

Appendix 2

Resource Consent Application
Including: Clarification Information



SHAW'S PROPERTY HOLDINGS
LIMITED

**KAIPAKI ROAD SAND QUARRY
AND CLEANFILL OPERATION**

Resource Consent Applications for a
Mineral Extraction Activity and
Associated Works

26 April 2020

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REPORT INFORMATION

Report Status	Final		
Our Reference	MDL000794 – Shaw’s Property Holdings Ltd		
File Location	Mitchelldaysh.sharepoint.com/Shaws Holdings Kaipaki Sand Quarry	Property	MDL000794
Author	Cate Southworth		
Review By	Mason Jackson		

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PART A

Resource Consent Applications

FORM 9

APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

To Waikato Regional Council
401 Grey Street
Private Bag 3038
Waikato Mail Centre
Hamilton 3240

1. **Applications for Resource Consents**

Shaw's Property Holdings Limited (Company #1897054), applies for the resource consents for sand quarrying activities described further in Part B of this AEE, namely:

- **A groundwater take** (a Discretionary Activity pursuant to Rule 3.3.4.24 of the Waikato Regional Plan); and
- **Large scale cleanfill disposal** (a Controlled Activity pursuant to Rule 5.2.5.5 of the Waikato Regional Plan).

2. **The names and addresses of the owner and occupier (other than the applicant) of any land to which the application relates are as follows:**

Legal Description	Owner Details
Lot 2 Deposited Plan 444992	Jonny Schick Shaw's Property Holdings Ltd PO Box 962 CAMBRIDGE 3994
Lot 3 Deposited Plan 424105	N E and S D Schick 21B Amber Lane, Karapiro

3. **The location to which the applications relate is described as:**

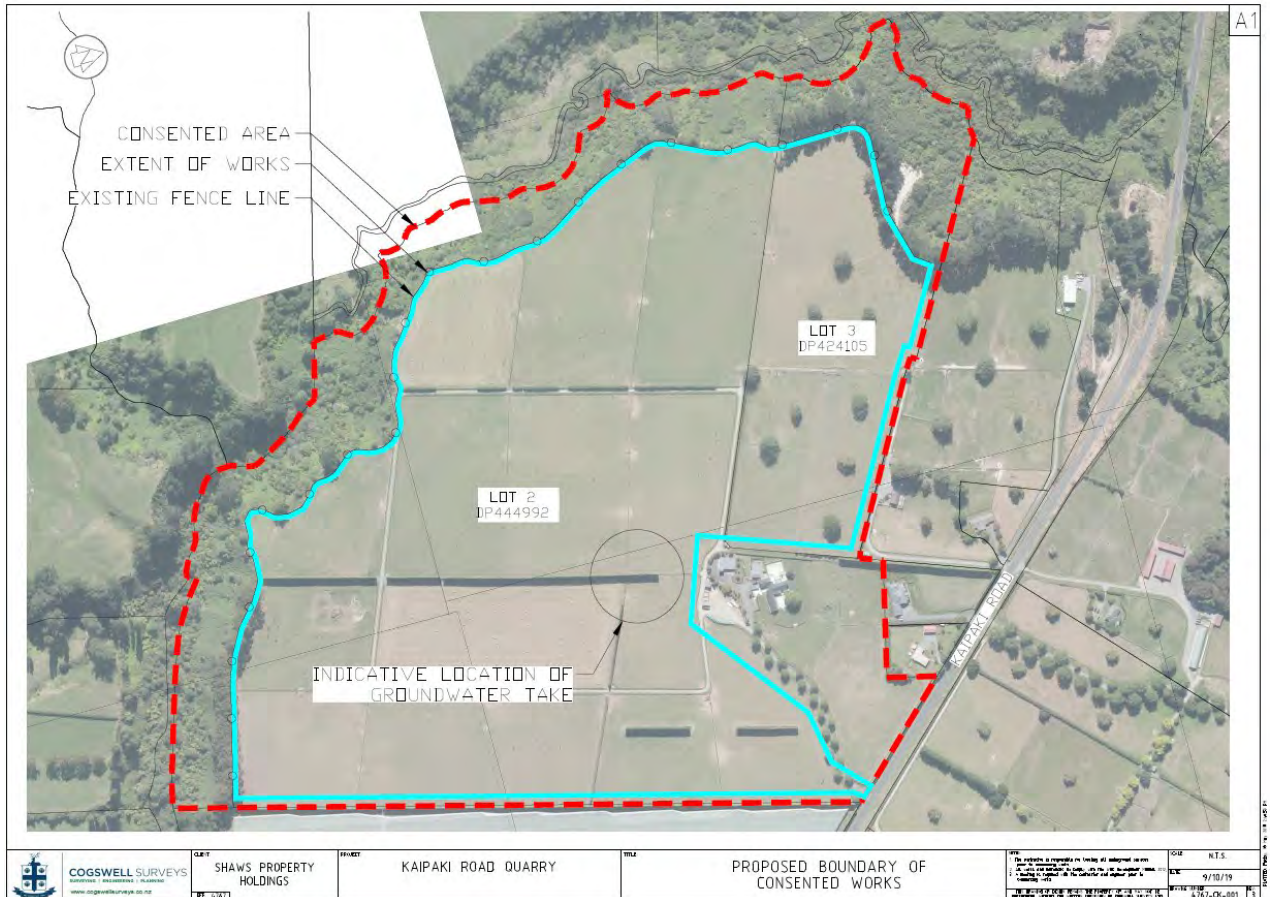
Address: 928 Kaipaki Road RD 3, Cambridge 3495,

Legal Descriptions: Lot 2 DP 444992 and Lot 3 DP 424105

Copies of the Records of Title are attached in **Appendix A**.

The location and boundaries of the application site and extent of proposed quarry works are identified in the site plan below. The indicative location for the proposed groundwater take is also shown.





4. **The activities to which these applications relate to are described fully in Part B of this document.**

5. **Other Resource Consents Required**

Waipa District Council:

- **Land Use Consent** for a Discretionary Activity for the establishment and operation of a mineral extraction activity (sand quarry) and associated works in the Rural Zone pursuant to Rule 4.4.1.4(h) of the Waipa District Plan;
- **Land Use Consent** for a Discretionary Activity in accordance with Rule 16.4.2.5 of the Waipa District Plan. Performance Standard Non-Compliance – Site Access Vehicle Crossing Minimum Separation Distances; and
- **Land Use Consent** under the National Environmental Standard for assessing and managing contaminants in soil to protect human health.

6. **Assessment of Environmental Effects**

Attached (as Part B of this document) in accordance with section 88 of, and Schedule Four to, the Resource Management Act 1991, is an assessment of environmental effects in the

detail that corresponds with the scale and significance of the effects that the activities may have on the environment.

7. **Other Information**

No other information is required to be included in this application by the District or Regional Plan, the Resource Management Act 1991, or any regulations made under that Act:

Dated: 26 April 2020

Signature: Shaw's Property Holdings Limited

By its duly authorised agents Mitchell Daysh Limited



Mason Jackson
Senior Consultant

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1130 Kaipaki Road,
CAMBRIDGE 3495
Telephone: +64 7 823 4029
Email: admin2@shaws.co.nz



FORM 9

**APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88 OF THE
RESOURCE MANAGEMENT ACT 1991**

To Waipa District Council
Private Bag 2402
TE AWAMUTU 3840

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3. The location to which the applications relate is described as:

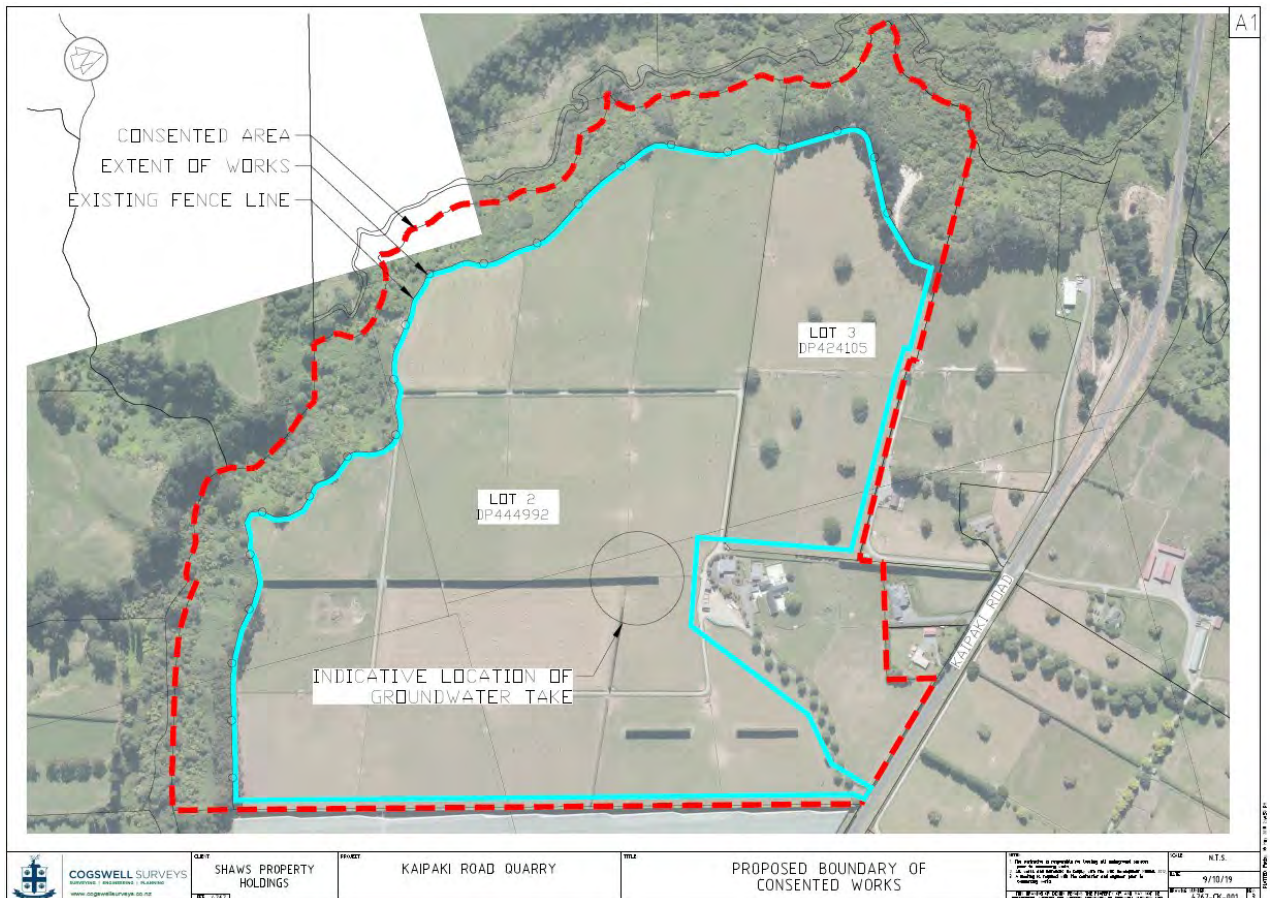
Address: 928 Kaipaki Road RD 3, Cambridge 3495,

Legal Descriptions: Lot 2 DP 444992 and Lot 3 DP 424105

Copies of the Records of Title are attached in **Appendix A**.



The location and boundaries of the application site and extent of proposed quarry works are identified in the site plan below. The indicative location for the proposed groundwater take is also shown:



4. The activities to which these applications relate to are described fully in Part B of this document.

5. Other Resource Consents Required

Waikato Regional Council

- **A groundwater take** (a Discretionary Activity pursuant to Rule 3.3.4.24 of the Waikato Regional Plan).
- **Large scale cleanfill disposal** (a Controlled Activity pursuant to Rule 5.2.5.5 of the Waikato Regional Plan).

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Telephone: +64 7 823 4029

Email: admin2@shaws.co.nz



PART B

Assessment of Environmental Effects

1. INTRODUCTION

1.1 PROPOSAL SUMMARY

Shaw's Property Holdings Limited (the Applicant) is applying for resource consent approval from the Waipa District Council (WDC) and Waikato Regional Council (WRC) to establish and operate a proposed Sand Quarry and Cleanfill operation on a rural property, with an area of approximately 49.93 hectares, located at 928 Kaipaki Road, Leamington, Cambridge.

This proposal is a discretionary activity under the Waipa District Plan. Under Waikato Regional Plan provisions, abstraction of groundwater associated with the proposal is also a discretionary activity, while largescale clean filling is a controlled activity.

1.2 DEMAND FOR SAND RESOURCE

Sand is an important resource for the construction, manufacturing, building, infrastructure and cropping/horticulture and industrial sectors, and is becoming increasingly scarce.

Cambridge has experienced significant growth and development in recent years. As the Cambridge area continues to grow, more sand will be required to meet the demand generated by associated subdivision and infrastructure projects.

The number of suitable sand extraction sites within the Waikato is diminishing due to unsuitable ground conditions and/or increased rural-residential development in areas containing quality sand resources (creating incompatible adjacent land uses).

Sand deposits must be of a certain quality and of a sufficiently large enough volume to make the investment in infrastructure required to establish and operate the quarry economical over time.

The proposed Sand Quarry and Cleanfill site at Kaipaki Road is ideally placed to service the local Cambridge market. Only a short distance from Cambridge, it is in a good location to supply the various local industries that utilise the sand resource and contains sufficient amounts of high-quality sand to support the investment.

The proximity to Cambridge, the high quality local roading network and the site's rural location all favour the proposed sand extraction activity.

1.3 REPORT STRUCTURE

This document has been prepared to describe the nature of the activities proposed and provide an Assessment of Environmental Effects (AEE) as required under section 88 of the Resource Management Act 1991 (RMA).

Specifically:

- Section 2 provides a description of the existing environment.
- Section 3 describes the proposed activities.

- Section 4 identifies the status of the proposed activity under the RMA. This includes an assessment against the relevant Waipa District Plan and Waikato Regional Plan provisions.
- Section 5 provides an assessment of the effects on the environment associated with the proposed activities.
- Section 6 provides an analysis of the proposed activity in relation to the provisions of the relevant policy and planning documents.
- Section 7 analyses the activity under Part 2 of the RMA.
- Section 8 addresses consultation undertaken with interested and potentially affected parties and the results of that consultation.
- Section 9 requests appropriate notification processes for each consenting authority.
- Section 10 sets out the consent duration sought by the Applicant.
- Section 11 sets out the key conclusions of this AEE.

1.4 RESOURCE CONSENTS APPLIED FOR

Resource Consent approval is sought for the following activities and works:

Within the jurisdiction of the Waipa District Council:

- Land Use Consent for a Discretionary Activity for the establishment and operation of a mineral extraction activity (sand quarry) and associated works in the Rural Zone pursuant to Rule 4.4.1.4(h) of the Waipa District Plan;
- Land Use Consent for a Discretionary Activity in accordance with Rule 16.4.2.5 of the Waipa District Plan. Performance Standard Non-Compliance – Site Access Vehicle Crossing Minimum Separation Distances; and
- Land Use Consent under the National Environmental Standard for assessing and managing contaminants in soil to protect human health.

Within the jurisdiction of the Waikato Regional Council

- Groundwater take (a Discretionary Activity pursuant to Rule 3.3.4.24 of the Waikato Regional Plan); and
- Large scale clean fill disposal (a Controlled Activity pursuant to Rule 5.2.5.5 of the Waikato Regional Plan).

1.5 TECHNICAL REPORTS

The following technical reports have been prepared in support of this application and assessment of environmental effects:

- A Geotechnical Report prepared by Mark T Mitchell Limited (Appendix C)

- A Quarry and Cleanfill Management Plan (including Dust Management Plan, an Erosion and Sediment Control Plan and Staging Plan) prepared by Cogswell Surveys Limited (Appendix D)
- An Integrated Traffic Assessment (ITA) prepared by Gray Matter Limited (Appendix E)
- An Archaeological Assessment prepared by Clough and Associates Limited (Appendix F)
- An Acoustic Assessment prepared by Marshall Day Acoustics (Appendix G)

The activities will be undertaken in accordance with the recommendations of the above technical assessments and reports, and as detailed within this application report.

2. EXISTING ENVIRONMENT

2.1 SITE DESCRIPTION

2.1.1 Location

The application area is a rural property located at 928 Kaipaki Road, Cambridge approximately 4km West of Cambridge Road (Figure 1). The site adjoins Kaipaki Road and other rural properties to the north and an existing kiwifruit block to the east. The south-western boundary of the property is located on an existing steep gully containing the Mangawhero Stream.



Figure 1: Location of the application site.

2.1.2 Existing Land Uses and Development

The application area is currently used for general rural purposes (dry stock and horse grazing). There is an existing dwelling and detached accessory buildings located towards

the northern end of the site on Lot 2 DP444992. The balance of the property comprises rural paddocks/pasture and vegetated gully.

2.1.3 Topography and Vegetation

The site is uniformly flat until it reaches the existing gully area containing the Mangawhero Stream which runs along the south-western edge of the property.

Two Significant Natural Areas (SNA's) are identified within the gully area (WP344a and WP344). The SNA boundaries generally align with the gully areas along the south-western edge of the property. Vegetation within the gully area is predominantly invasive species (including gorse and blackberry) with some interspersed native species. A number of areas adjoining the gully also show evidence of erosion.

Figures 2 and 3 show the existing vegetation within the gully areas.



Figure 2: View of the existing SNA and gully area at the rear of the site.



Figure 3: View of the existing SNA and gully area at the rear of the site.

Figure 4 shows an area where erosion is occurring along the top of the gully (the applicant has fenced around the eroding gully bank).



Figure 4: View of an existing erosion area occurring within the gully

2.1.4 NEIGHBOURING LANDOWNERS AND DWELLINGS

Neighbouring land and dwellings are shown in Figure 2 (refer white reference numbers).

Table 1 lists landowner details (where known) along with setback distances between dwellings and the extent of works boundary (where relevant). Most sensitive receptors (dwellings) are located to the north and northeast of the site. Dwellings 4 and 5, shown in Figure 5 are closest to the proposed works.



Figure 5: Aerial Photo showing the location of the application site and neighbouring land / dwellings.

Table 1: Neighbouring Landowner / Dwelling Details

Neighbour Location (Figure 5 Reference Number)	Landowner / Occupier Name and Address	Legal Description	Dwelling Setback from Extent of Works Boundary
1	Janet and Ronald Taylor	LOT 1 DP 364402	120m
2	898 Kaipaki Road RD 3	LOT 2 DP 424105	N/A (No Dwelling)
10	Cambridge 3495	LOT 1 DP 424105	140m
3	Unknown		430m (Dwelling not shown on Figure 2)
4	Michael and Helen Moran 906 Kaipaki Road RD3 Cambridge 3495	Lot 1 DP 444992	52m
5	Deborah and Robin Comes 914 Kaipaki Road (Ohaupo)	Lot 1 Deposited Plan South Auckland 68688,	120m
6	Whitehall Fruitpackers Holdings Limited	Parcel ID # 4430283, Lot 3 Deposited Plan South Auckland 32828 (SA31D/868)	N/A (No Dwelling)
7	A & K Walker 899 Kaipaki Road (Ohaupo)		277m
8	Ralph and Sarah Manning 951 Kaipaki Road (Ohaupo)		225m
9	Unknown		N/A (No Dwelling)

2.1.5 Existing Screen Planting

There are several areas of existing mature planting within the site that assist in screening the property from the adjacent rural properties and public road. The existing planting includes:

- Established internal shelter belt planting within the site;
- Existing boundary planting including an existing shelter belt that runs the length of the eastern boundary and completely screens the application site from the adjacent kiwifruit block and properties further to the east;
- Existing shelter belt planting along the southern, western and part of the eastern property boundaries for dwelling 5; and

- Established trees and planting within the gully areas along the south and western property boundaries (adjacent to Mangawhero Stream).

Figures 6 and 7 depict some of the existing shelter belt planting on site.



Figure 6: View of the existing shelter belt planting onsite



Figure 7: View of the existing shelter belt along the eastern (side) boundary; and some of the existing internal planting

2.2 CULTURAL SETTING

The site falls within the Waikato Tainui rohe. It also sits within the Ngati Haua's area of interest. Raukawa and Ngati Koroki Kahukura rohe also extend to areas within 10km or so to the south of the site.

In oral tradition the Tainui canoe, captained by chief Hoturoa, made its final landfall at Kawhia some 800 years ago. The canoe had travelled around various parts of the central North Island, including the Bay of Plenty, the Coromandel, the Manukau Heads and the Hauraki Gulf, with some people leaving the voyage and settling in these areas (Te Ara). Hoturoa is said to have made his base at Kawhia and over the years the Tainui people expanded inland from there. This included movement into the Waikato and Maori settlements spread throughout the region, with many concentrated along the coast to exploit the rich resources available there. Further inland, settlements were made along navigable waterways, such as the Waikato and Waipa Rivers and their tributaries, with numerous pa sites identified as well as gardening and food storage sites.

Waikato Tainui hold strong cultural connection to the Waikato River and its contributing tributaries. As evidenced from their Iwi Environmental Management Plan, they also favour of an approach to resource use that sees a net benefit back to the environment in such a way that the environment is actually enhanced from the resource use, activity, or development.

2.3 SURROUNDING LANDUSE

The application site is located within an established rural area in which the predominant land use activities are farming, horticulture, horse training and lifestyle blocks.

Neighbouring properties along Kaipaki Road are predominantly rural and rural-residential in nature and includes an existing kiwifruit orchard and horse stud, both to the east.

2.4 SITE GEOLOGY

Mark T Mitchell Limited (and their associate company Geocon Geotechnical Limited) have prepared a Geotechnical Investigation of the application site (attached as Appendix C).

This report formed part of the initial feasibility study to determine the scale and quality of the underlying sand resource and its viability as a commercial sand quarry.

Mark T Mitchell Limited describe the soil conditions and geology of the area as follows:

- Silt loam and Filling overlie generally silica-rich sands of the Hinuera Formation. The sands are generally medium to coarse grained and comprise of minerals such as quartz, feldspar and rock fragments. The presence of larger grained deposits including gravel and cobbles indicate that some of these soils were deposited in a high energy environment.

- The sand soils are generally suitable for the purpose of Pit Sand Extraction, however larger gravels encountered at depths may require separating from the bulk of the sands
- The natural soils encountered onsite at test locations were found to consist primarily of aeolian (Loess) and alluvial deposits (Hinuera Formation). The more recent Silt Loam (loess) is a product of wind-blown and redeposited alluvium and volcanic ash material.
- The underlying soils onsite at the test locations consist primarily of alluvial deposits known as the Hinuera Formation which was deposited at a time when the Waikato River was meandering over a vast flood plain from the latest 17,000 to 22,000 years, with rhyolitic sands, gravels and silts being laid down in irregular patterns together with occasional slack water deposits including organic silts.
- Taupo Pumice Alluvium (TPA) was found onsite within boreholes located close to the gully slope. TPA is a soil that has been deposited within the last 2,000 years and which is characterized by soft silts and loose sands.

Several boreholes were drilled on site to test and map the quality and quantity of the sand resource. These results were also used to identify an area of 'best sand' (located in the middle of the application site, on Lot 2 DP 444992).

Figure 8 shows the location of the borehole tests, and the change in topography between the site and the adjacent gully with Mangawhero Stream.

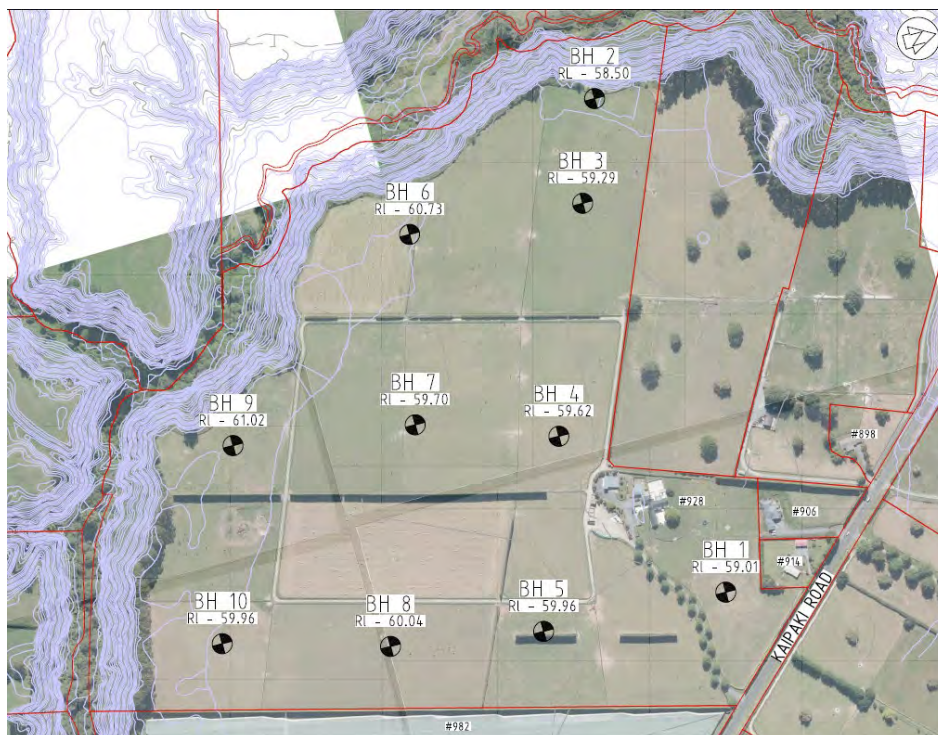


Figure 8: Site Contours and Borehole Testing Layout

2.5 ARCHAEOLOGICAL VALUES

The archaeological assessment (Appendix F) summarises the currently known archaeological values of the site. In summary, five archaeological sites (S15/285, S15/546, S15/547, S15/631 and S15/715) have been previously recorded in the Project Area (Figure 9). All of these sites are borrow pits associated with Maori horticulture. Borrow pits are common features in the archaeological landscape of the Waikato. The pits were dug to collect sands and gravels that were present below the upper soil layers. The extracted material was then added to the topsoil to create a 'made soil' for gardening.



Figure 9: Aerial photo showing the location of the recorded archaeological sites

A field survey of the majority of the sand quarry footprint (Lot 2DP444992) was undertaken on 25 June 2019 as part of the archaeological assessment. During the survey, the majority of recorded archaeological sites shown in Figure 9 could not be relocated. This indicates that the landscape has undergone significant modification through historic farming practises, especially infilling, levelling and stock damage.

However, the field survey identified the presence of one possible borrow pit near recorded archaeological site (S15/547) and another possible borrow pit near S15/285 outside the

quarry footprint. No clear evidence of the borrow pits recorded at S15/631 (within the quarry footprint) and S15/546 were able to be identified. It was noted that the upper layers of the soil have been modified through past activities, including infilling, levelling and stock movements and, in the case of S15/546, for creation of a dirt bike track that would have damaged or destroyed archaeological remains that may have existed close to the ground surface.

Also during the survey, a second possible borrow pit was located in the western paddock around the recorded location of S15/285, where a depression partially filled with water was observed. The area had been affected by horse activity with horses using the depression to roll in. It is considered possible that this area represents a borrow pit as the grass around the central water-filled area varied from the general pasture grass and probing indicated a softer soil in an area of approximately 0.5 x 10m.

Figure 10 shows the location of the recorded archaeological sites (blue stars) in the area covered by the survey (red shaded area) and the location where evidence of borrow pits was able to be detected in the field.



Figure 10: Aerial photo showing the location of the recorded archaeological sites and the location where evidence of borrow pits was detected during the field survey

2.6 WIND ENVIRONMENT

Wind conditions at the site are likely to be very similar to those near the Hamilton Airport weather station. The Hamilton Airport wind rose at Figure 11 shows the predominant wind on site will be from the westerly quarter. Figure 11 also shows the strongest (higher velocity) winds are from the west.

