservation Organization during the 1970s. In 2009 the 3rd Edition of the LUC Survey Handbook[1] was published and has been used for this assessment. The LUC uses a systematic arrangement of different kinds of land according to those properties that determine its capacity for permanent sustained production, where the word "capability" is used in the sense of "suitability for productive use" after taking into account the physical limitations the land may have.

The LUC classification is specifically designed to provide an index of versatility. There are eight LUC classes (**Figure 2**) arranged in order of increasing degree of limitation or hazard to use; and a decreasing order of use, from Class 1 to 8.

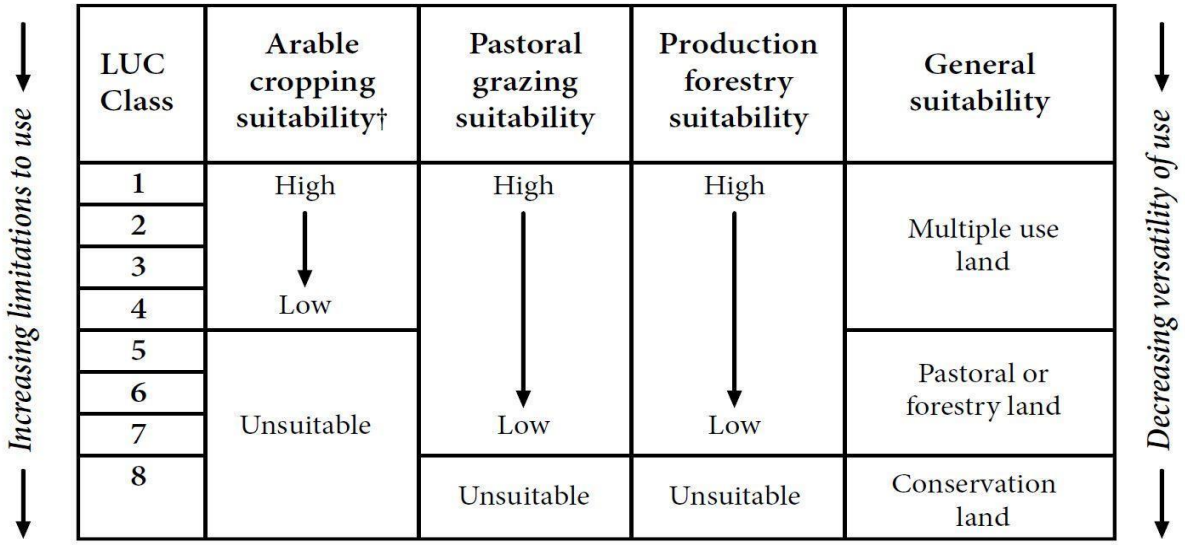

Figure 2: Increasing limitations to use and decreasing versatility of use from LUC Class 1-8.

Within each LUC Class the land is assigned a subclass according to the kind of limitation (e = Erodibility, w = Wetness, s = Soil limitations within the rooting zone, c = Climate). At the most detailed level LUC groups together those inventory units which respond similarly to the same management, and which are suitable for the same kinds of crops, pasture, or forest species with the same potential yield and which require the application of the same conservation measures.

The LUC worksheets were compiled from all relevant databases of land resource documents available at the time, consequently some sheets suffered from a lack of information that only detailed soil and geological surveys could have provided. Therefore, there are **scale limitations**, which need to be considered, especially when interpretation is required at the individual property scale.

[1] Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, Newsome PJF 2009. Land Use Capability survey handbook – a New Zealand handbook for the classification of land. AgResearch Hamilton; Manaaki Whenua Lincoln; GNS Science Lower Hutt, New Zealand.

The LUC units displayed on the 1970s worksheets remain reasonably robust but are subject to change. For example, the second edition (1993) Northland region worksheets were mapped at the more detailed scale of 1:50 000, replacing the earlier first edition 1:63,360 maps. In the first edition, 69 LUC units were defined compared with 91 LUC units in the second edition - about 60 of the first edition classification units changed.

The average area for a map unit is 125 ha, however, at the 1:50 000 scale of mapping it is theoretically possible to delineate an unhooked inventory map unit (no vinculum) area of 60 ha (60 ha = 600 m by 1000 m) provided the geology, soil, vegetation, erosion and slope are uniform.

3. Waikato District Plan definition of high class soil

Under the Waikato District Plan-Operative in Part (**WDP-OiP**) definition, "High class soils" are defined as[2]:

> *those soils in Land Use Capability Classes I and II (excluding peat soils) and soils in Land Use Capability Class IIIe1 and IIIe5, classified as Allophanic Soils, using the New Zealand Soil Classification.*

4. National Policy Statement for Highly Productive Land 2022

The National Policy Statement for Highly Productive Land 2022 (NPS-HPL) came into force on the 17th of October 2022. The NPS-HPL was amended in December 2025, with amendments taking effect from 15 January 2026.[3]

"Highly productive land" is defined as:

> *land that has been mapped in accordance with clause 3.4 and is included in an operative regional policy statement as required by clause 3.5 (but see clause 3.5(7) for what is treated as highly productive land before the maps are included in an operative regional policy statement and clause 3.5(6) for when land is rezoned and therefore ceases to be highly productive land).*

