National Policy Statement for Highly Productive Land assessment of the Sunfield site, Ardmore.

Photo: Dr Peter Singleton (Natural Knowledge).

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Executive summary

This report presents an assessment of Sunfield Developments Limited's Sunfield site in Ardmore, focusing on its soil and land use capability under the National Policy Statement for Highly Productive Land 2022 (NPS-HPL). The assessment is based on a property-scale study conducted by Dr. Peter Singleton in 2020 (prior to the implementation of the NPS-HPL), supplemented with desktop analyses and discussions with Dr. Singleton.

The Sunfield site spans approximately 244.5 hectares, comprising a rural zoned area of 188.0 hectares and a 56.5 hectare Future Urban Development area. The assessment specifically covers the rural zoned area. Dr. Singleton's report provides detailed soil observations and land use capability classification, following New Zealand's accepted guidelines (Milne et al., 1995, and Lynn et al., 2009).

The NPS-HPL, in effect from October 17, 2022, defines "highly productive land" based on mapping and regional policy statements. However, since regional policy statement maps are not yet operational, the NPS-HPL requires identifying highly productive land by mapping based on New Zealand Land Resource Inventory (NZLRI) or more detailed mapping using Land Use Capability (LUC) classification.

The property-scale mapping provided in Dr. Singleton's report meets NPS-HPL requirements for identifying highly productive land. However, the assessment highlights several limitations on the site, particularly due to heavy clay soil textures (LUC 2e5 and 3e4) and wetness limitations (LUC 3w2 and 2w2). These restrictions reduce the range of viable primary production land uses, making intensive horticulture and cropping during wet periods unsustainable.

The site contains highly productive land areas (LUC 2s4) suitable for vegetable production and deep-rooting horticulture. However, their individual size and isolation from similar land with good drainage (LUC 2s4) or surrounding heavy clay soils (LUC 2e5 and 3e4) make them less practical for intensive primary production.

Soil factors that restrict land use options and may have relevance only when maps produced in accordance with clause 3.4 have been included in an operative regional policy statement:

- The poorly drained soils (LUC 3w2 and 2w2), although deemed to be highly productive land, are not LUC class 1 land (with deep and well drained soils) and are of lesser productive value and not suitable for intensive horticulture crops requiring deep, well drained soils.

Contents

1. Introduction

Sunfield Developments Limited have requested an assessment of the soil and LUC map units present on the site against the National Policy Statement for Highly Productive Land 2022 (NPS-HPL).

A field based property scale assessment of the Sunfield site has previously been undertaken by Dr Peter Singleton.

I have not undertaken a field visit or assessment and so the assessment provided is based on the site assessment information provided in Dr Singleton's report, discussion with Dr Singleton, and additional desktop analyses using regional scale soil and LUC map information and aerial photograph interpretation.

2. Sunfield site description

The Sunfield site is located in Ardmore, bounded by Ardmore Road to the north and Mill and Cosgrave Roads to the west. The site is approximately 244.5 ha, including a Future Urban Zone area of 56.5 ha and a Rural Zone area of 188.0 ha (**Figure 1**). This area is referred to as the 'Sunfield site' in this assessment.

