

Irrigation Water Take Consent

Resource Consent Application & Assessment of Environmental Effects

FAR NORTH AVOCADOS LIMITED

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Irrigation Water Take Application

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1. Introduction

This document and attachments comprise a Resource Consent Application and an associated Assessment of Environmental Effects for the purpose of obtaining groundwater take permits for Far North Avocados Limited located at on Henderson Bay Road, approximately 500 m northeast of the intersection with Far North Road. Far North Avocados is seeking irrigation water for the development of an orchard with a total area of 9.6 hectares.

The analysis of effects for the aforementioned property is considered in tandem with two concurrent but separate applications for a new groundwater takes. One is for Henderson Bay Avocados Limited, located at 5126 Kimberly Road, directly adjacent to the Far North Avocados property, and the other application is for a nearby orchard, Waikopu Avocados Limited located at 367 Kimberly Road.

The background details of this application using Northland Regional Council's (NRC) "Application for Resource Consent" form is provided in **Appendix A**. Further details of various items where marked on the form are provided in the **Section 2**.

1.1 Report Structure

The report comprises:

- **Section 2** – a description of the proposed activity and suggested consent conditions;
- **Section 3** – background details of the application;
- **Section 4** – an assessment of environmental effects;
- **Section 5** – an assessment of cultural effects;
- **Section 6** - an assessment of statutory considerations;
- **Section 7** – a discussion of the notification process;
- **Section 8** – a discussion consideration of consultation; and
- **Section 9** – summary and conclusions.

2. Description of Proposed Activity

2.1 Location

Figure 1 provides a map of the project area for the proposed Far North Avocados orchard development on the north side of Henderson Bay Road (Lot 1, DP 515085), approximately 500 m northeast of the intersection with Far North Road.

The Waikopu Avocados and Henderson Bay Avocados properties are included in **Figure 1** because of groundwater takes applications that are being submitted concurrently with the Far North Avocados consent application.

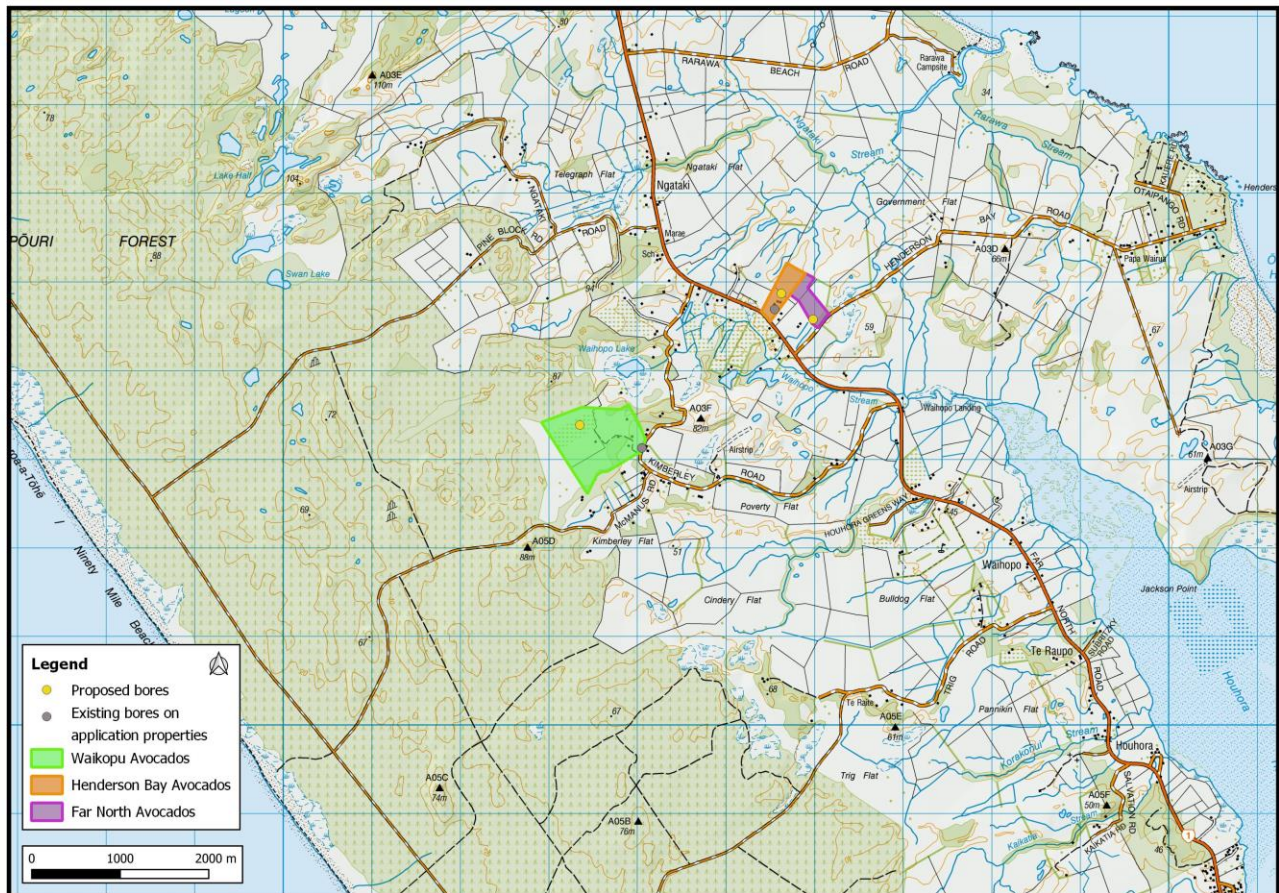


Figure 1. Project location map.

2.2 Description of Proposed Activity

The resource consent application for Far North Avocados Limited is to take and use groundwater for the development of a 9.6 hectare orchard with an anticipated canopy area of 8 hectares.

Maximum daily volumes have been calculated at 25 m³/ha/day over the total orchard area, in accordance with the decision made in the Motutangi-Waiharara Water User Group (MWWUG) decision¹.

¹ The maximum daily volume can also be calculated on the basis of 41.6 m³/day per canopy hectare (4.16 mm irrigation system capacity) on the basis of a peak daily soil requirement of 3.74 mm/day per canopy hectare and allowing for 10% system losses in delivery and application.

The maximum annual volume has been calculated on the basis canopy area being 80% of total orchard area and an annual application volume of 400 mm, which is consistent with the NRC recommendation in the MWWUG Hearing². This irrigation requirement is adequate to meet up to a 1 in 10 years drought requirement (**Section 3.1.4**).

2.2.1 Consent Duration, Lapse and Review

A consent duration of 30 years is sought subject to a lapse period of 5 years from commencement of consent, and review conditions have been proposed for the purposes laid out in **Section 2.3**.

2.3 Proposed Consent Conditions

This section contains the proposed conditions for the water permit sought by the Applicant.

Water Extraction Volumes Far North Avocados Limited (Lot 1 DP 515085)

1. The rate of take shall not exceed the limits set out as follows:
 - (a) Maximum daily volume of 240 m³/day (being any 24 consecutive hours); and
 - (b) Maximum annual volume of 32,000 m³/annum (being 1 July to 30 June).

Notification of Irrigation

2. The Consent Holder shall advise the Council's assigned Monitoring Officer in writing when irrigation is to commence for the first time each season, at least five days beforehand.

Metering and Abstraction Reporting

3. The Consent Holder shall install a meter to measure the volume of water taken, in cubic metres, from each production bore. Each meter shall:
 - (a) Be able to provide data in a form suitable for electronic storage;
 - (b) Be sealed and as tamper-proof as practicable;
 - (c) Be installed at the location from which the water is taken; and
 - (d) Have an accuracy of +/-5%.

The Consent Holder shall, at all times, provide safe and easy access to each meter installed for the purposes of undertaking visual inspections and water take measurements.

4. The Consent Holder shall verify that the meter required by Condition 3 is accurate. This verification shall be undertaken prior to 30 June:
 - (a) Following the first taking of water from each production bore; and
 - (b) At least once in every five years thereafter.

Each verification shall be undertaken by a person, who in the opinion of the Council's Compliance Manager, is suitably qualified. Written verification of the accuracy shall be provided to the Council's assigned Monitoring Officer by 31 July following the date of each verification.

² The maximum annual volume can also be calculated on the basis of approximately 97 days at full daily volume, which is equivalent to approximately 400 mm/year. In practice the maximum daily rate will only be required on consecutive days during the peak of summer and when this coincides with drought.

5. The Consent Holder shall, using the meter required by Condition 3, keep a record of the daily volume of water taken from each production bore in cubic metres, including all nil abstractions.
6. If the instantaneous rate of taking is equal to or greater than 10 litres per second, then the water meter required by Condition 3 shall have an electronic datalogger for automatic logging of meter data. A copy of the electronic data records shall be forwarded to Council's assigned Monitoring Officer by the 7th of the following month, and immediately on written request from the assigned monitoring officer.
7. The Consent Holder shall measure, and keep a record of, the static water level in each production bore at least once each month. This measurement shall be taken at least eight hours after cessation of pumping. The Consent Holder shall also monitor electrical conductivity at least once a month during any irrigation season when the bore is in use.
8. A copy of the records required to be kept by Conditions 5, 6 and 7 for the period 1 July to 30 June (inclusive) shall be forwarded each year to the Council's assigned Monitoring Officer by the following 31 July. In addition, a copy of these records shall be forwarded immediately to the Council's Compliance Manager on written request. The records shall be in an electronic format that has been agreed to by the Council.

Advice Note: If no water is taken during the period 1 July to 30 June (inclusive) then the Consent Holder is still required to notify the Council's Monitoring Manager in writing of the nil abstraction. Water use record sheets in an electronic format are available from the Council's website at www.nrc.govt.nz/wur.

9. Easy access for a water level probe shall be provided and maintained at the production bore wellhead to enable the measurement of static water levels in the bore.

Water Use Efficiency

10. The Consent Holder shall prepare an Irrigation Scheduling Plan (ISP) that outlines how irrigation decisions will be made. The ISP shall be prepared by a suitably qualified and experienced person and submitted to the Council's Compliance Manager for written approval. The ISP shall, as a minimum, address:
 - Water balance and crop water requirements;
 - Subsurface drainage; and
 - Overall irrigation strategy.

For each irrigation area, the ISP should include:

- (a) A description of how water requirement for each irrigation cycle is calculated;
- (b) Method(s) for assessing current soil moisture levels;
- (c) Method(s) for assessing potential evapotranspiration (PET) and rainfall to date;
- (d) Assessment of other inputs such as effluent irrigation and effect on irrigation requirement;
- (e) Soil moisture target to be maintained in each zone by irrigation;
- (f) How measured data will be used to assess irrigation requirements over the next irrigation cycle; and
- (g) A description of proposed method(s) for remaining within consent limits at each borehole or group of boreholes.

Advice Note: The ISP seeks to ensure that an irrigation efficiency of a minimum 80% is achieved.

11. The Consent Holder shall not exercise this consent until the ISP required by Condition 10 has been certified by the Council's Compliance Manager.
12. The ISP certified in accordance with Condition 11 shall be implemented prior to the first irrigation season, unless a later date has been approved in writing by the Council's Compliance Manager.
13. The Consent Holder shall, within six months of the first exercise of this consent, undertake an audit of the irrigation system and the ISP described in Condition 10 using a suitably qualified and experienced person. The irrigation system audit shall be prepared in accordance with Irrigation New Zealand's "Irrigation

Evaluation Code of Practice" (dated 12 April 2010), including recommendations on any improvements that should be made to the system to increase water efficiencies. The results of the audit and its recommendations shall be submitted in writing to the Council's assigned Monitoring Officer within one month of the audit being undertaken. A follow-up audit shall occur at five yearly intervals throughout the term of this consent, with a focus on the efficiency of water use.