Our understanding is that NPS-HPL clause 3.5(7) applies because maps produced in accordance with clause 3.4 have not yet been included in an operative regional policy statement as required by clause 3.5. Under the December 2025 amendments, the deadline for regional councils to undertake this mapping was extended to 31 December 2027 (clause 4.1(2)).[4] Clause 3.5(7) says:

> *(7) Until a regional policy statement containing maps of highly productive land in the region is operative, each relevant territorial authority and consent authority must apply this National Policy Statement as if references to highly productive land were references to land that:*
>
> *(a) is*
>
> *(i) zoned general rural or rural production at the commencement date; and*

[2] https://eplan.waikatodistrict.govt.nz/
[3] Ministry for the Environment. 2025. National Policy Statement for Highly Productive Land 2022 (consolidated with December 2025 amendments). Ministry for the Environment. Wellington.
[4] "…regional councils are not required to undertake mapping of highly productive land in regional policy statements as required under clause 3.5 prior to 31 December 2027."

(ii) LUC 1, 2, or 3 land; but

(b) is not:

(i) identified for future urban development at the commencement date; or

(ii) subject to a Council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle at the commencement date; or

(iii) subject to a resource consent application for subdivision, use or development on LUC 3 land for any activity other than rural lifestyle, where that consent has been lodged at or after the commencement date.

The NPS-HPL includes the following definition of LUC 1, 2, or 3 land:

> *"LUC 1, 2, or 3 land means land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory, or by any more detailed mapping in place at the commencement date that uses the Land Use Capability classification."*

Of relevance to this application, under clause 3.5(7)(b)(iii), LUC 3 land is excluded from the interim HPL definition where a resource consent application for any activity other than rural lifestyle has been lodged on or after 17 October 2022. For the purposes of this application, LUC 3 land identified by the on-site assessment must still be treated as HPL under the interim clause 3.5(7) definition. However, the December 2025 amendments signal a clear policy direction that LUC 3 land is not intended to carry the same level of protection as LUC 1 and 2 land.

5. Non-productive land and modified areas

For an accurate assessment of LUC classification for a property, the assessment should be based on the current condition of the area (i.e. mapped in current state). This is important because some land management practices (e.g. the placement of tracks, excavation of drains, and general earthworks) result in irreversible changes to the soil (i.e. changes other than those that can be remediated by management practices and return the soil to its intrinsic state). These areas are referred to as non-productive land. Examples of non-productive land include native vegetation, wetlands and riparian areas, tracks, and buildings and curtilage.

Non-productive land can include areas where the soil has been modified by truncation, placement of fill or extensive mixing. Where these areas do not resemble a functioning soil, the areas are not considered to be available for primary production (i.e. they are non-productive land). Where these areas do resemble a functioning soil (such as the reinstatement of a soil profile following gravel extraction) the land can be assigned a LUC classification.

For this assessment the productive area of the Site (to which the LUC classification can be applied) is the Site area excluding non-productive land.

6. LUC and soil classification from available sources

The desktop assessment interpreted available regional scale map information, soil reports and geospatial data including:

- New Zealand Land Resource Inventory (NZLRI) layers, including the New Zealand Fundamental Soil Layer (NZFSL) and Land Use Capability Layer (providing map units of dominant soil type and LUC unit)[5]
- S-Map Online (providing map units of Soil Siblings)[6]
- Visual interpretation of aerial photos provided on Google Earth

Of the available map information sources, the S-Map Online soil map information, NZFSL and NZLRI map information are at a regional scale (approximately 1:50,000 scale).

The assessment included assessing the accuracy of soil and LUC map information, boundaries and soil 'types', LUC classes present. Areas of non-productive land are mapped based on current and historic aerial photography.

NZLRI (1:50,000 scale) soil and LUC classification

Based on the available NZLRI and NZFSL map information the soils and LUC units the Site are mapped as shown in **Figure 3**. Available NZLRI map information maps 100% of the property[7] as Kaipaki peaty loam and loamy peat (Organic Soil within the New Zealand Soil Classification[8]) on flat to gently undulating slopes (0-3°) with an LUC classification of LUC 2w2. The description given in the NZLRI layer for the assigned LUC 2w2 unit is "flat to undulating floodplains and terraces below 200 m with Organic soils developed on peat and alluvium in moderate (1100-1300 mm) rainfall areas, with a slight wetness limitation after drainage".

[5] https://lris.scinfo.org.nz/layer/48076-nzlri-land-use-capability-2021/
[6] https://smap.landcareresearch.co.nz/maps-and-tools/app/
[7] https://lris.scinfo.org.nz/layer/48134-nzlri-north-island-edition-2-all-attributes/
[8] Hewitt AE. 2010. New Zealand Soil Classification. 3rd ed. Landcare Research Science Series No. 1. Lincoln, Manaaki Whenua Press