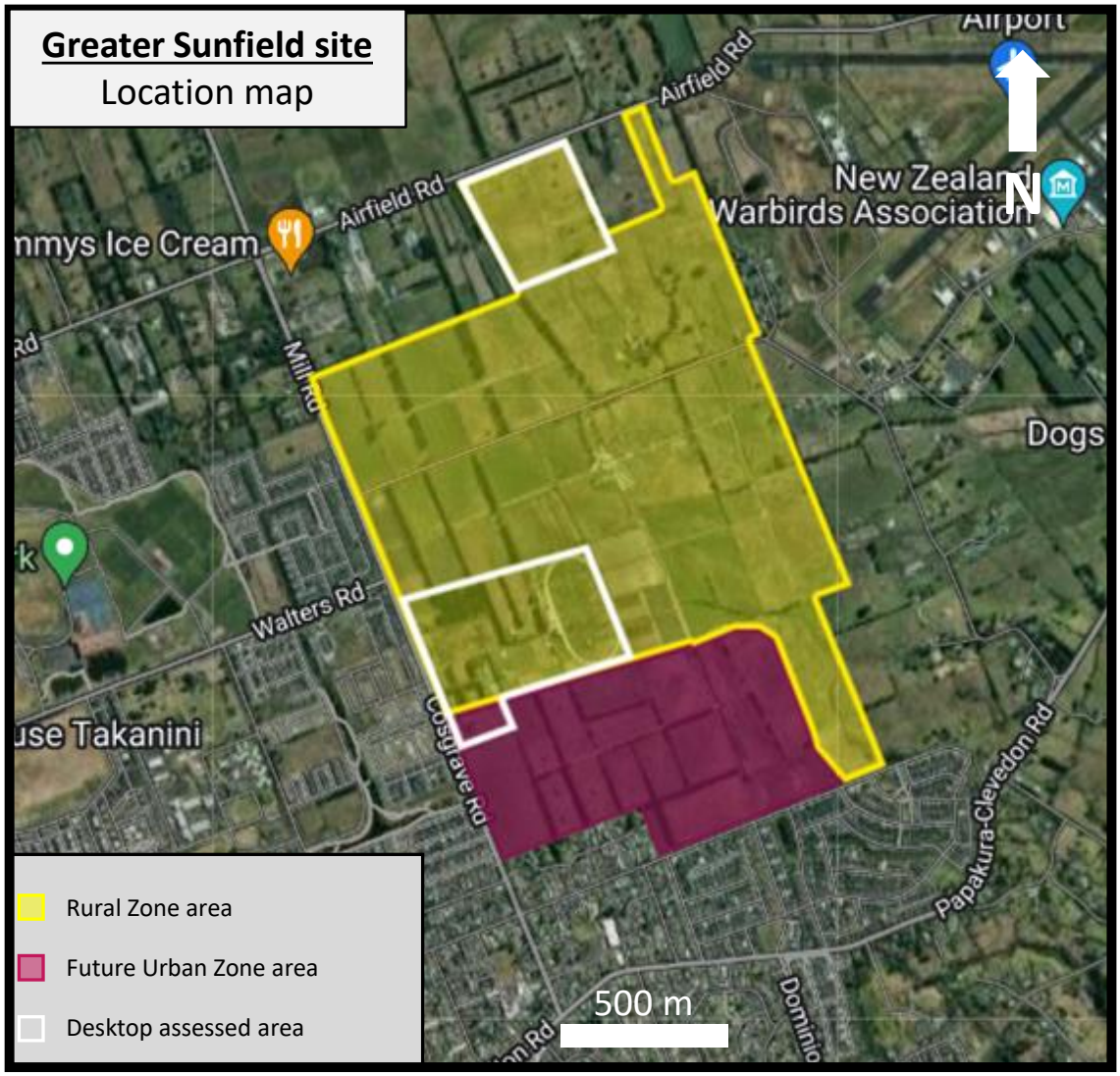

***Figure 1**. Greater Sunfield site, including the Future Urban Zone area.*

As Future Urban Zoned land is not covered under the NPS-HPL we have excluded the portion of the Sunfield site which is Future Urban Zoned land from this assessment.

It should be noted that the Future Urban Zoned land, like the balance of the Sunfield site, is not LUC class 1 land and has similar soil limitations. Similarly the land in the Future Urban Zone is of lesser productive value and not suitable for intensive horticulture crops requiring deep, well drained soils.

The NPS-HPL assessment presented in this report covers the rural zoned area (188.0 ha) shaded yellow shown in **Figure 1**.

A property scale land use capability and soil field assessment[1] is available for the site, excluding the desktop assessed areas (40.7 ha) shown by the blue boundary lines in **Figure 1.**

For the desktop assessed areas, aerial photo interpretation was used to delineate the non-productive areas, and available regional scale soil and LUC map information in combination with the maps provided in Singleton (2020) were used to approximate the LUC classes for the purpose of NPS-HPL assessment.