14. The Consent Holder shall, within three months of notification in writing by the Council's Compliance Manager, implement any recommendations of the audit referred to in Condition 13.
15. The reticulation system and components shall be maintained in good working order to minimise leakage and wastage of water.
16. There shall be no significant ponding of irrigated water within any irrigated area, or significant runoff from either surface or subsurface drainage to a water body, as a result of the exercise of this consent.

Review Condition

17. The Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions annually during the month of June for any one or more of the following purposes:
 - (a) To deal with any adverse effects on the environment that may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
 - (b) To review the allocation of the resource.

The Consent Holder shall meet all reasonable costs of any such review.

Lapsing Condition

18. This consent shall lapse on the **30 June 2023**, unless before this date the consent has been given effect to.

Advice Note: An application can be made to the Council in accordance with Section 125 of the Act to extend the date after which the consent lapses. Such an application must be made before the consent lapses.

EXPIRY DATE: 30 June 2048

3. Background Information

3.1 Site Conditions

3.1.1 Soils

There is no Landcare Research S-Map soil data available for this site, however there is Fundamental Soil Layer information, pre-dating S-Map, which describes the soil around the property as having typic sandy brown soils³, which occur in areas where summer drought and winter waterlogging do not generally occur. These soils display the following properties:

- *Physical properties* - Brown soils are relatively stable topsoils with a well-developed structure, with sandy brown soils dominated by coastal and loamy sand.
- *Chemical properties* - Brown soils have low to moderate base saturation.
- *Biological properties* - Brown soils are associated with high biological activity (earthworms are prominent).

3.1.2 Geology

The property is underlain by the Aupouri Aquifer – an extensive sequence of sand, peat and shellbed that covers an area of approximately 79,000 hectares extending from Ahipara in the south to Ngataki in the north. The aquifer is underlain by older low permeability Cenozoic and Mesozoic age basement rocks.

Fine sand is the dominant sediment within the Aupouri Aquifer, which vary in thickness from a few meters near the hard rock boundaries to over 100 m in some places. The sand sequence is interspersed with multiple discontinuous layers of alternating iron pan (sand stone), clay and peat, which reside across the entire peninsula typically in the upper portion of the aquifer. These deposits are associated with ancient wetlands.

The aquifer is underlain to the east by volcanic basement rocks that outcrop forming Mount Camel. These rocks most likely extend at some depth across the subsurface of the Aupouri Peninsula together with greywacke, argillite and indurated conglomerate deposits of the same age.

3.1.3 Hydrogeological Interpretation

The surficial sand deposits generally become progressively younger, unconsolidated and mobile towards the west. These younger sands have higher permeability than the sands in the east, which tend to be more weathered and contain cemented iron pans close to the surface.

With increasing depth, the presence of shell-rich sands increases, which is important from a water yield perspective as the shellbeds typically have significantly higher hydraulic conductivity (ability to transmit water) than the finer sands. The shellbed is the target aquifer for orchard irrigation water and typically resides at depths from 70 – 140 m below ground level.

All the basement rocks in the area are known to be low permeability.

3.1.4 Irrigation Requirements

The peak water requirement is 26 m³/day per canopy hectare, which is equivalent to 2.6 mm per day. The irrigation requirement was simulated on a daily basis with the Soil Moisture Water Balance Model (SMWBM) using historical rainfall and evaporation data from 1957 to 2016. The simulation results are portrayed statistically on a monthly basis in **Figure 2**, which is a box and whisker plot showing the monthly median, lower quartile (25th percentile), upper quartile (75th percentile) and minimum and maximum recorded monthly values. The graph shows the seasonal irrigation profile and likelihood of water requirements each month.

³ <https://soils.landcareresearch.co.nz/describing-soils/nzsc/soil-order/brown-soils/>

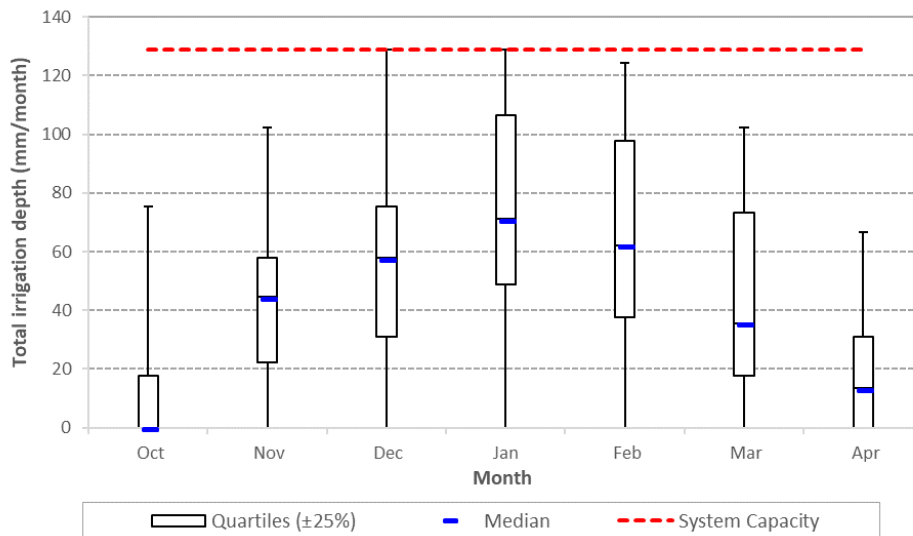


Figure 2. Simulated monthly statistical irrigation profile.

During the irrigation season, the rate of application will remain the same, but the number of days between irrigation events will increase during the shoulders of the season (i.e. typically in spring and autumn), which is exemplified in the monthly statistics shown in **Figure 2**.

Table 1 provides information on the frequency of monthly irrigation requirements and the number of days irrigation is likely required. The 1-year recurrence interval represents the typical monthly requirements and indicates that on average irrigation will not be required in October and April, and between November and March will vary from 18 mm to 47 mm per month.

In a 10-year drought year, the irrigation requirement for the season is likely to approximately 400 mm, with peak monthly totals up to approximately 120 mm, hence the amount of water being applied for is adequate to fully meet the requirements up to the 10-year drought.

Table 1. Frequency of monthly and annual irrigation requirements (mm) and days of irrigation [days].

Average Recurrence Interval	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Annual
1 yr	0 [0]	23 [6]	31 [7]	47 [11]	40 [10]	18 [4]	0 [0]	250 [60]
2 yr	0 [0]	44 [11]	58 [14]	69 [17]	62 [15]	36 [9]	16 [4]	307 [74]
4 yr	18 [4]	58 [14]	76 [18]	107 [26]	98 [24]	74 [18]	31 [7]	369 [89]
5 yr	18 [4]	62 [15]	76 [18]	107 [26]	98 [24]	80 [19]	40 [10]	382 [92]
10 yr	31 [7]	76 [18]	104 [25]	117 [28]	116 [28]	84 [20]	50 [12]	401 [96]
100 yr	53 [13]	102 [25]	124 [30]	129 [31]	124 [30]	100 [24]	64 [15]	545 [131]

Table 2 provides the orchard water balance under dryland and irrigated conditions and **Figure 3** shows the mean monthly seasonal breakdown of this data. The data represents the mean annual water balance

components from the 59-year simulation. It is evident that under the irrigated orchard profile, soil moisture content typically resides at a higher status (which is the intention) during summer, and surface runoff, sub-soil drainage, soil evaporation and canopy interception all increase.

However, avoidable losses due to surface runoff have not change appreciably, and the additional runoff that has occurred is due to rainfall excess rather than too much irrigation, demonstrating that the irrigation applications of 4.16 mm/day are efficient.

Table 2. Summary of average annual water balance components under irrigated and unirrigated profiles (mm/yr unless specified otherwise).

Annual Average	Dryland	Irrigated
Average Soil Moisture Content (mm)	92	104
Sub-Soil Drainage	452	522
Surface Runoff	93	105
Soil ET	467	547
Canopy Interception	179	284
TOTAL	1,191	1,458

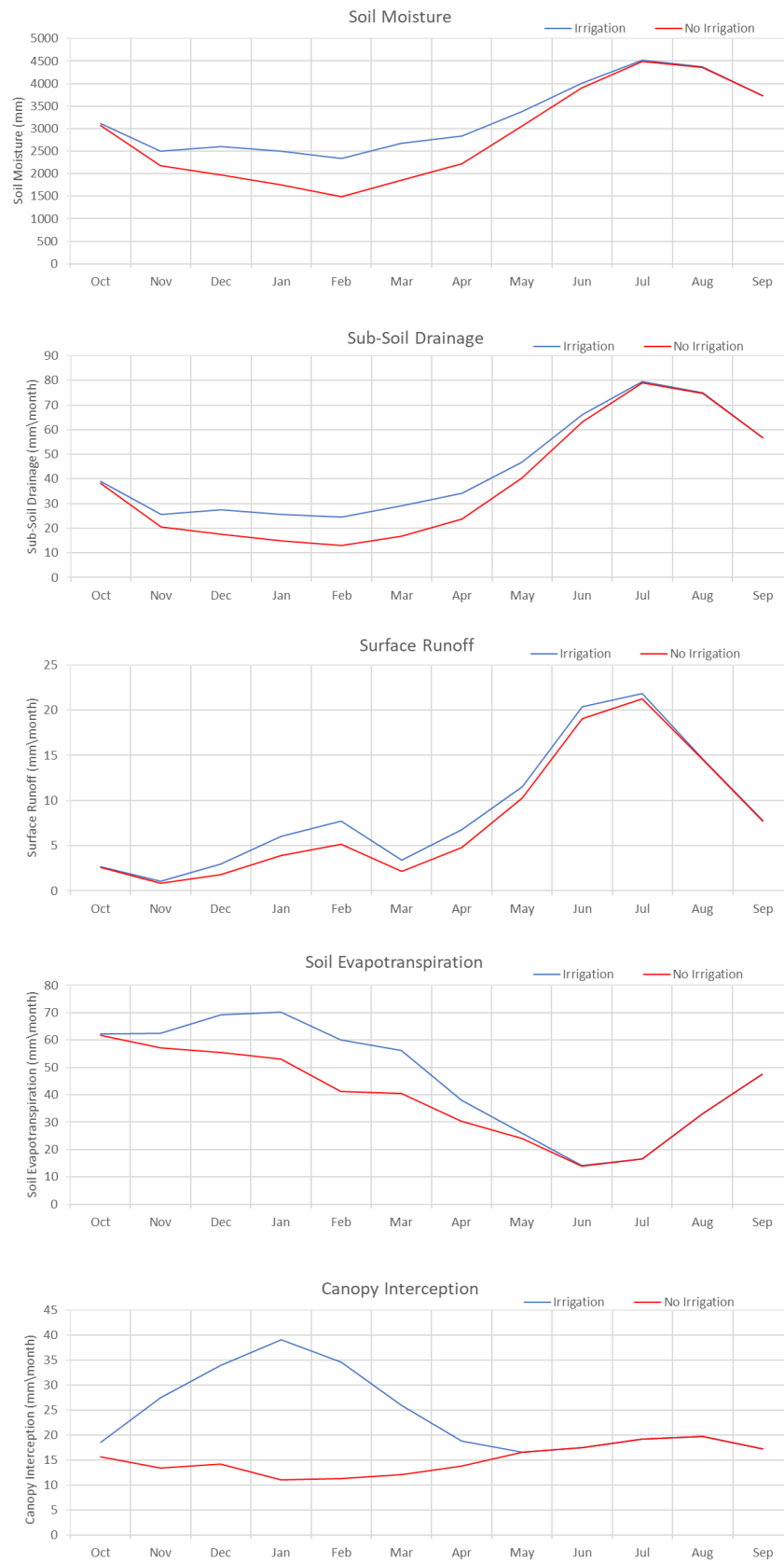


Figure 3. Comparison of water balance components.