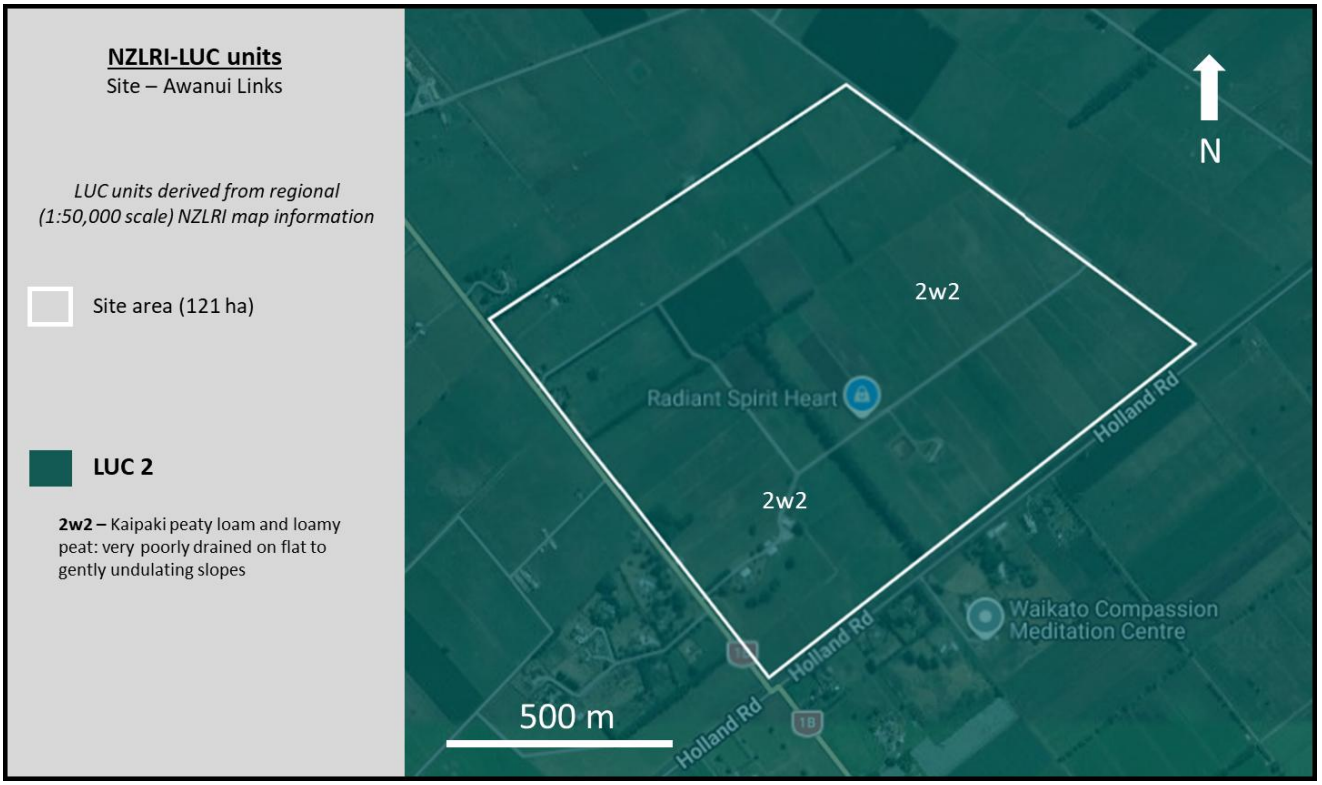

Figure 3: LUC units for the Site, derived from regional scale NZLRI-LUC map information.

Table 1 gives the general characteristics of the soils and LUC units as mapped in **Figure 3**. The approximate % cover of these regional NZLRI derived LUC units were estimated using Google MyMaps.

*Table 1. Summary of the NZLRI soil and LUC map unit characteristics and approximate % cover (estimated from **Figure 3**) of regional NZLRI derived LUC units within the Site.*

Soil type (NZSC Soil Order)	Parent material	Soil drainage	Slope class	LUC unit (limitation)	Area of total assessment area ha (%)*
Kaipaki peaty loam or loamy peat (Organic Soil)	Peat over alluvium (at > 1 m depth)	Very poorly drained	A	2w2 (wetness)	121 (100)

*% areas rounded to whole number.

Based on the available NZLRI and NZFSL map information the entire assessment very poorly drained Kaipaki peaty loam or loamy peat (Organic Soil) on flat to gently undulating slopes (0-3°) with an LUC classification of LUC 2w2 (**Table 1**).

S-Map Online

The S-Map soil map information is sourced from S-Map Online and is mapped at 1:50,000 scale. S-Map soil polygons are only available on the S-Map Online website. The soil names for each map unit are "soil siblings", with a probability of occurrence (%) and certainty rating provided for each soil sibling in a map unit.
S-Map Online identified the soils in the assessment area as Organic Soils (100%) (**Figure 4** and **Table 2**).