3. National Policy Statement for Highly Productive Land 2022

The National Policy Statement for Highly Productive Land 2022 (NPS-HPL)[2] came into force on the 17th of October 2022 (clause 1.2(1)).

"Highly productive land" is defined as:

> means 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).

My 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. 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, at the commencement date:
>
> (a) is
>
> (i) zoned general rural or rural production; and
>
> (ii) LUC 1, 2, or 3 land; but
>
> (b) is not:
>
> (i) identified for future urban development; 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.

[1] Singleton P. 2020. Land use capability and soil assessment – Hamlin Road, Ardmore. Natural Knowledge, Hamilton.

[2] National Policy Statement for Highly Productive Land 2022. September 2022.

The NPS-HPL includes the following guidance in clause 3.4(5):

> (5) For the purpose of identifying land referred to in subclause (1):
>
> (a) mapping based on the New Zealand Land Resource Inventory is conclusive of LUC status, unless a regional council accepts any more detailed mapping that uses the Land Use Capability classification in the New Zealand Land Resource Inventory.

4. Soil and LUC classification on the site

The 2020 land use capability and soil field assessment by Dr Singleton provides property scale soil and LUC map information covering most of the Sunfield site in this assessment.

The assessment by Dr Singleton included 25 detailed soil observations, augmented the soil observations with landform boundaries to assist land use capability classification of the soils. Underlying geology, surface soil, and other relevant physical features - slope, site wetness, and erosion or deposition were noted for each landform following the criteria provided in Lynn et al. (2009).

The methods used for the soil assessment and LUC classification followed the accepted approach and guidelines used in New Zealand for soil and LUC assessment, namely Milne et al. (1995)[3] and Lynn et al. (2009)[4], and other relevant reference sources which were referred to in the report and listed in the reference section of the report.

Soil names identified and LUC units used were those provided in the Manukau City Soil Map compiled by DSIR Soil Bureau (Purdie et al., 1981)[5] and the NZLRI South Auckland – Waikato region land use capability extended legend Jessen (1984)[6]. Dr Singleton likely retained the DSIR's nomenclature (soil names) for his soil map of the subject area (as opposed to S-Map soil sibling names) on the basis that planners and consultants generally use the same names, when supplying published (and unpublished) information about soil properties to local landowners.

The LUC classification method correctly describes, adopts, and applies the relevant existing LUC units provided by the LUC classes, sub-classes and units as defined for South Auckland (Jessen 1984).

A comparison of the NZLRI LUC classes for the area covering the site and that mapped at property scale and shown in Figure 6 of the report is provided in **Figure 2**.

[3] Milne JDG, Clayden B, Singleton PL, Wilson AD. (1995). Soil Description Handbook. Lincoln, New Zealand, Manaaki Whenua Press. 157p.

[4] 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.

[5] Purdie BR et al. (1981). Manukau City Soil Survey Progress Report. District Office Report HV5, Soil Bureau, DSIR.

[6] Jessen MR (1984). Additions to NZLRI South Auckland – Waikato region land use capability extended legend (2nd edition). Unpublished document, Water & Soil Division, MWD.