3.2 Neighbouring Bore Information

There are 19 bores registered within the NRC database within a 2 km radius of the Far North Avocados properties (**Figure 4**). Statistics on these bores are as follows:

- 17 are active and two are inactive.
- Bores depth is provided for 16 of the bores, and ranges from 6.7 m to 135 m with an average of 71 m.
- 14 bores have information attached in terms of the purpose of the bores; among these bores:
 - One is for private water supply;
 - One is for stock and irrigation;
 - Two are for domestic purposes;
 - Six are for irrigation; and
 - Four are for stock use.



Figure 4. Neighbouring bores within 2 km radius.

There are nine proposed bores within the pending Te Raite Station consent application (OPUS, 2018) two of which are within the Aupouri-Waihopo allocation zone. These pending consent applications have been included in the allocation assessment in **Section 3.3.3**.

3.3 Relevant Statutory Documents

3.3.1 Section 104(1)(b) of the RMA

Schedule 4 of the RMA requires that when applying for a resource consent for any activity an assessment of activities against the matters in any relevant provisions of a statutory document referred to in s104(1)(b) of the RMA must be provided. These matters are described below and **Section 0** provides an assessment against the relevant documents.

The documents referred to in Section 104(1)(b) of the RMA are:

- a national environmental standard;
- other regulations;
- a national policy statement;
- a New Zealand coastal policy statement;
- a regional policy statement or proposed regional policy statement;
- a plan or proposed plan;

The following section provides details of the relevant Regional Planning provisions, while assessment of which documents listed is above are relevant is provided in **Table 3**.

Table 3. Summary of relevance of Section 104 statutes.

Statute	Relevance	Requirement of Statue
National Environmental Standards	There are no national environmental standards that are applicable to the proposed activity.	None
Resource Management (Measurement and Reporting of Water Takes) Regulations 2010	This regulation applies to a water permit that allows fresh water to be taken at a rate of 5 litres/second or more and is consumptive. Therefore, this regulation is relevant for this water take consent.	In summary, the regulations require permit holders to keep records that provide continuous measurement of the water taken under a water permit, including water taken in excess of what the permit allows. These records are to comprise measurements of the volume of water taken each day (in cubic metres) or each week (if approved by the Regional Council), and must be in an appropriate format for auditing, and in a form suitable for electronic storage. The regulations also specify the required accuracy of any metering device (to within $\pm 5\%$ of the actual volume taken if from a full pipe (e.g. bore)).
National Policy Statement for Freshwater Management 2014	The following objectives and policies of the NPS are relevant to this proposal: <i>Water Quality</i> <ul style="list-style-type: none"> • Objectives A1, A2, and A4. • Policies A2, A3, and A7. <i>Water Quantity</i> <ul style="list-style-type: none"> • Objective B2, B3 and B5. • Policies B2 to B6. <i>Integrated Management</i> <ul style="list-style-type: none"> • Objective C1. • Policies C1 and C2. 	<i>Water Quality</i> <ul style="list-style-type: none"> • Objective A1 seeks to safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and of discharges of contaminants. • Objective A2 required that the overall quality of fresh water within a region is maintained or improved while improving the quality of fresh water in water bodies that have been degraded by

		<p>human activities to the point of being over-allocated.</p> <ul style="list-style-type: none"> Objective A4 seeks to enable communities to provide for their economic well-being, including productive economic opportunities. Policies A2, A3, and A7 are considered relevant to this application and give effect to Objectives A1, A2, A4. <p><i>Water Quantity</i></p> <ul style="list-style-type: none"> Objective B2 seeks to avoid any further over-allocation of fresh water and phase out existing over-allocation. Objective B3 seeks to improve and maximise the efficient allocation and efficient use of water. Objective B5 seeks to provide for communities' economic wellbeing within freshwater quantity limits. Policies B2 to B6 are considered relevant to this proposal. <p><i>Integrated Management</i></p> <ul style="list-style-type: none"> Objective C1 seeks to improve integrated management of fresh water and the use and development of land in whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment. Policies C1 and C2 are relevant to this application and give effect to Objective C1.
<p>Regional Policy Statement for Northland</p>	<p>The Regional Policy Statement (RPS) was made operative on 9 May 2016. The RPS provides a broad direction and framework for managing Northland's natural and physical resources. These include land, water, air, soil, minerals, plants, animals and all built structures.</p> <p>The following Objectives are considered relevant to this proposal:</p> <ul style="list-style-type: none"> Objective 3.2, 3.3, 3.5, and 3.10. <p>The following Policies give effect to the above Objectives, and therefore are considered relevant to this application:</p> <ul style="list-style-type: none"> Policy 4.3.2, 4.3.3. 	<ul style="list-style-type: none"> Objective 3.2 seeks to maintain and improve water quality for human use and ecological health. Objective 3.3 seeks to safeguard the flows and flow variability required to maintain water's life-supporting capacity, for ecological processes, and to support indigenous species. Objective 3.5 requires that the region's resources are sustainably managed in a way that is attractive for business and investment that will improve the economic wellbeing of the region and its communities. Objective 3.10 requires efficient use and allocation of common natural resources with a particular focus on maximising the security and reliability of supply for users. Policy 4.3.2 requires regulatory methods to avoid over-allocation of region-wide ecological flows and water levels. Policy 4.3.3 requires the allocation and use of water efficiently within allocation limits.
<p>Regional Plans</p>	<p>The Proposed Regional Plan for Northland (pRPN) sets out policies and rules for how Northland's water, soil, air and coast are used and was publicly notified on 6 September 2017 and closed for submissions on 26 March 2018. The pRPN will replace the Regional</p>	<p>From the pRPN:</p> <ul style="list-style-type: none"> Objective F.0.1 seeks to manage the use, development, and protection of Northland's natural and physical resources which enables people and

	<p>Water and Soil Plan for Northland (RWSPN), which has been operative since 28 August 2004.</p> <p>At present, the rules in both these plans have legal effect, with weight given to whichever plan has the more restrictive rule for the same activity if there is a conflict between the two plans, or the later plan if no submissions were received on certain aspects.</p> <p>Both plans address groundwater abstractions that have the potential to adversely affect the environment. However, there are no specific aquifer allocation limits set in the RWSP.</p> <p>The following objectives and policies of the pRPN are considered relevant to this proposal:</p> <ul style="list-style-type: none"> • Objective F.0.1. • Policy D.2.2. • Policy D.2.5. • Policy D.4.5. • Policy D.4.13. • Policy D.4.17. • Policy D.4.18. • Policy D.4.20. • Policy D.4.23. <p>The following objectives and policies of the RWSPN are considered relevant to this proposal:</p> <ul style="list-style-type: none"> • Objective 7.4. • Objective 10.4.1. • Policy 10.5.1. • Policy 10.5.2. • Policy 10.5.4. • Policy 10.5.7. • Policy 10.5.9 	<p>communities to provide for their social, economic and cultural well-being while</p> <ol style="list-style-type: none"> 1. sustaining the natural resources to meet the reasonable foreseeable needs of future generations, 2. safeguarding life-supporting capacities of water, and 3. avoiding, remedying, or mitigating adverse effects on the environment. <ul style="list-style-type: none"> • Policy D.2.2 requires that regard is had to the social, cultural, and economic benefits of the proposed activity when considering resource consents. • Policy D.2.5 requires an authority to have regard to community and tangata whenua values • Policy D.4.5 seeks to maintain overall water quality. • Policy D.4.13 seeks to achieving freshwater quantity related outcomes and inn particular manage the taking, use, damming, and diversion of fresh water so that (with relevance to this application) saline intrusion in, and land subsidence above, aquifers is avoided (amongst other things). • Policy D.4.17 considers allocation limits for aquifers and requires rules and applications to meet allocation limits • Policy D.4.18 concerns conjunctive surface water and groundwater management. • Policy D.4.20 requires the reasonable and efficient use of water for irrigation and sets requirements for a resource consent application to take water for irrigation purposes. • Policy D.4.23 <p>From the RWSPN:</p> <ul style="list-style-type: none"> • Objective 7.4 requires the maintenance or enhancement of water quality of natural water bodies. • Objective 10.4.1 maintains the sustainable use and development of the region's groundwater resources while avoiding, remedying, or mitigating actual and potential adverse effects on groundwater quantity and quality. • Policy 10.5.1 seeks to ensure the sustainable use of resources by avoiding takes that exceed recharge. Saltwater intrusion, reduced groundwater quality, significant drawdown, and adverse effects on surface water resources can arise where takes exceed recharge. • Policy 10.5.2 recognises that aquifers are at risk in certain circumstances and that adverse effects on water quality should be avoided.
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		<ul style="list-style-type: none"> • Policy 10.5.4 seeks that groundwater allocations take into account reduction in recharge that may occur in time. • Policy 10.5.7 requires the Northland Regional Council to consider effects of a groundwater take and use on surface water bodies. • Policy 10.5.9 seeks to avoid, remedy or mitigate any ground subsidence as a result of groundwater takes, use or diversion, where this is likely to cause adverse flooding, drainage problems, or building damage.
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3.3.2 Activity Status

The activity status of the proposed activity under both the RWSPN and pRPN is considered a discretionary activity – details of this conclusion are summarised in **Table 4**.

Table 4. Summary of activity status against Regional Plan Provisions.