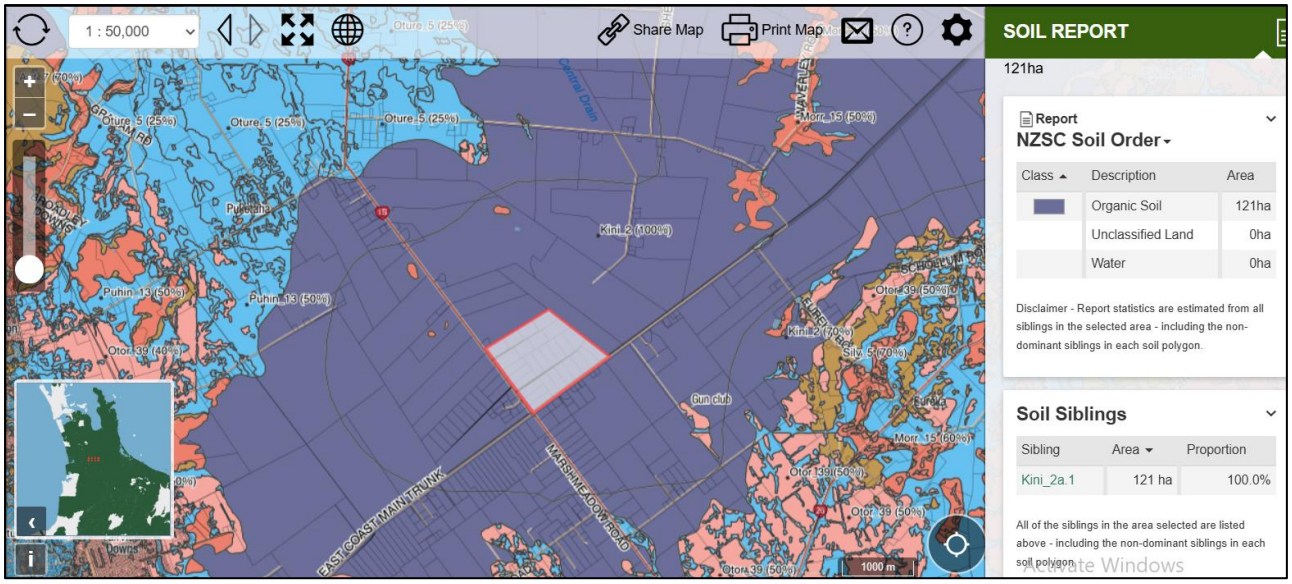

Figure 4: S-Map soil (Soil Order and soil sibling) distributions for the Site.

Table 2 provides a summary of the S-Map soil sibling map unit characteristics, including S-Map Family, S-Map Sibling, correlating Soil Series name, NZSC Soil Order, soil drainage, and their approximate proportions, for the Site. This information is derived from S-Map Online factsheets and can be sourced from the S-Map Online website[9].

Table 2. S-Map soil sibling map unit characteristics for the Site.

S-Map Family	S-Map Sibling	Soil Series name	NZSC (Soil Order)	Soil texture	Soil drainage	Soil depth	Proportion (%)
Kini	Kini_2.1	Kaipaki	Organic (OMA)	Peat	Very poorly drained	Deep (> 1 m)	100

The S-Map soil map information provides a more spatially detailed representation of the soils on the Site than the NZLRI 1:50,000 soil map information. However, because of the absence of land characteristics information (e.g. slope) for the soil map units, there is currently no direct correlation with LUC units. Some, but not all, of the S-Map soil map units correlate to the soil series identified by the NZLRI map information. In this report, we have retained the DSIR's soil nomenclature (e.g. soil type and series names) in preference to the S-Map soil sibling nomenclature to allow for direct correlation of the soils with the LUC units provided by the NZLRI map information and associated NZLRI Extended Legends.

Soil characteristics

Available NZLRI and S-Map Online soil map information mapped 100% of the Site as Kaipaki peaty loam and loamy peat (Organic Soil within the New Zealand Soil Classification[10]) (**Figure 5A**).

Organic soils have significant amounts of organic matter and form from vegetation that has accumulated in a permanently wet environment. By definition, "Organic Soils are soils that occur in

[9] https://smap.landcareresearch.co.nz/maps-and-tools/app/

[10] Hewitt AE. 2010. New Zealand Soil Classification. 3rd ed. Landcare Research Science Series No. 1. Lincoln, Manaaki Whenua Press

the partly decomposed remains of wetland plants (peats) or forest litter. Mineral soil material is commonly present but organic soil material is dominant".[11]

The typical soil-landscape relationship of Organic soils (peat soils) in the Waikato Basin is shown in **Figure 5B**. In the schematic, the Kaipaki Series has formed in peat which accumulated in the margins to centres of lakes or peat swamps, or backswamp areas (right hand side of Figure 5B). Kaipaki Series soils have a peat thickness of more than 1 m, and the organic material has decomposed (or humified) to such an extent that it is not possible to identify the peat-forming vegetation. Towards the margins of the peat swamp, the thickness of the peat diminishes and Organic soils give way to peaty Gley soils where there is a thin (less than 30 cm) humified peaty topsoil, with inorganic (often alluvium) beneath. Figure 5B also depicts subsidence of the original surface of the peat when artificial draining occurs (refer dashed black line). Average subsidence rates for peat in the Waikato agriculturally managed peatlands are estimated at 19 ± 2 mm yr.[12]