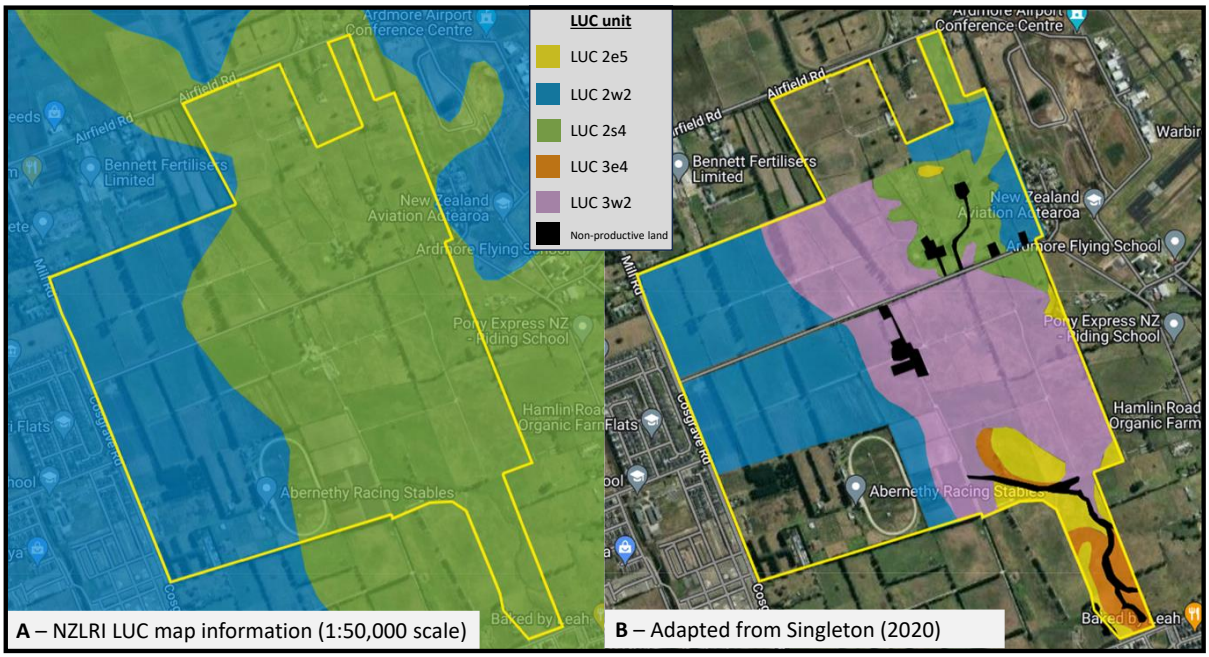

***Figure 2**. A comparison of (A) NZLRI LUC classes for the area covering the site and (B) LUC classes mapped at property scale by Dr Singleton for the Sunfield site.*

The main difference between the regional scale (NZLRI) and the property scale (Singleton 2020) LUC map information is the extent of the 2w2 and 2s4 land. The property scale mapping identified a greater area of 2w2 and a smaller area of 2s4, which was correctly mapped as predominantly 3w2. In general, the soil drainage of the site is poorer (not well drained) than indicated by the NZLRI map information.

The map information provided in Dr Singleton's report correctly uses LUC classification methods and is of greater detail and accuracy that the regional scale NZLRI map information.

As such, the map information provided in Dr Singleton's report meets the requirements for identifying NPS-HPL highly productive land at property scale as required by NPS-HPL clause 3.4(7).

5. Soil features and sustainable land use options

Limiting soil features (as indicated by LUC class limitation criteria) may impact on the range of land use options available to the Sunfield site. The estimated distribution of soils with a wetness limitation is shown in **Figure 3**.