Plan	Relevant Rules	Comment
RWSPN	<p>Rule 25.03.01 of the plan states that “The taking, use or diversion of groundwater from an aquifer, and any associated discharge of groundwater onto or into land or into water, which does not meet the requirements of the permitted, controlled or non-complying activity rules is a discretionary activity.” In essence, the discretionary activity rule is for takes that are not for domestic or stock watering purposes (Rule 25(A)) and exceed the permitted activity thresholds (Rule 25.01.01) of a daily volume of 10 m³/d and instantaneous rate of 5 L/s per bore.</p>	<p>Under this plan and until such time as the equivalent provisions within the Proposed Regional Plan for Northland (pRPN) are no longer contested, the proposed activity would be considered Discretionary Activity.</p>
pRPN	<p>Rule C.5.1.10 states that the taking and use of fresh water is a discretionary activity unless it is one of the following:</p> <ol style="list-style-type: none"> 1) a permitted activity under C.5.1.1 'Minor takes – permitted activity', or 2) a permitted activity under C.5.1.2 'Temporary take for road construction or maintenance – permitted activity', or 3) a permitted activity under C.5.1.3 'Water take from an off-stream dam – permitted activity', or 4) a permitted activity under C.5.1.4 'Water take from an artificial watercourse – permitted activity', or 5) a permitted activity under C.5.1.5 'Water take associated with bore development, bore testing or dewatering – permitted activity', or 6) a controlled activity under C.5.1.6 'Replacement water permits for registered drinking water supplies - controlled activity', or 7) a controlled activity under C.5.1.7 'Takes existing at the notification date of the plan - controlled activity', or 8) a restricted discretionary activity under C.5.1.8 'Supplementary allocation – restricted discretionary activity', or 9) a discretionary activity under C.5.1.9 'Takes existing at the notification date of this plan – discretionary activity', or 	<p>The proposed groundwater take does not conform to any of the activities in listed in 1) to 10) above, and as indicated in the following Section 3.3.3 does not exceed an allocation limit, therefore the proposed activity constitutes a Discretionary Activity under the pRPN.</p>

	<p>10) a non-complying activity under C.5.1.11 'Water take below a minimum flow or water level-non-complying activity', or</p> <p>11) a non-complying activity under C.5.1.12 'Water take that will exceed an allocation limit - non-complying activity', or</p> <p>12) a prohibited activity under C.5.1.13 'Water takes that will exceed an allocation limit - prohibited activity'.</p>	
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3.3.3 Allocation Zones

The Aupouri Peninsula Aquifer is divided into ten groundwater allocation zones for management purposes. The Far North Avocados property sits within the Aupouri-Waihopo allocation zone. The allocation limit, current level of allocation, and the level of allocation should this consent (along with other pending consents) be granted, are shown in **Table 5**.

The allocation limit is calculated as 15% of mean annual recharge, as recommended by the Northland Regional Council in paragraphs 111 to 118 of the Section 42 Hearing Report (Tait, 2018).

Table 5 shows that the Aupouri-Waihopo zone is currently 13% allocated and granting the Far North Avocados groundwater take (32,000 m³/yr) will account for an additional 2.5% of the allocation limit. If the other current proposals are granted (Waikopu Avocados, Henderson Bay Avocados, and Te Raite Station) the total allocation status for the Aupouri-Waihopo zone will increase to 33%.

Table 5. Aupouri-Waihopo Aquifer Limits⁴ and Allocation Status.

Sub-aquifer	Allocation Limit ^A		Allocation Status (Current) ^B		Allocation Status Including Proposed Groundwater Takes:	
					Te Raite Station (120,000), Waikopu Avocados (83,360), Henderson Bay Avocados (19,000), and Far North Avocados (32,000)	
	m ³ /year	% mean annual recharge	m ³ /year	%	m ³ /year	% mean annual recharge
Aupouri - Waihopo	1,278,200	15	171,170	13	425,530	33

Notes:

A. Recalculated from Lincoln AgriTech (2015).

B. Current allocation includes the recently granted (June 2018) MWWUG consents, which equated to 329,370 m³/year in the Motutangi zone.

⁴ According to NRC's allocation maps at <http://gis.nrc.govt.nz/LocalMaps-Viewer/?map=895e0785f7054d47b10a72edc38022dc>

4. Assessment of Environmental Effects

The proposed take for Far North Avocados (32,000 m³/year) was evaluated in tandem with the proposed take for Waikopu Avocados (83,360 m³/year) and Henderson Bay Avocados (19,000 m³/year) using the Aupouri Aquifer Groundwater Model, which is a numerical model covering the Aupouri shellbed aquifer from Ahipara to Ngataki. The model applied the MODFLOW Unstructured Grid (MODFLOW-USG) developed by the United States Geological Survey (USGS) applied within the GMS10.3 modelling platform to simulate regional groundwater flow. The development and calibration of the Aupouri Aquifer Model is detailed in WWA (2017; 2018b) and will also be detailed in a standalone model development report currently being prepared.

In addition to the groundwater take applications for the three orchards evaluated in this model application, there is an additional pending groundwater take application within the Aupouri-Waihopo area of the model domain (WWA, 2018a; WWA, 2018b). This proposed take is for Te Raite Station (120,000 m³/yr).

The Base Case Scenario (Scenario 1) for evaluating the proposed groundwater take at the Waikopu and Henderson Bay bores applied the Aupouri Aquifer Model with all currently consented groundwater takes and pending applications included. The Proposed Pumping Scenario (Scenario 2) was then developed by adding the proposed Waikopu, Henderson Bay, and Far North Avocados groundwater takes to the Base Case Scenario. The results of the two scenarios were compared to assess cumulative effect of the proposed groundwater take with regard to the AEE criteria.

This assessment also included a sensitivity analysis (Scenario 3) using the methods described in WWA (2018). In the sensitivity analysis, connectivity between the surface conditions and the deep aquifer was significantly reduced while boundary and source/sink conditions remained the same as in the baseline model. The model was not calibrated to the conditions applied in Scenario 3, therefore Scenario 3 results are only referenced to illustrate relative (rather than absolute) changes in simulated groundwater levels.

The sensitivity analysis was undertaken because the calibrated groundwater model errs on the side of over simulation of vertical leakage. This was deliberately built into the model in the absence of a single well-defined low permeability horizon in the field, but rather a series of multi-layered and discontinuous iron pans and other low permeability horizons within the sedimentary sequence that in combination act as a flow barrier between the deeper groundwater system and the surface drains and wetlands. As a result, the model exaggerates the effects of the proposed abstraction on the groundwater levels in the shallow aquifer and at the surface. Conversely, the model under-predicts the local-scale drawdown in the deeper aquifer.

The numerical simulation was run for a 58-year time period using historic climate records and groundwater pumping data. In effect, the climatic conditions of the last 58-years have been utilised to simulate conditions that may occur in the next 58-years.

The three predictive model scenarios can be summarised as follows:

- **Scenario 1: Base Case** – the calibration model which includes all currently consented groundwater takes at a total peak annual abstraction rate of 11,539,091 m³/year.
- **Scenario 2: Proposed Extraction** – includes current and proposed groundwater extraction totalling a combined peak annual rate of 11,673,451 m³/year.
- **Scenario 3: Low Permeability-Proposed Extraction** – Groundwater extraction is the same as in Scenario 2 with horizontal hydraulic conductivity of Layer 2 was decreased to 1x10⁻⁷ m/s in both the coastal sands and weathered sand regions to simulate a hard pan extending over the model area.

From an assessment of effects perspective, it is important to focus on annual volumes. However, simulated pumping in the model is premised on peak daily rates (consented or proposed) pumped until the annual volume is reached (cap). However, due to variable stress period length ranging from a minimum of 13 days to a maximum of 185 days, the average pumping rate reported from the model is always less than the peak rate due

to days within the stress period where pumping was not required. Historical dates where the maximum annual volume (consented or proposed) was simulated included 1974, 1991, and 2010.

4.1 Surface Water Effects

An analysis of the impact on flows including discharge to both farm drains and wetlands was undertaken for low-flow situations. Scenario 2 was selected for this assessment because it represents a greater potential impact on surface drains compared to Scenario 3. The annual minima in daily flow was determined from the global flow budget for all combined drain cells within the potential area of impact. Annual minima flows were used to calculate annual recurrence intervals for each scenario, and the resulting data is presented in **Table 6** and **Figure 5**.

A comparison of the proposed groundwater extraction (Scenario 2) against the Base Case scenario indicates that the reduction in mean annual (1-year) low flow as a result of the combined groundwater extraction at the Far North Avocados, Waikopu, and Henderson Bay bores is likely to be negligible (approximately 0.3%). However, as stated in WWA (2018) the model errs on the side of exaggerating groundwater level reduction in the shallow aquifer and at the surface because of the lack of hard pans in the model. In this regard, these values can be considered conservative estimates.

These results indicate that the variation in annual minimum discharge from groundwater to surface water over a range of drought severities (i.e. annual to 100-year recurrence interval) is likely to be, at most, a 0.6% reduction with the groundwater extraction at the 3 proposed bores. The relative reduction increases slightly for the more infrequent events. In the event of a 100-year drought the annual low flow with proposed groundwater extraction is likely to be 0.6% less than under the conditions applied in the Base Case scenario.

Table 6. Low-flow analysis of surface discharge and percentage reduction in flow from Baseline scenario

Recurrence Interval	Scenario 1: Base Case	Scenario 2: Proposed GW Extraction	Relative Difference
(years)	(L/s)	(L/s)	(%)
1	573.6	572.0	-0.3%
2	443.9	442.4	-0.3%
5	391.2	389.3	-0.5%
10	370.4	368.7	-0.5%
25	340.6	338.5	-0.6%
50	328.1	326.1	-0.6%
100	317.2	315.2	-0.6%

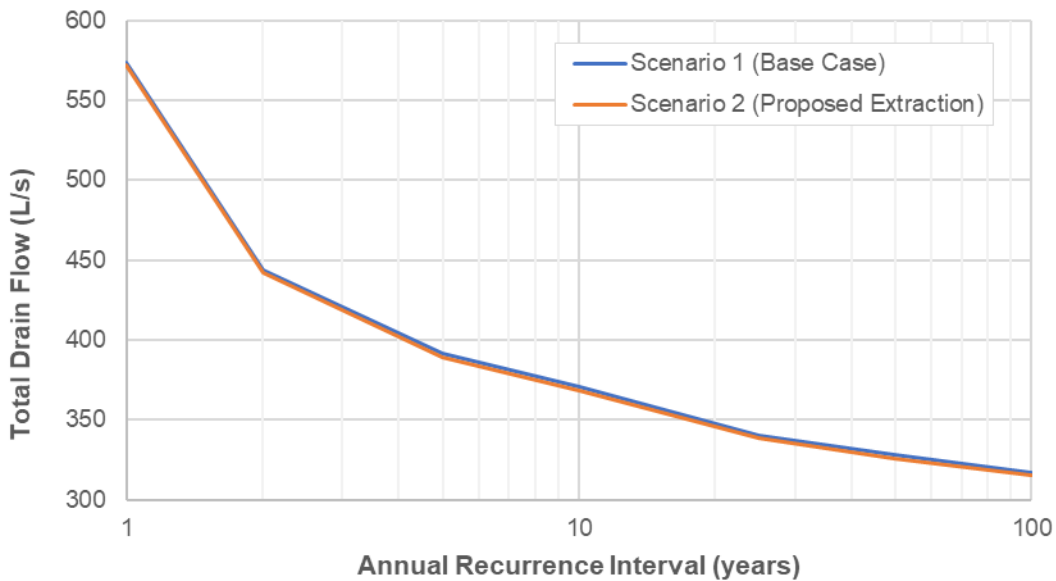


Figure 5. Surface drainage low flow analysis for model predictive scenarios.

4.2 Pumping Interference Effects

The end of the 2010 irrigation season (30 April 2010) was selected for impact analysis as this date represents the end time of the driest period within the historical record, and the greatest simulated seasonal irrigation pumping requirement. Simulation results were evaluated within and around the Far North Avocados property in order to assess potential effects from proposed pumping in the area most likely to be impacted.

Drawdown Effects

The simulated groundwater level for the end of 2010 irrigation season for Scenarios 2 and 3 were subtracted from the head simulated at the corresponding time from the Baseline Model in the case of Scenario 2, and a revised version of the Baseline Model with low permeability in Layer 2 for Scenario 3, to produce regional drawdown maps (**Figure 6** and **Figure 7**). The resulting drawdown predictions are used to evaluate the magnitude and extent of potential impacts resulting from the proposed pumping on both the shallow and deep aquifers both scenario conditions.