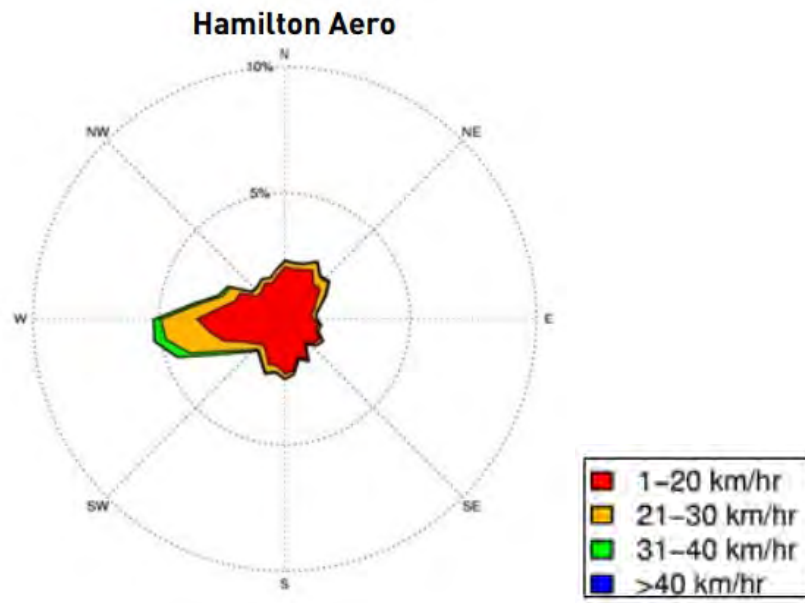


Figure 11: Mean Annual Wind frequency (%) of surface wind direction from hourly observations at Hamilton Airport. Plot shows direction from which the wind blows (Source: NIWA Report “The Climate and Weather of the Waikato” Second Edition, P.R.Chappell).

The Hamilton area also experiences a very marked diurnal variation in wind speed, with greatest wind speeds occurring in the early part of the afternoon. This is because at that time of day heating of the land surface is most intense and stronger winds aloft are brought down to ground level by turbulent mixing. Cooling at night generally restores a lighter wind regime.

Table 2 gives average wind speeds at three-hourly intervals for the Hamilton Airport location.

Table 2: Average wind speed (km/hr) for selected hours at Hamilton Airport

Hour	00	03	06	09	12	15	18	21
Wind Speed	8	7	7	9	14	16	14	9

2.7 GROUNDWATER

The site overlies the Hamilton Basin – West aquifer system.

The Waikato Regional Council online maps shows four existing bores are present in the immediate area surrounding the application site. These are listed in Table 3 and identified in Figure 12.

Table 3: Existing Bores in the immediate area (Source: Waikato Regional Council online maps)

Auth No.	Address	Details
70 663	899 Kaipaki Road	Bore (25-50m)
70 942	899 Kaipaki Road	Bore (unknown)
70 943	951 Kaipaki Road	Bore (<25m)
70 913	82 Speake Road	Bore (unknown)

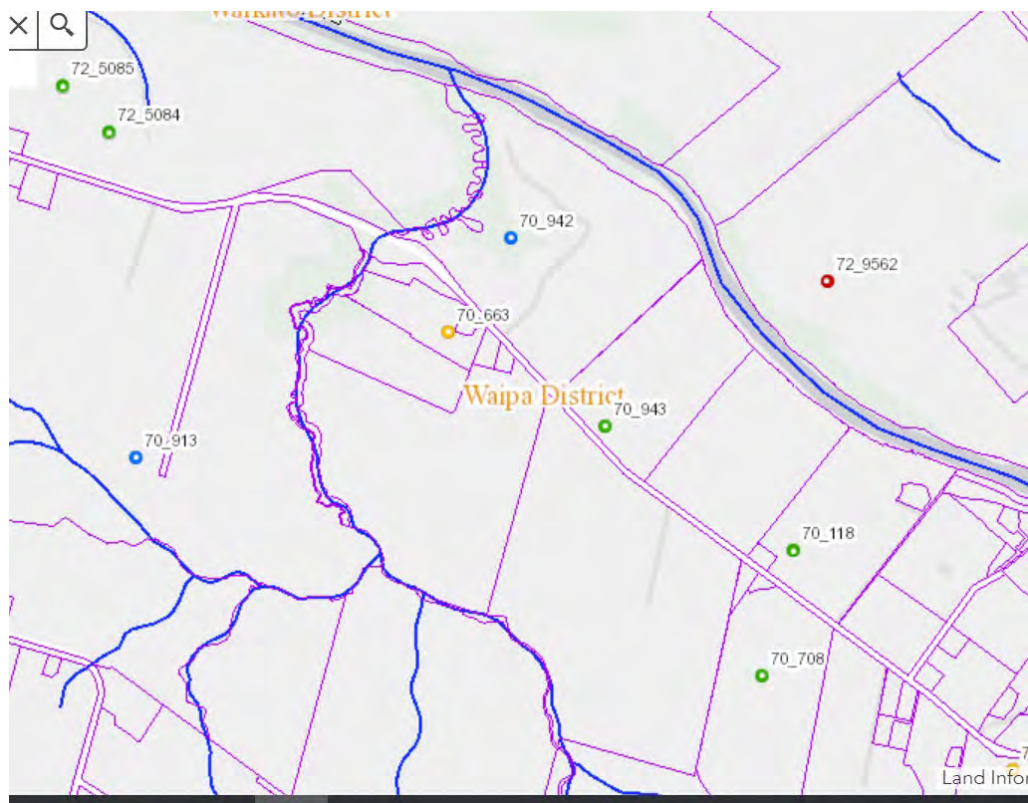


Figure 12: Existing Water Bores (Source: Waikato Regional Council online maps)

2.8 TRAFFIC AND ROADING ENVIRONMENT

The traffic and roading environment at and surrounding the site is described in detail within the Integrated Traffic Assessment provided in Appendix E. A summary is set out below.

2.8.1 Road Network

The local roading network is illustrated in Figure 13. The road hierarchy (WODP Appendix T5) classifies Kaipaki Road as a collector road between SH3 and Mellow Road and a minor arterial route between Mellow Road and Cambridge Road. Kaipaki Road intersects Cambridge Road at its eastern end, and SH3 at its western end and is approximately 13 kilometres long. It is used as a link between Cambridge and Ohaupo, and as access from Cambridge to the Hamilton Airport, Rukuhia and south Hamilton. There are ten intersections along Kaipaki Road.

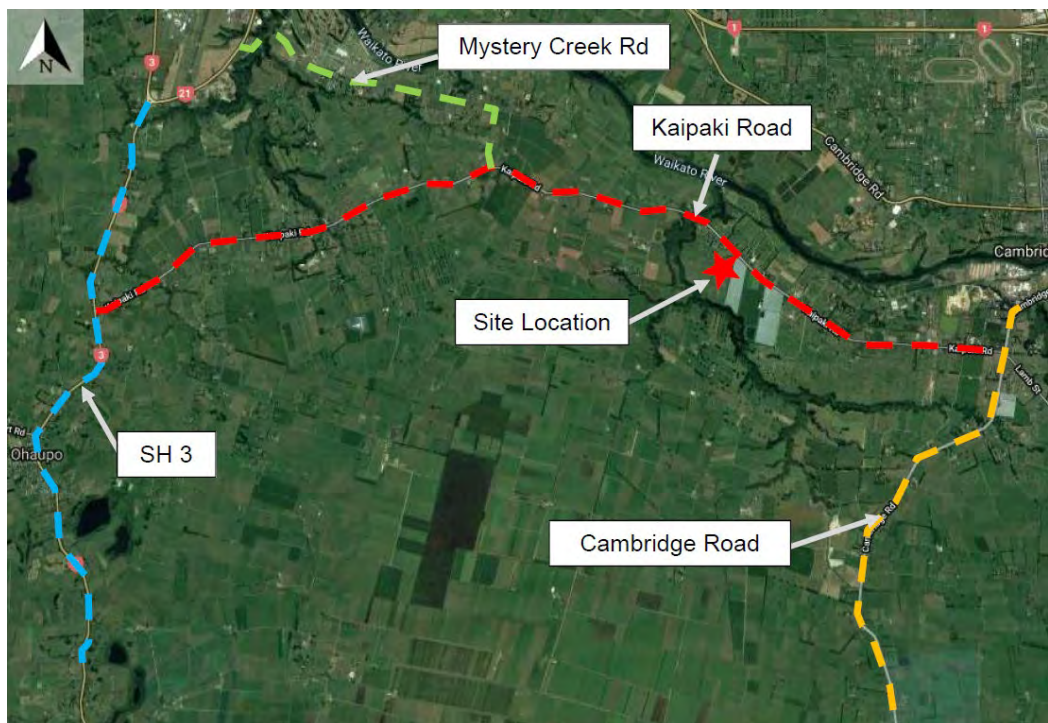


Figure 13: Existing Road Network.

At the site, Kaipaki Road has a 100km/h posted speed limit and a two-lane carriageway with 3.4m lane widths in each direction and average annual daily traffic (AADT) of 3,200 veh/day.

Kaipaki Road traffic volumes as recorded in mobileroad.org (as at 14/06/2019) are:

- 1,300 vehicles per day (veh/day) including 9.3% Heavy Commercial Vehicle (HCV) from State Highway 3 to Tarr Road;
- 2,100 veh/day including 9.3% HCV from Tarr Road to McEldownie Road;
- 3,200 veh/day including 10.2% HCV from McEldownie Road to Cambridge Road.

The closest dwellings to the site are located between 898 – 906 Kaipaki Road (within a distance of approximately 200m). The dwelling at 914 Kaipaki Road (reference 5 in Figure 5) is located approximately 150m from the site access and approximately 200m from the closest extraction area.

2.8.2 Traffic Volumes

Traffic volumes for Kaipaki Road and the surrounding road network are shown in Table 4. The posted speed limit on all the roads listed is currently 100km/h.

Table 4 :Traffic Volume for Road Network (* HCV figures given where listed)

Road Name	Waipa DC Road Classification	Traffic Volume veh/day	HCV* veh/day (%)
Kaipaki Road	Collector/ Minor arterial	1,300-3,200	121-326 (9.3-10.2%)
State Highway 3	Major Arterial	12,899	748 (5.8%)
Cambridge Road	Major Arterial	7,200	842 (11.7%)
Mellow Road	Minor Arterial	1,100	78 (7.1%)
Mystery Creek Road	Minor Arterial	2,260	210 (9.3%)
Norrish Road	Local	90	0%
Lynds Road	Local	240	0%
Tarr Road	Local	110	0%
Berquist Road	Local	55	0%
Goodwin Road	Local	195	20 (10%)
McEldownie Road	Local	1,000	94 (9.4%)
Speake Road	Local	20	-
Thrillwall Lane	Local	75	0%
Pukerimu Lane	Local	100	0%

2.8.3 Existing Vehicle Entrances

The vehicle entrance at 928 Kaipaki Road provides access to the existing residence and farm (Figure 14). The driveway is formed and lined with mature trees and is accessed via electronic gates. The entrance is approximately 21m wide at the road edge and the gate is set back approximately 24m.

Immediately adjacent to the existing vehicle entrance is an access gate for the kiwifruit orchard. There is no formed vehicle entrance to this gate and it appears that it is used infrequently. An access gate is located on the property opposite the existing vehicle entrance but appears to be unused.



Figure 14: Looking across Kaipaki Road at the existing vehicle entrance

2.8.4 Sight Distances

Sight distance looking right (south-east) is approximately 640m to the horizontal curve (Figure 15). Sight distance looking left (north-west) is approximately 400m to the crest vertical curve (Figure 16).



Figure 15: View from the proposed vehicle entrance looking south-east



Figure 16: View from the proposed vehicle entrance looking north-west (arrow indicates top of crest curve)

2.9 NOISE ENVIRONMENT

The noise environment at the site is described in detail within the Acoustic Assessment provided in Appendix G. A summary is set out below.

2.9.1 Nearest Receivers

Existing noise receivers near the site are shown in Figure 17.

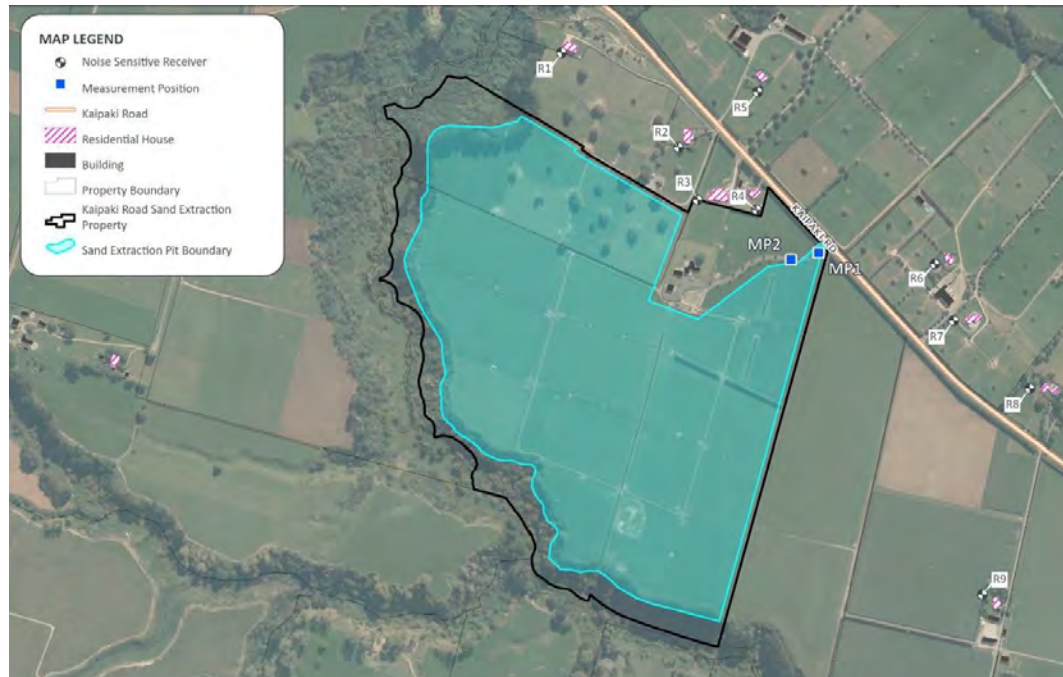


Figure 17: Proposed sand quarry and clean filling site in relation to nearest dwellings.

2.9.2 Existing Ambient Noise

Ambient noise has been measured at the site at locations MP1 and MP2 (Figure 17). The results are presented in Table 5.

Table 5: Measurement Noise Level Summary

Measurement Position	Measured Levels (dBA)		Comments
	L _{eq}	L ₉₀	
MP1 (20m from road edge)	63	38	Kaipaki Road traffic noise
MP2 (60m from road edge)	53	40	Traffic noise with intermittent bird calls. No other noise sources in the area

The measured daytime ambient noise levels are consistent with a rural environment with one controlling noise source – Kaipaki Road. The traffic flow varies during the day - thus,

the measured results provide a snapshot of the existing noise present at the time of the measurement.

2.10 TITLE INFORMATION

2.10.1 Records of Title

The application site comprises of two fee simple Records of Title as follows:

Legal Description	Area	Owners
Lot 2 DP 444992 (RT 558891) Containing the existing dwelling	40.7327 ha	Jonny Schick Shaw's Property Holdings Limited
Lot 3 DP 424105 (RT 493900)	9.2547 ha	N E and S D Schick
Total Site Area	49.9874 hectares	

2.10.2 Legal Encumbrances

The following legal encumbrances / interests are registered on the Records of Title:

Record of Title 55891:

- Consent Notice 8386295.1 relating to a 'Dwelling for a Person with a Long Association with a Holding'.

The consent notice is not applicable to the proposal to establish and operate a sand quarry and cleanfilling operation at the application site. A subdivision is not proposed, nor are any new dwellings proposed. The existing dwelling (occupied by the Applicant) will be retained and is located outside of the quarry area. The site will be rehabilitated back to rural farmland upon completion of the sand extraction activities.

Record of Title 493900:

- Easement Instrument 6814910.6 relating to a right of way and a right to convey electricity, telecommunications and computer media; and subject to Section 243(a) of the RMA 1991.
- Easement Instrument 8411152.4 relating to a right (in gross) to transmit electricity over part marked H on PD 424105 in favour of Waipa Networks Limited; and subject to Section 243(a) of the RMA 1991.
- Easement Instrument 8411152.5 relating to a right of way and a right to convey water, electricity, telecommunications and computer media; and subject to Section 243(a) of the RMA 1991.

None of the above easements are applicable (or affected by) the proposal to establish and operate a sand quarry and clean filling operation at the application site. The existing rights of way and easements are all located outside of the operational sand quarry area and are

therefore unaffected. Further, the site will be rehabilitated back to rural farmland upon completion of the sand extraction activities.

Copies of the Records of Title and the corresponding Consent Notice are attached as Appendix A.

2.11 EXISTING RESOURCE CONSENTS

The applicant holds a land use consent AUTH141611.03.01 granted by the Waikato Regional Council to construct a water supply well on the site to be used to supply water for the proposed quarry. There are no other existing resource consents for the application site.

The nearest resource consent (as identified on the Waikato Regional Council online maps) is a consent '*to undertake vegetation clearance in a High Risk Erosion Area in association with the construction of the Te Awa Cycleway – St Peters School – Hooker Road (AUTH 139974.01.01)*'; and relates to the property at 82 Speake Road (located to the west of the application site, and on the opposite side of the existing gully and riparian stream area).

3. DESCRIPTION OF THE PROPOSAL

3.1 OVERVIEW

The Applicant proposes to establish and operate a sand quarry and clean filling operation at the subject property.

It is estimated that the site has the potential to supply over 900,000 cubic metres of sand over the next 7-10 years. The volume extracted may vary dependent on further detailed analysis. The rate at which the sand will be extracted may also vary, and will be dependent on a number of factors, including weather conditions and market demand. However, a maximum extraction limit of 200,000m³ per year is proposed.

The boundaries of the proposed consent application area align with the external site boundaries of the two titles, however, the actual operational area (i.e. the 'extent of works') will be slightly smaller so that the activities proposed are appropriately set back from the external site boundaries and adjacent SNA areas.

A site plan showing the consent application area and indicative 'extent of works' is provided in Figure 18.

In general, the site will comprise;

- Upgraded and re-designed entranceway;
- Sealed site access road running alongside the site's eastern boundary;
- Wheel wash;

- Sand excavation and clean fill “working areas”;
- Stockpile areas;
- Pre-fabricated site office;
- Staff parking area;
- Groundwater well; and
- Machinery service area / Maintenance shed.

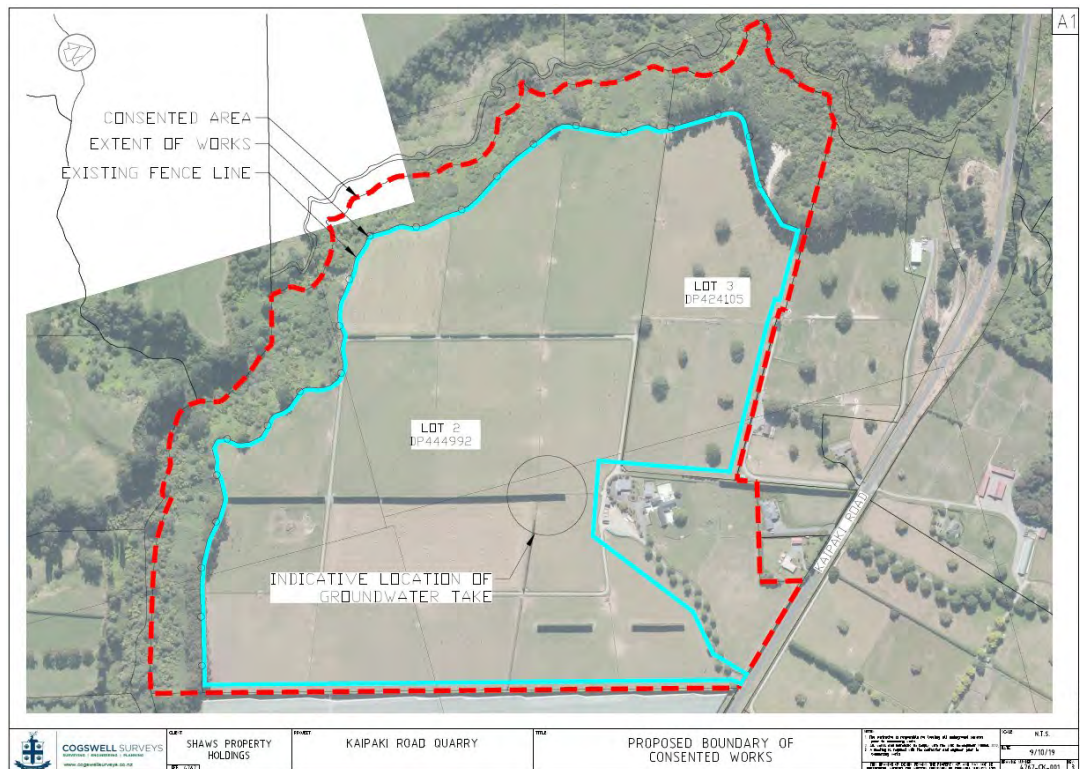


Figure 18: Consent application area and proposed extent of works

The sand extraction activities will occur as a series of stages so that the total quarry and clean fill area exposed at any one time is no more than three hectares.

Sand extraction activities will initiate in the south eastern corner of the site and will generally move in a northerly direction away from the Mangawhero Stream and gully edge. This will limit the visual effects of the sand quarry, particularly when viewed from the existing rural residential properties and dwellings to the north. The retention of the existing gully vegetation and trees along the top of the gully areas will also afford visual mitigation and screening for those properties to the west (on the opposite side of the SNA area).

The open pit (working area) will be well below the natural ground level. The existing topography and working face will therefore screen the open pit working area.

Imported clean fill will be utilised as part of the rehabilitation and recontouring works for the sand quarry - essentially used to back-fill extraction areas.

The existing farming activities (dry stock and horse grazing) will continue to operate on the balance of land concurrently with the sand extraction and clean filling activities.

3.2 HOURS OF OPERATION

The following hours of operation are proposed:

- 7:00am to 5:30pm, Monday to Friday;
- 7:00am to 12:00pm Saturday; and
- Closed Sunday and Public Holidays.

3.3 STAFF

Approximately four full time staff are proposed on-site (contributing eight vehicle movements per day).

3.4 SAND EXTRACTION

The process of extracting sand involves the following processes:

Vegetation Removal

Existing vegetation (predominantly pastoral grasses) will be scraped off and stockpiled.

Stripping and Site Preparation

The average ground area of open soil for sand extraction purposes will be approximately three hectares at any one time. This will involve the stripping of approximately 15,000m³ of topsoil material (in stages) to be temporarily stockpiled on site. Some of this material will be used for construction of bunds for landscaping, noise control and erosion & sediment control.

Sand Extraction for Sale

Excavation of approximately 900,000m³ of sand to be mined in stages using excavators and trucks and/or loaders to transport the sand material to stockpiles. Any unsuitable materials will be later added to clean fill for landscaping/rehabilitation. Maximum excavation depth will be approximately 7 metres and will not intercept local water table.

3.5 CLEAN FILLING

The process of receiving clean fill will involve the following processes:

Receipt of material to site

Trucks will discard their loads and material will be spread and compacted on site, using loaders, bulldozers, rollers and/or excavators and trucks.

Compaction of Material

The clean fill will be placed in layers approximately 300mm deep and compacted using loaders, bulldozers, rollers and/or excavators and trucks. Compaction shall produce an in-situ density no less than that of the original material prior to excavation. There shall be a minimum of 4 tests per 1 hectare in a 50m grid. Backfill will be tested using Scala Penetrometer.

3.5.1 Clean Fill Acceptance Criteria

Accordingly, the applicant proposes to adhere to the WasteMinz Guidelines for Waste Acceptance Criteria (WAC) for Class 5 landfills. These criteria include:

- virgin excavated natural materials (VENM), including soil, clay, gravel and rock; and
- maximum incidental¹ inert manufactured materials (e.g. concrete, brick, tiles) to be no more than 5% by volume per load; and
- maximum incidental 1 or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load; and
- maximum chemical contaminant limits are local natural background soil concentrations.

3.5.2 Records

Prior to accepting any clean fill on site, the following detailed information will be obtained and recorded (daily) from the disposer:

- Date and time materials were received;
- Details of any random load inspections;
- Vehicle and driver identification;
- Source of the waste;
- Confirmation that the waste has not been contaminated;
- Copies of any soil testing results (If available);
- Copies of any resource consents (If available); and
- Confirmation that soils meet the WAC criteria.

All daily records will be provided annually to WRC.

¹ Incidental items or materials are those present in small quantities that cannot practically be separated from the materials intended for disposal.

3.5.3 Monitoring

Throughout the clean filling process, materials will be visually monitored at the tipping face for any inappropriate constituents. Where these are identified, the removal and/or treatment of the offending materials will take place as soon as practicable.

3.5.4 Random Load Inspections

Incoming loads will be selected on a random basis (approximately 1 in 50 loads) and recorded. Random load inspection methodology will be dependent on the size of the incoming vehicle.

Vehicles with low sided trays/trailers (typically cars to medium sized trucks)

Load contents will be visually inspected on vehicle/trailer prior to discarding at fill location.

Vehicles with high sided trays/trailers (typically large trucks)

Load will be directed to and partially unloaded at the quarantine area, where contents can be visually inspected prior to discarding at fill location.

3.5.5 Notification of Alternatives

Where loads are found to be non-compliant, the disposer will be informed of near-by suitable facilities that are able to accept the material. Where multiple non-compliances are recorded against a disposer, both WRC and WDC will be advised.

3.5.6 Verification

Verification sampling and testing will be completed on both a random and annual basis.

Random Sampling

Collected from incoming loads, based on approximately one sample per 500m³ of incoming material to site.

Annual Sampling

Collected from the deposited waste sites across the landfill.

All clean fill material shall meet the Waikato Regional Plan definition of Clean fill and the parameters identified in the Table 6.

Table 6: Clean Fill Testing Criteria

Constituent	Threshold Concentration (mg/kg dry weight) Total recoverable fraction
Arsenic	20
Boron	15
Cadmium	1
Chromium	56 95
Copper	120

Constituent	Threshold Concentration (mg/kg dry weight) Total recoverable fraction
Lead	78.90
Mercury	1
Nickel	33.60
Zinc	175
Benzene	1.10
Toluene	68.00
Ethylbenzene	53.00
Xylenes	48.00
Naphthalene	7.20
Acenaphthylene	50
Acenaphthene	90
Fluorene	80
Hexachlorobenzene	0.02
Phenanthrene	90
Anthracene	800
Fluoranthrene	320
Pyrene	160
Benzo[a]pyrene	0.272
Gamma BHC (Lindane)	0.02
Heptachlor	0.02
Aldrin	0.02
Dieldrin	0.02
Sum of DDT, DDD and DDE	0.70
Sum of PAH's	80
TPH C7-C9	2700
TPH C10-C14	560
TPH C15-C36	4000

All test results will be forwarded to Waikato Regional Council within one month of test results being received.

3.6 SETBACKS

The proposed sand extraction and clean filling activities (shown as the 'extent of works' area on the attached site plan) will be appropriately positioned within the application area so that sufficient setbacks are established from all external site boundaries. The extent of works approximates with the boundary fence lines for the property which achieves the following approximate setbacks:

- at least 20m from the northern property boundaries;
- between approximately 60m and 180m from the Mangawhero Stream (which demarcates the southern and western site boundaries);
- 20m from to the existing kiwifruit orchard to the south east; and
- 10m from the eastern boundary, inclusive of the proposed sealed road.

The activities will be sited approximately 160m from the nearest dwelling (excluding the owners dwelling).

In addition to the above setbacks, the excavation line for all sand removal working areas will be setback a further 5 metres from the boundary fence as shown in Figure 19.