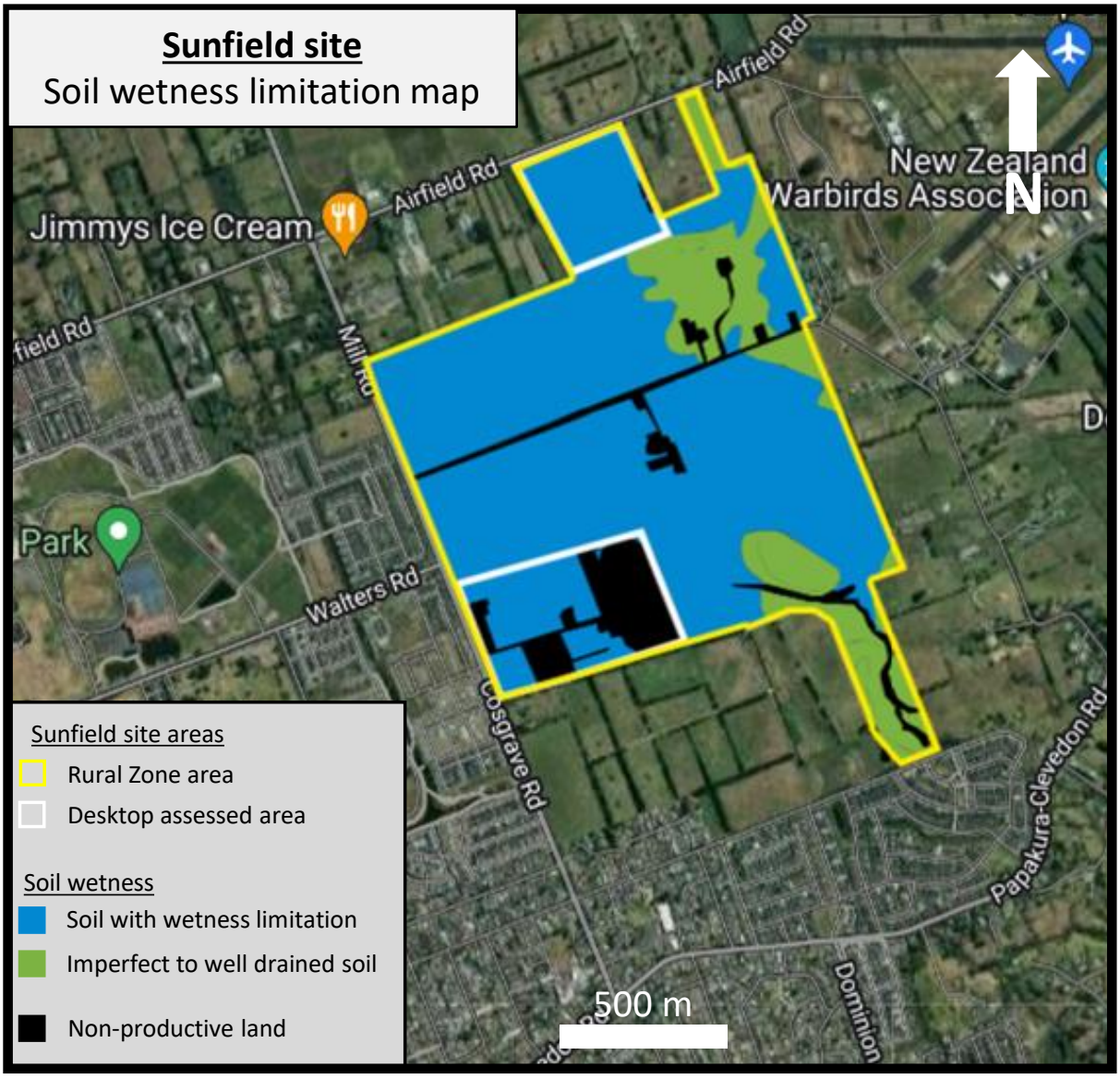

***Figure 3**. The distribution of soil with a wetness limitation (LUC 3w2 and 2w2) identified at property scale for the Sunfield site.*

A summary of the soil features and assessment of the sustainable land use options based on the limitations of the soils mapped at property scale on the Sunfield site is as follows:

Karaka (LUC 2s4 - well to moderately well drained)

The Karaka soils (LUC 2s4) on the site is well drained and moderately well drained, on flat to gently undulating slopes, and capable of continuous cultivation.

Brookby (LUC 3e4 and 2e5 – imperfectly drained)

The Brookby soils (LUC 2e5 and 3e4) on the site are imperfectly drained, on undulating to rolling slopes. Although classed as highly productive land when applying the NPS-HPL, imperfect drainage and heavy clay textures make cropping (cultivation) very difficult. It should be noted that these clays are heavier and stickier than those of the Patumahoe soils which in contrast are favourable for continuous cultivation. Where situated on rolling slopes

there is an increased erosion risk if cultivated. They are productive land but at best limited to pastoral land uses.