Deep aquifer

The predicted drawdown in the deep aquifer for Scenario 2 is shown in **Figure 6**. In Scenario 2 the maximum predicted drawdown was 0.37 m at the proposed bore location. The extent of significant drawdown is typically considered to be the contour where 0.6 m of drawdown is predicted. By this definition there was no significant drawdown predicted in Scenario 2 as a result of the proposed extraction at the Far North Avocados bore.

In Scenario 3 the low permeability of model Layer 2 limited leakage from the overlying layers thereby magnifying the impact of pumping on groundwater levels. The maximum drawdown predicted in Scenario 3 was 1.32 m at the Far North Avocados pumping location while pumping at the Henderson Bay Avocados bore also contributed to the extent of predicted drawdown (**Figure 7**). The 0.6 m drawdown contour encompassed the Far North Avocados, Henderson Bay, and Waikopu properties, extending up to 1.8 km from the proposed pumping bores, though the Waikopu Avocados bore has the greatest proposed pumping volume among the three proposed extraction points.

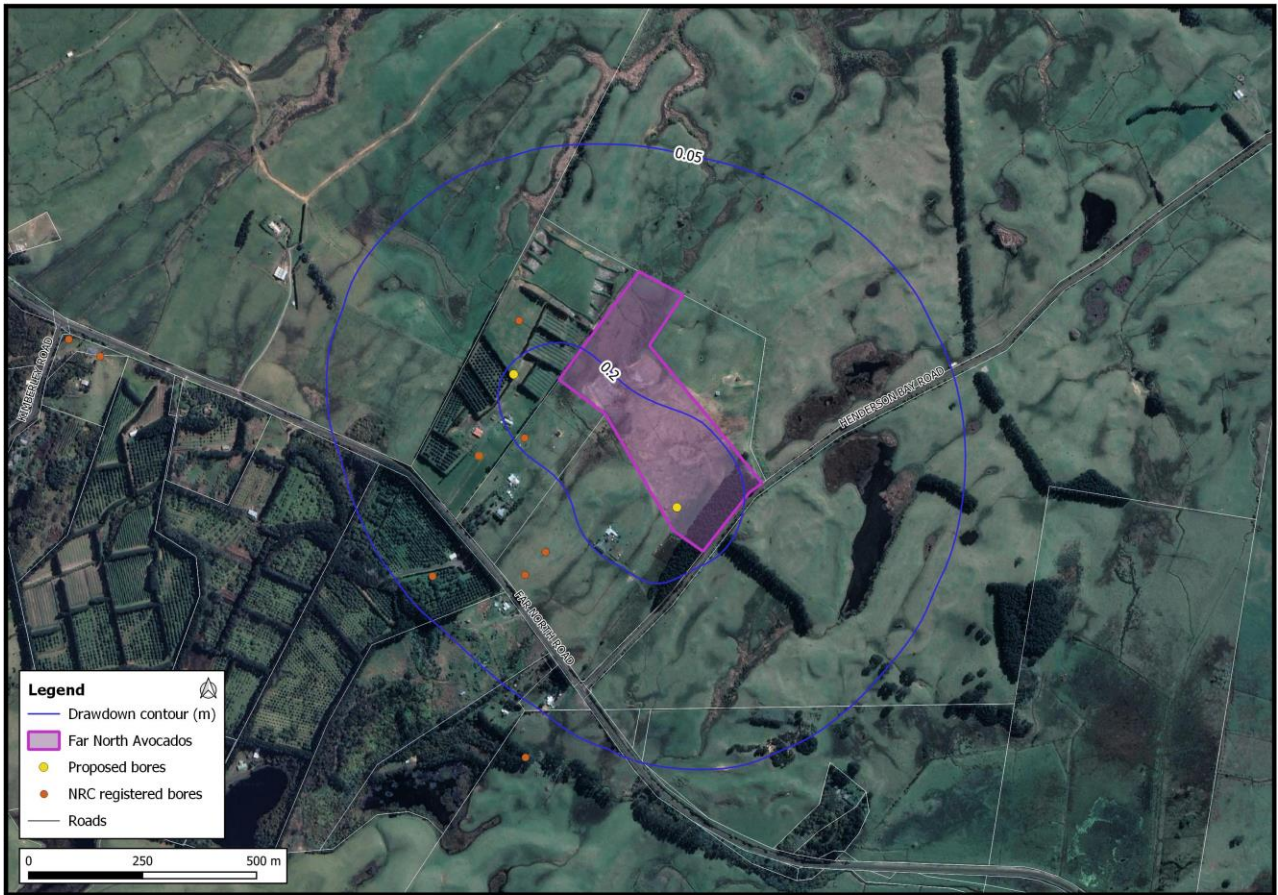


Figure 6. Simulated drawdown of deep aquifer (Scenario 2).

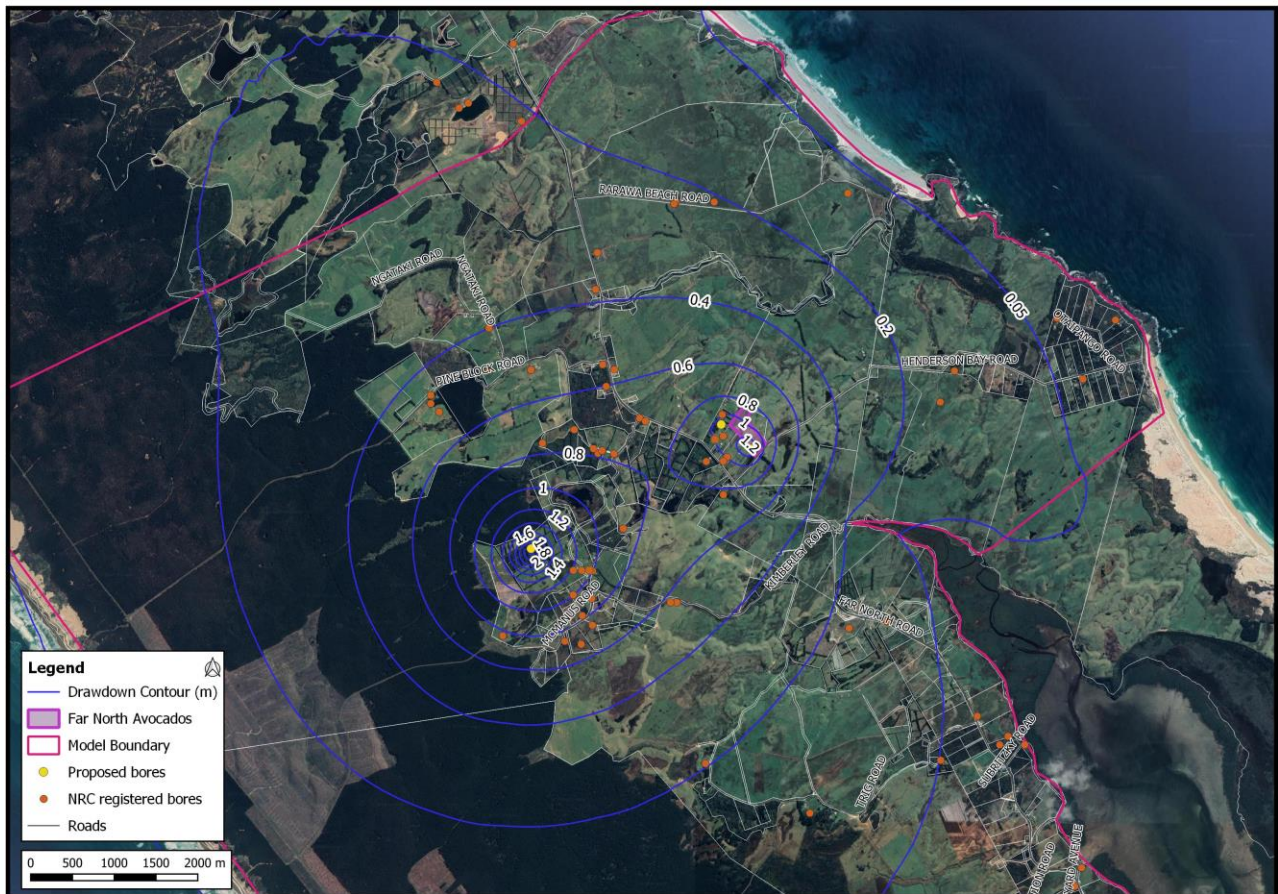


Figure 7. Simulated drawdown of deep aquifer (Scenario 3)

Shallow aquifer

Negligible drawdown (<0.05 m) was predicted in the shallow aquifer for the proposed extraction scenario (Scenario 2). In Scenario 3 no shallow aquifer drawdown was predicted due to increased groundwater pumping because of the disconnection of the upper and lower portions of the aquifer.

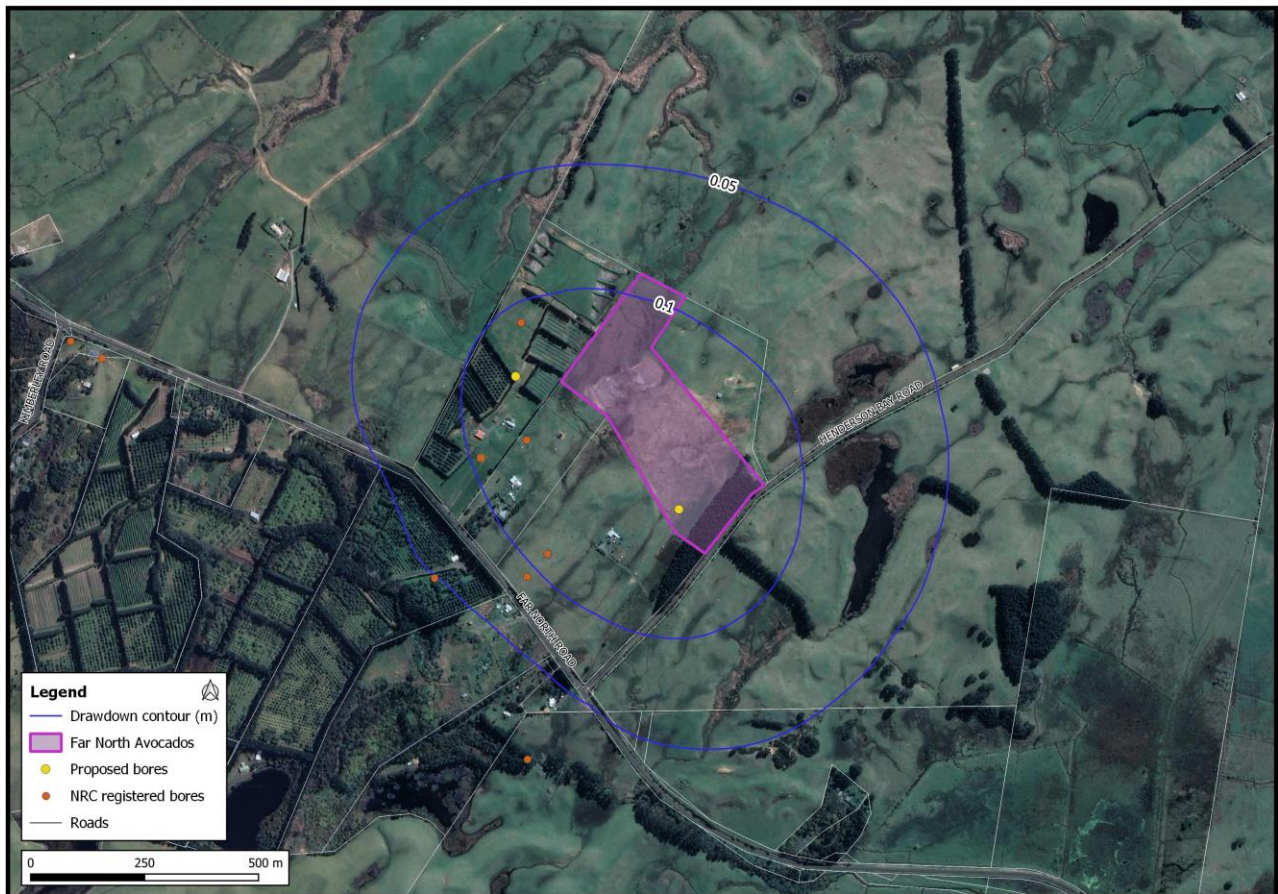


Figure 8. Simulated drawdown of shallow aquifer (Scenario 2).