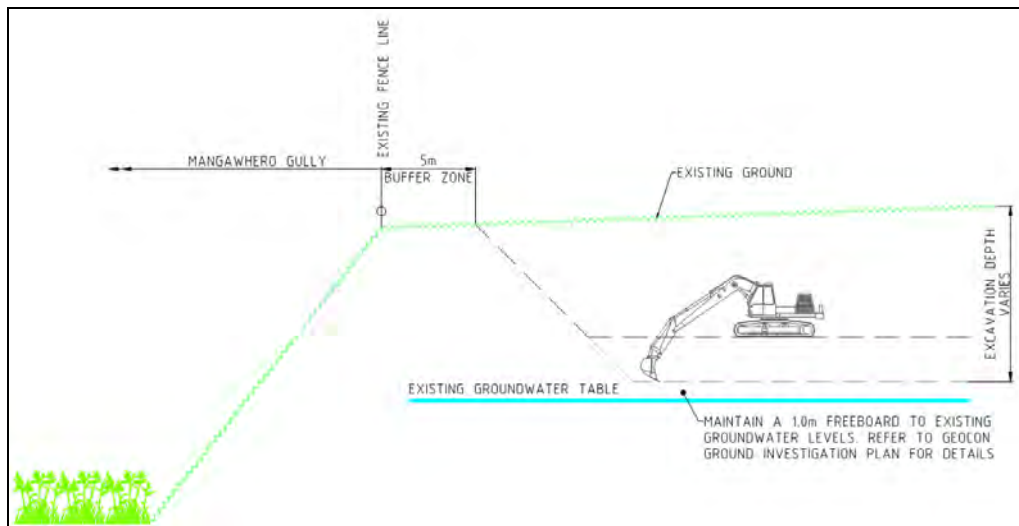


Figure 19: Cross Section of Typical Working Area

3.7 DEVELOPMENT STAGING

To minimise potential visual and amenity effects, and effects from dust, erosion and sediment runoff, the construction activities will be staged over time in accordance with a Staging Plan (Figure 20). The staging will also ensure that a total amount of active and unstabilised clean fill and sand extraction working areas does not exceed three hectares. The staging of works takes account of the following factors:

Extraction volumes

Annual maximum sand extraction of 200,000m³

Clean filling volumes

Annual maximum clean filling of approximately 100,000m³

Groundwater levels

No works are to be undertaken below groundwater (no dewatering) and excavations will maintain 1.0m freeboard from groundwater levels identified in the Geocon Geotechnical Report.

Noise and visual impacts

Extraction and clean filling will begin from the southern corner of the site and expanding to the north.

Based on the above, it is estimated that approximately 2-4 hectares of land will be disturbed annually.

The Staging Plan forms part of the Quarry and Cleanfilling Management Plan (discussed in more detail below).

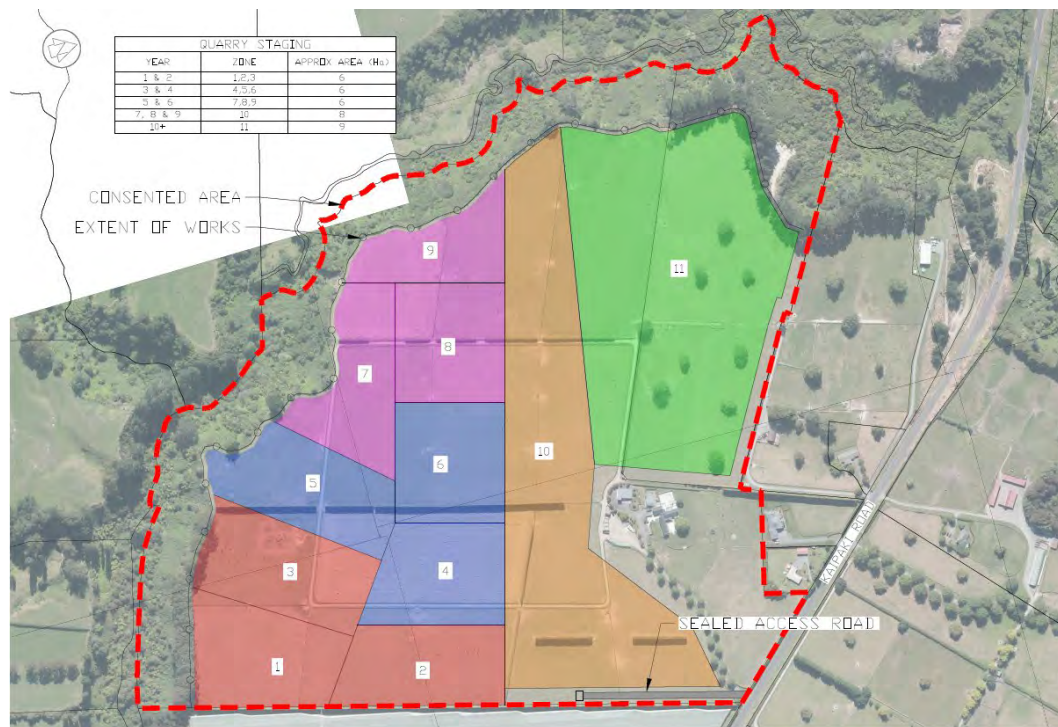


Figure 20: Sand Extraction Staging Plan

3.8 QUARRY MANAGEMENT PLAN

The site will operate in accordance with a comprehensive Quarry and Cleanfilling Management Plan (QCMP). A copy of a draft QCMP is provided in Appendix D.

The primary purpose of QCMP is to document all management, monitoring and operational procedures that will be implemented at the Kaipaki Road Sand Quarry and Clean fill site to minimise environmental effects both within and beyond its boundaries.

The QCMP covers the following operational matters:

- Site responsibilities and contacts;
- Health and safety;
- Staging procedures and plans;
- Sand extraction procedures;
- Clean fill management procedures;
- Accidental discovery protocols;
- Erosion and sediment control procedures and plans;

- Dust management procedures;
- Traffic management procedures;
- Complaints procedures;
- Rehabilitation processes;
- Reporting and record keeping requirements; and
- Plan review procedures.

3.9 DUST MANAGEMENT

Dust will be controlled on site through a combination of dust minimisation and mitigation methods based on the following key site design and operation principles;

Design

- Minimising the open quarry area to no more than 3 hectares;
- Implementation of a secure supply of water (bore),
- Establishment of contingency water carts for dust suppression;
- Establishment of a truck wheel wash;
- Retaining existing shelter belt vegetation that acts both as a barrier to wind exiting the site and a filter to intercept any entrained dust. The existence of a mature shelter belt on the eastern site boundary (i.e. the predominant down-wind site boundary) is particularly advantageous in this respect;
- Sealing the site entrance and first 100m of the site access road;
- Locating the accessway parallel to the existing shelter belt;

Operational

- Staff training and awareness of dust generation risk factors and mitigation measures;
- Employment of water spray or water carts to dampen dust in dry / windy conditions (particularly if blowing from the south or southwest);
- Regular visual monitoring;
- Enforcement of on-site speed restrictions;
- Use of a truck wheel wash to minimise tracking of sediment by outbound trucks;
- Use of dust covers for the transportation of loads with high dust potential (mainly sand) to minimise any residual dust;
- Neighbours feedback / complaint response.

3.10 EROSION AND SEDIMENT CONTROL PLAN

Earthworks and stormwater during construction will be managed in accordance with relevant sections of Waikato Regional Council document titled “Erosion and Sediment Control – Guidelines for Soil Disturbing Activities” (Technical Report No. 2009/02 – dated January 2009).

Protection of the Mangawhero Stream from any disturbance/contamination/sediment is a key driver for managing and controlling potentially contaminated runoff from the site. The overall philosophy proposed is to utilise the sandy soils and sub-soils and the working quarry pit, and associated high soakage capabilities, as the primary destination for the majority of runoff generated from unstabilised surfaces on site.

The sand extraction operation will excavate down, effectively creating an in-situ bund around the perimeter of the works (Refer Figure 18). The soakage capacity of the quarry pit, and the limitation on unstabilised ground surface area are such that avoidance of any sediment discharge from active quarry / clean fill areas to the Mangawhero Stream is expected.

To minimise the volume of stormwater to be managed on site, perimeter controls (diversion drains, silt fences and/or earth bunds) will be implemented to divert clean water away from the proposed works area.

Protection of the Mangawhero Stream and associated gully is further protected by a “buffer” distance of 5 metres between the existing boundary fence, that demarcates the edge of the gully, and the sand quarry pit edge.

Any overburden or topsoil disposal / stockpile sites located beyond the working quarry pit will include appropriately designed devices to control potential sediment loss from these areas.

Complementing the above sediment and erosion control philosophies, detailed sediment and erosion control plans will be prepared for different stages of development (as appropriate) and the following on site practices will be followed:

- The average ground area of open soil for the works will be limited to approximately 3 hectares at any one time to limit overall risk;
- Topsoil and subsoil stripping will be timed to occur predominantly during the summer period (October to April) where practicable, to avoid periods of high rainfall;
- Stabilisation and grassing of completed areas as soon as practicable after they are finished.

A draft Erosion and Sediment Control Plan has been prepared for the initial stage of the development. This forms part of the QCMP provided in Appendix D. A copy of this plan is also shown in Figure 21.

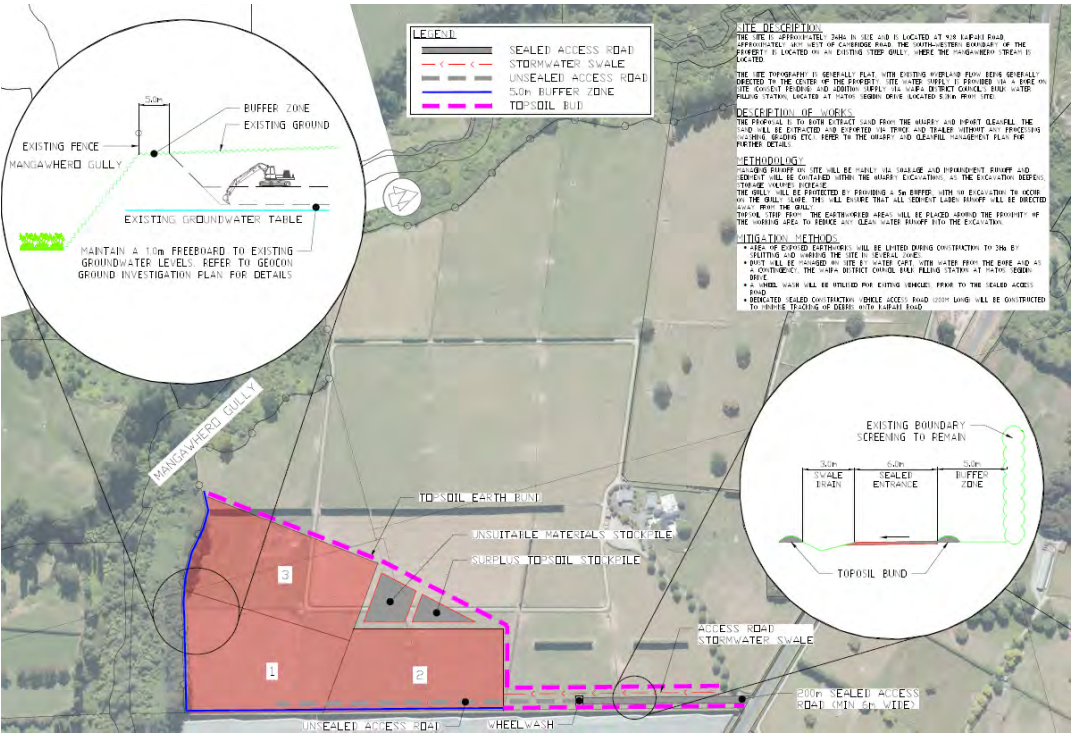


Figure 21: Draft Erosion and Sediment Control Plan

3.11 MODIFICATION OF ARCHAEOLOGICAL SITES

As recorded archaeological sites S15/ 285, S15/546, S15/547, S15/631 and S15/715 cannot be avoided, an Authority must be applied for under Section 44(a) of the HNZPTA and granted by Heritage NZ prior to the start of any works that will affect those sites. Accordingly, the applicant will need to seek and secure such authorisations prior to disturbing these sites.

The Heritage NZ authorisations sought will be subject to the staging of the project, as these are usually granted for a term of five years.

Because it is possible that additional unrecorded sites may be exposed during earthworks, the Authority application will also seek to include any additional sites that may be discovered when works are under way.

3.12 ACCIDENTAL DISCOVERY PROTOCOLS

In the event of any archaeological site, koiwi or waahi tapu being discovered or disturbed, while undertaking earthworks, the activity shall cease immediately in the area of the discovery, and Nga Iwi Toopu O Waipa, the WDC's Senior Enforcement Officer, Heritage New Zealand (HNZ), WRC, and in the case of koiwi, the NZ Police shall be notified within 48 hours. Works will only recommence upon receipt of the written approval of the WDC and WRC.



3.13 WATER SUPPLY

The water supply to support the proposed mineral extraction activities (wheel wash and dust suppression) will be sourced via a proposed bore and groundwater take at the subject property. Specifically, a groundwater take of up to 50m³ per day is proposed.

The indicative location of the proposed groundwater take is identified on Figure 18.

Waikato Regional Council have confirmed that the existing aquifer (Hamilton Basin – West) has sufficient capacity to accommodate the proposed water take.

The Waikato Regional Council online maps do not identify any existing resource consents for water takes in the immediate vicinity of the application site.

3.14 ACCESS

The application seeks to utilise the existing vehicle crossing on to Kaipaki Road, located at the north-eastern side of the property (Refer Figure 14). The existing crossing will be upgraded and widened to create a shared vehicle entrance for the existing dwelling (and farm) and the proposed sand quarry and clean fill operation.

A separate internal access (driveway) is proposed for each activity as follows:

- The existing dwelling (and farm) will continue to utilise the existing sealed driveway; and
- A new internal access road is proposed for the sand quarry and clean fill, operation, located on the eastern side of the existing dwelling driveway.

The concept for the proposed access is shown in Figure 22. In the event consents are granted, the applicant proposes to develop a final design for the accessway in consultation with WDC traffic and roading teams.



Figure 22: Concept layout of proposed vehicle entrance

The proposed internal quarry access will be sealed (with chip seal) for the first 100m into the site. Trucks will be kept on the sealed areas where possible, the exception being where the haulage vehicles need to collect sand from a worked area.

A wheel wash facility will also be utilised by sand haulage vehicles as required (mainly during the winter months) before they exit the property. This will prevent nuisance material being deposited on the adjacent public road.

3.15 TRAFFIC MANAGEMENT

The proposed mineral extraction activities will generate an average of 82 HCV/day, with daily peaks of up to 160 HCV/day at its maximum weekly extraction.

These figures are based on the average volumes that will be extracted at the sand quarry and the capacity of the network to accept those vehicle movements (including road upgrades at the entrance to the site). It is anticipated that approximately 50% of the vehicles bringing clean fill to the site will also reload with sand before they leave. A high proportion of shared trips are therefore proposed to mitigate the potential traffic effects on the roading network (reducing the number of total trips required to service the activity).

The applicant expects most of the sand to be used in the Cambridge area with the predominant traffic movements to and from the south-east, being right-turn out and left-turn in to the site (60-70%). The likely transport routes to and from the site are shown in Figure 23. These include:

- Route A: Kaipaki Road to the south-east, connecting to Cambridge Road, providing access to destinations in Cambridge and surrounding areas – approximately 70% of trips;
- Route B: Kaipaki Road to the north-west, connecting to SH3, providing access to Ohaupo, Te Awamutu, Rukuhia and Hamilton – approximately 10% of trips; and
- Route C: Mystery Creek Road via Kaipaki Road to the north-west and Mellow Road, connecting to SH21, providing access to Rukuhia, Tamahere, Matangi, and Hamilton – approximately 20% of trips.



Figure 23: Likely transport routes

If the quarry were to get a large supply contract, it is possible that 100% of quarry traffic could be directed to a single route for the duration of that contract.

With respect to traffic management, the applicant's proposal includes the following initiatives:

- Detailed design approval process with WDC for the vehicle entrance, with a focus on:
 - Diagram E widening modified to suit heavy vehicle tracking;
 - Relocation of the existing private access and gate;
 - Gate set back from the traffic lane a sufficient distance to allow any vehicle visiting
 - the site to stop clear of the traffic lane (a minimum of 25m);
 - Access road to allow two-way vehicle movement for the first 80m from Kaipaki Road; and
 - Spacing and size of the proposed passing bays (if required).
- Construction of a sealed internal access road designed with;
 - A minimum of 6m width for a minimum of 80m from Kaipaki Road; and

- A minimum of 6m width up to the site office and wheel wash areas; or
- A minimum of 3m wide with passing bays provided at least every 100m with visibility between the passing bays.
- Independent road safety audit for the vehicle entrance to Kaipaki Road;
- Adequate parking, loading and manoeuvring areas;
- On site speed restrictions;
- Limits on heavy vehicle movements such that they do not exceed the following:
 - Daily maximum of 133 HCV movements/day; and
 - Daily average of 106 HCV movements /day (calculated over a one-month period)
- Recording of monthly average and daily peak vehicle movements;
- Monitoring and reporting of vehicle movements; and
- Temporary traffic management plan to manage access upgrade construction works.

3.16 NOISE MANAGEMENT

All machinery equipment used on site will be operated and maintained in accordance with the manufacturer's specifications to ensure that the emission of noise does not exceed a reasonable level.

The following constraints on operations will be adopted to ensure daytime noise compliance is achieved at the nearest noise sensitive receivers:

- Earth bunding will be constructed as shown on Figure 24.
- Before topsoil stripping occurs within 180 metres of any dwelling façade (160m from any notional boundary) without a bund in place, the written approval and/or planning permission will be obtained from that party. Based on the extent of the proposed operation, bulldozer topsoil extraction will not occur within 180 metres of the dwellings: R1 – 1/898 Kaipaki Road, R2 – 898 Kaipaki Road, R3 – 906 Kaipaki Road & R4 – 914 Kaipaki Road, unless written approval is gained from the owners/occupiers
- Before sand extraction can occur within the areas of constraint, an earth bund of 2.0-meters (gradient: 1:3) will be established as shown on Figure 24.
- Nearby dwelling owners/occupants will be advised in advance where topsoil stripping will occur within 180 metres of their dwelling. This information shall be provided in writing and shall include the expected dates of the work, hours and days of the week that topsoil stripping will occur on as well as any other information relevant to the party.

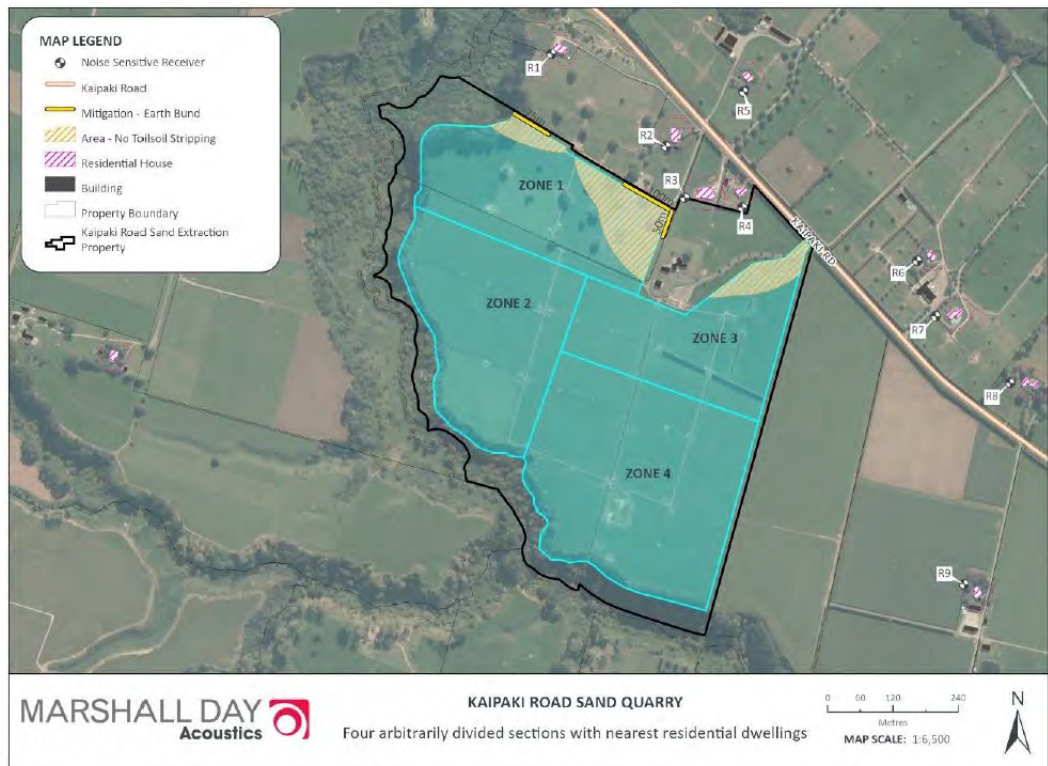


Figure 24: Site plan showing locations of required noise attenuation bunds

3.17 SITE REHABILITATION

As the quarry expands throughout the property, the disturbed areas will be rehabilitated with the placement of unsuitable and imported clean fill material in general accordance with the Staging Plan. The final rehabilitated site contours will, as far as practicable, match the predevelopment contours. Once an area has reached its final rehabilitated level, it will be top soiled and re-grassed and/or revegetated, for the return to pasture.

It is also expected that the demand for sand will be higher than the demand for clean fill disposal space. To maintain the three hectare limit on open and active quarrying and clean fill working areas, this mismatch will mean areas of the site will require pre-rehabilitation stabilisation. This will be achieved through typical stabilisation techniques as documented in the Waikato Regional Council's "Erosion and Sediment Control - Guidelines for Soil Disturbing Activities (2009)". These stabilised areas will then be rehabilitated to pre-existing ground levels with clean fill material as supplies allow.

In this respect, the staging and rehabilitation plans will be live, and subject to some change, depending on the actual rates of sand quarrying and clean filling occurring over time. These changes will be controlled and managed as part of regular reviews undertaken on the QCMP.

Weed species will be monitored onsite and sprayed/managed as and when required.

3.18 PROPOSED CONSENT CONDITIONS

Separate suites of consent conditions are also proffered by the applicant for the respective Waikato Regional and Waipa District Council resource consents in the event they are granted. These are contained in Appendices H and I respectively. These conditions include various relevant restrictions and requirements as recommended by technical experts engaged by the applicant to assess the effects of the proposal, as well as other conditions that have either been agreed with affected parties, discussed with Council staff, and/or reflect other standard requirements considered relevant and appropriate given the type and scale of activities proposed.

Key aspects of the proposed activities, as described above, are also included as proposed consent conditions where relevant.

4. ASSESSMENT AGAINST RELEVANT DISTRICT AND REGIONAL PLAN PROVISIONS

Section 104(1)(b) of the RMA sets out the suite of planning instruments that must be considered in any assessment of the proposal. The following assessment identifies the relevant district, regional and national statutory planning documents and considers the proposal in relation to the relevant provisions.

The relevant District and Regional Plan provisions are contained within:

- The Operative Waipa District Plan; and
- The Operative Waikato Regional Plan

An assessment against the relevant District and Regional Plan provisions is provided in Sections 4.1 and 4.2 respectively.

4.1 WAIPA DISTRICT PLAN

The Waipa District Plan (WDP) became fully operative on 14 August 2017.

4.1.1 District Plan Definitions

The proposal to establish and operate a sand quarry at the application site is assessed as a 'mineral extraction activity' under the provisions of the WDP and in accordance with the following definitions:

- Mineral Extraction Activities; and
- Cleanfill.

'Mineral extraction activities'

means extraction and processing activities including:

- *Blasting; and*
- *Excavating rock and MINERALS; and*

- *Processing rock and MINERALS by crushing, screening, washing, or blending them; and*
- *ANCILLARY ACTIVITIES to rock and MINERAL processing; and*
- *Storing, distributing and selling rock and MINERAL products; and*
- *ANCILLARY land disturbance activities; and*
- *Removing and depositing overburden; and*
- *Treating stormwater and wastewater; and*
- *LANDSCAPING and rehabilitation works including CLEANFILLING; and*
- *Recycling or reusing aggregate from DEMOLITION waste such as concrete, masonry, or asphalt; and*
- *ACCESSORY BUILDINGS and structures; and*
- *ANCILLARY residential accommodation for caretaking and on-SITE security; and*
- *SITE OFFICES.*

‘Cleanfill’

means material that when buried will have no adverse effect on people or the ENVIRONMENT. CLEANFILL material includes virgin natural materials such as clay, soil and rock, and other inert materials such as concrete or brick that are free of:

- *Combustible, decaying, degradable or leachable components; and/or*
- *HAZARDOUS SUBSTANCES; and/or*
- *Products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practice; and/or*
- *Materials that may present a risk to human or animal health such as medical and veterinary waste, asbestos or radioactive substances; and/or*
- *LIQUID WASTE.*

The proposal involves the excavation, processing and storing of the sand resource and associated land disturbance activities including removal of overburden, landscaping and rehabilitation works and placement of accessory buildings (including a site office). The associated clean filling and any ancillary activities are also all assessed as ‘mineral extraction activities’ in accordance with the above definition.

The imported clean fill material will comply with the above definition for ‘clean fill’ and is also expressly provided for within the definition for ‘mineral extraction activities’.

All of the activities proposed on site are therefore covered by the above definitions.

4.1.2 ZONING

The site is zoned Rural under the provisions of the WDP.

The following policy areas are also identified as applicable to the subject property or the immediate surrounding area:

- Significant Natural Areas WP344a and WP344; and
- Archaeological Site S15/28

These are described within the WDP as follows:

4.1.3 Significant Natural Areas

Significant Natural Areas (SNA) WP344a and WP344 apply along the south and western boundaries of the site and are described in Appendix N5 – Significant Natural Areas as:

- SNA 344: Mangawhero Stream riparian margin (Local Significance, and Unprotected); and
- SNA 344a: Esplanade Reserve within the Mangawhero Stream riparian margin (Local Significance and Protected)

The SNA areas are identified as green hatched areas in Figure 25. The proposed mineral extraction activities will not encroach into either SNA.

4.1.4 Archaeological Site

Archaeological Site S15/285 is identified in Appendix N3 of the Waipa District Plan as:

- S15 285 Pukemiro, NZAA Description: Borrow Pits.

The archaeological site is identified as a red cross in Figure 25 - an excerpt from the relevant zone and policy maps in the vicinity of the application site. As described above in Section 3, other records show the site includes additional registered archaeological sites.

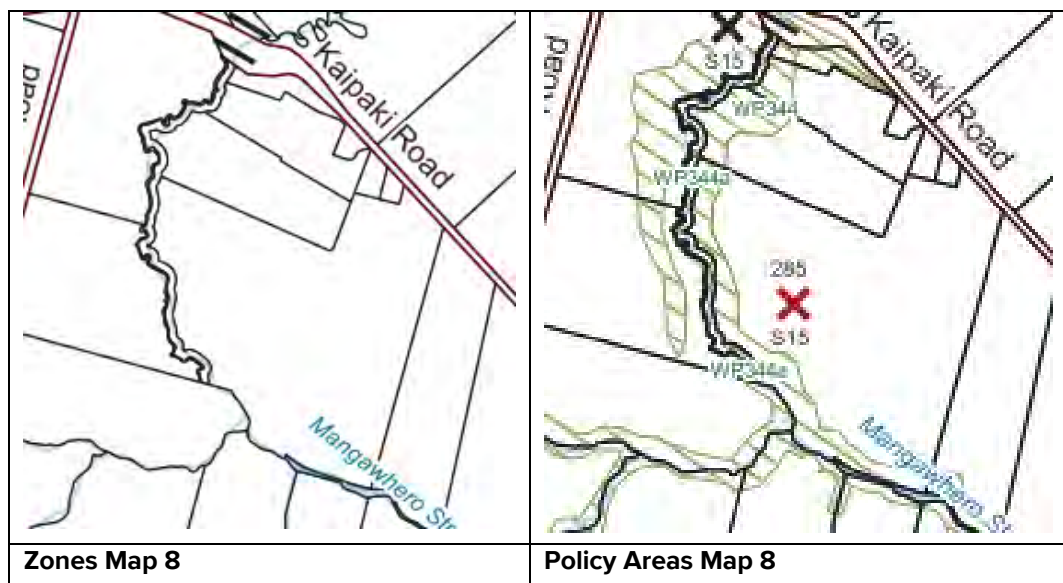


Figure 25: Excerpts from the Waipa District Plan Planning Maps

4.1.5 Special Features

The Waipa District Council online maps also identify the following special features as applicable to the application site, or the land in the immediate surrounding area (discussed below):

- HAIL Site; and

➤ Hazards

4.1.6 HAIL Site

Part of the application site (Lot 2 DP 444992) is identified as a potential HAIL site – The brown circle in Figure 26 below.