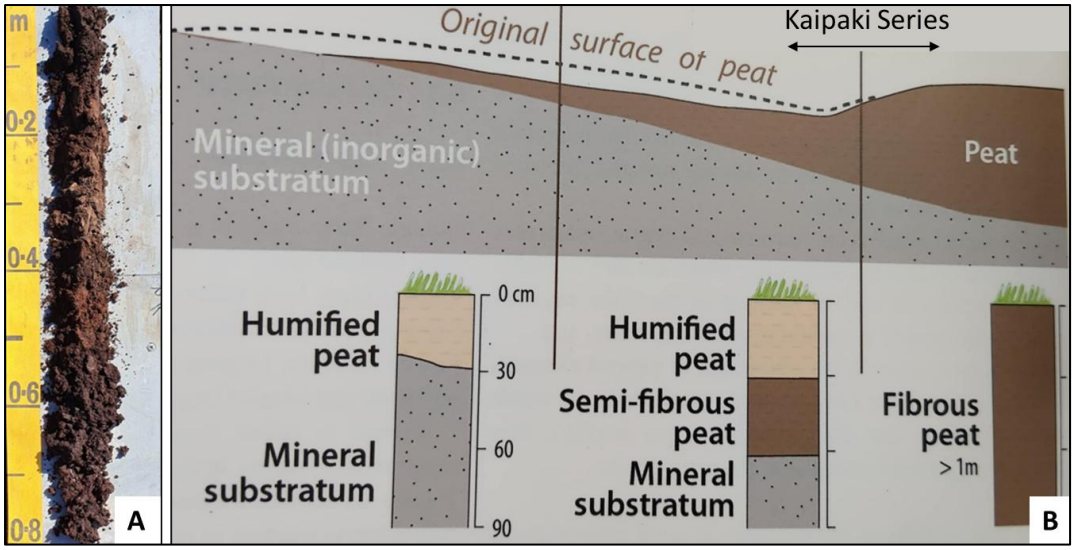

Figure 5. A) Example of a Kaipaki peaty loam soil profile; B) Soil-landscape relationship of Waikato Basin Organic Soils (modified from Hewitt et al. 2021). Increasing thickness of peat from left to right, moving from peaty Gley soils to shallow Organic soils, to deep Organic soils.

A typical Kaipaki peaty loam has a strongly decomposed topsoil and upper subsoil and moderately to weakly decomposed lower subsoil. At about 30 cm depth a discontinuous layer of pale sandy volcanic ash is common (**Figure 5A**).

In their natural state, Kaipaki Series soils are not particularly versatile due to their very poor drainage, however, with careful management using artificial drainage their versatility can increase. Conversely, even with drainage put in place, in some instances land can remain wet at least seasonally or a

[11] Hewitt AE. 2010. New Zealand Soil Classification. 3rd ed. Landcare Research Science Series No. 1. Lincoln, Manaaki Whenua Press

[12] Pronger J, Schipper LA, Hill RB, Campbell DI, McLeod M. 2014. Subsidence Rates of Drained Agricultural Peatlands in New Zealand and the Relationship with Time since Drainage. Technical reports - Landscape and Watershed Processes. Journal of Environmental Quality.

wetness limitation be present throughout most of the year. An on-site assessment would be required to accurately assess the drainage status of the Site.

Interpretation using aerial imagery

A time series of Google Earth aerial imagery from 1985 to 2025 was used to refine the regional mapping for the Site. Primarily, areas of clearly non-productive land were identified and mapped, and observations of relative soil wetness across the Site were also made. Only the non-productive areas were delineated remotely at a finer spatial resolution and are discussed further in Section 9.

Interpretation of the imagery indicates that the Site contains several non-productive features, including densely planted shelterbelts, buildings, gravelled tracks and races, main drains, dwellings with associated curtilage, and areas where soils have likely been modified by earthworks.

The imagery also suggests that drainage characteristics are not uniform across the Site. Variations in grass colour observed during particularly wet winters and dry summers, together with differences in surface drain density, imply spatial variability in soil drainage.

Without on-site assessment of soil drainage conditions—including identification of soil type, depth to hydromorphic features, pasture condition, presence of water-tolerant species, and observations of surface or shallow groundwater—it is difficult to confirm the accuracy of the regional LUC 2w2 classification across the Site. In some areas, greater wetness limitations may be present, indicating that portions of the Site could correspond more closely to LUC Class 3w land if the wetness limitation (w) is more pronounced.

7. WDP-OiP high class soil classification

Based on the available 1:50,000 scale NZLRI information and applying the Waikato District Plan-Operative in Part (WDP-OiP) high class soil definition, LUC 2w2 (peat) land is not considered high class soil (**Figure 6**).