Neighbouring Bores

The predicted groundwater drawdown for 30 April 2010 was used as the basis for predicting potential interference on existing groundwater users resulting from the proposed pumping at the Waikopu and Henderson Bay bores. Drawdown resulting from the proposed pumping at the Henderson Bay and Far North Avocado properties was cumulative, and the parties have expressed support for each other's proposed groundwater takes so pumping interference between the two proposed bores was not considered. Appendix B provides a summary of predicted drawdown at bores within the 5 cm drawdown contour for Scenario 3, the scenario where maximum drawdown is predicted and therefore the most conservative reference case.

In total, there are 19 registered bores that are (or may be) deep enough to reach the shell bed aquifer where Scenario 3 predicted drawdown is 0.6 m or greater, excluding bores located on the application properties. The maximum drawdown at a neighbouring bore predicted in Scenario 3 was 1.14 m, predicted to occur at a bore situated between the Far North Avocados and Henderson Bay Avocados orchards (LOC.200340), on a property owned by Martin Dijkstra. The greatest drawdown predicted at a neighbouring bore adjacent to the Waikopu Avocados orchard was 1.03 m, predicted to occur at the bore owned by S V Rawnsley on Kimberly Road (LOC.209678).

In all cases, predicted drawdown was insignificant in the context of available drawdown in this aquifer, which is between 70 – 100 m in most shellbed aquifer bores. Based on this assessment and the available drawdown in the aquifer the interference effects on existing groundwater users is considered less than minor.

4.3 Saline Intrusion

Model results from the Base Case (Scenario 1) and Proposed Extraction (Scenario 2) scenarios were used to evaluate the risk of the proposed groundwater takes inducing saltwater intrusion into the Aupouri aquifer. The Low Permeability Scenario (Scenario 3) was not considered for this analysis because it is not based on a calibrated version of the model, and therefore can only be used to assess relative drawdown rather absolute water levels as required for analyse potential saline intrusion (WWA, 2018b).

It was determined that the negligible drawdown (<0.01 m) predicted at either the east or west coast would not be significant enough to cause upconing or lateral migration, the two processes by which inland saline intrusion may occur.

The impact on saltwater intrusion due to proposed take will therefore be less than minor.

4.4 Ground Settlement

Land subsidence due to groundwater extraction was calculated using the Bouwer (1977)⁵ equation:

$$S_u = (P_{i2} - P_{i1}) \frac{Z_1}{E}$$

where S_u = vertical subsidence (m)
 $P_{i2} - P_{i1}$ = Increase in intergranular pressure due to drop of the water table
 Z_1 = layer thickness
 E = modulus of elasticity of the soil

The following characteristics were assumed for the aquifer:

- Porosity = 0.30
- Unsaturated water content = 0.08
- Specific weight of aquifer material (consolidated silty sand) = 20 kN/m³ (Silty sand density ranges between 1,410 kg/m³ and 2,275 kg/m³ (http://structx.com/Soil_Properties_002.html), corresponding to specific weight of 14 kN/m³ and 22 kN/m³)
- Specific weight of water = 9.81 kN/m³.

The deep shellbed material is denser and less compressible compared to the mixture of sand, silt and peat overlying above. The subsidence analysis was conducted using three separate layers representing the conceptual hydrogeological units of the sub-surface environment, and the parameter values used were based on Bouwer (1977).

The potential maximum ground settlement was estimated at the proposed Far North Avocados bore based on the maximum simulated drawdown in the Base Case Scenario and low permeability scenarios. Predicted settlement at the bore location was 8 mm in the Scenario 2 (Base Case) and 1.3 cm in the Scenario 3 (Low Permeability). These values would be impossible to measure under existing field conditions and can therefore be considered negligible.

In summary, the potential settlement effects are considered less than minor.

4.5 Water Quality

The potential risk to water quality from the leaching of fertilisers and pesticides that may be associated with horticulture is not a relevant consideration for a water take application under the current Northland Regional planning framework. With reference to the effects from horticultural sprays the Commissioners for the MWWUG water take applications stated in their Hearing Decision Report (June 2018) that:

“such are not matters that are directly engaged by the present applications for water abstraction. Accordingly, we have no present jurisdiction to consider those putative effects. If resource (or other) consent is subsequently required, then such will need to be applied for and considered at the appropriate time”.

Nevertheless, there are a range of factors that make the leaching of fertiliser and pesticides unlikely to impact water quality:

In practice orchardists in this area tend to apply fertiliser efficiently via fertigation as part of their irrigation water using a small dosage regularly, which is driven by both the soil conditions (i.e. high permeability and lacking in nutrients) and economic considerations.

Inefficient irrigation practice will lead to root rot, thus because orchardists will actively avoid this, excessive leaching of nutrients is unlikely.

Both fertiliser and approved pesticides are applied in accordance with permitted activity rules within the pRPN and rules needing to be met to become certified under the AvoGreen Assured program by the Avocado Industry Council Ltd. One of the key aims is “environmental sustainability by only using sprays when required”.

Due to the presence of significant amounts of organic matter within the shallow sand deposits, shallow groundwater is likely to be reducing. Under such conditions, nitrate concentrations are likely to be low in groundwater (consistent with available groundwater quality data) due to denitrification within the aquifer system. The presence of organic matter is also likely to substantially decrease the mobility of any pesticide compounds prone to leaching.

4.6 Consideration of Alternatives

An AEE must include a description of alternative locations or methods for undertaking an activity, if it is likely that the activity will result in any significant adverse effect on the environment.

The effects of the proposed taking and using of groundwater were assessed above as being no more than minor on the environment and less than minor on other groundwater users. As such, no alternatives have been considered for this proposal.

5. Assessment of Cultural Effects

Northland Regional Council have an internal procedure where they circulate all applications to local Iwi and Maori Groups that have registered with the Council as having an interest in the area. Therefore, regardless of whether the local Iwi or Maori Groups are considered to be affected by the effects of the proposed activity, the Group must will be notified by the Regional Council and therefore can be considered as part of the consultation process.

The applicant has not undertaken any personal consultation with Iwi or Maori Groups based on the understanding that physical effects of this application are less than minor, therefore any meta-physical (cultural and spiritual) effects would commensurately be less than minor.

Therefore, given the less than minor impact of this proposal, we do not consider Iwi consultation is necessary for this application.

6. Assessment Of Statutory Considerations

Table 7 to Table 10 provide assessments of the relevant statutory documents as were identified in Section 0.

Overall, this resource consent application is consistent with the objectives and policies of the National Policy Statement for Freshwater Management 2014, incumbent regional plan (RWSPN) and proposed regional plan (pRPN).

Table 7. Assessment against relevant objectives and policies for the National Policy Statement for Freshwater Management 2014.

No.	Objective / Policy	Assessment
<i>Water Quality</i>		
Objective A1	<ul style="list-style-type: none"> Seeks to safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and of discharges of contaminants. 	This proposal is consistent with these objectives and policies and either supports them or at the least maintains them.
Objective A2	<ul style="list-style-type: none"> Required that the overall quality of fresh water within a region is maintained or improved while improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated. 	
Objective A4	<ul style="list-style-type: none"> Seeks to enable communities to provide for their economic well-being, including productive economic opportunities. 	
Policies A2, A3, and A7	<ul style="list-style-type: none"> Give effect to Objectives A1, A2, A4 	
<i>Water Quality</i>		
Objective B2	<ul style="list-style-type: none"> Seeks to avoid any further over-allocation of fresh water and phase out existing over-allocation. 	This proposal is consistent with these objectives and policies.
Objective B3	<ul style="list-style-type: none"> Seeks to improve and maximise the efficient allocation and efficient use of water. 	
Objective B5	<ul style="list-style-type: none"> Seeks to provide for communities' economic wellbeing within freshwater quantity limits. 	
Policies B2 to B6	<ul style="list-style-type: none"> Give effect to Objectives B2 to B5. 	
<i>Integrated Management</i>		

No.	Objective / Policy	Assessment
Objective C1	<ul style="list-style-type: none"> Seeks to improve integrated management of fresh water and the use and development of land in whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment. 	This proposal is consistent with these objective and policies.
Policies C1 and C2	<ul style="list-style-type: none"> Give effect to Objective C1. 	

Table 8. Assessment against relevant objectives and policies for the Regional Policy Statement for Northland.

No.	Objective / Policy	Comment
Objective 3.2	<ul style="list-style-type: none"> Seeks to maintain and improve water quality for human use and ecological health. 	This proposal is consistent with this objective as it will at the least maintain water quality.
Objective 3.3	<ul style="list-style-type: none"> Seeks to safeguard the flows and flow variability required to maintain water's life-supporting capacity, for ecological processes, and to support indigenous species. 	The proposal is consistent with this objective as it will have a no more than minor impact on surface water resources.
Objective 3.5	<ul style="list-style-type: none"> Requires that the region's resources are sustainably managed in a way that is attractive for business and investment that will improve the economic wellbeing of the region and its communities. 	The proposal is consistent with this objective as it will efficiently utilise a natural resource to facilitate development of economic wellbeing.
Objective 3.10	<ul style="list-style-type: none"> Requires efficient use and allocation of common natural resources with a particular focus on maximising the security and reliability of supply for users. 	The proposal is consistent with this objective.
Policy 4.3.2	<ul style="list-style-type: none"> Requires regulatory methods to avoid over-allocation of region-wide ecological flows and water levels. 	The proposal does not exceed allocation limits, hence is consistent with this policy.
Policy 4.3.3	<ul style="list-style-type: none"> Requires the allocation and use of water efficiently within allocation limits. 	The proposal will use water efficiently and will not exceed allocation limits, hence is consistent with this policy.

Table 9. Assessment against relevant objectives and policies for the Proposed Regional Plan for Northland.