Councils Compliance Manager (Mr Karl Tutty) has confirmed that the HAIL notation refers to an unverified A10 orchard activity referred to as “Kaipaki Road Orchard”.

The proposed mineral extraction activities are located within the potential HAIL site.

4.1.7 Hazards

The following hazards are identified in respect of the site;

- Orchard – applies to part of the application site (Lot 2 DP 444992) and the adjacent properties to the east, including the existing kiwifruit orchard site immediately next door. The orchard activity is identified as pink solid lines around the title boundaries on Figure 26.
- Unstable Land – applies to the gully areas that extend along the west and southern boundaries of the application site. No mineral extraction activities are proposed within these areas. The unstable land is identified as a solid orange area on Figure 26.

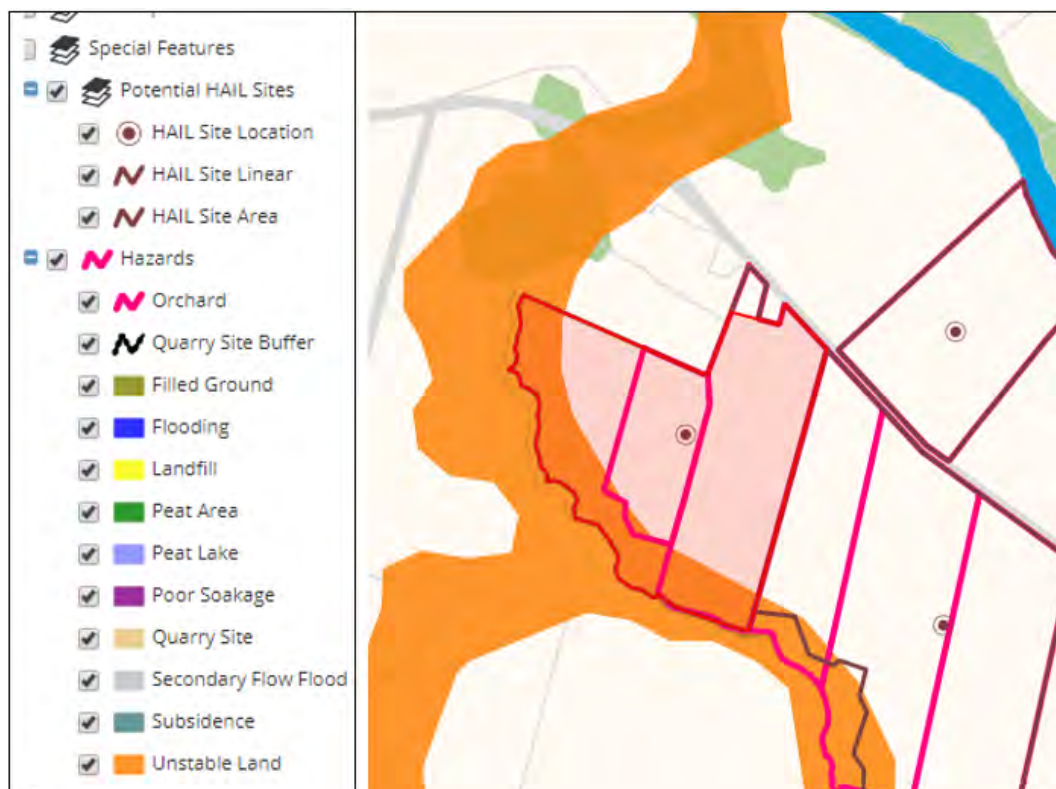


Figure 26: Excerpt from the Waipa District Council online maps - Special Features

4.1.8 Relevant District Plan Provisions

Table 7 sets out the provisions of the WDP relevant to the application, and assessed within the application report.

Table 7: Summary of the District Plan Provisions that have been assessed/considered:

Part B	Definitions	<ul style="list-style-type: none"> • 'Mineral Extraction Activities • Cleanfill (discussed above)
Part D	Zone Provisions	<ul style="list-style-type: none"> • Section 4 – Rural Zone
Part E	District Wide Provisions	<ul style="list-style-type: none"> • Section 16 – Transportation • Section 18 – Financial Contributions • Section 19 – Hazardous Substances
Part F	District Wide Natural and Cultural Heritage	<ul style="list-style-type: none"> • Section 22 - Archaeology • Section 24 - Indigenous Biodiversity
Volume 2 Appendices	Natural and Cultural Heritage	<ul style="list-style-type: none"> • Appendix N3 – Archaeological Sites • Appendix N5 – Significant Natural Areas

4.1.9 District Plan Assessment

An assessment of the proposal against the relevant Activity Status provisions of the District Plan are provided in Table 8.

Table 8: Summary of the Activity Status of Proposed Activities

Activity	Relevant Rule	Status	Comment
Rural Zone Provisions (Section 4)			
Mineral Extraction	Rule 4.4.1.4.(h)	Discretionary	<p>Applies.</p> <p>Mineral extraction activities (except where <500m from Lakes) are a discretionary activity in the Rural Zone.</p> <p>The application site is not less than 500m from a Lake. Rule 4.4.1.4(h) therefore applies.</p>
Earthworks	Rules 4.4.1.1(m)	Permitted	<p>Applies.</p> <p>Earthworks are a permitted activity in the Rural Zone.</p>

Activity		Relevant Rule	Status	Comment
				The earthworks performance standard (Rule 4.4.2.75) does not apply to a mineral extraction activity.
Quarry Area	Buffer	Rule 4.4.1.4(m)	Discretionary	Not Applicable. The applicant does not seek to impose a quarry buffer area.
Transportation Provisions (Section 16)				
Activities generating 100 vehicles or more per day onto any State Highway or major arterial road		Rule 16.4.1.1(e)	See Rule 16.4.2.25	Not Applicable The proposed sand quarry will generate more than 100 vehicles per day (refer to the anticipated traffic volumes in the ITA). Kaipaki Road is identified as a minor arterial road. An assessment against Rule 16.4.2.25 is provided below.
Provisions of an integrated transportation assessment		Rule 16.4.2.25		Whilst the activities proposed do not technically trigger the requirement for an integrated transportation assessment under Rule 16.4.2.25 above, an integrated transportation assessment has been prepared for the application (and is attached as Appendix E).
Activities generating less than 100 vehicles per day that don't require access onto a State Highway of major arterial road		Rule 16.4.1.1(f)	Permitted	No Applicable Kaipaki Road is identified as a minor arterial road. However, the proposal will generate more than 100 vehicles per day and Rule 16.4.1.1(f) therefore does not apply. There is no alternative Rule within Activity Status Table 16.4.1 for an activity generating more than 100 vehicle movements.
Archaeology Provisions (Section 22)				
Archaeological site removal		Rule 22.4.1.1(j)	Permitted	Applies

Activity	Relevant Rule	Status	Comment
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The Archaeological Report attached as **Appendix F** has assessed the archaeological value of the borrow pit identified in the WDP (S15/285).

The necessary heritage authority will be obtained If the borrow pit is required to be removed. The site will be recorded and documented and then disestablished on site.

SNA Provisions (Section 24 – Indigenous Biodiversity)

Removal of indigenous vegetation for any other purpose	Rule 24.4.1.1(n)	Discretionary (Local SNA)	Not Applicable No vegetation removal is proposed within the SNA's. All works will be appropriately setback from the boundaries of the SNA's.
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The application therefore requires resource consent for a **discretionary activity** in accordance with Rule 4.4.1.4(h) – Mineral Extraction Activity.

An assessment of the proposal against the relevant performance standards is provided in Table 9.

Table 9: Summary of the Relevant WDP Performance Standards

Rule	Compliance Standard	Compliance Status
Rural Zone Provisions (Section 4)		
Rule 4.4.2.1 Minimum building setback from road boundaries	30m setback from road boundaries, for buildings over 100m ² (other than dwellings).	Complies. All buildings will comply with the required building setback requirements.
Rule 4.4.2.2 Minimum setbacks from internal site boundaries	Buildings that are not accessory buildings to dwellings: - less than or equal to 250m ² :15m - greater than 250m ² :25m	Complies. All buildings will be sited to comply with the required building setbacks.



Rule	Compliance Standard	Compliance Status
Rule 4.4.2.7 Minimum setback from Significant Natural Area	Minimum building setback from the boundary of a significant natural area shall be at least 10m.	Complies. No buildings will be within 10m from the SNA (the gully area located to the south and west of the quarry area).
Rule 4.4.2.9 Height of buildings	Shall not exceed 12m in height above ground level.	Complies.
Rule 4.4.2.10 Maximum building coverage	The maximum amount of a site which can be covered by buildings is 3% for sites of one hectare or more.	Complies The site has a total area of approximately 49.9 hectares and 3% equates to a permitted site coverage of approximately 14,996m ² . The coverage of any buildings associated with the quarry will be significantly less.
Rule 4.4.2.12 Daylight control	No building shall penetrate a recession plane at right angles to a boundary inclined inward and upwards at an angle of 45° from 2.7m above the ground level of the front, side or rear boundaries of a site.	Complies. All buildings associated with the quarry will comply The site office is a small relocatable building.
Rule 4.4.2.15 Noise	Limits within the notional boundary of any dwelling: Day time - 7.00am to 10.00pm 50dBA (Leq) Night-time - 10.00pm to 7.00am 40dBA (Leq) Night-time single noise event 70dBA (Lmax) The noise levels shall be measured and assessed in accordance with the requirements of NZS 6801:2008 – Acoustics – Environmental Sound and assessed in accordance with NZS 6802:2008 – Acoustics – Environmental Noise. Provided that this rule shall not apply to the use or testing of station and vehicle sirens or alarms used by emergency services.	Complies. The Acoustic Report submitted with the application confirms that the proposal will comply with the applicable Rural Zone noise standards (see Appendix G).

Rule	Compliance Standard	Compliance Status
	Activities that fail to comply with this rule will require a resource consent for a discretionary activity.	
Rule 4.4.2.16 Mineral Extraction air blast over pressure	The air blast over pressure from blasting activities within the notional boundary of any dwelling not owned by the quarry operator...	Not Applicable. No blasting activities are proposed.
4.4.2.19 Construction Noise	Construction noise emanating from a site shall meet the limits recommended in NZS 6803:1999 Acoustics – Construction Noise	Complies. The application included an Acoustic Report that confirms that the proposal complies with the applicable noise standards of the WDP (see Appendix G).
Rule 4.4.2.44 Signs	Signs 1.2m ² in area visible in any one direction with a maximum area of 2.4m ² . Freestanding sign to be no more than 2m above ground level.	Complies. A sign (identifying the site and the sand quarry operation) is proposed near the site entrance. The sign will comply with the maximum area requirements. Internal signage (relating to traffic management and onsite safety etc) is also proposed and will comply with the applicable signage rules.
Rules 4.4.2.49 and 4.4.2.50 Temporary construction buildings	Shall only be used in conjunction with a construction project located on the same site; and are only permitted for one calendar year.	Not Applicable. The Site Office and any other accessory buildings and structures are all expressly provided for in the District Plan definition for 'mineral extraction activities' (which includes 'accessory buildings and structures' and 'site offices'). The rules relating to temporary construction buildings are therefore not applicable to the quarry operation.
Rule 4.4.2.54 Farm Quarries	The material extracted shall not exceed 1000m ³ in any calendar year; and shall primarily be for use on the source land holding.	Not Applicable A commercial sand quarry operation is proposed.
Rule 4.4.2.55 Imposition of a quarry buffer area and mineral		Not Applicable The application does not seek the identification and imposition of a quarry buffer area and mineral extraction area on the Planning Maps.

Rule	Compliance Standard	Compliance Status
extraction area		
Rule 4.4.2.75 Earthworks	Earthworks (excluding mineral extraction activities), shall not exceed a total volume of 1,000m ³ per calendar year	Not Applicable This rule does not apply to mineral extraction activities. The definition for a mineral extraction activity also includes the 'ancillary land disturbance activities' 'removing and depositing overburden' and 'landscaping and rehabilitation works including clean filling.' All aspects of the earthworks associated with the proposal are therefore exempt from the earthworks standard in Rule 4.4.2.75.
Transportation (Section 16)		
Rule 16.4.2.4 Vehicular access to sites in all zones	Every site shall be provided with vehicle access to a formed road that is constructed to a permanent standard...	Complies. A shared access is proposed for the existing dwelling (and farm) and the sand quarry operation. The existing entrance will be upgraded (to Diagram E standard) as detailed in the ITA submitted with the application (Appendix E).
Rule 16.4.2.5 Vehicle entrance separation	Minimum distance of a vehicle entrance from an intersection or other entrance. For the posted speed limit of 100km/hr, the minimum separation distance required between accessways is 200m. Activities that fail to comply with this rule are a Discretionary Activity	Does Not Comply. The ITA submitted with the application has assessed the location of the proposed access (Appendix E). The ITA confirms that the proposal does not comply with the minimum separation requirements. However, the two adjacent accessways are seldom used. The existing neighbouring access to the private dwelling 160m north-west is well positioned with clear sight distance and no safety issues. A shared entrance is proposed for the existing dwelling (and farm) and the proposed sand quarry. The operating speed of Kaipaki Road is posted 100km/h speed. Users of the site will have good site visibility along the road and there are good separation distances between the site and other entrances on both sides of the road. Therefore, the effects of the proximity of other entrances will not be significant. Discretionary consent is required for the above non-compliance.

Rule	Compliance Standard	Compliance Status
Rule 16.4.2.13 Parking loading and manoeuvring	All activities that change the use of any land shall provide parking and loading/unloading for vehicles on the site as set out in Appendix T1	Complies. There is no specific carparking requirement specified within Appendix T1 for a quarry activity (nor are there any 'similar' activities). There is sufficient space available on the application site to accommodate the required onsite carparking (for staff). Refer to the ITA in Appendix E .
Rule 16.4.2.15 Parking loading and manoeuvring	Carparks shall be designed, formed and constructed in accordance with Appendix T2, and be constructed to accommodate the anticipated use of the area.	Complies. A suitable (staff) parking area will be provided within the site.
Rule 16.4.2.25 Provision of an integrated transportation assessment	Integrated traffic assessment.	This rule applies to permitted and restricted discretionary activities. The activity status of the mineral extraction activity is discretionary. However, an ITA has been prepared for the application and is attached as Appendix E .
Hazardous Substances (Section 19)		
Rule 19.4.2.4 Activities Exempt from the HFSP	(l) Developments that are or may be hazardous but do not involve hazardous substances (e.g. Mineral extraction)	Applies. The proposed mineral extraction activities are exempt from the Hazardous Facilities Screening Procedure. No onsite fuel storage tanks are proposed onsite. Any hazardous substances will be stored and managed on site in accordance with best practice and HSNO requirements.
Financial Contributions (Section 18)		
Rule 18.4.2.13	Heavy Vehicle Impact Fee Council may require as part of a land use consent the payment of a Financial Contribution where: a) Routes and other infrastructure for vehicles and pedestrians off the site subject to consent requires construction or upgrading; and/or	Noted. Refer to the ITA for assessment.

Rule	Compliance Standard	Compliance Status
	b) Increased in heavy traffic are likely to lead to infrastructure renewal; and/or c) Construction or upgrades are required earlier than expected; and/or d) Where the effects of the development adversely affect public roads managed by other agencies, any financial contribution taken may be used by those agencies to upgrade those roads.	

Indigenous Biodiversity (Section 24)

Rule 24.4.1.1(n)	<p>The removal of indigenous vegetation from within a 'Local SNA' is a Discretionary Activity</p> <p>The matters over which Council reserves its control are:</p> <ul style="list-style-type: none"> • Location and extent of vegetation removal associated with the activity; and • The necessity of vegetation removal associated with the activity; and • Effects on the connectivity, value and characteristics of biodiversity corridor; and • Appropriateness of mitigation measures proposed including consideration of the no net loss principle. 	<p>Not Applicable.</p> <p>The application does not involve the removal of any gully vegetation within the SNA area located on the subject property.</p> <p>All works will be appropriately setback from the SNA's.</p>
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The proposal can comply with all but one of the applicable performance standards.

The non-compliance relates to the minimum separation distance requirement between vehicle entrances (as required in Section 16 Transportation) and requires resource consent

for a **Discretionary Activity** in accordance with Rule 16.5.2.5 – Vehicle entrance separation from other vehicle entrances.

An assessment against the relevant assessment criteria is provided in Table 10.

Table 10: Summary of Relevant Assessment Criteria and Information Requirements for all Discretionary Activities (Section 21 of the WDP)

Rule	Assessment Criteria	Comment
Rule 21.1.1.3 Visual	<p>(a) The extent to which the development effects the surrounding environment; particularly any identified character precinct areas, prominence of buildings and design elements in the proposal, and public places and roads.</p> <p>(b) The scale, height, bulk, cross sectional area, colour, glazing reflectivity and texture of any buildings.</p> <p>(c) The location, scale and nature of earthworks/ excavations/spoil and vegetation removal/soil or spoil heaps.</p> <p>(d) The extent of any light spill, light intensity and shadowing effects.</p> <p>(e) The extent to which existing vegetation is retained to screen or soften visual effects.</p> <p>(f) The extent and nature of landscape planting and rehabilitation proposed and whether this will remedy or mitigate the effects of the activity, including provision for on-going maintenance of planting.</p>	<p>The visual effects of the proposal are discussed in Section 5.</p> <p>The application achieves the criteria of the plan relating to potential visual effects. The application site is located within an established rural area and the operational quarry area is centrally located within the application site. Visual effects will be mitigated as follows:</p> <ul style="list-style-type: none"> • The operational quarry area will be set well back from the external site boundaries. • No large buildings are proposed. • The placement of bunds. • Controlling the direction and staging of the sand extraction subject to neighbouring property agreement. • Limiting the area exposed at any one time (3ha cells). • Avoiding the SNA area along the south and western boundaries. • Forming the first 100m of the access road will minimise any dust nuisance and provide an

Rule	Assessment Criteria	Comment
		attractive entrance into the sand quarry (when viewed from the adjacent public road).
		It is anticipated to be a relatively short-term activity, and over time the appearance and functionality of the site will be restored (to rural farmland).
Rule 21.1.1.4 Amenity	<p>(a) The likely effects of the activity and associated land uses on any other activity in the vicinity by emission of noise, fumes, dust, smoke, glare or any other form of pollution.</p> <p>(b) The degree to which there is a loss of privacy, daylight or sunlight in adjacent sites.</p> <p>(c) The extent to which harmony of form, colour, texture and materials is present within individual developments.</p> <p>(d) The extent to which solar potential, innovative aspect and design is optimized in the development.</p> <p>(e) The scale and bulk of building(s) in relation to the site and adjoining neighbours.</p> <p>(f) The built characteristics of the locality.</p> <p>(g) The extent to which the road boundary setback is appropriate in the location.</p> <p>(h) The extent of modification to the existing landform and the impact this will have on the character and amenity of the surrounding area.</p> <p>(i) The ability to avoid, remedy or mitigate potential visual and amenity effects on sites in the vicinity.</p>	<p>The amenity effects are discussed in Section 5.</p> <p>The application achieves the criteria of the plan relating to potential amenity effects. The application site is an existing rural property located in an established rural area. The following mitigation is proposed:</p> <ul style="list-style-type: none"> • The operational quarry area will be set well back from the external site boundaries and the adjacent public road. • No large buildings are proposed. No loss of daylight or sunlight is therefore anticipated with respect to the adjacent sites. • The placement of bunds. • Controlling the direction and staging of the sand extraction subject to neighbouring property agreement. • Limiting the area exposed at any one time (4ha cells).

Rule	Assessment Criteria	Comment
		<ul style="list-style-type: none"> • Avoiding SNA areas along the south and western boundaries. • Forming the first 100m of the access road and the use of a wheel wash facility (as required) will minimise any dust nuisance effects. • The sand quarry will operate 6 days a week and the acoustic report confirms that the proposal complies with the relevant noise standards. <p>It is anticipated to be a relatively short-term activity, and over time the appearance and functionality of the site will be restored close to its original form (rural farmland). Once the works take the topsoil off most of the digging works will be below ground level.</p>
Rule 21.1.1.5 Earthworks	<p>(a) The extent to which methods are utilised to retain high class soils on site for use in rehabilitation.</p> <p>(b) The extent to which the proposed earthworks affect the values of identified landscape areas and the ability for effects to be avoided in outstanding landscapes.</p> <p>(c) Where located within, adjacent or adjoining an area of indigenous vegetation or vegetation that provides habitat for indigenous species, the extent to which the earthworks will affect ecosystem values including effects on such areas due to altered water levels.</p> <p>(d) Whether the earthworks proposed are to be undertaken in a manner that avoids,</p>	<p>The earthworks effects are discussed in Section 5.</p> <p>The application achieves the criteria of the plan relating to potential earthworks effects.</p> <p>No earthworks are proposed within the SNA area (that runs along the south and western site boundaries). Any adverse effects on the adjacent Mangawhero Stream (and the sites groundwater) will be avoided.</p>

Rule	Assessment Criteria	Comment
	remedies or mitigates any adverse effect on the environment including on the natural character of wetlands, lakes, rivers and their margins; with particular regard to the removal of vegetation, contamination of lakes and water bodies, alteration or diversion of surface or ground water flows.	The activity will take place under a Quarry Site Management Plan which controls the stages (land exposed), sediment/erosion control measures; and regulates the overburden and deposition of clean fill to be used for site rehabilitation. All cuts and fill on site will be stabilised.
(e)	The extent to which earthworks are to be undertaken in a manner that provides sound foundations and avoids any increased risk to persons or property associated with a natural hazard event which may arise from undertaking earthworks.	The Quarry Management Plan and sets out a staging process where only small areas (cells of 4ha) are exposed at any one time.
(f)	Whether a slope stability and natural ground suitability assessment for foundations of buildings, road services or other works is required and warrants an evaluation, investigation, control and or certification by a suitably qualified geotechnical soils engineer.	Any dust associated with the earthworks will be actively managed onsite.
(g)	The timing and extent to which the rehabilitation programme will enable the land to be restored suitable for use by other activities.	The operational quarry area is centrally located within the site, with appropriate setbacks / buffers between all adjoining sites.
(h)	The extent to which methods are used to prevent discharge of contaminants into the air.	Conditions have been proffered around noise, dust, traffic and any effects on sites of significance to Maori.
(i)	The extent to which the earthworks will detrimentally affect adjoining or adjacent sites through changes in soil drainage, ground level, noise, dust, vibration, traffic movement or effects on sites of significance to Māori where the earthworks are adjoining, or on sites of cultural significance.	The activity is temporary in nature and over time the topography of the site will be restored.
(j)	Where earthworks are proposed in proximity to High Voltage Transmission Lines the extent to which any earthworks and the construction of any subsequent buildings will comply with the New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34:2001).	
(k)	The extent to which there are any adverse effects on water including groundwater and	

Rule	Assessment Criteria	Comment
	lake levels. Where areas have high water tables the ground water level shall be identified and defined. Where the work to be undertaken is adjacent to rivers and streams, it shall be established with reference to the average water table of the river or stream at maximum river level. For areas in close proximity to lakes, the ground water table shall be established with reference to the maximum lake level	
Rule 21.1.1.6 Traffic	<p>(a) The impacts on the safe, efficient and effective provision of the transportation system including, but not limited to:</p> <ul style="list-style-type: none"> (i) Impacts on the road network and the effective operation of the road hierarchy; and (ii) Infrastructure provision, including works needed to maintain the safety, efficiency and effectiveness of the transportation system such as any upgrades necessary to pedestrian and cycle facilities, intersections, pavements and structures on the system affected by the proposed activity; and (iii) Timing and staging of development; and (iv) Connectivity between adjacent areas of development. <p>(b) Whether sufficient provision has been made for alternative modes of transportation where this is available and practicable, including but not limited to:</p> <ul style="list-style-type: none"> (i) Public transport; and (ii) Cycle and pedestrian movement; and (iii) The establishment of cycleways, walkways and public transport stops; and (iv) The establishment of cycle stands; and (v) Connectivity to alternative transport modes such as rail and air transport. 	<p>The ITA submitted with the application (Appendix E) has assessed the proposal against the relevant traffic related assessment criteria in Section 21 of the WDP. It is not proposed to duplicate that assessment here. Suffice to say, the proposal complies with these assessment criteria.</p>

Rule	Assessment Criteria	Comment
	<ul style="list-style-type: none"> (c) The extent to which the location of the activity on the site has given regard to: <ul style="list-style-type: none"> (i) The need for acceleration and deceleration lanes; and (ii) The type, frequency and timing of traffic; and (iii) The safety of road users, cyclists and pedestrians; and (iv) The ability for access to roads other than arterial roads or State Highways; and (v) The need for forming or upgrading roads and pavements potentially affected by the activity; and (vi) The need for additional maintenance, inspection or traffic monitoring; and (vii) The need for traffic control, including signs, signals and traffic islands; and (viii) The ability for parking and manoeuvring to be carried out on site. (d) The extent to which the location of the site access way has given regard to: <ul style="list-style-type: none"> (i) Safety for vehicles, and pedestrians with particular regard to the effect on the safety and functioning of the road and/or level crossing. (ii) The practicality and adequacy of the proposed access having regard to the location, nature and operation of the proposed activity and/or development. (e) The extent to which the location of the land use activity on the site has given regard to: <ul style="list-style-type: none"> (i) Visibility and sight distances particularly the extent to which vehicles entering or exiting the level crossing are able to see trains. (ii) The extent to which failure to provide adequate level crossing sightlines will give rise to level crossing safety risks. 	