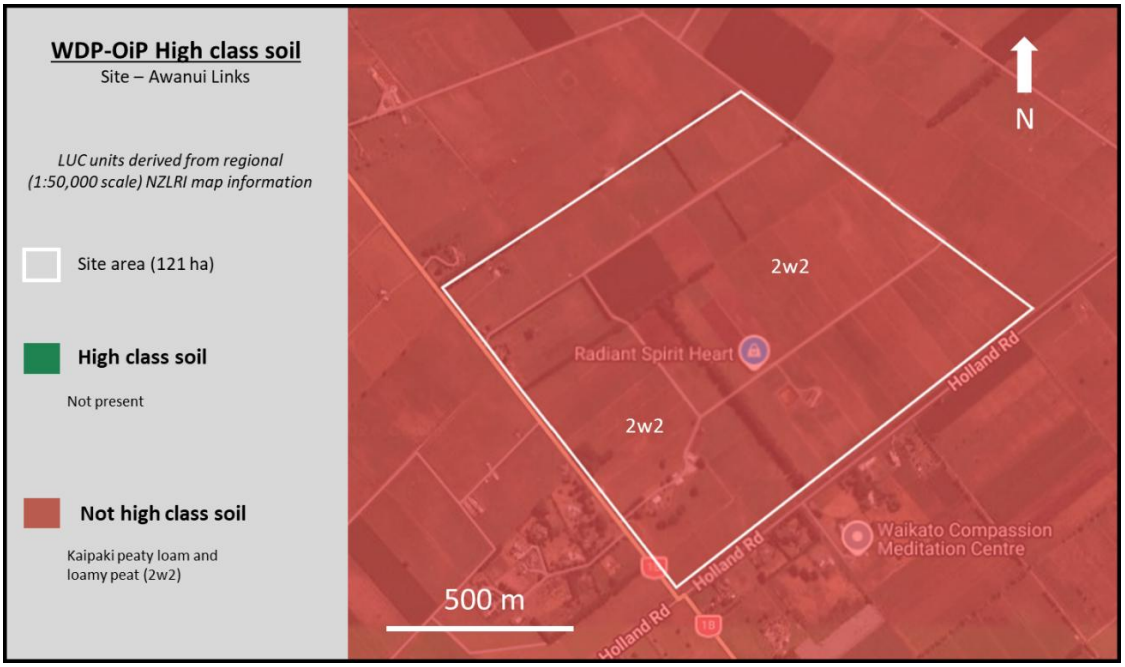

Figure 6. The distribution of WDP-OiP defined high class soil for the Site, based on the NZLRI (1:50,000 scale) map information.

8. NPS-HPL highly productive land classification

Based on the available 1:50,000 scale NZLRI information and applying the NPS-HPL, LUC 2w2 land is considered highly productive land (**Figure 7**).

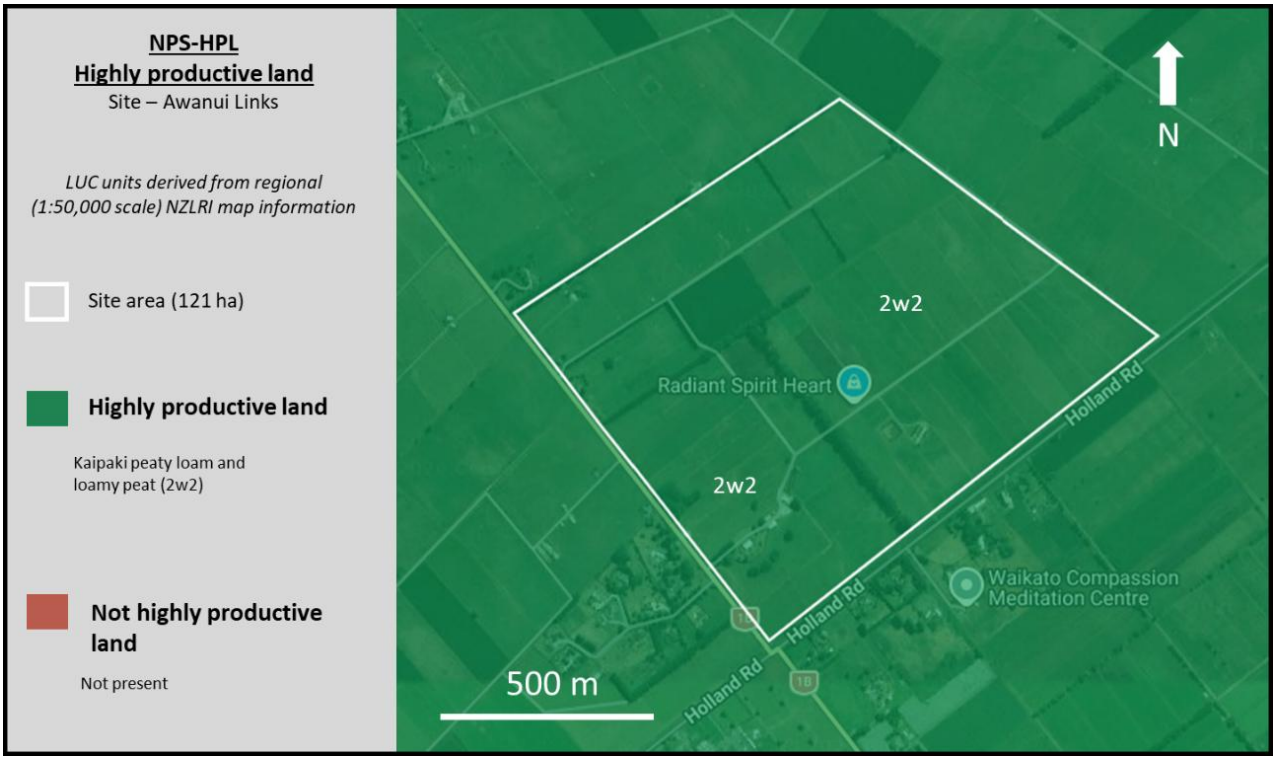

Figure 7. The distribution of NPS-HPL highly productive land for the Site, based on the NZLRI (1:50,000 scale) map information.

9. Revised LUC classification

Based on NZLRI and NZFSL mapping, the entire Site is classified as LUC 2w2 land—very poorly drained, deep Kaipaki peaty loam or loamy peat (Organic Soil) occurring on flat to gently undulating slopes. Interpretation of the time-series aerial imagery indicates that the NZLRI-delineated LUC 2w2 unit is likely to remain the dominant land-use capability across the Site, although localised areas may exhibit greater wetness limitations consistent with LUC Class 3w.