Clevedon (LUC 2w2 and 3w2 – poorly drained)

The Clevedon soils (LUC 2w2 and 3w2) on the site are poorly drained on flat to gently undulating slopes. Although classed as highly productive land when applying the NPS-HPL, these soils have poor drainage and clay texture that makes cropping (cultivation) unstainable over winter months and very difficult throughout the remainder of the year. Again, it should be noted that these clays are heavier and stickier than those of the Patumahoe soils which in contrast are favourable for continuous cultivation. Also noted is the limitation of acidic conditions which requires ongoing soil pH management to enable production. They are productive land but at best limited to pastoral land uses.

Ardmore (LUC 2w2 – poorly drained)

The Ardmore soils (LUC 2w2) on the site are poorly drained on flat to gently undulating slopes. Although classed as highly productive land when applying the NPS-HPL, these soils have poor drainage and peat texture that makes cropping very difficult throughout the year. With excessive drainage and cultivation the soils are prone to increased subsidence. Also of note is the limitation of acidic conditions which requires ongoing soil pH management to enable production. They are productive land but at best limited to pastoral land uses and occasional seasonal cropping.

6. LUC classes surrounding the site

The distribution of LUC classes for the area surrounding the Sunfield site (based on the NZLRI 1:50,000 scale map information) is shown in **Figure 4**.