Rule	Assessment Criteria	Comment
Rule 21.1.1.7 Noise and Vibration	(a) The extent to which the activity affects the existing ambient noise environment of the locality.	The noise effects are discussed in Section 5 of this AEE.
	(b) The time and frequency that the activity occurs, duration of noise, and any special characteristics of the noise or vibration and subsequent effects on health and safety, and on the amenity values of the surrounding environment.	The application achieves the criteria of the plan relating to the activities potential noise and vibration effects. The application includes an Acoustic Assessment (see Appendix E) that has assessed the potential noise effects associated with the proposal.
	(c) The effects on the environment from the maximum noise levels of the proposed activity, particularly at night.	The assessment confirms that the proposal will comply with the applicable noise standards,
	(d) The extent to which the noise adversely affects the amenity of the surrounding environment including cumulative effects.	No blasting activities are proposed. Vibration will not be discernible given the site works only propose to use diggers and there is a reasonable setback from all adjacent dwellings. The activity is temporary in nature and over time the appearance and functionality of the site will be restored to that of a rural property.
21.1.4.34 Mineral extraction activities	(a) The extent to which the activity will internalise and address actual and potential adverse effects.	See Section 5 of this AEE.
	(b) The proposed life span of operation, the estimated volume of material to be excavated and likely staging of works.	Most of the sand quarry effects can be internalised. The lifespan of the sand quarry is estimated to be approximately 10 years and an estimated volume of 900,000m ³ is likely to be extracted, as a series of 4ha stages (cells).
	(c) The extent to which any rehabilitation programme will enable the land to be returned to a state suitable for use by other activities.	
	(d) The proposed location and dimensions of overburden storage and deposition areas and areas for stockpiles of mineral material.	The land will be fully rehabilitated to high quality rural

Rule	Assessment Criteria	Comment
	(e) The proposed location and dimension of areas of excavation, including pits and faces.	farmland and will be utilised for the existing farming activities.
	(f) An assessment of slope stability for proposed overburden areas and extraction site faces.	The Erosion and Sediment Control Plan and Quarry and Cleanfill Management Plan covers items d-f.
	(g) The anticipated average daily number of vehicle movements to and from the site, including the number of people proposed to be employed and the location of parking spaces on-site. Where appropriate, Council may require an Integrated Transport Assessment be prepared as part of the application.	
	(h) The extent to which high class soils from within the site shall be retained on site for use in rehabilitation.	The anticipated average daily vehicle movements are detailed in the ITA that forms part of the application.
	(i) The extent to which off-site effects, will inhibit the use of surrounding land for the carrying out of other activities.	
	(j) The ability to protect the environment from adverse effects having regard to the technical and operational ability to manage any adverse effects.	
	(k) The extent to which landscaping proposals protect the amenity of land adjoining the mineral extraction area.	
	(l) The total heavy vehicle traffic generation from the site.	
	(m) The hours and days that heavy vehicle traffic are proposed to be entering and exiting the site.	
	(n) The location and formation of access points to avoid any dirt, mud or debris entering the road reserve, and to ensure that traffic safety matters are adequately addressed.	
	(o) Measures undertaken to ensure that material deposited to reclaim worked out 'quarry' areas is clean fill and does not include refuse.	
	(p) The methods to be used to avoid any contamination of water from any aspect of the extraction activity.	

Rule	Assessment Criteria	Comment
	(q) The design and operation of any security or other lighting to ensure that it does not cause any direct light spill or disturbing glare for any occupiers of adjoining properties or users of roads.	
	(r) The form, extent and effectiveness of landscaping where the mineral extraction area is visible from an existing dwelling. Note: Where identification and imposition of a quarry buffer area and mineral extraction area is sought in conjunction with a new or existing mineral extraction activity, also see Assessment Criteria 21.1.4.	

4.1.10 Overall Activity Status – Waipa District Council Jurisdiction

As set out in the sections above, the resource consent application being lodged with Waipa District Council is a land use consent for mineral extraction activities and associated works and includes a non-compliance with the minimum separation requirement between vehicle entrances.

The proposal requires resource consent approval as a **Discretionary Activity** under the WDP.

4.2 WAIKATO REGIONAL PLAN

4.2.1 Status of the Waikato Regional Plan

The Waikato Regional Plan (WRP) became operative in 2007. By April 2012, all variations (including Variations 2, 5, 6 and 7) were operative and incorporated into the WRP.

Plan Change 1 to the WRP was publicly notified on 22 October 2016 with submissions closing on 8 March 2017 (parts of the plan change were withdrawn on 3 December 2016). This plan change, previously referred to as the ‘Healthy Rivers Plan Change’, amends the WRP in relation to the matters associated with the restoration and protection of water quality in the Waikato and Waipa Rivers. This is to be achieved through the management of land use activities and associated discharges of a range of contaminants, in particular diffuse discharges that may enter the region’s water resources (as outlined in the proposed new Module 3.11 to the WRP). Upon notification, the rules in Part A, a new condition (q) in Section 5.1.5 and the consequential amendments to the WRP (as provided in Part D of Plan Change 1 to the WRP) had immediate legal effect.

4.2.2 Relevant Regional Plan Provisions

Table 11 summarises the WRP provisions applicable to the application and assessed in the sections below

Table 11: Summary of the Regional Plan Provisions that have been assessed/considered:

Part 3	Water Module	<ul style="list-style-type: none"> Discharge of Stormwater Groundwater Take
Part 5	Land and Soil Module	<ul style="list-style-type: none"> Soil Disturbance Overburden and Cleanfill Disposal Earthworks within a High-Risk Erosion Area
Part 6	Air Module	<ul style="list-style-type: none"> Mineral extraction Discharge of Air to Contaminants

An assessment of the above rules against the relevant assessment criteria and information requirements is provided in the tables below:

4.2.3 Part 3: Water Module

GROUNDWATER TAKE

Table 12: Implementation Methods - Water Takes (Rule 3.3.4.24)

3.3.4.24 Discretionary Activity Rule - Groundwater Takes

Condition	Compliance
1. Is a supplementary take, temporary take or well and aquifer testing take that does not comply with Rules 3.3.4.12, 3.3.4.14 or 3.3.4.15 ; or	Does Not Comply. The proposed water take exceeds 15m ³ /day and therefore does not comply with Rule 3.3.4.12.
2. Is a non-qualifying s14(3)(b) take described by Policy 10 c); or	Complies. The water take is not for reasonable domestic needs and exceeds the permitted level for animals drinking water. However, based on the absence of a high number of water takes in the immediate area, and the high allocation that is still available the taking or use is unlikely to have an adverse effect on the environment.
3. Does not exceed the Sustainable Yield if listed in Table 3-6; or	Complies The aquifer from which the bore draws from is listed in Table 3-6. There is no sustainable yield

	set for this aquifer but WRC have confirmed (in an email dated 12.09.19) that 95.7% is available for allocation. The existing aquifer therefore has capacity to accommodate the proposed ground water take.
4. Is from an aquifer that is not listed in Table 3-6; or	N/A
5. Is for domestic or municipal supply takes where a water management plan is provided that meets the requirements of Method 8.1.2.2 of this Plan.	Complies. The ground water take is for reasonable commercial needs (dust suppression) as per 8.1.2.2(2)(d).

Table 13: Information Requirements Water Takes (Rule 8.1.2.1)

Assessment Criteria	Comment
a. The location of the take.	Lot 2 DP 444992 referred to as 928 Kaipaki Road, Cambridge.
b. Define the maximum volume of water to be taken as a minimum per day and per year.	Approximately 50m ³ per day and an annual take of 17,000m ³ per year
c. The rate at which water is to be taken.	2.5m/s
d. The source of water.	Hamilton Basin West Aquifer
e. Any associated discharges used to offset the cumulative allocation effects of the taking of water.	The water take will predominantly be used to provide water for dust suppression measures and will percolate back into the aquifer through soakage.
f. Identification of alternative water sources including, groundwater, water harvesting and water reuse and provide an assessment of how these may minimise adverse effects, including those on existing and foreseeable future users.	There is a Mangawhero Stream that flows into the Waikato River.
g. Intake screening.	N/A
h. The identity and location of other neighbouring abstractors.	See Table 2 above

Assessment Criteria	Comment
i. What effects this activity will have on the environment.	The groundwater take is a new take. But an initial assessment of the Hamilton Basin West Aquifer and current abstractors show the groundwater take activity will have low impact on the environment.
j. The proposed method of recording water use and reporting to Waikato Regional Council.	The applicant proposes to record water usage via a water meter and provide it to WRC in a spreadsheet format.
k. In the case of an application for the replacement of an existing resource consent: <ul style="list-style-type: none"> a demonstrated continued need for the volume and rate of water applied for based on water use records, recognising seasonal and crop rotational factors, any enforcement action taken by Council, and use of best industry practice. 	N/A
m. In the case of an application for domestic or municipal supply a water management plan prepared as detailed in method 8.1.2.2 shall be provided with all resource consent applications made in accordance with 3.3.3 Policy 9 and Rules 3.3.4.18, 3.3.4.21, 3.3.4.23, 3.3.4.24 and 3.3.4.26.	N/A
n. Details, including distribution extent, of any other properties to which water is to be supplied from this take.	N/A
o. In the case of an application for domestic or municipal supply details shall be provided of any existing or proposed riparian fencing and planting necessary to mitigate adverse effects of the take on the water body. Details on proposed riparian fencing and planting shall be provided in the form of a Riparian Vegetation Management Plan having regard to Standard 3.3.4.28	N/A

4.2.4 Part 5: Land and Soil Module

SOIL DISTURBANCE

Table 14: Earthworks (Rule 5.1.4.11)

5.1.4.11 Permitted Activity Rule – Soil Disturbance, Roothing and Tracking and Vegetation Clearance

Condition	Compliance
1. Unless otherwise provided for by Rules 5.1.4.14, 5.1.4.15, 5.1.4.16 or 5.1.4.17, soil disturbance, roading and tracking, and vegetation clearance and any associated deposition of slash into or onto the beds of rivers and any subsequent discharge of contaminants into water or air	<p>Some soil disturbance, roading and tracking and vegetation clearance activities are proposed.</p> <p>The works will create exposed areas. The volume, area, length and batter height of the proposed activities will be appropriate for the scale of the proposal and will occur as a series of stages in the site.</p> <p>Methods to control erosion and sediment are included in Appendix D under the QCMP.</p> <p>Because no part of the site is a High-Risk Erosion Area and the conditions of Section 5.1.5 of the plan will be adopted, largely through the implementation of an Erosion and Sediment Control Plan, the associated earthworks are permitted.</p>
2. Any roading and tracking activities associated with the installation of bridges or culverts permitted by Rules 4.2.8.1, 4.2.9.1 and 4.2.9.2, within 20 metres of that bridge or culvert and any associated deposition of slash into or onto the beds of rivers and any subsequent discharge of contaminants into water or air;	<p>Not Applicable</p> <p>No bridges or culverts are proposed, nor is any slash being deposited into the bed of a river.</p>
3. Vegetation clearance of planted production forest	<p>Not Applicable</p>

OVERBURDEN DISPOSAL

Table 15: Discharge of overburden onto or into land

5.2.5.5 Permitted Activity Rule – Overburden Disposal Outside High Risk Locations

Standards and Terms	Compliance
a. The concentration of suspended sediment in any discharge to a water body arising from this activity shall comply with the suspended sediment criteria as set out in Section 3.2.4.5.	Complies Sediment control plans will address.
b. Any discharge to air arising from the activity shall comply with the conditions and standards and terms in Section 6.1.8 except where the matters addressed in Section 6.1.8 are already addressed by conditions on resource consents for the site.	Complies QCMP and associated dust management procedures will address.
c. The overburden has no acid producing material	Complies Material consists of unsuitables and top soil from on site.
d. The activity shall not disturb any archaeological site or waahi tapu as identified at the date of notification of this Plan (28 September 1998), in any district plan, in the NZ Archaeological Association's Site Recording Scheme, or by the Historic Places Trust except where Historic Places Trust approval has been obtained.	Appropriate authorisations will be sought
e. In the event of any waahi tapu that is not subject to condition d) being identified by the Waikato Regional Council to the person undertaking the activity, the activity shall cease insofar as it may affect the waahi tapu. The activity shall not be recommenced without the approval of the Waikato Regional Council.	Accidental discovery protocols will be followed.
f. Where the site is to receive a total volume of more than 1,000 cubic metres of overburden (solid measure) the operator shall notify the Waikato Regional Council in	Complies

5.2.5.5 Permitted Activity Rule – Overburden Disposal Outside High Risk Locations

Standards and Terms	Compliance
writing of the accurate location of the site seven working days prior to commencing operation.	
a. The placement of the material shall be undertaken and maintained in a manner so as to ensure its long term stability.	Complies
b. The activity shall not cause any increase in flooding on neighbouring properties	Complies

CLEAN FILLING

Table 16: Large Scale Clean Filling

5.2.5.5 Controlled Activity Rule – Large Scale Cleanfill Disposal outside High Risk Locations

Standards and Terms	Compliance
a) Any discharge to air arising from the activity shall comply with the conditions and standards and terms in Section 6.1.8 except where the matters addressed in Section 6.1.8 are already addressed by conditions on resource consents for the site.	The operation will be undertaken in accordance with a QCMP inclusive of methods to minimise effects of dust. Other consent conditions are suggested by the applicant that adequately address relevant standards and terms within Section 6.1.8.
b) Records of the source and composition of all material disposed of at the site shall be maintained and made available to the Waikato Regional Council upon request to demonstrate that only cleanfill as defined in the Glossary to this Plan has been received	Appropriate records of all cleanfill deliveries will be maintained in accordance with this standard.
c) The cleanfill has no acid producing potential	No organic material or other material with the potential to generate acidic ground conditions in the absence of oxygen will be accepted on site.



d) The placement of the material shall be undertaken and maintained in manner so as to ensure its long-term stability.	All cleanfill will be adequately compacted prior to rehabilitation. Risk of failure considered very low due to flat site.
e) The activity shall not cause any increase in flooding on neighbouring properties.	Cleanfill material will replace what is removed as sand, therefore there is no potential to impact surface drainage beyond the site.

Table 17: Information Requirements Land and Soil (Rule 8.1.4)

Assessment Criteria	Comment
a. Volume, area, length and batter height of the proposed activity.	The works will create exposed areas. The volume, area, length and batter height of the proposed activities will be appropriate for the different stages in the site. Methods to control erosion and sediment are included in the QCMP attached as Appendix D.
b. The proposed start and completion times of the activity.	The activity will commence as soon as practicable once consent has been granted and construction works have been undertaken. The sand resource will be extracted according to market demand (likely to be between 7-10 years). However, a specific duration is consent is not being sought.
c. Description of the topography, soil type and vegetation.	The topography and soil characteristics of the site is described in the Geotechnical Assessment prepared by Mark Mitchell Limited and attached as Appendix C. The site is relatively flat with and adjoins a gully area and the Mangawhero Stream along the south and western site boundaries. Surrounding this area the ecological value is variable with exotic and native species. The soil type consists primarily of aeolian (Loess) and alluvial deposits (Hinuera Formation), Taupo Pumice alluvium was found close to the gully slope.
d. What effects the activity will have on the environment including: <ul style="list-style-type: none"> i. the potential effects on soil erosion, slope stability, adjacent water bodies and water quality, ii. the extent to which the activity will adversely affect areas of significant 	Presented in Section 5 (the Assessment of Environmental Effects) below.

	indigenous vegetation and significant habitats of indigenous fauna,	
iii.	the extent to which the activity will affect sites of significance to tangata whenua as Kaitiaki,	
iv.	the extent to which the activity will affect neighbouring properties,	
v.	the extent to which the activity will affect any lawfully established structure,	
vi.	the effects on the uses and values of adjacent water bodies,	
vii.	the effects on uses and values of adjacent water bodies as identified in the Regional Coastal Plan.	
e.	The design and construction methods to be used.	The stages of the sand quarry will be appropriately battered (5H:1V) to minimise effects on land stability.
f.	Methods to control water and sediment run-off from the site.	The scraping of grass species using a digger or bulldozer.
g.	The characteristics and sources of the material to be received at the site, and the measures to ensure that the material meets the definition of cleanfill or overburden in this Plan.	As per WRC TR0902 (Erosion and Sediment Control Guidelines for Soil Disturbing Activities)
h.	An assessment of the acid drainage potential of the material.	N/A
i.	Methods to control airborne particulate matter.	Water trucks over summer and high wind periods
j.	Any measure necessary to rehabilitate the land following the completion of activity.	The importation of Cleanfill to rebuild the ground level once the sand is extracted.

4.2.5 Part 6: Air Module

MINERAL EXTRACTION

Table 18: The discharge of contaminants to air from mineral extraction, processing and storage operation.

6.1.16.1 Permitted Activity Rule – Mineral Extraction, Size Reduction, Screening and Storage

Condition	Compliance
<p>a. Where the operation occurs within 1000 metres of a property boundary and there is a discharge of particulate matter beyond the property boundary the following measures shall be implemented:</p> <ul style="list-style-type: none"> i. the use of water sprays to suppress dust from crushing and screening plants, access ways, haul roads, stockpiles, load out areas and access roads ii. the sealing and maintenance of the access road, when it is within 150 metres of a neighbouring residential dwelling. 	<p>Complies.</p> <p>The activity will be within 1000m of surrounding property boundaries. The use of water sprays is proposed in the QCMP (See Appendix D) to suppress dust. The main access road will be sealed for the first 100m.</p>
<p>b. As specified in Section 6.1.8 a) to e) of this Plan.</p>	<p>Complies.</p> <p>The standard conditions in 6.1.8 of the WRP apply to discharges to air:</p> <ul style="list-style-type: none"> (a) that contaminants are not discharged beyond site boundaries, (b) do not result in objectionable odours (c) or particulate matter, (d) does not impair visibility beyond the boundary; and (e) does not cause accelerated corrosion or deterioration of structures beyond the site boundary. <p>As detailed elsewhere in the application report (and in Appendix D), the proposal can comply with all of the above conditions. Of particular note, specific procedures are included in the QCMP to address dust nuisance.</p>

c. Within seven working days of commencing works at a new site, the operator of the new quarrying site shall provide the Waikato Regional Council with written notification of the location of the site.	Will Comply. The regions notification requirements will be complied with via written notification of when the activity is going to commence (within 7 days).
d. Should an emission of particulate matter occur that causes adverse effects of an objectionable nature beyond the property boundary as determined in accordance with the decision-making guidelines set out in Section 6.4.2.2, the quarry operator shall provide a written report to the Waikato Regional Council within five days of the incident occurring, which specifies: <ul style="list-style-type: none"> i. the cause or likely cause of the event and any factors that influenced its severity ii. the nature and timing of any measures implemented by the quarry operator to avoid, remedy, or mitigate any adverse effects iii. the steps to be taken to prevent recurrence of similar events. 	Will Comply. The Applicants will satisfy the requirements of this section in the event of an objectionable emission beyond the site's boundary and proposes conditions of any consent granted to this affect.
e. There shall be no discharges of hazardous substances into the air,	Complies. No hazardous substances will be discharged to the air.

4.2.6 Overall Activity Status – Waikato Regional Council Jurisdiction

Table 19: Summary of the Activity Status of Proposed Activities

Activity	Relevant Rule in the WRP	Comment
Part 3 Water Module		
Discharge of stormwater onto land	Rule 3.5.11.5 Permitted Activity Rule – Discharge of Stormwater	Applies. The proposed discharge of stormwater to land can comply with the requirements of Rule 3.5.11.5 and is therefore, a Permitted Activity pursuant to Rule 3.5.11.5.

Activity	Relevant Rule in the WRP			Comment
Groundwater Take	3.3.4.24	Discretionary Activity	Rule – Groundwater Takes	<p>Applies.</p> <p>A groundwater take in excess of 15m³ (50m³) is required to provide a suitable water supply for the proposal (for dust suppression and washdown areas on site).</p> <p>A resource consent required for a Discretionary Activity pursuant to Rule 3.3.4.24.</p>

Part 5 Land and Soil Module

Soil disturbance, outside a high-risk erosion area.	Rule 5.1.4.11	Permitted Activity	Rule – Soil Disturbance, Roding and Vegetation Clearance.	<p>Applies.</p> <p>The area where the soil disturbance activities are proposed is located further than 10m from the SNA and 20m from Mangawhero Stream (located to the west and south of the soil disturbance areas), and involves two parcels of land that are generally flat and are currently utilised for rural (grazing) purposes.</p> <p>A resource consent is not required for those soil disturbance activities that are located outside of a High Risk Erosion Area.</p> <p>This aspect of the application is a Permitted Activity pursuant to Rule 5.1.4.11.</p>
	Rule 5.1.5	Conditions for Permitted Activity	Rule 5.1.4.11	<p>Applies.</p> <p>The proposal complies with the relevant conditions for a permitted activity. Erosion and sediment control measures will be installed and maintained in accordance with the QCMP, and the adjoining land will not become subject to flooding as a result of the quarry activities. Prior approval will be obtained from HNZ if the known archaeological feature at the site is disturbed/removed as a result of the soil disturbance activities.</p>
Overburden Disposal	Rule 5.2.5.1	Permitted Activity	Rule – Overburden Disposal Outside of High Risk Locations	<p>Applies</p> <p>The overburden associated with the proposed mineral extraction activities will be disposed of onsite; and will be located outside of a high-risk erosion area.</p>

Activity	Relevant Rule in the WRP	Comment
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The onsite overburden complies with the relevant conditions in Rule 5.2.5.1. and is therefore a **Permitted Activity**.

Large Scale Cleanfill Disposal outside High Risk Locations	Rule 5.2.5.5 Controlled Activity Rule	Applies The application seeks to discharge clean fill onto the site. Imported clean fill is proposed as part of the rehabilitation measures. Appropriate dust mitigation measures are proposed. The source and composition of all material disposed of at the site will be recorded and monitored in accordance with WasteMinz guidelines. Material will be placed to ensure its long-term stability. The proposed clean fill disposal is therefore a Controlled Activity .
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Part 6 Air Module

Mineral extraction, size reduction, screening and storage	Rule 6.1.16.1 Permitted Activity Rule – Mineral Extraction, Size Reduction, Screening and Storage. The discharge of contaminants to air from mineral extraction processing and storage operation is a Permitted Activity subject to conditions.	Applies The proposal can comply with the conditions in Rule 6.1.16.1 and a resource consent is not required being a Permitted Activity pursuant to Rule 6.1.16.1.
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As set out above, the discharge of stormwater, soil disturbance, overburden disposal, mineral extraction and discharges to air associated with the proposed activities are all permitted activities under the WRP. However, resource consents from WRC are required for the following activities:

- A groundwater take as a discretionary activity in accordance with **Rule 3.3.4.24**; and
- Large Scale Cleanfill Disposal as a controlled activity in accordance with **Rule 5.2.5.5**.

5. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The following assessment of environmental effects is focused on the matters that are relevant to the breaches of various performance standards (as set out in Section 4 of this report) and the relevant Assessment Criteria and Information Requirements in the Waipa District Plan and Waikato Regional Plan provisions that are applicable to the proposal.

The following effects have been identified, and are discussed in the subsequent sections:

- Positive Effects;
- Cultural Effects;
- Character and Amenity;
- Landscape and Visual Effects;
- Traffic and Roading Effects;
- Noise and Vibration;
- Dust;
- Archaeological Effects;
- Ecological Effects;
- Groundwater and Water Quality; and
- Soil Disturbance and Earthworks.

5.1 POSITIVE EFFECTS

The supply of a quality sand resource for the local industrial and construction sectors, and the ability of the site to accommodate clean fill from other sites, will support local projects and assist with enabling local and regional economic growth.

The proposal will also provide additional employment opportunities within the quarry (extractive industry) sector.

As a result, the quarry and clean fill site will positively contribute to the growth of the local and regional economy through provision of additional employment hours for local contractors associated with the construction industry, inclusive of associated additional rate and tax contributions.

Overall, and more generally, this proposal will support the applicant and the local community to provide for their social and economic wellbeing. This is considered particularly important as the country emerges from Covid-19 restrictions, looking to regain the social and economic losses suffered as a result.

5.2 CULTURAL EFFECTS

On the face of the proposal, while avoiding any notable impacts on the Mangawhero Stream and the SNA, it would seem that the level of adverse cultural effect is very small.

Destruction of borrow-pit sites, however, will likely be of more concern to local tangata whenua, and in this respect, consultation with mana whenua will be important, both for this consent process and for the separate Heritage NZ authorisation applications that will also be required.

The other aspect to this proposal is that the sand quarrying inherently results in disturbing earth (Papatuanuku). Although the areas of disturbance will be rehabilitated with clean fill, there will be an inevitable adverse impact of some degree on the mauri of this piece of earth as a result.

Overall, the adverse cultural impacts associated with the proposal are likely to be minor, and to a large degree, are addressed due to the avoidance philosophies built into the proposed site design and operation. Irrespective of this assessment, the applicant has initiated a process of consultation with mana whenua to better understand the level of cultural effects this proposal represents.

5.3 CHARACTER AND AMENITY

The application site is located within an established rural area. The Waipa District Plan provisions specifically provide for mineral extraction activities within the Rural Zone and recognise the importance of the regions underlying mineral (sand) resource. The rural environment is, therefore an appropriate location for the activities that are proposed.

The applicant has designed and located the proposed sand quarry within the application site to internalise effects as much as practicable, thereby minimising any change to the existing rural character and amenity.

The operational area is centrally located within the property, with adequate setbacks and separation from the adjacent rural properties to the north and east of the site, from the existing SNA that runs along the south and western site boundaries, and from the adjacent public road to the north.

The existing mature shelter belt that runs along the length of the eastern (side) boundary, and the existing planting along some external site boundaries, in conjunction with other screen planting on neighbouring properties, will assist in screening the operational area from the viewpoints of nearby neighbours, including the adjacent kiwifruit orchard.

The proposal to extract the sand resource as a series of relatively small three hectare stages while progressively rehabilitating disturbed quarried areas will further assist in retaining the existing character and amenity of the site, by ensuring only a limited area of land is open

and exposed at any one time. The balance of the site will continue to be utilised for general farming and grazing purposes (where practicable).

The proposal complies with the relevant rural zone noise standards and potential dust nuisance will be appropriately minimised through various design and operational measures as set out in the QCMP.

Based on the above, any adverse effect on the rural character and amenity of the application site or the surrounding rural area is expected to be less than minor.

5.4 LANDSCAPE AND VISUAL EFFECTS

5.4.1 Landscape

The application site comprises of predominantly modified rural land with limited natural landscape values. There are some limited areas of landscape value within the application site. These landscape values relate to the existing SNA located along the south-western boundaries of the application site.

Adverse landscape effects associated with the proposal will be minimised by the following factors;

- The relatively small size of the site;
- The avoidance of all SNA areas;
- The absence of any nearby outstanding natural features or landscapes;
- The retention of boundary screen plantings;
- Minimising worked areas to no more than three hectares; and
- The progressive recontouring and rehabilitation of worked areas back into quality pastoral farmland.

Overall, any adverse landscape effect associated with the proposal will be less than minor.

5.4.2 Visual

A mineral extraction and clean fill activity have the potential to produce adverse visual effects if the operations are not appropriately designed or managed. Those most likely to be impacted by visual impacts are the properties closest to the quarry site.

Adverse visual impacts associated with the proposal will be mitigated through the following initiatives and factors;

- The relatively small size of the site;
- Relatively few publicly accessible view-points of the site;
- Proposed setbacks for all quarry and clean fill working areas;

- The retention of boundary screen plantings;
- The presence of plantings that visually screen the site when viewed from dwellings 1, 5 and 8 in Figure 5;
- Minimising worked areas to no more than three hectares;
- Sand extraction and clean filling working areas will be lower than the existing ground level. Consequently, the edge of the quarry escarpment will provide suitable visual (and acoustic) screening – particularly when viewed from nearby dwellings;
- The direction of extraction (in a northerly direction across the site) will assist in screening the quarry activities and thereby minimising any visual effects;
- Construction of earth bunds using stripped topsoil to providing additional visual (and acoustic) screening;
- The progressive recontouring and rehabilitation of worked areas back into quality pastoral farmland; and

Overall, any adverse visual effects associated with the proposal will be less than minor.

5.5 TRAFFIC AND ROADING EFFECTS

The ITA attached (Appendix E) has assessed the traffic and roading effects associated with the proposed sand quarry and clean fill operation and presents the following conclusions;

- The additional traffic is within the capacity of the surrounding road network and is not considered a significant change in traffic volume, therefore, efficiency is unlikely to be adversely affected;
- A vehicle entrance designed to Diagram E standard is expected to be sufficient to accommodate the additional traffic with no reason to expect safety issues;
- A right-turn bay at the site entrance is not required. In this respect the authors of the ITA calculate that even if 100% of quarry traffic were to travel to/from the north-west (a possible but highly unlikely scenario) the estimated maximum vehicle movements indicate that the peak right-turn movements could be up to 7 veh/hr. However, this does not exceed the accepted 8 veh/hr trigger level for requiring a right turn bay at the quarry access; and
- Sufficient space is available on site to accommodate expected parking and manoeuvring.

The authors of the ITA also made a number of mitigation recommendations relating to traffic management and roading effects. These are all adopted by the applicant and proposed as suggested conditions of consent.

The ITA finally concludes that, provided the recommended mitigation is carried out, the transport effects are expected to be no more than minor, and there is no reason related to transport why the proposal should not proceed.