No.	Objective / Policy	Comment
Objective F.0.1	<ul style="list-style-type: none"> • Seeks to manage the use, development, and protection of Northland’s natural and physical resources which enables people and communities to provide for their social, economic and cultural well-being while <ol style="list-style-type: none"> 1. sustaining the natural resources to meet the reasonable foreseeable needs of future generations, 2. safeguarding life-supporting capacities of water, and 3. avoiding, remedying, or mitigating adverse effects on the environment. 	The proposal is consistent with this objective.
Policy D.2.2	<ul style="list-style-type: none"> • Requires that regard is had to the social, cultural, and economic benefits of the proposed activity when considering resource consents. 	As discussed in Section 6, proposal will facilitate the economic and social benefits of both the landowner, their employees and the wider community through flow on effects of purchases made to operate and maintain the orchard.
Policy D.2.5	<ul style="list-style-type: none"> • Requires an authority to have regard to community and tangata whenua values 	The proposal is not inconsistent with either community values, as there has been conversion to market gardening and horticulture in the area that has benefitted the community and tangata whenua through employment opportunities.
Policies D.4.5	<ul style="list-style-type: none"> • Seeks to maintain overall water quality 	This proposal is consistent with this policy as it will not impact water quality.
Policy D.4.13	<ul style="list-style-type: none"> • Seeks to achieve freshwater quantity related outcomes and in particular manage the taking, use, damming, and diversion of fresh water so that (with relevance to this application) saline intrusion in, and land subsidence above, aquifers is avoided (amongst other things). 	This proposal is consistent with this policy as it will avoid the saline intrusion and subsidence impacts, as discussed in Section 0 and 0 .
Policy D.4.17	<ul style="list-style-type: none"> • Considers allocation limits for aquifers and requires rules and applications to meet allocation limits. 	This proposal is consistent with this policy as the proposed take will not exceed allocation limits within the Aupouri-Motutangi zone.
Policy D.4.18	<ul style="list-style-type: none"> • Concerns conjunctive surface water and groundwater management. 	This application is not inconsistent with this policy, in that the groundwater take will not adversely impact on surface water through stream depletion.
Policy D.4.20	<ul style="list-style-type: none"> • Requires the reasonable and efficient use of water for irrigation and sets requirements for a resource consent application to take water for irrigation purposes. 	This proposal is consistent with this policy as the daily irrigation rate and annual volume are considered efficient and just meet 10-year drought requirements, but provide reduced reliability for more severe droughts.

No.	Objective / Policy	Comment
Policy D.4.23	<ul style="list-style-type: none"> • Requires conditions on water permits that <ol style="list-style-type: none"> 1) clearly define the take amount in instantaneous take rates and total volumes, including by reference to the temporal aspects of the take and use, and 2) require that the water take is metered and information on rates and total volume of the take is provided electronically to the regional council, and 3) for water permits for takes equal to or greater than 10 litres per second, require the water meter to be telemetered to the regional council, and 4) clearly define when any restrictions and cessation of the water take must occur to ensure compliance with freshwater water quantity limits set in this plan, and 5) require the use of a backflow prevention system to prevent the backflow of contaminants to surface water or ground water from irrigation systems used to apply animal effluent, agrichemical or nutrients, and 6) specify when and under what circumstances the permit will be reviewed pursuant to Section 128(1) of the RMA, including by way of a common review date with other water permits in a catchment. 	The proposal is only partially consistent with this policy, as the applicants are arguing that so long as pumping data is recorded electronically and available for the council upon request, telemetry is not required. All other provisions will be met.

Table 10. Assessment against relevant objectives and policies for the Regional Water and Soil Plan for Northland.

No.	Objective / Policy	Comment
Objective 7.4	<ul style="list-style-type: none"> • Requires the maintenance or enhancement of water quality of natural water bodies. 	This proposal is consistent with this objective as the effects of the take and use of the water will have no more than minor impacts on the shallow aquifer and other surface water bodies, as discussed in Section 4.1 .
Objective 10.4.1	<ul style="list-style-type: none"> • Seeks to maintain the sustainable use and development of the region's groundwater resources while avoiding, remedying, or mitigating actual and potential adverse effects on groundwater quantity and quality. 	Ditto above.
Policy 10.5.1	<ul style="list-style-type: none"> • Seeks to ensure the sustainable use of resources by avoiding takes that exceed recharge. Saltwater intrusion, reduced groundwater quality, significant drawdown, and adverse effects on surface water resources can arise where takes exceed recharge. 	This proposal is consistent with this policy as the cumulative allocation in this aquifer management zone is only 11% of mean annual recharge, which is a low limit on a national scale.

No.	Objective / Policy	Comment
Policy 10.5.2	<ul style="list-style-type: none"> Recognises that aquifers are at risk in certain circumstances and that adverse effects on water quality should be avoided. 	This proposal is consistent with this policy in that current water quality will be maintained.
Policy 10.5.4	<ul style="list-style-type: none"> Seeks that groundwater allocations take into account reduction in recharge that may occur in time. 	This proposal is consistent with this policy in that the analysis assumed no rainfall for the entire 96 days of pumping.
Policy 10.5.7	<ul style="list-style-type: none"> Requires the Northland Regional Council to consider effects of a groundwater take and use on surface water bodies. 	This proposal is consistent with this policy as the effects of the take and use of the water will have no more than minor impacts on the shallow aquifer and other surface water bodies, as discussed in Section 4.1 .
Policy 10.5.9	<ul style="list-style-type: none"> Seeks to avoid, remedy or mitigate any ground subsidence as a result of groundwater takes, use or diversion, where this is likely to cause adverse flooding, drainage problems, or building damage. 	This proposal is consistent with this policy as subsidence effects will be no more than minor in the context of a rural setting, as discussed in Section 0 .

7. Notification

Section 95 sets out the decision-making steps for the determining of public notification and limited notification of applications and the timeframe Councils have for making the notification decision.

A notification assessment has been carried out in accordance with the stepped process as documented in **Table 11**.

Table 11. RMA Section 95A public notification of consent applications assessment.

Step	Question	Assessment
Step 1: mandatory public notification in certain circumstances	a) The applicant has requested that the application be publicly notified	NO
	b) Public notification is required under section 95C	NO
	c) The application is made jointly with an application to exchange recreation reserve land under section 15AA of the Reserves Act 1977	NO
Step 2: if not required by step 1, public notification precluded in certain circumstances	a) The application is for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes public notification.	NO
	b) The application is for a resource consent for 1 or more of the following, but no other, activities: <ul style="list-style-type: none"> (i) a controlled activity; (ii) a restricted discretionary or discretionary activity, but only if the activity is a subdivision of land or a residential activity; (iii) a restricted discretionary, discretionary, or non-complying activity, but only if the activity is a boundary activity; (iv) a prescribed activity (see section 360H(1)(a)(i)). 	NO
Step 3: if not precluded by step 2, public notification required in certain circumstances	a) The application is for a resource consent for 1 or more activities, and any of those activities is subject to a rule or national environmental standard that requires public notification.	NO
	b) The consent authority decides, in accordance with section 95D, that the activity will have or is likely to have adverse effects on the environment that are more than minor.	NO
Step 4: public notification in special circumstances	Determine whether special circumstances exist in relation to the application that warrant the application being publicly notified.	NO

Therefore, in accordance with s95A(9)(b) RMA, the consent authority should not publicly notify this application but may determine whether to give limited notification under s95B.

8. Consultation

Schedule 4 of the RMA requires that an AEE should identify (amongst other things) the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted.

Potentially affected parties in relation to this application could include other groundwater users and occupiers of the land within the pumping induced groundwater cone of depression.

However, it should also be noted that while it is considered good practice and “neighbourly” to undertake consultation, under Section 36A of the RMA there is no requirement for an applicant or council to undertake any consultation with any person in regard to an application.

In this case written approval has been obtained from one land owner, the neighbouring orchard, Henderson Bay Avocados Limited. A copy of this document is provided in **Appendix C**. No additional consultation has been undertaken with other water users and landowners because the assessment of effects and in particular the bore interference assessment provided in **Section 4.2** concludes that no other groundwater users are considered to be adversely affected by the granting of this application.

9. Summary and Conclusions

This document comprises an application for a groundwater take at the Far North Avocados orchard located on the north side of Henderson Bay Road (lot 1, DP 515085).

Potential effects for this take were evaluated simultaneously along with concurrent applications for groundwater takes at Waikopu Avocados and Henderson Bay Avocados, the latter being a neighbouring property to the Far North Avocados Orchard. The following summarises the volumes for the proposed groundwater take:

Far North Avocados

- 240 m³/day maximum daily volume
- 32,000 m³/year maximum annual volume

A consent duration of 30 years is sought, subject to a lapse period of 5 years.

If granted, this consent taken with other pending applications, will take the allocation status for the Aupouri-Waihopo allocation zone to approximately 33% of full allocation. The activity status thus remains Discretionary.

The AEE has demonstrated that the potential adverse effects of the proposed water take and use on the environment will be less than minor, and the effects on persons will also be less than minor.

The proposal is also considered to be consistent with the relevant objectives and policies of the NPS, the RPS, the PRP, the RWSPN, and Part 2 of the RMA. The applicant considers that in light of the less than minor effects of the proposed groundwater extraction with consideration for the decision following the recent hearing for the MWWUG consent applications, this consent should proceed without public notification and be granted on a non-notified basis.

10. References

Lincoln AgriTech, 2015. Aupouri Aquifer Groundwater Model. Consultancy report prepared for Northland Regional Council.

Tait, B., 2018. Allocation and use of water. Recommendations in response to submissions on the Proposed Regional Plan for Northland - Section 42A hearing report. Date: 3/07/2018. Author: Ben Tait. Version: Final.

Williamson Water Advisory, 2017. Motutangi-Waiharara Groundwater Model Factual Technical Report – Modelling. Consultancy report prepared for Motutangi-Waiharara Water Users Group.

Williamson Water Advisory, 2018a. Resource Consent Application & Assessment of Environmental Effects. Consultancy report prepared for NE Evans Trust.

Williamson Water Advisory, 2018b. Te Raite Station Groundwater Investigations. Letter report addressing RMA s92 requests prepared for WSP-OPUIS Consultants Limited.

Appendix A. Form A - Application For Resource Consent

The Northland Regional council application for resource consent is attached as an accompanying document.

APPLICATION FORM FOR RESOURCE CONSENT



Putting Northland first

Whāngārei Office	Phone:	(09) 470 1200
	Fax:	(09) 470 1202
Kaitiāia Office	Phone:	(09) 408 6600
Ōpua Office	Phone:	(09) 402 7516
Dargaville Office	Phone:	(09) 439 3300
Free Phone		0800 002 004
E-mail		mailroom@nrc.govt.nz
Website		www.nrc.govt.nz

**This application is made under Section 88/127
of the Resource Management Act 1991**

To: Consents Department
Northland Regional Council
Private Bag 9021
Whāngārei Mail Centre
Whāngārei 0148

IMPORTANT NOTES TO APPLICANTS

- Please read **fully** the notes below and the Information Brochures and Explanatory Notes available from the Council, **before** preparing your application and any supporting information.
- The Resource Management Act 1991 sets out the information you must provide with your application for a resource consent. If you do not provide adequate information, your application cannot be received nor processed by the Council and will be returned to you. If you are unsure of what information should be included with your application, please contact the Council before submitting the application.
- Applications require notification (public advertising calling for submissions) unless the Council is satisfied that the adverse effects on the environment of the activity for which consent is sought will be minor; and written approval has been obtained from every person who the Council is satisfied may be adversely affected by the granting of the consent. The Council also has available a form "Form 8A – Affected Person's Written Approval", to help you record such approvals for applications that may be processed without public notification.

PART A – GENERAL

APPLICANT	Full Names
(1) Full Name of Applicant(s): <small>(in full e.g. Albert William Jones and Mary Anne Jones. For Companies, Trusts and other Organisations, commonly used name)</small>	Far North Avocados Limited
	Blake and Olivia Powell
Phone Number – Business:	Fax:
Home:	Mobile: 021 182 4444
E-mail:	blake.olivia@slingshot.co.nz

For applications by a company, private trusts or other entity/organisations, the Directors; Trustees and Officers' full names must be supplied and Section (12) completed and signed.