Analysis of the imagery further identified that approximately 12.87 ha (11%) of the Site comprises non-productive land, with the remaining 108.13 ha (89%) corresponding to LUC 2w2 Kaipaki peaty loam or loamy peat (**Table 4; Figure 8**).

Table 4. LUC classes, LUC units and dominant soil type within the Site, based on the LUC map units identified by the desktop assessment.

LUC class	Dominant LUC unit	Dominant soil type	LUC unit area, ha, (%)[$]
2	2w2	Kaipaki peaty loam and loamy peat	108.13 (89)
Non-productive land/modified soil			12.87 (11)

[$] % areas rounded to whole number.

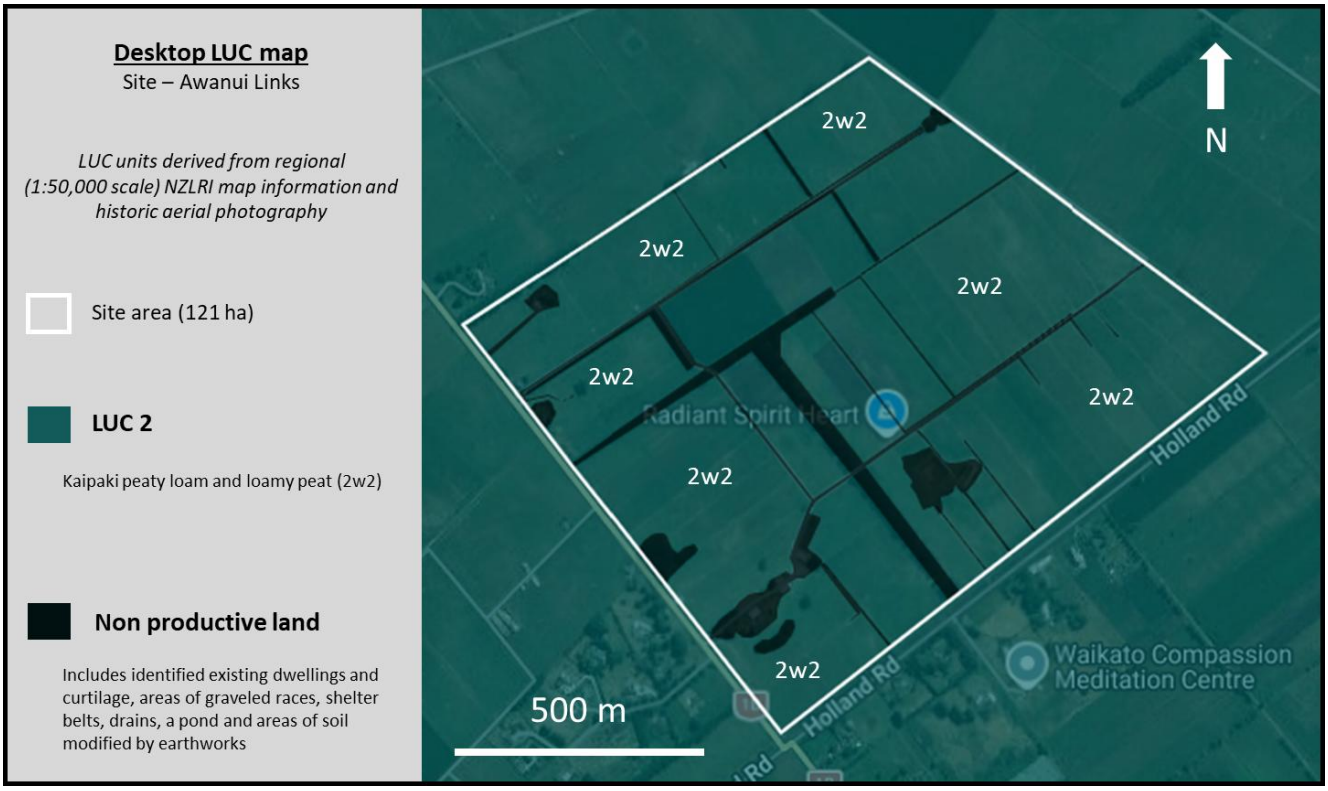

Figure 8: Revised LUC classification of the Site, incorporating non-productive land areas identified from time-series aerial imagery.

As discussed in Section 6, the LUC 2w2 unit is very poorly drained and has only a slight wetness limitation after drainage. If drainage is poorer than depicted on regional-scale maps, localised areas of LUC 3w land may be present.

LUC 3w land is characterised by wetness or waterlogging after drainage, representing a moderate wetness limitation. These areas can support arable cropping or pasture, but productivity may be limited by temporary waterlogging, restricted rooting depth, and reduced soil aeration. Special management, including drainage or conservation practices, may be required. Crop choice and cultivation intensity are constrained in these areas.[13]

LUC 2w2 peat soils are characterised by a slight wetness limitation relative to other poorly drained soils. Due to their organic nature and poor natural drainage, maintaining productivity typically requires careful management of soil moisture and drainage to prevent waterlogging and subsidence. In accordance with the LUC Handbook[14], classification as LUC 2w2 can be justified where permanent and effective drainage has been established. These soils are generally suitable for pasture and, under carefully managed conditions, may support limited arable cropping.