5.6 NOISE AND VIBRATION

The Acoustic Assessment (Appendix G) assesses the noise effects associated with the proposal. The report concludes that, with appropriate bunds in place, the proposed operation can comply with the relevant noise standards for the Rural Zone, therefore, any noise effects will be appropriate for the zone and the surrounding rural environment.

No blasting activities are proposed. No adverse vibration effects are therefore anticipated as part of the proposal.

More specifically, the Acoustic Assessment concludes:

The proposed sand extraction would comply with the OWDP daytime limit of 50dB L_{Aeq} , with the worst case predicted sound levels received at the nearest dwellings ranging between 36 and 47.50dB L_{Aeq} . At times, when the activity is closest to receivers, it is possible that the operations could be audible above the background levels although would remain compliant with OWDP limits. The sound level generated during construction activities would readily comply with the NZS6803:1999 Residential – rural daytime limit of 75 dB L_{Aeq} .

The assessment also points out that, if neighbours with dwellings located within 180m of soil stripping and/or sand extraction activities would rather the applicant did not construct attenuation bunds, then this could be achieved with their written agreement.

Based on the conclusions set out in the Acoustic report, it is considered that the noise effects associated with the proposal can be undertaken within the permitted activity limits prescribed for the Rural Zone in the WDP. Therefore, there will be a less than minor noise effect on local receivers.

5.7 DUST

Dust can be an issue associated with quarrying and clean filling areas if not managed appropriately. Dust is generally generated from exposed ground areas and mobilised by wind and/or disturbances by quarry equipment and traffic.

In general, the generation of dust in this instance will be managed through a number of design and operational factors documented in the QCMP. These include;

Design

- Minimising the open quarry area to no more than 3 hectares;
- Implementation of a secure supply of water (bore),
- Establishment of contingency water carts for dust suppression;
- Establishment of a truck wheel wash;

- Retaining existing shelter belt vegetation that acts both as a barrier to wind exiting the site and a filter to intercept any entrained dust;
- Use of vegetated earth bunds for acoustic screening to also provide wind shelter;
- Sealing the site entrance and first 100m of the site access road;
- Locating the accessway parallel to the existing shelter belt;

Operational

- Staff training and awareness of dust generation risk factors and mitigation measures;
- Employment of water spray or water carts to dampen dust in dry / windy conditions (particularly if blowing from the south or southwest);
- Regular visual monitoring;
- Enforcement of on-site speed restrictions;
- Use of a truck wheel wash to minimise tracking of sediment by outbound trucks;
- Use of dust covers for the transportation of loads with high dust potential (mainly sand) to minimise any residual dust;
- Neighbours feedback / complaint response.

Overall, with a well-designed site and with appropriate dust management procedures in place, it is considered that any potential adverse dust effects associated with the proposal can be appropriately managed or mitigated so they are less than minor.

On the basis of this assessment, the applicant does not consider continuous dust monitoring equipment is required on the property boundaries, but instead would consider accepting an adaptive management approach to dust monitoring - based on substantiated complaints.

5.8 ARCHAEOLOGY

The Archaeological Assessment attached as Appendix F has assessed the effects of the proposed sand quarry operation with respect to the impact on archaeological values.

In summary:

- The proposed sand quarry will affect five recorded archaeological sites, S15/285, S15/546, S15/547, S15/631 and S15/715. Based on the locations of these sites within the proposed quarry footprint it is unlikely that they can be avoided. As the preliminary site works will require removal of the upper levels of soil and extraction of the sand layers below them, all of these sites will be destroyed by the proposed activity. An Authority will be required under the HNZPTA before the sites can be modified.



- Any additional archaeological remains should be provided for under the Authority obtained from Heritage NZ, which should include all works associated with the quarry operation. Details of works will be required as part of the Authority application.
- Lot 3 DP 424105 which contains archaeological site S15/715 has only had a desk based assessment, however, based on these findings it is considered likely that borrow pits may still be present, although not necessarily visible from surface inspection. This is based on review of aerial photographs that indicate this property has been used for agricultural purposes with no major modifications to the property that would have destroyed the site. It must be surveyed if any development works are proposed and this report must be updated accordingly.
- As sites S15/285, S15/546, S15/547, S15/631 and S15/715 are considered to have limited archaeological value, the overall effects on archaeological values are considered likely to be minor and can be mitigated through collection of information (particularly through collection of material suitable for radiocarbon dating) under the provisions of the HNZPTA. Effects on the wider archaeological landscape area are also considered to be minor as the affected sites make a relatively minor contribution to the archaeological landscape.

Appropriate resource consent conditions are proffered with respect to obtaining the necessary Authority from HNZPTA should the resource consent be granted.

5.9 ECOLOGICAL EFFECTS

The proposed sand extraction activities will be sufficiently setback from Mangawhero Stream and the adjacent SNA so that physical effects on these features are avoided. The erosion and sediment control methods proposed will ensure any sediment-laden runoff from the site is diverted to the quarry pit which also effectively avoids the stream and adjacent gully.

Some level of wind-blown dust is likely to settle on adjacent vegetation, and be later washed into local waterways, however, this is considered to represent very low levels of sediment which are not likely to be detectable or distinguishable from local background.

There will also be inevitable loss of some exotic trees and temporary loss of pasture located within the “extent of works” area, however this is considered to have inconsequential impacts on local ecological values.

Overall, the ecological impacts associated with this proposal are considered de minimis.

5.10 GROUNDWATER

The water take is located within a single site with the closest neighbouring bore (70_663) located on Lot 2 DP 424105 (at NZMS260 Map Ref S15:219-649) at a depth of approximately 40m located over 260m away from the edge of the proposed sand quarry.

The application site comprises of two separate titles, neither of which currently have bores. Permitted groundwater takes across these two properties could be up to 30m³ (i.e. 15m³ per title in accordance with Permitted Activity Rule 3.3.4.12 of the Waikato Regional Plan). In the surrounding properties there is only one bore operating out of seven titles.

5.10.1 Groundwater Resource Sustainability

The proposed rate of take is 50m³ per day. This is a very low rate of take in comparison with the size of the resource and likely natural rate of rainfall recharge. Groundwater used at the wheel wash will be recycled prior to being discharged to ground soakage, resulting in the net water consumption being generally limited to evaporative losses, and overall, being lower than the actual rate of abstraction.

The proposed abstraction of groundwater is from the Hamilton Basin West Aquifer. There is no sustainable yield set for this aquifer, but WRC have confirmed that, as at September 2019, there was 95.7% available for allocation.

On this basis, granting this proposal will not cause any adverse effect on the sustainability of ground water resources. Consequently, any actual or cumulative resource sustainability effects will be inconsequential.

5.10.2 Drawdown Effects

Due to the reasonably large separation distance to the nearest bore, the very high transmissivity expected from the underlying sandy aquifer sediments, and the low rate of daily take, any drawdown effects on neighbouring bore owners are expected to be less than minor.

5.11 SOIL DISTURBANCE AND EARTHWORKS

All soil disturbance and earthworks activities will be undertaken in accordance with the Waikato Regional Council's "Erosion and Sediment Control - Guidelines for Soil Disturbing Activities (2009)" and will be confined to areas that are not a high erosion risk.

Therefore, any adverse soil disturbance and earthworks effects will be inconsequential.

5.12 CONCLUSION

Sand is an important resource to the local and regional economy. Finding an appropriate site where the sand is of an appropriate quality and quantity, and where the effects can be sufficiently mitigated or minimised, is becoming increasingly more difficult as the district develops.

The proposed sand quarry is of a relatively small scale, with a limited active working area (3 hectares). These factors significantly mitigate against a number of potential adverse effects associated with the proposal.

Erosion and sediment controls will be put in place to protect the surrounding environment, and given the small scale of the associated water take, the proposed groundwater take is not expected to generate any concerns. Stringent monitoring and acceptance criteria will be enforced on site thereby, minimising any adverse effects associated with clean filling.

Machinery noise from both the worked areas and the truck movements will be similar to farming machinery typically used for rural activities. The acoustic assessment submitted with the application has assessed the potential noise effects and confirms that the proposal proposed sand quarry can comply with the WDP noise controls. Further, it is not anticipated that vibrations will affect the surrounding land area given the type of quarrying and machinery proposed and the absence of any blasting.

The movement of sand from the site through the Waipa district to other destinations in the Waikato does result in increased local truck movements. However, the ITA has assessed that potential traffic effects and is satisfied that the proposal will not adversely impact upon the existing roading network.

With effective on-site management through the implementation of a QCMP and with appropriate conditions of consent (as suggested by the applicant) being complied with, the effects of the proposal can be appropriately minimised.

Based on the above assessment, it is concluded that, in terms of the proposed groundwater take and clean filling activities falling within the Waikato Regional Council's jurisdiction, the associated environmental effects, and the effects on any person will be less than minor. It is also concluded that, in terms of the proposed land use activities falling within the Waipa District Council's jurisdiction, the associated environmental effects, and the effects on any person will be no more than minor.

6. STATUTORY ASSESSMENT

The application needs assessment against the relevant legislative considerations contained in the RMA. As a discretionary activity, the application needs to be assessed in accordance with section 104 and Part 2 of the RMA.

6.1 SECTION 104 OF THE RMA

Section 104(1) of the RMA lists the matters that the consent authority must have regard to when considering an application for resource consent. Section 104(1) states:

104 Consideration of applications

(1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to—

(a) any actual and potential effects on the environment of allowing the activity;



and

- (ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
 - (b) any relevant provisions of*
 - (i) a national environmental standard:*
 - (ii) other regulations:*
 - (iii) a national policy statement:*
 - (iv) a New Zealand coastal policy statement:*
 - (v) a regional policy statement or proposed regional policy statement:*
 - (vi) a plan or proposed plan; and*
 - (c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.*
- (2) When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect. (2A) When considering an application affected by section 124 or 165ZH(1)(c), the consent authority must have regard to the value of the investment of the existing consent holder. (2B) ...*

Section 104 does not give any of the matters to which a Consent Authority is required to have regard primacy over any other matter. All the matters are to be given such weight as the consent authority deems fit in the circumstances, and all matters listed in section 104(1) are subject to Part 2 of the RMA.

An assessment of the proposal against the relevant matters set out in Section 104 of the RMA is provided below.

6.1.1 Actual and Potential Effects on the Environment

Section 104(1)(a) of the RMA requires an assessment of the actual and potential effects on the environment of allowing the activity; and any is provided in Section 5 above, and in the various technical assessments commissioned by the Applicant (**Appendices C-G**).

6.1.2 RELEVANT STATUTORY DOCUMENTS

Section 104(1)(b) of the RMA requires assessment against any relevant provisions of a national environmental standard, national policy statement, regional policy statement, plan or any other regulations.

An assessment of the proposal against the relevant statutory provisions is provided in the sub-sections below.

6.1.2.1 National Environmental Standards

National Environmental Standard for Assessing and Managing Contaminants in Soil

The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011 (**NESCS**) aims to ensure that land affected by contaminants in soil is appropriately identified and assessed before it is developed, and if necessary, the land is remediated, or the contaminants contained to make the land safe for human use.

Clause 5(1) of the NESCS states that it applies when:

“...a person wants to do an activity described in any of subclauses (2) to (6) on a piece of land described in subclause (7) or (8):”

Clause 5(7) of the NESCS states:

“Land covered

(7) The piece of land is a piece of land that is described by 1 of the following:

- a) an activity or industry described in the HAIL is being undertaken on it;*
- b) an activity or industry described in the HAIL has been undertaken on it;*
- c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.”*

The application site is identified on the Waipa District Council online maps as a potential HAIL site, being an unverified A10 orchard activity. The piece of land is therefore covered by c) above, being a piece of land on which *it is more likely than not that an activity or industry described in the HAIL has been undertaken*.

Although parts of this land will continue to be utilised as rural farmland concurrent to the sand quarry operation, and although the entire property will be reinstated back to rural pasture once the mineral extraction activities have ceased, the majority of the land will, at some point throughout the site's development, be temporarily disturbed and used for quarrying and clean filling activities prior to being reinstated. To this extent, subclause (8) the NESCS regulations applies.

The NESCS applies to disturbances of a “piece of land”. In this case, the scale of disturbance associated with the sand quarrying activities would not comply with the permitted activity thresholds in Regulation 8(3) of the NES-Soils.

Regulation 8(4) allows land-use change of a piece of land where it can be demonstrated it is highly unlikely there will be a risk to human health given the intended activity. To meet the requirements of a permitted activity, a preliminary site investigation (PSI) must be provided to the Council before the change of use begins.

If an activity cannot meet the requirements for a permitted activity, and if a detailed site investigation is not provided, the activity will be assessed as a discretionary activity under regulation 11.

The applicant has not yet engaged a suitable expert to undertake a PSI. Without a PSI for a “piece of land”, the proposal falls to be considered as a **Discretionary Activity** under regulation 11 of the NES-Soils.

To avoid delay, the applicant requests that this be managed via appropriate consent conditions included in any consent granted. Accordingly, the proposed conditions in Appendix I include obligations on the consent holder to undertake a PSI, and if required, a Detailed Site Investigation (DSI) and any remediation, before any quarrying activities get underway. Similar conditions to those proposed in Appendix I have been used previously in other consents to ensure the proposal meets the purpose of the NES-Soils in the absence of PSI and/or DSI reports at the time of lodging the application.

National Environmental Standards on Air Quality 2011

The National Environmental Standard on Air Quality (NESAQ) sets out ambient air quality standards for several contaminants for the protection of public health - including fine particulates (PM₁₀), sulphur dioxide (SO₂), carbon monoxide (CO) and nitrogen dioxide (NO₂). The NESAQ applies where people are likely to be exposed for periods commensurate with the relevant assessment averaging period. The NESAQ also includes concentration limits and the specified number of occasions that those concentration limits may be exceeded within any year.

The only contaminant of relevance to this application (and controlled by the NESAQ) is PM₁₀.

Appropriate dust mitigation measures are proposed to manage any potential for dust nuisance and reduce airborne dust. Water trucks will be utilised during dry and windy periods to spray exposed areas. The total area of land exposed at any one time will also be kept to a minimum to reduce the potential for dust. Accordingly, the NESAQ is not considered to be triggered in this application.

6.1.2.2 NATIONAL POLICY STATEMENTS

National Policy Statement on Freshwater Management 2014

The National Policy Statement on Freshwater Management (NPSFM) supports improved freshwater management in New Zealand. It does this by directing regional councils to establish objectives and set limits for freshwater in their regional plans. The NPSFM also provides a National Framework that directs how councils must go about setting objectives, policies and rules about fresh water in their regional plans. They must do this by establishing freshwater management units across their regions and identifying the values that communities hold for the water in those areas. Councils are required to maintain or

improve water quality within their region.

All earthworks will be undertaken to ensure no adverse effects on freshwater. Appropriate setbacks are proposed from the existing vegetated gully area adjoining Mangawhero Stream. The proposal operated outside of a high-risk erosion area and in accordance with the Waikato Regional Councils “Erosion & Sediment Control Guidelines for Soil Disturbing Activities January 2009” is entirely consistent with the direction of the NPSFM. These elements of the proposal ensure the objectives and policies within the NPSFM are not compromised.

6.1.2.3 VISION AND STRATEGY

The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 and the Ngāti Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010 inserted the Vision and Strategy for the Waikato River (“Vision and Strategy”) into the (then) operative Waikato Regional Policy Statement (RPS). The Vision and Strategy prevails over any inconsistent provisions in a national policy statement or the New Zealand Coastal Policy Statement.

The Vision and Strategy applies to the area of the Waikato River from Huka Falls to Te Puuaha o Waikato (Port Waikato) and the Waipa River from its junction with the Punui River to its confluence with the Waikato River at Ngaruawahia. This area includes the area that is the subject of this application.

The Vision for the Waikato River is:

“... for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come.”

There are 13 objectives included to realise the above Vision, 12 strategies to achieve those objectives and 18 methods to implement those strategies.

Of these provisions, it is the 13 objectives which contain the desired outcomes for the management of the Waikato River, and which are most relevant to the proposal. These are:

- A. The restoration and protection of the health and wellbeing of the Waikato River.*
- B. The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural, and spiritual relationships.*
- C. The restoration and protection of the relationship of Waikato River Iwi according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural and spiritual relationships.*
- D. The restoration and protection of the relationship of the Waikato Region’s communities with the Waikato River including their economic, social, cultural and spiritual relationships.*

E. The integrated, holistic and coordinated approach to management of the natural, physical, cultural and historic resources of the Waikato River.

F. The adoption of a precautionary approach towards decisions that may result in significant adverse effects on the Waikato River, and in particular those effects that threaten serious or irreversible damage to the Waikato River.

G. The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments on the health and wellbeing of the Waikato River.

H. The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.

I. The protection and enhancement of significant sites, fisheries, flora and fauna.

J. The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental and economic wellbeing is subject to the restoration and protection of the health and wellbeing of the Waikato River.

K. The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.

L. The promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities.

M. The application to the above of both maatauranga Maaori and latest available scientific methods.

The key points in respect of each of the relevant objectives are discussed below.

Objective A – Restoration and Protection of the Health and Wellbeing of the Waikato River

The sand quarry and clean filling proposal, as presented, has been developed to ensure the overarching objective of restoring and protecting of the health and wellbeing of the Waikato River is not compromised. In this regard, the following mitigating factors are noted;

- The site is located over 800 metres from the Waikato River;
- All active quarry areas will be limited to 3 hectares at any one time and restricted to areas of existing flat terrain (i.e. low risk erosion areas);
- All activities will avoid the adjacent Mangawhero stream gully and associated indigenous vegetation;
- Runoff generated from un-stabilised ground within the site will be minimised by limiting active quarry areas to 3 hectares, and managed in accordance with appropriate sediment and erosion control structures before being directed to the active quarry pit area, or stormwater soakage ponds, where it will soak to ground through naturally occurring sand and gravel materials that provide a natural filtering effect;

- In accordance with industry best practice, strict acceptance criteria will be imposed on all clean fill entering the site to avoid unwanted contaminants entering local groundwater;
- Groundwater abstracted for wheel washing will be minimised through recycling prior to being discharged to ground soakage resulting in the net water consumption being generally limited to evaporative losses only.

Overall, due to these mitigating factors, the actual and potential effects of the development on the Waikato River are considered to be inconsequential.

It is recognised that the consenting authorities have a statutory requirement to give effect to the Vision and Strategy, including those matters relating to the “betterment” of health and wellbeing of the Waikato River. In this regard, it is submitted that, the need for a resource consent within the Waikato catchment should not automatically require the applicant to achieve a net improvement or betterment of the Waikato River’s health and wellbeing. Moreover, such outcomes should instead be applied to proposed activities that result in an adverse effect or risk to the River. It is on this basis, and in light of the absence of any effects expected on the Waikato River from this proposal, that the applicant has not proposed any specific mitigation or betterment as part of the application.

Despite this view, it is noted that the applicant has only recently embarked on a consultation process with local Iwi (Waikato Tainui, Ngāti Koroki-Kahukura, and Ngāti Hauā). In this respect, if there are any cultural concerns expressed from Iwi about the proposal’s impact on the health and wellbeing of the Waikato River, these will be discussed in good faith, with the aim of reaching a satisfactory outcome which may include aspects of restoration, protection or betterment (if considered appropriate).

Objectives B, C and D – Restoration and Protection of the Relationship of Waikato Tainui, Waikato River Iwi and the Waikato Community with the Waikato River

As a result of the mitigating factors listed above, the proposal is also not considered to involve activities that are of a type, scale or nature that will adversely affect the relationship iwi or the wider Waikato community have with the Waikato River. As noted, the applicant has recently embarked on a consultation process with Waikato Tainui, Ngāti Koroki-Kahukura, and Ngāti Hauā. If there are any concerns expressed with respect to the proposals impact on river Iwi’s relationship with the Waikato River, these too will be discussed in good faith with the aim of reaching a satisfactory outcome.

Objective E – Integrated, Coordinated and Holistic Approach to Management

In respect of Objective E, the approach taken to assessing and managing the effects of the proposal has included consideration of the physical values of the site and its surrounds. A better understanding of the cultural values of the site, and in particular the values of the borrow pits on site, will be gained through consultation with mana whenua.

Objective F, G, and H – Adverse Effects

With respect to Objectives F, G, and H, no further degradation of the Waikato River is expected as a result of the proposal and there are no expected effects on the River's catchment – certainly nothing that are of the type that would require the adoption of a precautionary approach.

Objective I – Protection and Enhancement of Significant Sites, Fisheries, Flora, and Fauna

The proposal will not impact fisheries or indigenous flora or fauna, however, it will result in the loss of five archaeological sites (borrow pits). Using both RPS criteria and Heritage NZ Guidelines, Clough and Associates have assessed these to have limited archaeological value. They state that borrow pits have been extensively studied in previous archaeological investigations and it is not considered likely that the borrow pit sites would contribute any significant new information to the understanding of Maori horticultural practices. Conditions of consent proposed by the applicant, along with separate requirements that will form part of any Heritage NZ authority (to be informed through Iwi consultation) is considered an appropriate response to Objective I.

Objective J – Strategic Importance of the Waikato River to Community Wellbeing

The applicant recognises the importance of the Waikato River to New Zealand's social, cultural, environmental and economic wellbeing, and has ensured the design and operation of the sand quarry protects this valuable taonga accordingly. As described above, these protections will ensure no further degradation occurs to the health and wellbeing of the Waikato River.

Objective K and L – Use of, and Access to, the Waikato River

With respect to Objective K and L, the sand quarrying and cleanfilling is entirely limited to privately owned land located more than 800 metres from the Waikato River. This land does not currently restrict the use of, or access to, the Waikato River, and this will not change as a result of the proposed activities going ahead.

Objective M – Use of Maatauranga Maaori and Latest Scientific Methods

Given the nature of the site and the likely absence of any conceivable or measurable environmental effects on the Waikato River or its tributaries, the use of Maatauranga Maaori has not been considered in this instance. The effects have instead been considered using scientific methods.

As discussed above, Iwi consultation is about to be undertaken. Matters associated with the use of maatauranga maaori may be raised in that process if Iwi consider it appropriate.

Conclusion

The applicant's proposal will result in the provision of much needed sand - a resource vital to support the significant level of growth being experienced in Cambridge.

To the extent this proposal relates to the Vision and Strategy, a key point to note is that the Vision and Strategy provides an additional consideration for decision-makers assessing any resource consent application relating to the Waikato River. There is an obligation on decision-makers under section 18 of the Ngāti Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010 and section 17 of the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 to have "particular regard" to the Vision and Strategy in their decision-making (and the Vision and Strategy refers, amongst other things, to restoring and protecting the health and wellbeing of the Waikato River). This obligation must be considered along with the decision-maker's other duties under section 104 and Part 2 of the RMA.

Chapter 8 of the RPS sets out the policies and implementation methods for freshwater bodies, including measures intended to give effect to the Vision and Strategy. The focus of these policies is on maintaining or enhancing the values associated with freshwater bodies.

In this case, the AEE addresses the effects of the proposed sand quarry and clean filling activities. Due to various mitigating factors, any adverse effect or risk relating to the Waikato River is considered inconsequential. Although the applicant recognises that we all have a role to play in the process of improving the Waikato River, on the basis that, through active protection and avoidance, there is an absence of any adverse effects expected on the Waikato River, it considers this proposal will not denigrate from achieving the Vision and Strategy. Accordingly, the proposal does not include any specific offer of betterment to the Waikato River.

Finally, and noting that Iwi consultation has not yet been completed, if there are any concerns expressed from Iwi about the proposal's impact on the health and wellbeing of the Waikato River, these matters will be discussed in good faith, with the aim of reaching a satisfactory outcome. The applicant is open to these outcomes involving elements of restoration, protection or betterment if these are considered appropriate, however, it is reluctant to propose such initiatives at this stage.

6.1.2.4 WAIKATO REGIONAL POLICY STATEMENT

The Operative Waikato Regional Policy Statement (RPS) is a document prepared under the RMA that identifies the major resource management issues for the Waikato Region. The RPS achieves this through objectives, policies and methods so the region's natural and physical resources will be sustainably managed.

The RPS became operative on 20 May 2016. The WRP and Waipa District Plan are required to give effect to the RPS, although it is understood that neither has been amended so far to reflect the most recent policy direction provided by the RPS.

The following objectives are considered relevant to the current applications, and are discussed below:

- Integrated Management;
- The Use and Development of Resources;
- Health and Wellbeing of the Waikato River;
- Sustainable and Efficient Use of Resources;
- Air Quality; and
- Values of Soil.

Integrated Management

Objective 3.1 of the RPS seeks that natural and physical resources are managed in a way that recognises the inter-relationships within, and values of, catchments, and the relationships between environmental, social, economic and cultural wellbeing (amongst other things). This objective is intended to be implemented by a range of policies in the RPS (discussed in the sub-sections below).

However, Policy 4.1 specifies that an integrated approach to resource management will be adopted by recognising the inter-connected nature of natural and physical resources and the multiple values of natural and physical resources. Many of the methods to implement this policy are focussed on plan-making processes and the development of strategies, as opposed to the assessment of resource consent applications.

The proposal will be carried out in an integrated manner that recognises the interrelationships between natural and physical resources, consistent with Objective 3.1 above and the associated policies. The sand quarrying will be managed as outlined in this AEE, by seeking to avoid erosion and sediment loss, and other potential environmental impacts that could harm the ecology of the receiving environment.

Use and Development of Resources

Objective 3.2 seeks to recognise and provide for the role of sustainable resource use and development and its benefits in enabling people and communities to provide for their economic, social and cultural wellbeing. Related to this objective, Policies 4.4 and 6.8 of the RPS specify that the management of natural and physical resources should provide for the continued operation and development of regionally significant industries by:

- Recognising the value and long-term benefits of a regionally significant industry to community wellbeing (inclusive of sand quarrying);
- Ensuring that the adverse effects of regionally significant industry are avoided, remedied or mitigated;

- Maintaining and, where appropriate, enhancing access to natural and physical resources while balancing the competing demand for these resources;
- Promoting positive environmental outcomes; and
- The availability of mineral resources for infrastructure and building.

The proposed sand quarry is consistent with Objective 3.2 above insofar as it seeks to provide for the sustainable use of existing resources. The sand resource will enable the community to provide for economic, social and cultural wellbeing. The land has appropriate sand reserves (for infrastructure and building) and the adverse effects of the regionally significant industry can be avoided, remedied or mitigated. The site will be rehabilitated to near its original condition once the sand resource is extracted.

The activities for which groundwater take are sought allow the applicant and wider community to provide for their economic and social well-being, and to maintain access to natural and physical resources that support the mineral extraction activity. The proposed activities allow the availability of water for a community (business) activity, without adverse effects on the availability of water for other purposes. In summary, the groundwater take is considered consistent with Objective 3.2 of the RPS.

Health and Wellbeing of the Waikato River

Objective 3.4 seeks that *“the health and wellbeing of the Waikato River is restored and protected and Te Ture Whaimana o Te Awa o Waikato (the Vision and Strategy for the Waikato River) is achieved”*. The Vision and Strategy has become a central tenet of resource management in the Waikato Region given the inter-relationships between land use and the river.

The Vision and Strategy referred to in Objective 3.4 is discussed in detail above at Section 6.1.2.3. In summary, the health and wellbeing of the Waikato River will not be impacted by the proposal.

Furthermore, the proposal involves avoiding vegetation removal around the Mangawhero Stream. Accordingly, the proposed activities are consistent with Objective 3.4.

Sustainable and efficient use of resources

Objective 3.10 seeks that *“use and development of natural and physical resources occurs in a way and at a rate that is sustainable, and where the use and development of all natural and physical resources is efficient and minimises the generation of waste.”*

The proposed sand quarry represents a sustainable and efficient use of the finite resource of land and its underlying mineral resources. The application seeks to extract the sand resource and then rehabilitate the site to productive agricultural land. All topsoil and subsoil

will be reused onsite, and there will be off-site clean fill to supplement the removal of the sand. The proposal is therefore considered consistent with Objective 3.10.