(2) Postal Address: <small>(in full)</small>	12 Churchill Rd.
	Cockle Bay
	Auckland
	2014

(3) Residential Address: <small>(if different from postal address)</small>	

(4) Address for Service of Documents: (if different from postal address e.g. Consultant)	Jon Williamson (jon.williamson@wwa.kiwi)
	c/o Williamson Water Advisory
	PO Box 314
	Kumeu, 0812 Auckland

(5) Owner/Occupier of Land/ Water Body: (if different from the Applicant)	

(6) Type(s) of Resource Consent sought from the Regional Council:

You will need to fill in a separate Assessment of Environmental Effects Form for each activity. These forms can be obtained from the Northland Regional Council.

Coastal Permit

Mooring Marine Farm Structure Pipeline/Cable
 Other (specify) _____

Land Use Consent

Vegetation Clearance Quarry Structure in/over Watercourse
 Earthworks Construct/Alter a Bore Dam Structure
 Other (specify) _____

Water Permit

Stream/Surface Take Damming Groundwater Take Diverting Water
 Other (specify) _____

Discharge Permit

Domestic Effluent to Land General Discharge to Land Farm Dairy Effluent to Land/Water
 Air Water
 Other (specify) _____

(7) Other Resource Consents required from the District Council:

Where other Resource Consents are required for the same activity, they must be applied for at the same time. Not doing so will delay the processing of this application.

What other Resource Consents are required from the District Council?

None Land Use Consent Subdivision Consent
 Have the applications been made? Yes No

(8) Description of the Activity:

Please briefly describe the activities and duration for which Consent(s) are being sought. It is important you fill this out correctly, as the Council cannot grant Consent for any activity you do not apply for.

Groundwater take consent to enable development of 9.6 ha Total Orchard Area of avocados.

The details of the take are as follows:

Daily rate - 240 m³/day (25 m³/day per Total Orchard Area)

Annual volume - 32,000 m³/annum (based on a maximum of 400 mm per annum over 8.0 ha canopy area.)

(9) Location of Property/Waterbody to which Application relates:

Describe the location in a manner which will allow it to be readily identified, e.g. street address, legal description, harbour, bay, map reference etc. Attach appropriate plans and/or diagrams.

Property Address: Henderson Bay Road Locality: Ngataki
(see rate demand)

Legal Description: DP 515085, Lot 1 Blk: _____ SD: _____

Other Location Information: North side of road, 500 m NE of intersection
with Far North Road)

PART B – ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

You must include an assessment of the effects of your activity on the environment as part of your application.

The Resource Management Act 1991 requires that each application include an assessment of the actual and potential effects of the activity on the environment in accordance with the Fourth Schedule.

To assist you to supply this assessment of effects, the Council has prepared specific forms for various consent activities. For minor activities, all that will be required is for you to complete the specific form. Where the potential effects of the activity are more significant, we recommend you undertake a full assessment of effects, with professional assistance if necessary.

If you are unsure of what information to include with you application and the assessment of effects, please contact the Council before submitting your application. A pre-lodgement meeting with relevant Consent Staff is recommended.

PART C – GENERAL

(10) Renewal of an Existing Resource Consent:

Yes No A change in conditions of a current Resource Consent

(11) Fee/Deposit Enclosed with Application(s):

Application to be processed as: Notified Limited Notified Non-notified

Coastal Permit: \$ _____ Land Use Consent: \$ _____

Water Permit: \$ \$896.50 Discharge Permit: \$ _____

Bore Permit: \$ _____ Change Conditions: \$ _____

(12) Signature of Applicant(s) or Persons authorised to sign on behalf of Applicant(s):

IMPORTANT NOTES TO APPLICANTS

- (a) Your application must be accompanied by the minimum fee (deposit) as determined by the Council. A schedule of the fee/deposits for different consent applications is annexed. Please note that applications by private trusts and other group entities require the personal guarantees of the Trustees and/or Officers for the payment of costs to be submitted with the application.
 - For complex applications, the Council may require an additional deposit pursuant to Section 36(3) of the Act, based on the estimated costs for processing such complex applications and may require progressive monthly payments during consent processing.
 - The final fee is based on actual and reasonable costs including disbursements and where this fee exceeds the fee/deposit, the additional fee is subject to objection and appeal.
- (b) All accounts are payable by the 20th of the month following the date of invoice. Any actual and reasonable costs, including but not limited to legal costs, debt collection fees or disbursements incurred as a result of any default in payment, shall be recoverable from the Applicant and is so notified in compliance with the Credit Contracts and Finance Act 2003. Submitting this Application authorises the Council to, if necessary, provide your personal information to a Credit Reporter in order to employ in its debt collection services in compliance with the Credit Reporting Privacy Code 2004, should payment default occur.
- (c) Resource Consents usually attract an annual fee to recover the reasonable costs of the Council's monitoring, supervision and administration of the Consent during its term.
- (d) The information you provide is official information. It will be used to process the application and, together with other official information, assist the management of the region's natural and physical resources. Access to information held by the Northland Regional Council is administered in accordance with the Local Government Official Information and Meetings Act 1987 and the Privacy Act 1993.

I/we declare that, to the best of my/our knowledge and belief, the information given in this Application and attached Assessment of Environmental Effects is true and correct. I/we unconditionally guarantee jointly and severally to pay the actual and reasonable costs of processing this Application as and when charges become due and payable. I/we acknowledge that I/we understand the consequences of sig

Signature: _____ Signature: _____

Full Name (print): Jon Williamson _____ Full Name (print): _____

Date: 22/11/2018 _____ Date: _____

Continue with Trustees' and Authorised Officers' signatures below, as necessary.

Personal details and signatures of Trustees*, or Officers authorised to sign on behalf of and to bind Trusts, Societies and Unincorporated Entities. * Private and Family Trusts only

Full Name and Status: <small>(Trustee, Officer etc)</small>	
Full Residential Address:	
Signature:	

Full Name and Status: <small>(Trustee, Officer etc)</small>	
Full Residential Address:	
Signature:	

Full Name and Status: <small>(Trustee, Officer etc)</small>	
Full Residential Address:	
Signature:	

Full Name and Status: <small>(Trustee, Officer etc)</small>	
Full Residential Address:	
Signature:	

CHECKLIST – Have you remembered to...

- | | |
|--|---|
| <input type="checkbox"/> Complete all details set out in this Application Form | <input type="checkbox"/> Include a Site Plan |
| <input type="checkbox"/> Include an Assessment of Effects of the activity on the environment, set out in the attached form | <input type="checkbox"/> Include the appropriate fee as set out in the "Schedule of Minimum Estimated Initial Fees" |
| <input type="checkbox"/> Sign and date the Application Form | <input type="checkbox"/> Complete details of Trustees and/or Authorised Officers on this page |

Appendix B. Impact on Neighbouring bores

Predicted drawdown on bores over 50 m deep that are included in the NRC database:

IRISID	X	Y	Purpose	Depth of Bore (m)	Scenario 3 Drawdown: Deep Aquifer (m)
LOC.200340	1605647	6154733	Stock	121.5	1.14
LOC.209678	1604083	6153122	Stock	61.2	1.03
LOC.317737	1603852	6152835	Not specified	Not specified	1.01
LOC.209328	1605693	6154483	Stock	131	0.97
LOC.200256	1605648	6154433	Irrigation	130	0.97
LOC.200188	1605445	6154430	Irrigation	135	0.90
LOC.200170	1604451	6153630	Domestic	84.5	0.87
LOC.210277	1604072	6152792	Domestic	73	0.87
LOC.209778	1603961	6152588	Domestic	74	0.81
LOC.200181	1605649	6154033	Irrigation	61	0.78
LOC.301443	1604340	6154522	Not specified	Not specified	0.78
LOC.311280	1603009	6152347	Domestic and stock	101	0.77
LOC.308345	1603009	6152347	Irrigation	101	0.77
LOC.314227	1603484	6154651	Not specified	Not specified	0.75
LOC.209580	1604082	6152474	Domestic	77	0.74
LOC.209535	1603752	6152281	Domestic and Stock	76.8	0.72
LOC.303423	1604647	6154949	Not specified	Not specified	0.71
LOC.303423	1604647	6154949	Not specified	Not specified	0.71
LOC.209860	1603948	6152245	Domestic	83.8	0.68
LOC.210160	1605092	6152745	Not specified	Not specified	0.57
LOC.200299	1603346	6155525	Stock	Not specified	0.51
LOC.209454	1604120	6156486	Domestic	75.5	0.38
LOC.308083	1605059	6157509	Not specified	Not specified	0.23
LOC.308083	1605080	6157539	Not specified	Not specified	0.23
LOC.210159	1605435	6150820	Not specified	Not specified	0.21
LOC.200305	1608244	6155140	Domestic and Stock	133	0.14
LOC.209542	1608415	6155512	Domestic	56	0.12
LOC.210375	1606684	6150227	Stock	93	0.10
LOC.209029	1607610	6152523	Irrigation	143	0.10
LOC.209030	1607610	6152523	Irrigation	68.3	0.10
LOC.200333	1607138	6157636	Private Water Supply	60.5	0.09

Appendix C. Affected Persons Written Approval

FORM 8A
AFFECTED PERSON'S WRITTEN APPROVAL
(Section 95E(3)(a)/95F(c) of the Resource Management Act 1991)

TO: Northland Regional Council

Full name of person giving written approval: Henderson Bay Avocados Ltd

I am the owner / occupier (delete one) of the property located at: 5126 Far North Rd R.D.k Kaitiaki 0484
(Give address of property)

I have authority to sign on behalf of all the other owners / occupiers (select one) of the above property. **Note:** If you are signing on behalf of a trust or company, please provide additional written evidence that you have signing authority.

This is written approval to the following activity that is subject of a resource consent application:

Applicant's Name: Blake Powell

Application Number (if known): -

Description of Proposal: Water take application

Location: Lot 1 DP 515085

I have read the full application for resource consent, the Assessment of Environmental Effects (AEE), and any site plans as follows:

Document name and date: - Letter to neighbours.

Plan number(s) and date(s): - 6 April 2018

In signing this written approval, I understand that the Northland Regional Council must decide that I am no longer an affected person, and the Northland Regional Council must not have regard to any adverse effects on me.

I understand that I may withdraw my written approval by giving written notice to the Northland Regional Council before the hearing, if there is one, or, if there is not, before the application is determined.

Grant Kokich 18th August 2018
Signature* of person giving written approval (or person authorised to sign on behalf of person giving written approval) Date

Address for service of person giving written approval: 367 Kimberley Rd R.D.k Kaitiaki

Telephone: 09 4097579 021 575791

Fax/Email: gk-sk @ outlook.com

Contact person: Grant Kokich
(name and designation, if applicable)

* A signature is not required if you give your written approval by electronic means.

NOTES: (1) There is no obligation for you to sign this form and no reasons need to be given. Therefore, if you do not understand what this form is, or details about the application, then **DO NOT SIGN IT**.

(2) Conditional written approvals cannot be accepted.

(3) If this form is not signed, the application may need to be notified with an opportunity for submissions.

AFFECTED PERSONS WRITTEN APPROVAL FORM OCTOBER 2013 (REVISION 5)