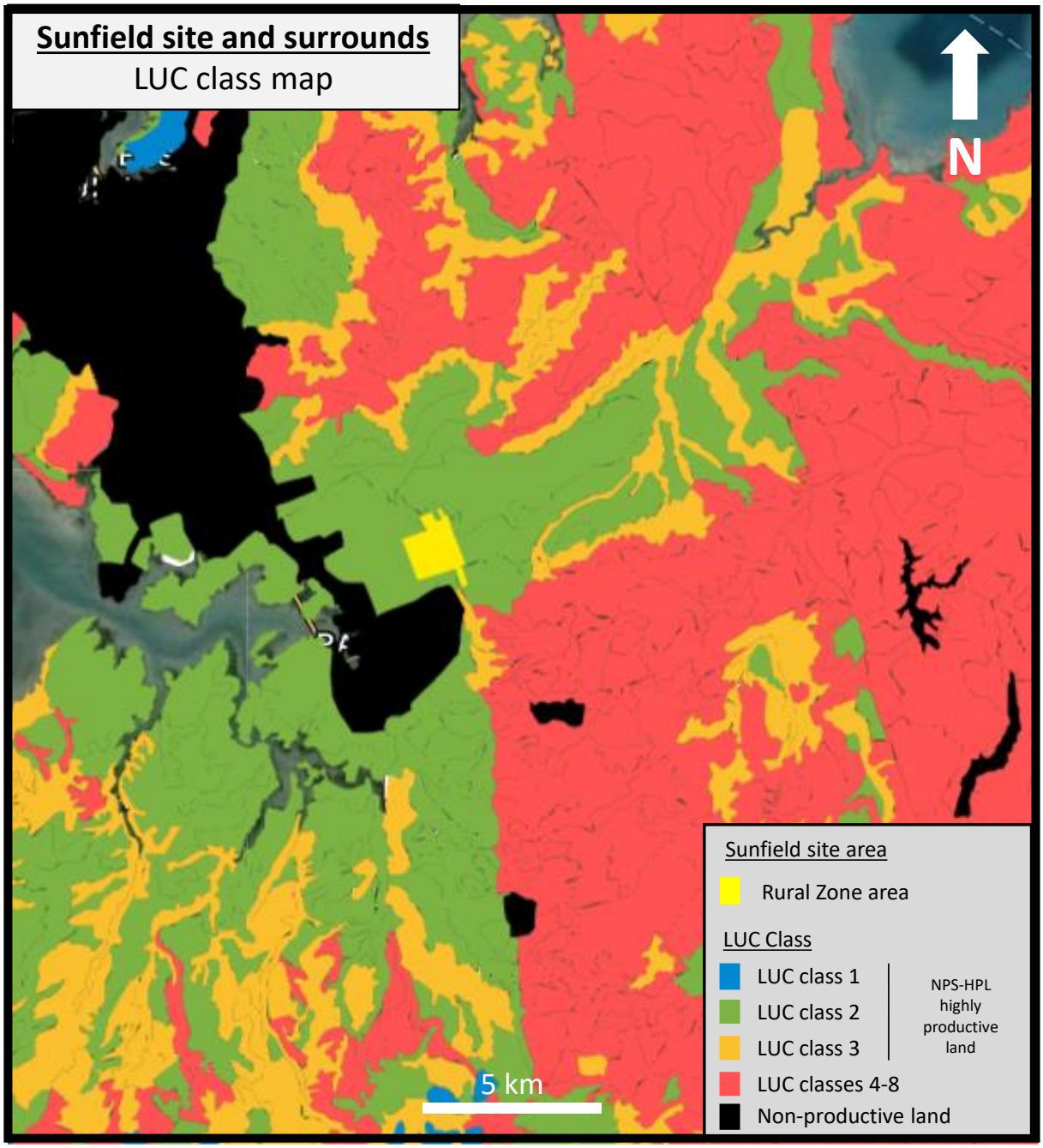

***Figure 4**. The distribution of NZLRI LUC classes surrounding the Sunfield site.*

Figure 4 shows that there is no LUC class 1 land surrounding the Sunfield site, only LUC class 2 (green) and non-productive land (black).

7. NPS-HPL highly productive land on the site

The estimated distribution of NPS-HPL highly productive land is shown in **Figure 5.**

***Figure 5**. The distribution of NPS-HPL highly productive land identified at property scale for the Sunfield site.*

Applying the NPS-HPL, the productive land on the site is classed as highly productive land.

The highly productive land on the site is LUC class 2 and 3 land but the site does not contain any LUC class 1 land.

The areas on the site that are not classed as highly productive land are the areas of non-productive land, which include a racetrack, buildings and curtilage, tracks and roads, and riparian areas.

8. NPS-HPL highly productive land surrounding the site

The distribution of NPS-HPL highly productive land for the area surrounding the Sunfield site (based on the NZLRI 1:50,000 scale map information) is shown in **Figure 6**.