The qualities and characteristics of the site and the wider area are key aspects of the proposed sand quarry. Careful consideration has been given to the layout and logistics of the mineral extraction process to ensure these will be maintained, consistent with Objective 3.10.

3.15 Allocation and use of fresh water

The allocation and use of fresh water are managed to achieve freshwater objectives (derived from identified values) by:

- a. avoiding any new over-allocation of ground and surface waters;*
- b. seeking to phase out any existing over-allocation of ground and surface water bodies by 31 December 2030;*
- c. increasing efficiency in the allocation and use of water; and*
- d. recognising the social, economic and cultural benefits of water takes and uses.*

The proposed activities are consistent with Objective 3.15. In particular the groundwater take will be at a level that avoids over-allocation of groundwater, and efficient use of the allocated water is proposed.

Policy 8.6 Allocating fresh water

Manage the increasing demand and competition for water through the setting of allocation limits, efficient allocation within those limits, and other regional plan mechanisms which achieve identified freshwater objectives and:

- a. maintain and enhance the mauri of fresh water bodies;*
- b. retain sufficient water in water bodies to safeguard their life-supporting capacity and avoid any further degradation of water quality;*
- c. enable the existing and reasonably justified foreseeable domestic or municipal needs of people and communities and an individual's reasonable animal drinking water requirements to be met (with discretion to consider additional allocations for those particular uses in fully and over-allocated catchments);*
- d. avoid any reduction in the generation of electricity from renewable electricity generation activities, including the Waikato Hydro Scheme; and*
- e. recognise that lawfully existing water takes (including those for regionally significant industry and primary production activities supporting that industry) contribute to social, economic and cultural wellbeing and that significant investment relies on the continuation of those takes.*

The proposed ground water take is consistent with Policy 8.6. The ground water take will provide an appropriate water supply for construction and operational purposes (dust suppression and wheel washing) and is considered an efficient water allocation that contributes to the social and economic wellbeing of the area. The ground water take provides for mineral extraction and will facilitate the sand quarry.

Air Quality

Objective 3.11 seeks that “Air quality is managed in a way that: a) ensures that where air quality is better than national environmental standards and guidelines for ambient air, any degradation is as low as reasonably achievable; b) avoids unacceptable risks to human health and ecosystems, with high priority placed on achieving compliance with national environmental standards and guidelines for ambient air; and c) avoids, where practicable, adverse effects on local amenity values and people’s wellbeing including from discharges of particulate matter, smoke, odour, dust and agrichemicals, recognising that it is appropriate that some areas will have a different amenity level to others.

Potential effects on air quality are addressed in detail in Section 5 of this AEE. Ambient concentrations of key contaminants associated with the Sand Quarry and storage areas are expected to remain within the relevant standards and guideline values, thus preserving human health.

In light of the above, it is considered that the proposal will meet the management outcome sought by Objective 3.11 and Policies 5.2 and 5.3 of the Waikato RPS for air quality and the control of the effects of air discharges.

Values of Soil

Objective 3.25 seeks that “soil resource will be managed to safeguard its life supporting capacity, for the existing and foreseeable range of uses.”

The proposed sand quarry operation is consistent with Objective 3.25 above. The site will be rehabilitated at the completion of the sand extraction activities (and will revert to pastoral farmland). The sand quarry will therefore only have a short-term impact on the life-supporting capacity of the soil resource. There will also be a continuation of pastoral farming on the balance of the property as each area is worked and rehabilitated.

The relevant policy is presented below (followed by an analysis):

Policy 14.1 Maintain or enhance the life supporting capacity of the soil resource

Manage the soil resource to:

- a. minimise sedimentation and erosion;*
- b. maintain or enhance biological, chemical and physical soil properties; and*

- c. *retain soil versatility to protect the existing and foreseeable range of uses of the soil resource.*

The proposal will not have adverse effects on the soil resource. Erosion and sediment controls will ensure that earthworks and sedimentation/erosion is minimised and there is no impact on the soil's biological, chemical and physical soil properties.

Waikato RPS Conclusion

As is to be expected, there are a series of competing tensions within the objectives and policies of the RPS, between the utilisation of natural and physical resources for social and economic wellbeing, and the protection or maintenance of natural character, amenity, indigenous biodiversity, freshwater and cultural values. Many of the policies and methods relate to the management of natural resources and are also aimed at regional and district plans. These plans need to protect or maintain such values via the avoidance, remediation or mitigation of adverse effects.

The provisions of the Waikato RPS are directed at the Regional Plan. It is considered that the granting of the applications will not undermine the ability of WRC to implement its obligations in respect of them. Overall, the proposal is considered to be consistent with the objectives and policies approach promoted in the Waikato RPS.

6.1.2.5 WAIKATO REGIONAL PLAN

The WRP is the primary tool to implement the Waikato RPS. The aspects of the proposal where the WRP needs to be considered are in the context of the activities that require resource consent (as it is considered that the permitted activities are clearly consistent with the provisions of the WRP). Those activities requiring resource consent include the deposition of clean fill and the taking and use of groundwater to enable the mineral extraction activities.

Proposed Plan Change 1 to the Waikato Regional Plan

On 22 October 2016, WRC notified a proposed change to the WRP for water quality within the Waikato and Waipa River catchments. PC1 introduces regulatory provisions into the WRP to assist with the achievement of the Vision and Strategy and to implement the NPSFM.

The focus of PC1 is the management of four contaminants, being nitrogen, phosphorus, sediment, and microbial pathogens. While this application does not largely relate to any of those contaminants. PC1 sets an 80-year timeframe to achieve the outcomes sought by way of the Vision and Strategy. It is considered that this application will not affect the ability of the outcomes sought in PC1 to be achieved. As detailed earlier, the sand quarry area is currently used for pastoral farming. The activity of the sand quarry will result in a slight reduction in nitrogen and phosphorus being discharged at this location until the site is rehabilitated (and returned to rural pasture). The land will then be used for dry stock grazing (specifically horses).

Water Module

Water Resources

Objective 3.1.2

The management of water bodies in a way which ensures:

- a) that people are able to take and use water for their social, economic and cultural wellbeing*
- b) net improvement¹ of water quality across the Region*
- c) the avoidance of significant adverse effects on aquatic ecosystems*
- d) the characteristics of flow regimes are enhanced where practicable and justified by the ecological benefits*
- e) the range of uses of water reliant on the characteristics of flow regimes are maintained or enhanced*
- f) the range of reasonably foreseeable uses of ground water and surface water are protected*
- g) inefficient use of the available ground surface water resources is minimised*
- h) an increase in the extent and quality of the Region's wetlands*
- i) that significant adverse effects on the relationship tangata whenua as Kaitiaki have with water and their identified taonga such as waahi tapu, and native flora and fauna that have customary and traditional uses in or on the margins of water bodies, are remedied or mitigated*
- j) the cumulative adverse effects on the relationship tangata whenua as Kaitiaki have with water their identified taonga such as waahi tapu, and native flora and fauna that have customary and traditional uses that are in or on the margins of water bodies are remedied or mitigated*
- k) the management of non-point source discharges of nutrients, faecal coliforms and sediment to levels that are consistent with the identified purpose and values for which the water body is being managed*
- l) the natural character of the coastal environment, wetlands and lakes and rivers and their margins (including caves), is preserved and protected from inappropriate use and development*
- m) ground water quality is maintained or enhanced and ground water takes managed to ensure sustainable yield*
- n) shallow ground water takes do not adversely affect values for which any potentially affected surface water body is managed*
- o) concentrations of contaminants leaching from land use activities and non-point source discharges to shallow ground water and surface waters do not reach levels that present significant risks to human health or aquatic ecosystems*
- p) that the positive effects of water resource use activities and associated existing lawfully established infrastructure are recognised, whilst avoiding, remedying or mitigating adverse effects on the environment.*

Policy 1: Management of Water Bodies

Manage all water bodies to enable a range of water use activities, whilst ensuring that a net improvement in water quality across the Region is achieved over time through:

- a. *Classifying and mapping water bodies based on the characteristics for which they are valued and implementing the classification through a mixture of regulatory and non-regulatory methods.*
- b. *Maintaining overall water quality in areas where it is high, and in other water bodies, avoiding, remedying or mitigating cumulative degradation of water quality from the effects of resource use activities.*
- c. *Enhancing the quality of degraded waterbodies.*
- d. *Providing for the mitigation and remediation of adverse effects in accordance with Section 1.3.3 of the Waikato Regional Policy Statement.*
- e. *Recognising the positive benefits to people and communities arising from use or development of water resources and by taking account of existing uses of water and the associated lawfully established infrastructure.*

With respect to this consent application, Parts a), b), c), e), f), i) & k) of Objective 3.1.2 are relevant. Part c) of section 3.1.2 states that water bodies should be managed in such a way as to 'avoid significant adverse effects on aquatic ecosystems.

Policy 1 (Management of Water Bodies) states that water bodies are to be managed in such a way that degraded water bodies are improved by avoiding, mitigating and remedying adverse effects on water quality through resource use activities.

As already indicated in this report, the proposal is not expected to have any significant adverse effects on aquatic ecosystems given the stormwater generated from the activities will be treated via appropriate sediment control measures before being discharged to the quarry pit and no direct discharge is proposed into Mangawhero Stream. The QCMP proposes a staged approach for open areas of soil and erosion and sediment control measures to further 'treat' the stormwater.

The take and use of groundwater is for social and economic wellbeing, and is considered to have less than minor adverse effects on the resource. The proposal therefore is not considered to adversely impact on the sustainable yield of the groundwater resource (although undefined in this case). Granting consents will recognise the positive effects of water resource use activities, whilst ensuring that adverse effects are avoided, remedied or mitigated.

3.3.2 Objective

- a. *Giving effect to the overarching purpose of the Vision and Strategy to restore and protect the health and wellbeing of the Waikato River for present and future generations.*
- b. *The availability of water to meet the existing and the reasonably justified and foreseeable future domestic or municipal supply requirements of individuals and communities and the reasonable needs for an individual's animal drinking water requirements.*

- c. The recognition of the significant community benefits that derive from domestic or municipal supply takes.*
- d. The efficient allocation and the efficient use of water.*
- e. No further allocation of water that exceeds the primary allocation in Table 3-5 that reduces the generation of electricity from renewable energy sources.*
- f. The recognition that existing water takes contribute to social and economic wellbeing and in some cases significant investment relies on the continuation of those takes, including rural-based activities such as agriculture, perishable food processing and industry.*
- g. The continued availability of water for cooling of the Huntly Power Station.*
- h. Sufficient water is retained instream to safeguard the life supporting capacity of freshwater, including its ecosystem processes and indigenous species and their associated ecosystems.*
- i. That decisions regarding the allocation and use of water take account of the need to avoid the further degradation of water quality, having regard to the contaminant assimilative capacity of water bodies.*
- j. Subject to Objectives a) to h) above, the availability of water to meet other future social, economic and cultural needs of individuals and communities (including rural based activities such as agriculture, perishable food processing and industry).*

The purpose of the Vision and Strategy for the Waikato River will be given effect to by the granting of these consents. The more efficient use of the water allocated pursuant a groundwater take permit will contribute to a greater availability of water to meet future dust suppression needs, as set out in subclause f. Overall it is considered that the activities are consistent with Objective 3.3.2.

Policy 2 in Section 3.4.3 of the Waikato Regional Plan implements Objective 3.1.2 a), g) and p) and Objective 3.3.2:

Policy 2: Efficient Use of Water

Ensure the efficient use of water by:

- a. Requiring the amount of water taken and used to be reasonable and justifiable with regard to the intended use and where appropriate:*
 - i. For domestic or municipal supplies is justified by way of a water management plan.*
 - ii. For industry, implementation of industry good practice, in respect of the efficient use of water for that particular activity/industry.*
 - iii. For irrigation, the following measures in relation to the maximum daily rate of abstraction, the irrigation return period and the seasonal or annual volume of the proposed take:*
 - *A maximum seasonal allocation reliability of up to 9 out of 10 years*

- *A minimum application efficiency of 80 percent (even if the actual system being used has a lower application efficiency), or on the basis of a higher efficiency where an application is for an irrigation system with a higher efficiency*
- b. *Requiring consideration of water conservation and minimisation methods, such as leak detection and loss monitoring as integral parts of water take and use consent applications to ensure no significant wastage of water resources*
- c. *Raising awareness amongst the regional community about water efficiency issues and techniques*
- d. *Facilitating the transfer of water take permits, provided the transfer does not result in effects that are inconsistent with the purpose of the relevant Water Management Class, as identified by the policies in section 3.2.3 and the water classes in section 3.2.4*
- e. *Promoting investigation of alternatives to the water take, alternative water sources, water harvesting (excluding the Waikato River catchment above Karapiro Dam) and seasonal storage, as an integral part of water take and use consent applications.*
- f. *Promoting shared use and management of water through water user groups or other arrangements where there is increased efficiency in the use and allocation of water.*

The new ground water take is consistent with Policy 2(a)(ii) above. Specifically, this activity will not result in groundwater over allocation and it is consistent with the objectives and policies of the Waikato Regional Plan, as addressed earlier in this section. In addition, the ground water take is not anticipated to have adverse effects on surface water bodies or on existing users. The purpose of the take (i.e. for dust suppression and wheel wash purposes) and the take volume will be capped at a relatively low level of 50m³/day.

In summary, it is concluded that the groundwater take of 50m³ from the site is consistent with Policy 2 of Section 3.8.3.

Land and Soil Module

Objective 5.2.2

Discharges of wastes and hazardous substances onto or into land undertaken in a manner that:

- a. *does not contaminate soil to levels that present significant risks to human health or the wider environment*
- b. *does not have adverse effects on aquatic habitats, surface water quality or ground water quality that are inconsistent with the Water Management objectives in Section 3.1.2*
- c. *does not have adverse effects related to particulate matter, odour or hazardous substances that are inconsistent with the Air Quality objectives in Section 6.1.2*
- d. *is not inconsistent with the objectives in Section 5.1.2*
- e. *avoids significant adverse effects on the relationship that tangata whenua as Kaitiaki have with their taonga such as ancestral lands, water and waahi tapu*
- f. *remedies or mitigates cumulative adverse effects on the relationship that tangata whenua as Kaitiaki have with their identified taonga such as ancestral lands, water and waahi tapu.*

Policy 1: Low Risk Discharges Onto or Into Land

Enable, through permitted activity rules and non-regulatory methods, the discharge of contaminants onto or into land where:

- a. *hazardous substances present in the discharge, or produced as a consequence of the breakdown of the contaminants from the discharge:*
 - i. *are not environmentally persistent*
 - ii. *will not bioaccumulate to a level that has acute or chronic toxic (carcinogenic, teratogenic or mutagenic) effects on humans or other non-target species*
- b. *the discharge of these contaminants onto or into land will not result in pathogens accumulating in soil or pasture to levels that would render the soil unsafe for agricultural or domestic use*
- c. *the discharge is not inconsistent with policies in Section 5.1.3*
- d. *the discharge will not result in any effect on water quality or aquatic ecosystems that is inconsistent with the purpose of the Water Management Classes as identified by the policies in Section 3.2.3*
- e. *the discharge will not result in any effect on air quality that is inconsistent with policies in Section 6.1.3*
- f. *the discharge will not damage archaeological sites, waahi tapu or other identified sites of importance to tangata whenua as Kaitiaki.*

Policy 2: Other Discharges Onto or Into Land

Manage discharges of contaminants onto or into land not enabled by Policy 1, in a manner that avoids, where practicable, the following adverse effects and remedies or mitigates those effects that cannot be avoided:

- a. *contamination of soils with hazardous substances or pathogens to levels that present a significant risk to human health or the wider environment*
- b. *the discharge is not inconsistent with policies in Section 5.1.3*
- c. *any effect on water quality or aquatic ecosystems that is inconsistent with the purpose of the Water Management Classes as identified by the policies in Section 3.2.3*
- d. *the adverse effects outlined in the policies and rules for air quality in Chapters 6.1 and 6.2, particularly for odour and particulate deposition*
- e. *damage to archaeological sites, waahi tapu or other identified sites of importance to tangata whenua as Kaitiaki.*

The proposed sand quarry will be sufficiently set back from the edge of the gully bank and the Mangawhero Stream and does not meet the WRP's definition of a 'high-risk erosion areas'. Of most relevance is Objective 5.2.2 which seeks to ensure discharges to land are undertaken in a manner that will not result in adverse effects on the environment. As explained in section 5 of this report, the proposed clean filling activity will follow industry best practice WasteMinz guidelines to minimise any risk to the environment. This is reflected in the controlled status of the activity in this case. The material to be discharged (cleanfill) is also considered low risk, therefore aligning with Policy 1. Finally, the proposed management methods to be implemented on the site through the QCMP will ensure consistency with Policy 2.

Air Module

Air Quality

6.1.2 Objective

Objective 1: Significant characteristics of air quality as identified in Table 6-1 are:

- a) protected where they are high*
- b) enhanced where they are degraded*
- c) otherwise maintained.*

Objective 2: No significant adverse effects from individual site sources on the characteristics of air quality beyond the property boundary.

Objective 3: Cumulative effects of discharges on ambient air quality do not:

- a) present more than a minor threat to the health of humans, flora and fauna*
- b) cause odour that is objectionable to the extent that it causes an adverse effect*
- c) result in levels of suspended or deposited particulate matter that are objectionable to the extent that they cause adverse effects*
- d) have a significant adverse effect on visibility*
- e) cause accelerated corrosion of structures*
- f) cause significant adverse effects on the relationship tangata whenua as Kaitiaki have with their identified taonga such as air, ancestral lands, water and wahi tapu.*

There are three objectives in Section 6.1.2 of the WRP relating to the management of air quality. They seek:

- The significant characteristics of air quality are either protected, enhanced or maintained;
- No significant adverse effects from individual site sources on the characteristics of air quality arise beyond property boundary;
- The management of the cumulative effects of discharges on ambient air quality; and
- The relevant policies direct that the effects of air discharges be managed to have particular regard to the effects on the achievement of ambient air quality guidelines, human health, the identified values of tangata whenua as kaitiaki, and any potential cumulative effects. Recognition is also given to the positive benefits to people and communities arising from activities that affect air quality (whilst ensuring that air quality resources are protected and adverse effects avoided, remedied or mitigated).

The analysis in the above Sections of this AEE is equally applicable to the air quality provisions of the WRP. In this regard, particulate deposition and the concentrations of PM₁₀, associated with air discharges from the site are expected to remain within the relevant standards and guidelines. The site will be managed by the QCMP including dust management procedures so as not to result in objectionable effects beyond the site boundary.

In light of the above, it is considered that the discharges and air from the site can be undertaken in such a manner that it meets the management outcomes sought by Objectives 1, 2 and 3 of Section 6.1.2 of the WRP.

WRP Conclusion

Based on the analysis in the sub-sections above, it is considered that the various 'regional' activities associated with sand quarry operation will be managed so the project is not contrary to the relevant objectives and policies of the WRP. Of particular note:

- The discharge of stormwater to land will avoid any effects on the Mangawhero Stream;
- The discharge of dust to air will not exceed the applicable air quality standards and guidelines and will be managed so that they do not cause offensive or objectionable effects beyond the boundaries of the site;
- The groundwater resource proposed to be used is plentiful with significant allocation available; and
- The proposal is for efficient use of natural resources (sand) and the site will be rehabilitated so that the soils are protected.

6.1.2.6 WAIPA DISTRICT PLAN

Rural Zone Provisions

Section 4 of the Waipa District Plan sets out various issues, objectives and policies relating to land within the Rural Zone. Relevant provisions are discussed below:

Objective 4.3.1 Rural Resources

To maintain or enhance the inherent life supporting capacity, health and well-being of rural land, ecosystems, soil and water resources.

Policy 4.3.1.2 - Avoid adverse effects on Water Catchment Areas

To avoid, remedy or mitigate the adverse effects of development, subdivision and activities on Water Catchment Areas as identified on the Planning Maps.

Policy 4.3.1.4 Protect the Rural Soil Resource

The versatility and life supporting capacity of the District's rural land and soil resource, particularly high-class soils and peat soils, are protected from development, subdivision or activities that would prevent its future use for primary production, or its ability to maintain the District's ecological/biodiversity values.

Policy 4.3.1.6 Earthworks

To ensure that earthworks are carried out in a manner that avoids adverse effects on infrastructure, between properties and on water bodies.

Comments: The proposed sand extraction activities will be undertaken and managed to ensure that the inherent life supporting capacity of the rural land and the underlying soil

resource are maintained. The site will be rehabilitated to rural farmland once the sand has been extracted, and the site will continue to be utilised as rural pastureland (dry stock grazing). The versatility and life supporting capacity of the underlying soil resource will therefore be retained.

The earthworks associated with the proposed sand quarry activities will be carried out in a manner that avoids adverse effects between properties and on water bodies. The existing topsoil will be stockpiled and used to rehabilitate the site back to high quality farmland.

The adoption of appropriate sediment control measures will avoid any adverse effects on the Mangawhero Stream.

The proposal is therefore consistent with Objective 4.3.1 and Policies 4.3.1.2, 4.3.1.4 and 4.3.1.6 above.

4.3.5 Objective - Rural activity: mineral and aggregate prospecting, exploration and extraction

To meet the District's and Region's mineral and aggregate needs from predominantly local sources and ensure that the location, use and development of the District's mineral and aggregate resources is provided for, subject to the management of the adverse effects associated with such activities.

4.3.5.1 Policy - Mineral prospecting and exploration

Mineral prospecting and exploration are enabled provided that the adverse effects of the activities are not significant.

Policies - Mineral extraction

4.3.5.3 *Mineral extraction activities are managed so that the adverse effects of the activities are internalised, or avoided, remedied or mitigated as far as practicable through methods such as management, mitigation and rehabilitation plans that address matters such as:*

- (a) Managing dust, noise, vibration, access and illumination to maintain amenity values, particularly during the night-time; and*
- (b) Ensuring buildings and structures are appropriately located in relation to boundaries, and of an appropriate scale; and*
- (c) Undertaking remedial measures during extraction operations; and*
- (d) Requiring sites to be rehabilitated and ensuring appropriate materials are used for this purpose.*

4.3.5.4 *The scale and location of mineral extraction shall:*

- (a) Be consistent with the capacity, design and function of the roading hierarchy; and*
- (b) Not adversely affect rural character.*

4.3.5.5 *To recognise:*

- (a) That mineral extraction is constrained by the location of the resource; and*
- (b) The importance of maintaining a supply of extracted minerals; and*
- (c) The need to identify other significant mineral resources as required, in conjunction with the Regional Council, and to provide for their future extraction and use.*

Comments: The WDP recognises the importance of meeting the District's and Region's mineral and aggregate needs from predominantly local sources, subject to the management

of the adverse effects associated with those activities. The Rural Zone is an appropriate location provided the adverse effects are appropriately managed.

The Assessment of Environmental Effects within this report has demonstrated that any potential adverse effects can be appropriately mitigated or contained within the application site. The various technical assessments, reports and management plans that have been prepared as part of the application (and are attached as Appendices) adequately address the matters in policy 4.3.5.3 above.

Potential dust and noise effects will be actively managed onsite. Vibrations will not be perceptible as the works will not require blasting and only heavy machinery for digging and cartage.

The scale of the proposed mineral extraction activities is considered appropriate for the site and the surrounding rural environment. The site will be rehabilitated to rural farmland. The rural character and capacity of the existing road network are therefore unaffected over the long term. The proposal is therefore consistent with policy 4.3.5.4 above.

The development will provide a much-needed mineral resource for the local community and is therefore consistent with policy 4.3.5.5 above.

4.3.7 Objective-Rural Character

Rural character and amenity is maintained.

4.3.7.1 Policy - Rural Character

Land use activities should be at a density, scale, intensity and location to maintain rural character.

4.3.7.2 Policy - Rural Character

Rural character and associated amenity values shall be maintained by ensuring rural land uses predominate in the Rural Zone, and buildings are of an appropriate scale and location.

4.3.8 Objective-Rural Amenity: Setbacks

To maintain rural character and amenity and avoid reverse sensitivity effects.

4.3.8.1 Policy – Transport network boundaries

Buildings and activities are set back from road boundaries and railway tracks to maintain safety, rural character and amenity, and to avoid reverse sensitivity effects.

4.3.8.2 Policy – Internal boundaries

Buildings and activities are setback from rear and side boundaries to maintain rural character and amenity and avoid reverse sensitivity effects.

Comments: The proposal is consistent with the above objectives and policies. The rural character and amenity will not be adversely impacted by the proposal to establish and operate a mineral extraction activity at the site. The Rural zone is specifically identified as an appropriate location for mineral extraction activities. The (modest) scale of the proposed quarry is appropriate with respect to the existing rural environment and character.

The earthworks and sand extraction activities will be temporary, and the site will be rehabilitated back to rural pasture once the sand resource has been extracted. Any potential effects (in terms of visual amenity, rural character and setbacks) will therefore also only be temporary.

Any adverse effects beyond the site will be managed to minimise their effect, including erosion and sediment control, hours of operation, exposure of small extraction areas and site rehabilitation.

The proposed activities and sand extraction works will maintain the overall rural character and amenity of the site, thus complying with Objective 4.3.7 and associated policies. The proposal also complies with the relevant setback rules which will maintain rural character, consistent with Objective 4.3.8.

Objective 4.3.9 Rural amenity: signs

To ensure that signs do not have an adverse impact on the amenity values of the Rural Zone, landscape values, heritage values, or public safety.

Policy 4.3.9.1 Signs to reflect local character and transport environment

Ensure that signs reflect the rural character and amenity values of the surrounding environment, including any identified landscapes, significant natural areas, viewshafts, and the nature of the adjacent transport environment, by restricting the location, size, number, and content of signs.

Policy 4.3.9.2 Location of signs

Avoid the establishment of signs in the Rural Zone which are not related to the site on which they are located.

Policy 4.3.9.3 Signs to avoid adverse effects

Avoid signs that are illuminated, moving, or flashing, or which are likely to create a visual hazard or interfere with the safe and efficient use of roads, railways, airports, or water bodies.

Policy 4.3.9.4 Temporary signs

Manage the location, size, number, and type of temporary signs to minimise short-term impact, and to avoid adverse effects on local amenity values and public safety.

Policy 4.3.9.5 Traffic safety

The design, location and content of signs shall not adversely affect the safe functioning of roads.

Comments: Signage is proposed as part of the sand quarry operation. A sign identifying the name of the business and the main entrance to the sand quarry will be placed adjacent to the site entrance. Additional internal signage (for traffic control, directions, health and safety and general site information) is also proposed within the quarry area. The location, size and number of signs will be managed to avoid adverse amenity effects, consistent with Policy 4.3.9.1-4 and provide for traffic safety (e.g. permitted speed limits). Signs will not be illuminated or create a visual hazard to users of Kaipaki Road.

Objective 4.3.10 Rural amenity: noise and vibration

To maintain rural amenity while enabling the operation of noise and vibration generating farming activities within the Rural Zone.

Policy 4.3.10.1 Rural farming activities

Enable the generation of noise and vibration arising from legitimate farming activities, while mitigating adverse effects as far as practicable.

Policy 4.3.10.2 Rural activities

To ensure that the adverse effects of noise generated by rural activities are avoided, remedied or mitigated.

Comments: Marshall Day Acoustics have assessed the potential noise effects associated with the proposed sand quarry (refer to the Acoustic Assessment in Appendix G). The assessment concludes that the proposal complies with all of the relevant Rural Zone noise standards, and any noise and vibration effects associated with the sand quarry are, therefore considered appropriate for the site and the surrounding rural environment. The noise effects will be similar to those associated with other rural activities, including the operation of large farm machinery. The site works will comprise of predominantly digging and recontouring works. There will be minimal vibration within the site and none at the edge of the property or neighbouring sites. For these reasons, the application is consistent with the above objective and policies.