[13] Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, Newsome PJF 2009. Land Use Capability survey handbook – a New Zealand handbook for the classification of land. AgResearch Hamilton; Manaaki Whenua Lincoln; GNS Science Lower Hutt, New Zealand.

[14] Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, Newsome PJF 2009. Land Use Capability survey handbook – a New Zealand handbook for the classification of land. AgResearch Hamilton; Manaaki Whenua Lincoln; GNS Science Lower Hutt, New Zealand.

In contrast, LUC 3w peat soils exhibit a moderate wetness limitation, with waterlogging remaining persistent even where permanent and effective drainage has been established. This can restrict rooting depth and reduce soil aeration, resulting in more constrained productivity than on 2w2 peat soils. Consequently, additional management practices, such as controlled drainage, water table management, and careful selection of crops or pastures, are typically required to maintain performance and prevent soil degradation.

An on-site soil assessment would be required to confirm the presence and extent of any LUC 3w land within the Site.

It is important to note that any reclassification of LUC 2w2 (peat) land to a lesser LUC class, such as LUC 3w, would not alter the statutory recognition of high-class soil under the WDP-OiP, nor the designation of highly productive land under clause 3.5(7) of the NPS-HPL. However, the refined estimate of available productive land provides a basis for assessing the Site's productive capacity.

10. Comments on productive use

Organic (peat) soils

Based on regional-scale NZLRI and NZFSL mapping, the Site comprises 100% Organic (peat) soils, specifically Kaipaki peaty loam developed on more than 1 m of peat and alluvium over flat to gently undulating (0–3°) slopes (refer Table 2 and Figure 3). These peat soils are primarily used for dairy farming, with smaller areas utilised for seasonal arable cropping, such as maize for silage, and potentially horticultural use limited to blueberries.

Kaipaki peaty loam soils are naturally poorly drained and prone to subsidence when drained. Key properties include high organic carbon, low bulk density, high porosity, low bearing strength, and severe trafficability limitations, particularly when wet. Soil acidity varies depending on management, and available rooting volume and aeration are limited when water tables are kept high to minimise subsidence.

Soil Management Requirements

Peat soils require careful drainage and cultivation to establish productive pastures and crops. Long-term management must balance lowering the water table to allow production while maintaining sufficient moisture to minimise peat subsidence caused by oxidation, compaction, and consolidation. Nutrient management, particularly phosphorus, and soil pH adjustment are essential for maintaining productive capacity. Cultivation for seasonal arable crops, such as maize, can exacerbate peat subsidence and must be carefully managed.

Soil Wetness Limitations

The Site has soil wetness limitations, including high water tables and slow internal drainage, which restrict long-term land use to summer cropping and pastoral activities. Artificial drainage improves versatility, but the land remains seasonally wet. Seasonally high water tables and temporary surface inundation on LUC 2w2 and 3w1 areas may reduce crop yield or survival, making pastoral land uses with reduced stocking during wetter months the most suitable option. Drain maintenance is critical to maintain drainage efficiency.

Long-term productive capability

Despite inherent limitations, the Site can support intensive pastoral use, such as dairy farming, and seasonal arable cropping where conditions allow, with ongoing management of drainage, water tables, nutrients (particularly phosphorus), soil pH, and seasonal wetness. However, soil and land limitations restrict the type, intensity, and timing of productive land uses. Improved drainage can extend productive periods, but long-term deepening of drains may accelerate peat subsidence, lowering the soil surface. The low bulk density and high porosity of peat also limit trafficability during wet months.

Taking soil properties, wetness limitations, and subsidence risk into account, the Site is best suited to pastoral systems, with careful management required to maintain soil structure, minimise subsidence, and optimise productive use.

11.Summary

Based on NZLRI LUC mapping, 100% of the Site is considered highly productive land under NPS-HPL clause 3.5(7). Desktop assessment using regional-scale map information indicates that the mapped soils and LUC units are generally accurate, although drainage across the Site is variable. Localised areas of poorer drainage may exist and could be identified through property-scale assessment.

Analysis of aerial imagery shows that approximately 11% of the Site comprises non-productive land, including existing houses and curtilage, farm races, a pond, shelterbelts, and drains. Accounting for these areas, the remaining productive land is estimated at 108.13 ha, or 89% of the Site.

A detailed field assessment may identify localised wetter areas with greater soil wetness limitations, which may be classified as LUC 3w1 at property scale.

Based on 1:50,000 scale NZLRI LUC mapping, the identified LUC 2w2 peat is not classed as WDP-OiP high-class soil.

The Site's productive capacity is constrained by inherent soil wetness, peat soil subsidence, and severe trafficability limitations when wet. These constraints render the land incompatible with water-sensitive, deep-rooting horticultural crops (e.g., kiwifruit). The Site's best land use is pastoral use and limited seasonal arable cropping, which requires careful, long-term drainage management.

The 11% non-productive land causes internal fragmentation, which severely reduces the cohesion and spatial continuity of the remaining productive area. This isolation limits the land's potential for intensive, single-purpose uses, thereby lowering the overall long-term productive capacity.

To accurately assess the drainage status of the Site and confirm the soils, LUC units and areas of non-productive land on the Site, an on-site soil and LUC assessment is recommended for the Substantive Application under the Fast-track Approvals Act ('FTAA').

Appendix 1: Enlarged map image from Figure 8.