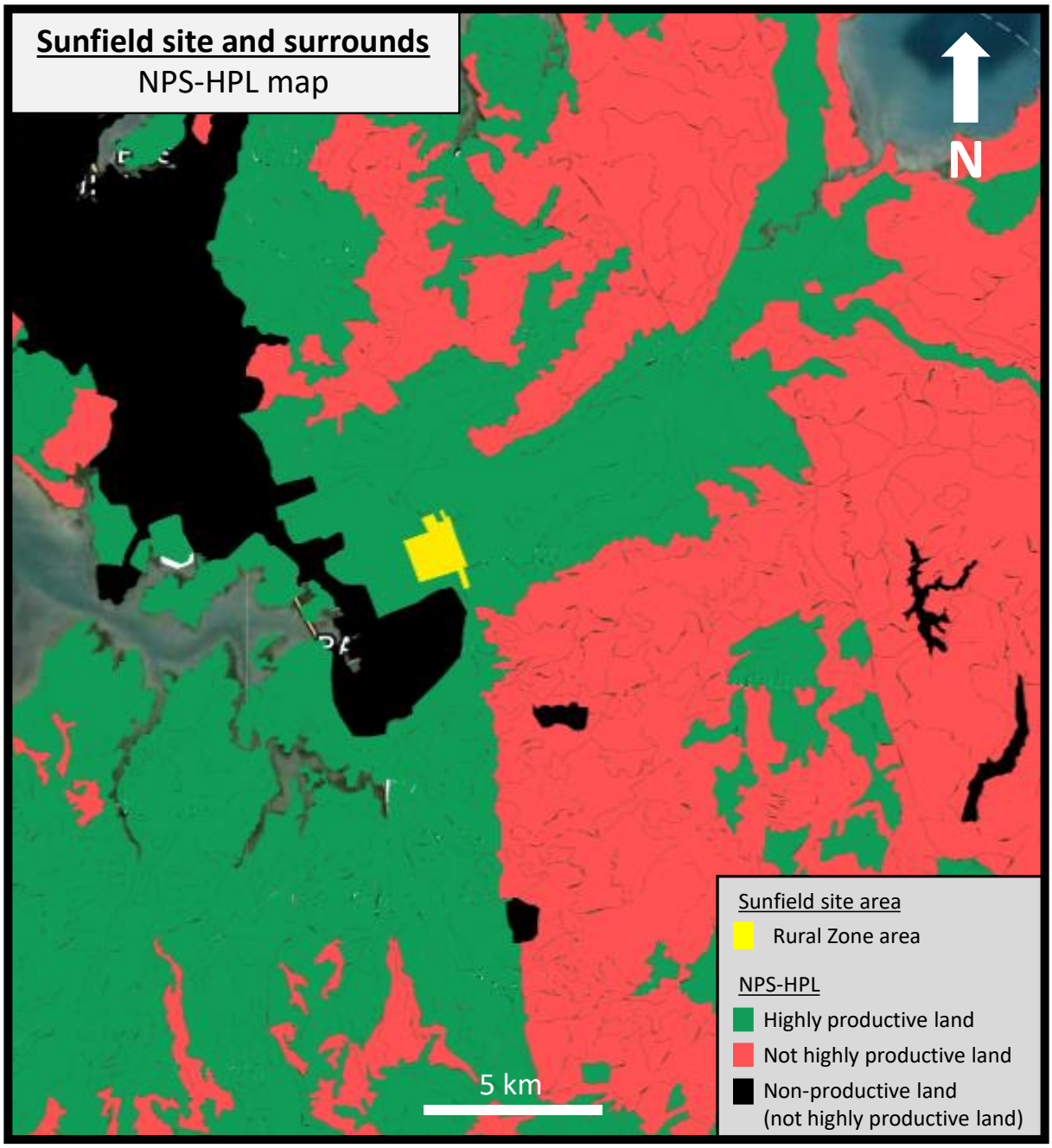

***Figure 6**. The distribution of NPS-HPL highly productive land surrounding the Sunfield site.*

Figure 6 shows that there is NPS-HPL highly productive land (green) bordering the Sunfield site to the north and east. However, some parts of the Sunfield site boundary in these directions is bordered by non-productive land.

Additionally, **Figure 6** shows that the Sunfield site is bordered to the west by existing urban development, to the east by Ardmore airport and urban development, and to the south by existing and future urban development. These areas are non-productive land.

9. NPS-HPL comments

Although the land on the Sunfield site is classed as NPS-HPL highly productive land, the majority of the soils (excepting the areas of LUC 2s4) on the site have heavy clay soil textures (LUC 2e5 and 3e4) and/or wetness limitations (LUC 3w2 and 2w2) that restrict the range of primary production land uses that would be viable. For these areas, cultivation during wetter periods is not sustainable and the soils are not suitable for deeper rooting horticultural crops requiring deep, friable, well drained soils (i.e. the range of sustainable land uses is restricted).

The highly productive land areas that are moderately well to well drained (LUC 2s4) do have soils suited to vegetable production and deep rooting horticulture. However, individually they are limited in area and use of these areas for such primary production enterprises is not likely to be practical. Additionally, the areas are isolated from other land with similar characteristics. They are surrounded by areas that have heavy clay soil textures (LUC 2e5 and 3e4) or are poorly drained (LUC 2w2 and 3w2) highly productive land. The soil wetness limitations, and limited distribution of the well drained soils reduce the productive potential of the highly productive land on the site as a whole.

Soil factors that restrict land use options and may have relevance only when maps produced in accordance with clause 3.4 have been included in an operative regional policy statement, include:

- The poorly drained soils on the site (LUC units 3w2 and 2w2), although considered highly productive land, are not LUC class 1 land (with deep and well drained soils) and are of lesser productive value and not suitable for intensive horticulture crops requiring deep, well drained soils.

10. Key points

The highly productive land on the Sunfield site is LUC class 2 and 3 land but the site does not contain any LUC class 1 land.

The poorly drained soils (LUC units 3w2 and 2w2) on the site, although considered highly productive land, are not suitable for intensive horticulture crops requiring deep, well drained soils.