Transportation Provisions

Section 16 of the District Plan sets out issues, objectives and policies relating to the topic of transportation. The most relevant objectives and policies are as follows:

Objective 16.3.2 -Integrating land use and transport: ensuring a pattern of land uses and a land transport system which is safe, effective and compatible.

Land use and transport systems successfully interface with each other through attention to design, safety and amenity.

Policy 16.3.2.1 Integrating land use and transport

Development, subdivision and transport infrastructure shall be located, designed and managed to:

- (a) Minimise conflict on and across arterial routes and provide appropriate access; and*
- (b) Include access that is safe and appropriate for all road users, including those with restricted mobility; and*
- (c) Minimise the need for travel and transport where practicable; and*
- (d) Facilitate travel demand management opportunities where practicable.*

Policy 16.3.2.4 Managing effects on character and amenity

Development, subdivision and transport infrastructure shall be located, designed and managed to:

- (a) Avoid, remedy, or mitigate adverse effects of transport on character and amenity; and*
- (b) Facilitate opportunities to enhance character and amenity; and*
- (c) Ensure that the outcomes sought in the Waipa Growth Strategy, Town Concept Plan 2010 Plans, and the Character Precinct statements in Section 6 – Commercial Zone of this Plan are achieved.*



Objective 16.3.3 Maintaining transport network efficiency

To maintain the ability of the transport network to distribute people and goods safely, efficiently and effectively.

Policy 16.3.3.1 Effects of development or subdivision on the transport network

Avoid, remedy or mitigate the adverse effects of development or subdivision on the operation and maintenance of the transport network, including from:

- (a) Traffic generation, load type, or vehicle characteristics; and*
- (b) The collection and disposal of stormwater; and*
- (c) Reverse sensitivity effects where development or subdivision adjoins existing and planned roads.*

Objective 16.3.4: Provision of vehicle entrances, parking, loading and manoeuvring areas.

The provision of adequate and well-located vehicle entrances and parking, loading and manoeuvring areas that contribute to both the efficient functioning of the site and the adjacent transport network.

Policy 16.3.4.1: Location of vehicle entrances.

To maintain the safe and efficient functioning of adjoining roads and railways, vehicle entrances to all activities shall be located and formed to achieve safe sight lines and entry and egress from the site. In some locations, adjoining rail lines, State Highways, and the District's Commercial Zones; vehicle entrances will be limited and will require assessment due to the complexity of the roading environment, or the importance of provision for pedestrians.

Policy 16.3.4.2: Ensuring adequate parking, loading and manoeuvring areas onsite.

To maintain the efficient functioning of adjoining roads, all activities shall provide sufficient area on site to accommodate the parking, loading and manoeuvring area requirements of the activity except in the Residential Zone where the provision of on-site manoeuvring for dwellings is enabled within the setbacks.

Comments: Gray Matter have assessed the potential transportation effects associated with the proposed sand quarry (refer to the Integrated Transport Assessment in Appendix E). This assessment includes an assessment against the relevant transportation related objectives and policies in the District Plan. It is considered that this assessment is correct and that the proposal is generally compliant with the above objective and policies for the following reasons:

- The proposal includes the provision of an appropriate access for vehicles. The existing entrance will be upgraded to Diagram E standard and will provide dual access to the existing dwelling and farm, and the proposed sand quarry operation. The proposal is therefore consistent with Objective 16.3.2 and its associated policies.
- The site is located in close proximity to the Cambridge township, and is easily able to connect to the existing roading network. The volume of traffic proposed is appropriate



for the site and can safely be accommodated within the existing roading network. The proposal is therefore consistent with Policies 16.3.2.1 and 16.3.2.4 above.

- The ITA concludes that the minor arterial (Kaipaki Road) will not be adversely affected by the proposal, and the application can be supported from a transportation perspective. The proposed activity is, therefore consistent with Policy 16.3.2.4 above in avoiding, remedying or mitigating adverse effects of transport on character and amenity.
- The proposed activity is also consistent with Objective 16.3.3 and Policy 16.3.3.1 above, as it will allow goods to be moved about the district while maintaining the safety, efficiency and effectiveness of the transport network and will avoid or mitigate adverse effects of traffic generation that are more than minor.
- The existing vehicle entrance (located in the north-eastern corner of the property, and adjacent to an existing shelterbelt that separates the site from the adjoining Kiwi Fruit Block) is well positioned to provide safe access to the site. The entrance is located on a relatively straight stretch of road, with clear sightlines in either direction. Placement of the entrance in this location also avoids proximity to any dwellings (914 Kaipaki Road). Traffic flows to and from the site will be managed in a manner that ensures traffic safety on Kaipaki Road. Sufficient space is available on site to accommodate parking, loading and manoeuvring areas. The proposal is therefore consistent with Objective 16.3.4 and Policies 16.3.4.1 and 16.3.4.2.

Archaeology Provisions

Section 22 of the District Plan sets out issues, objectives and policies relating to the topic of archaeology, and is therefore applicable insofar as it relates to the recorded archaeological feature on the subject property (S15/285). The relevant objectives and policies are as follows:

Objective 22.3.4 - Protecting archaeological heritage

To maintain the archaeological heritage of the District.

Policy 22.3.4.1 - Management of effects on Archaeological Sites

To manage effects on archaeological sites at the time of development and subdivision.

Comments: Clough and Associated Limited have prepared an Archaeological Assessment for the application (Appendix F). The Assessment confirms that the recorded archaeological features on the subject property are common ‘borrow pits’. The proposed sand extraction activities will require the removal of these archaeological features in order to extract the underlying sand resource. Therefore, prior approval (in the form of an Authority from HNZ) will need to be obtained, and the feature will be appropriately mapped and recorded. The removal of the aforementioned feature is a permitted activity subject to obtaining the necessary approval from Heritage New Zealand. The proposal is therefore consistent with the above objective and policy.

6.1.3 OTHER MATTERS

Section 104(1)(c) requires that when considering an application for resource consent and any submissions received, the Council must have regard to ‘any other matter’ relevant and reasonably necessary to determine the application.

Under section 104(1)(c) the relevant matter to be considered is the Tai Tumu Tai Pari Tai Ao, the Waikato-Tainui Environment Plan (“WTEP”).

Waikato Tainui Environmental Plan

The Waikato-Tainui Environment Plan (WTEP) was lodged with Waikato Regional Council on 6th September 2013. The purpose of the plan is

‘to provide a map or pathway that will return the Waikato-Tainui rohe to the modern-day equivalent of the environmental state that it was in when Kiingi Taawhiao composed his maimai aroha’.

An assessment of the Waikato-Tainui Environment Plan is presented below, however, the Applicant acknowledges that only Waikato-Tainui can determine for Waikato-Tainui if, from a Waikato-Tainui perspective, the magnitude, frequency, and duration of the effect, and if the overall effect of an activity is positive or negative.

Tribal Strategic Plan

This section of the WTEP sets out the tribe’s strategic objectives for its own identity, integrity, success and wellbeing. It draws on the blueprint ‘Whakatupuranga 2050’ for the cultural, economic and social advancement of Waikato-Tainui. While this section is most relevant to internal stakeholders, there is an objective, policy and several methods that seek to ensure that resource management, use and activities within the Waikato-Tainui rohe are consistent with (and if possible, contribute to the achievement of) the vision, mission, values and strategic objectives of Whakatupuranga 2050.

The Applicant recognises the role of Waikato-Tainui as kaitiaki within its rohe, and understand the importance of land and water resources, particularly the centrality of the Waikato River, to the tribe’s mana and identity.

Customary Activities

Section 14 of the WTEP outlines Waikato-Tainui’s customary activities and resource use, which has been affected by a decline in the abundance and variety of resources as well as reduced access to these resources.

The sand quarrying and associated earthworks will not impact upon the ability for customary activities to be undertaken.

Natural Heritage and Biosecurity

Section 15 of the WTEP discusses the loss of indigenous biodiversity and the negative effect this has had on the relationship of Waikato-Tainui with the whenua. The Plan seeks



to restore the rohe to ecological health.

The applicant proposes adequate setbacks within the site to maintain the riparian margin with indigenous plant material to be consistent with WTEP (Policy 15.3.1.1(d)). This area is already fenced from the wider farm to minimise animal grazing in this area to help restore the water quality of the stream and by association the rohe.

Historical Items, Prized and Significant Sites

The applicant is familiar with the WTEP's approach to site management protocols (Objective 16.3.1) and will carry out earthworks in accordance with the discovery protocols relating to taonga (16.4.3.2). The recorded archaeological sites have been identified and are discussed in this report.

Freshwater

The WTEP contains the objectives, policies, methods and specific environmental areas. The objectives and policies on fresh water in Section 19 of the WTEP relate mainly to the aspiration of Waikato-Tainui to work alongside government agencies to manage the allocation of freshwater and improve the quality of water across the region.

Objective 19.4.2 (water quality) seeks to ensure that fresh water is drinkable, swimmable and fishable in all places. This is supported by Policy 19.4.2.1 that seeks that regulators set clearer and higher water quality targets, and also develop and incentivise methods to achieve these targets.

Objective 19.4.3 (water quality (integrated catchment management)) seeks an integrated and holistic approach to the management of water. This is supported by Policy 19.4.3.1 that seeks to ensure that integrated catchment management is effective and informative, and the scope of planning is broad.

The applicant has employed appropriate management methods to ensure water quality is not adversely affected by the proposed activities. Any stormwater effects and earthworks activities will not have a direct discharge to the gully system or Mangawhero Stream. This application is therefore consistent with Section 19 of the WTEP.

Land

Section 21 of the WTEP pertains to the use of land and Waikato-Tainui's concern to restore ecosystem balance by addressing issues including soil erosion, catchment management, nutrient loss, land development, dam management and riverbank erosion.

The provisions seek that excavation works have sufficient measures in place to ensure that adverse effects on water bodies are managed.

The earthworks will be undertaken in accordance with the Waikato Regional Council titled "Erosion & Sediment Control Guidelines for Soil Disturbing Activities January 2009 and will be set well back from Mangawhero Stream to ensure sediment does not enter the SNA or freshwater.

Land Use Planning

Section 25 of the WTEP contains objectives and policies that provide for future urban and rural development that is well-planned and responsive to Waikato-Tainui concerns.

Section 25 of the Plan covers land use planning, and includes the following relevant objectives:

Objective – Positive environmental and cultural effects

25.3.3 Land use and development has positive environmental and cultural effects.

Policy – Positive environmental and cultural effects

25.3.3.1 To ensure that land use and development, particularly new land use and development, has positive environmental and cultural effects.

The sand quarry is considered to be consistent with the direction of the WTEP for land use planning, however, the applicant has recently engaged with Waikato-Tainui to better understand their views on the proposal.

7. PART 2 MATTERS

This section of the report assesses the proposal in relation to Part 2 of the RMA 1991.

7.1 Section 5 – Purpose of the Act

Section 5 of the RMA states the purpose of the legislation, being ‘to promote the sustainable management of natural and physical resources’.

... managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

- (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The application of section 5 to the proposal involves a broad judgement on whether allowing the proposed activities will promote sustainable management or not. This proposal will support the applicant and the local community to provide for their social and economic wellbeing by supplying sand to a wide range of local businesses and industries. This is considered particularly important as the country emerges from Covid-19 restrictions, looking

to regain the social and economic losses suffered as a result. In this respect, the proposal is well aligned with the purpose of the Act.

With respect to the requirement that effects be “avoided, remedied or mitigated”, case law has established that it is not required that all effects be avoided, or that there is no net effect on the environment or that all effects are compensated for in some way. Rather, it is about doing what is necessary, given the circumstances of the particular case, to lessen the severity of effects. The application proposes to appropriately ‘avoid, remedy or mitigate’ effects through the various management plans that are proposed, and the restrictions with respect to hours of operation and scale of the proposed quarry. Measures will also be employed with respect to the management of clean fill and groundwater take to ensure that any actual and potential adverse environmental effects are avoided, remedied and/or mitigated.

7.2 Section 6 – Matters of National Importance

Section 6 ‘Matters of National Importance’ of the RMA states the matters that are considered to be of national importance. The matters considered potentially relevant to this proposal are:

- (a) *the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (b) *the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
- (c) *the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- (d) *the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*
- (e) *the protection of historic heritage from inappropriate subdivision, use, and development:*

The natural character of the Mangawhero Stream and the associated riparian gully areas will be unaffected by the proposed mineral extraction activities and associated works. While the District Plan recognises Mangawhero Stream as a significant natural area as considered under (b), the activities of the sand quarry operation will be sufficiently set back, therefore having no impact on the SNA or the Mangawhero Stream margin. The necessary authority will be obtained from Heritage NZ prior to the removal or disturbance of recorded archaeological features.

7.3 Section 7 – Other Matters

Section 7 ‘Other Matters’ of the RMA lists various matters, some are which are relevant to this particular proposal. The most relevant subsections to the assessment of the application are considered to be:

- (a) *kaitiakitanga;*
- (b) *the efficient use and development of natural and physical resources,*
- (c) *the maintenance and enhancement of amenity values, and*
- (f) *maintenance and enhancement of the quality of the environment.*

The proposal represents an efficient use of the natural and physical resources on the site in a way that maintains existing rural amenity values and the quality of the environment. The proposal is therefore considered to be consistent with section 7 of the RMA.

Section 8 of the RMA requires the Council to take into account the principles of the Treaty of Waitangi. There are no particular issues created by the proposal to extract sand from the existing rural property in respect of the principles of the Treaty of Waitangi. The proposal is therefore considered consistent with section 8 of the RMA.

In summary, the proposed activities are consistent with sections 6, 7 and 8 of the RMA. The proposal represents a sustainable use of an existing rural site and is considered an appropriate land use activity for the site and the surrounding rural environment. The scale of the proposed quarry will not detract from the existing rural character and amenity. Furthermore, the site will be rehabilitated back to rural pastureland once the sand resource is extracted. The establishment of a sand quarry at the site is consistent with the sustainable management purpose of the RMA as stated within section 5 of the RMA.

8. CONSULTATION

8.1 Waipa District Council Roding and Traffic Team

Through the course of WDC's assessment of a previous application (now withdrawn), the following comments were received:

"Kaipaki Road has traffic volume between 2500 and 3200 in this location so a busy road with high speed traffic, so while I agree that 75-100 vehicles per day will not be a major impact, the location and design of the vehicle entrance will be critical for safety. The entrance has to be designed without skew so that trucks can make the turns on the widening. Traffic islands not generally used for private entrances. We will need to look carefully at the proposal and see whether a RTB should sensibly be provided. I understand they expect more sand to go east, but Hamilton development would draw all sand to the west and the Hamilton demand is likely to be high or higher than the Cambridge Demand (Consider Peacocks subdivision and this is a close quarry site to Peacocks). Diagram E just provides 6m of seal on each side of centre line so it makes for a very tight passage of cars or trucks past a stationary truck that is waiting to turn right, not ideal in a straight road environment where traffic is pretty fast."

Following receipt of these comments, Gray Matter were asked by the applicant to reconsider the proposed entrance design for right turning traffic into the site. As discussed in Section 5 of this application, and as described further in the ITA report, Gray Matter have confirmed that a right-turn bay at the site entrance is not required. In this respect they calculate that even if 100% of quarry traffic were to travel to/from the north-west (a possible but highly unlikely scenario) the estimated maximum vehicle movements indicate that the peak right-turn movements could be up to 7 veh/hr. However, this does not exceed the accepted 8 veh/hr trigger level for requiring a right turn bay at the quarry access.

8.2 Neighbours

The Applicant has consulted with a number of the surrounding landowners with respect to the proposed sand quarry operation. Consultation focussed on owners of land immediately adjacent to the subject site or across the road from it. Figure 27 shows the locations of landowners consulted with respect to the application site and Table 20 presents relevant details regarding each neighbour and the results of consultation to date. Written approvals received to date are provided in Appendix J.



Figure 27: Aerial Photo showing the location of the application site and neighbouring land / dwellings.

Table 20 : Neighbour Details and Consultation Results

Neighbour Location (Figure 5 Reference Number)	Landowner / Occupier Name and Address	Consultation Details	Consultation Results
1	Janet and Ronald Taylor 898 Kaipaki Road RD 3 Cambridge 3495	Face to face meeting	Applicant expects written approval to be forthcoming.
2			
10			
3	Unknown	No consultation	Not considered affected
4	Michael and Helen Moran 906 Kaipaki Road RD3 Cambridge 3495	Face to face meeting	<p>Concerned that the red dashed line in the site master plan defined as the “Consented Area” would mean quarrying activities could occur adjacent to their boundary in future. Also concerned about hours of operation extending to 7:00PM on week days.</p> <p>Clarification of “consented area” and “Extent of Works” is now provided by way of suggested consent conditions.</p> <p>The Applicant has agreed to limit hours of operation on week days to 5:30PM.</p> <p>Written approval from this neighbour has been received (Appendix J).</p>
5	Deborah and Robin Comes 914 Kaipaki Road (Ohaupo)	12 Feb 2020 Face to face meeting with Robin. Consultation pack provided.	<p>Concerned with property value impact, operational noise and traffic noise associated with trucks departing and accelerating away from the site towards the west past their driveway.</p> <p>Will not be providing written approval.</p> <p>Consultation is ongoing.</p>
6	Whitehall Fruitpackers Holdings Limited	Face to face meeting	No particular concerns expressed, however, unlikely to provide written approval.
7	A & K Walker 899 Kaipaki Road (Ohaupo)	13 Feb 2020 Consultation pack provided via letter drop.	<p>Unable to make direct contact with owners.</p> <p>To date, no response to consultation pack provided. Attempts still being</p>

Neighbour Location (Figure 5 Reference Number)	Landowner / Occupier Name and Address	Consultation Details	Consultation Results
			made to secure contact details but thwarted due to privacy requirements.
8	Ralph and Sarah Manning 951 Kaipaki Road (Ohaupo)	13 Feb 2020 Face to face meeting with Ralph. Consultation pack provided.	Understand the requirement for supplies of high quality sand to support large local infrastructure projects. No concerns expressed written approval has been provided (Appendix J).
9	Unknown	No consultation	Not considered affected

8.3 Tangata Whenua

The Applicant has recently engaged Te Huia Natural Resources (Julian Williams) to help undertake appropriate iwi consultation in relation to this proposal. The plan is to discuss the application with representatives from Waikato Tainui, Ngati Haua and Ngati Koroki Kahukura. Raukawa will also be advised of the proposal.

The consultation to be undertaken will also serve to support future applications the Applicant will need to make to Heritage NZ.

A site visit with iwi representatives will be undertaken when Covid-19 restrictions allow.

Initial advice received is that the proposal is of a nature and scale that is not likely to require a full cultural impact assessment, rather a statement from mana whenua, setting out any concerns and/or requests is more likely.

In any case, it is understood that Waipa District Council may forward a copy of this application to the relevant iwi authority (Nga Iwi Toopu o Waipa) as part of their routine application processing procedures.

9. NOTIFICATION CONSIDERATIONS

Notification of this application needs to be considered in accordance with tests set out in ss95A and 95B of the RMA.

Pursuant to s95A of the RMA, public notification is required where:

- The applicant has requested public notification (s95A(3)(a));
- public notification is required under section 95C:

- The application relates to specific types of activities (see ss95A(3)(c));
- A rule or national environmental standard requires public notification of the activity (s95A(8)(a));
- The activity is determined to have, or likely to have, adverse effects on the environment which are more than minor when assessed in accordance with s95D (s95A(8)(b)); or
- Special circumstances exist which warrant public notification (s95A(9) RMA).

In the present case, the applicant does not seek public notification and the activity to which the application relates is not relevant for the purposes of ss95A(3)(c), 95C or 95A(5).

In respect of s95D, this AEE concludes that the proposal will not have any effects which are more than minor. Consequently, there is no basis for public notification of the application pursuant to ss95A(8)(b) and s95D, therefore, public notification is precluded unless special circumstances exist.

The meaning of “special circumstances” has been well considered by the Courts and is considered to be *“something... outside of the common run of things which is exceptional, abnormal or unusual but less than extraordinary or unique”*

The Court of Appeal has also found that where there is no evidence of adverse effects likely to arise from an activity, it is unlikely that “special circumstances” requiring notification could be justified.²

As outlined in this application and AEE, the effects of the proposed groundwater take and clean filling activities, falling within the Waikato Regional Council’s jurisdiction, will be less than minor. It is separately concluded that the effects of the proposed land use activities falling within the Waipa District Council’s jurisdiction will be no more than minor. Accordingly, it is concluded that there are no “special circumstances” warranting public notification in relation to this application.

In light of the above assessment, there is no basis for considering public notification of the application.

Consequently, the Councils must apply the relevant tests to also consider whether the application should be subject to limited notification. Pursuant to s95B of the RMA, limited notification is required where:

- there are any relevant customary rights groups or relevant statutory acknowledgements (ss95B(2) and (3) RMA);
- there is no rule of NES that precludes limited notification (s95B(6) RMA);

² [Fullers Group Ltd v Auckland Regional Council](#) [1999] NZRMA 439 (CA), at [33].



- there are any affected persons assessed in accordance with s95E (s95B(7) and (8) RMA); and
- there are special circumstances that warrant notification of the application to specified persons (s95B(10) RMA).

In the present application, there are no known relevant customary rights or relevant statutory acknowledgements. As considered in detail above, there are no special circumstances which would warrant notification, be it public or limited.

Consequently, limited notification will only be justified where there are affected persons in relation to an application (applying the test in s95E). Under that test, a person will be an affected person if the proposal gives rise to adverse effects on the person that are minor or more than minor (but are not less than minor).

As noted above, the effects of the proposed groundwater take and clean filling activities, falling within the Waikato Regional Council's jurisdiction, will be less than minor. It is separately concluded that the effects of the proposed land use activities falling within the Waipa District Council's jurisdiction will be no more than minor. In addition, the assessments also indicate that some adjacent and nearby neighbours may be adversely affected by increased traffic associated the proposal, albeit in a minor way at most. Local iwi may also be impacted by the change in land use, but again this is not expected to be in any more than a minor way. In this respect, although further written approvals and or statements are expected from other neighbours and iwi, these are not yet in hand. In addition, one neighbour has confirmed they will not be providing approval.

Accordingly, the applicant considers that under s95B of the RMA, the consent applications made to the Waikato Regional Council should follow a non-notification process, and for the consent applications made to the Waipa District Council, limited notification is suggested. It is also suggested that the scope of the Waipa District Council applications' notification should be restricted to mana whenua and those neighbours listed in Table 20.

10. CONSENT DURATION

Section 123 sets out the duration period of resource consents:

(b) subject to paragraph (c), the period for which any other land use consent, or a subdivision consent, is granted is unlimited, unless otherwise specified in the consent:

(d) the period for which any other resource consent is granted is the period (not exceeding 35 years from the date of granting) specified in the consent and, if no such period is specified, is 5 years from the date of commencement of the consent under section 116.

It is expected that sand at the site could be fully extracted in around 10 years. Although the market for high quality sand is expected to be strong in the coming years, driven by large development projects occurring and planned locally, the applicant requires some flexibility to manage potential future slow-downs in development activity and reductions in market demand for sand that may result. It is also expected that, in general, the demand for sand will be higher than the demand for clean fill disposal space. This will result in clean filling activities occurring over a longer period than sand quarrying activities. Given these factors, and since the environmental effects of the proposal will be minor, an unlimited duration is requested for any District Council consents granted and a 20 year duration is requested on any Regional Council groundwater take and cleanfill discharge consents granted.

11. CONCLUSIONS

The application seeks to establish and operate a mineral extraction activity (sand quarry) and associated works (including a new groundwater take and clean fill disposal activities) at the property located at 928 Kaipaki Road, Cambridge.

The application site is zoned Rural Zone under the provisions of the Operative Waipa District Plan, and mineral extraction activities are expressly provided for as a Discretionary Activity within the Rural Zone. The activities proposed are, therefore, appropriate for both the site and the surrounding rural environment. Under the Waikato Regional Plan provisions, the small proposed groundwater take is provided for as a discretionary activity, while the large-scale clean filling is a controlled activity. The activity status of the latter reflecting the minor environmental impacts of clean filling when managed appropriately.

Further, the site is ideally positioned in an established rural setting that is afforded adequate separation from residential areas but is still located in close proximity to Cambridge township, and has suitable access and connectivity with the existing roading network. The application site is, therefore, a suitable location for the proposed activities.

Consideration has been made in respect of potential effects associated with sand extraction and clean filling. Given the self-imposed restriction on the extent of quarry works, none of these activities will occur within an SNA or a high-risk erosion area. Accordingly, the environmental risk associated with these activities is significantly reduced. The proposed groundwater take is very small in comparison to the quantum of unallocated resource available. This, in conjunction with the absence of other bores in close proximity, is likely to result in no more than less than minor effects on groundwater resource sustainability and other groundwater users.

Consideration was made in relation to rural character and amenity, landscape and visual effects, traffic and roading effects, noise, dust, archaeological and ecological effects,

groundwater and water quality impacts, and the potential impacts associated with soil disturbance and earthworks.

The application has demonstrated that any adverse effects are able to be appropriately managed on site. The acoustic report submitted as an appendix to the application confirms the proposal can comply with the relevant rural zone noise standards across most of the site, and with the installation of noise attenuation bunding, can also comply at other areas of the site within 180m of neighbouring dwellings. Any potential dust effects will be appropriately avoided, minimised or mitigated through various dust management plan initiatives documented in a QCMP. The QCMP will also ensure clean filling activities comply with relevant WasteMinz guidelines. The ITA assessment confirms actual and potential impacts associated with traffic, access and roading can be appropriately managed through conditions of consent such that any related residual effects are of no concerns. Of particular note in this respect, is the conclusion that even under worst case traffic generation conditions, the 8 veh/hr threshold for including a right turning bay at the site entrance is not reached.

The site can be completely rehabilitated to high-quality pastoral land once the sand has been extracted. The sand quarry will have positive social and economic benefits for Cambridge, Waipa District and the Waikato Region.

In terms of actual and potential environmental effects, it is concluded that, the proposed groundwater take and clean filling activities, falling within the Waikato Regional Council's jurisdiction, will be less than minor and any associated effect on any person will also be less than minor. It is separately concluded that, in terms of the proposed land use activities falling within the Waipa District Council's jurisdiction, the associated environmental effects, and the effects on any person will be no more than minor.

Furthermore, the proposal is found to be consistent with relevant policy framework of the Waipa District Plan, Waikato Regional Policy Statement, Waikato Regional Plan and other non-statutory documents. It is also aligned with Part 2 of the RMA.

Overall, it is considered the application in this case can be granted pursuant to s104 of the RMA, for the respective terms sought, since:

- any adverse effects from the proposal are no more than minor;
- the proposal is consistent with relevant planning documents; and
- the proposal is consistent with the purpose of the RMA.

The applicant has consulted with neighbouring property owners and residents. Most parties consulted do not have significant concerns, and some concerns expressed have already been resolved through amendments to the proposal (e.g. hours of operation). Two neighbours have provided written approval and the applicant expects one or two others will also. Some other neighbours have indicated they will not provide written approval due to

concerns mainly in respect of noise, traffic and property values. Consultation with neighbours will be ongoing and written approvals will continue to be sought and provided to Councils as they come to hand.

Consultation with mana whenua is also underway.

The report also concludes that non-notification is appropriate for consent applications made to the Waikato Regional Council, and for consent applications made to the Waipa District Council, limited notification of this proposal is suggested, with the scope of notification being restricted to mana whenua and neighbours listed in Table 20.



A



APPENDIX A

Record of Title



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**




R.W. Muir
Registrar-General
of Land

Identifier **493900**
Land Registration District **South Auckland**
Date Issued 24 February 2010

Prior References

261728

Estate	Fee Simple
Area	9.2547 hectares more or less
Legal Description	Lot 3 Deposited Plan 424105

Registered Owners

Nelson Edward Schick and Susan Dorothy Schick

Interests

Appurtenant hereto is a right of way and a right to convey electricity, telecommunications and computer media created by Easement Instrument 6814910.6 - 5.4.2006 at 9:00 am

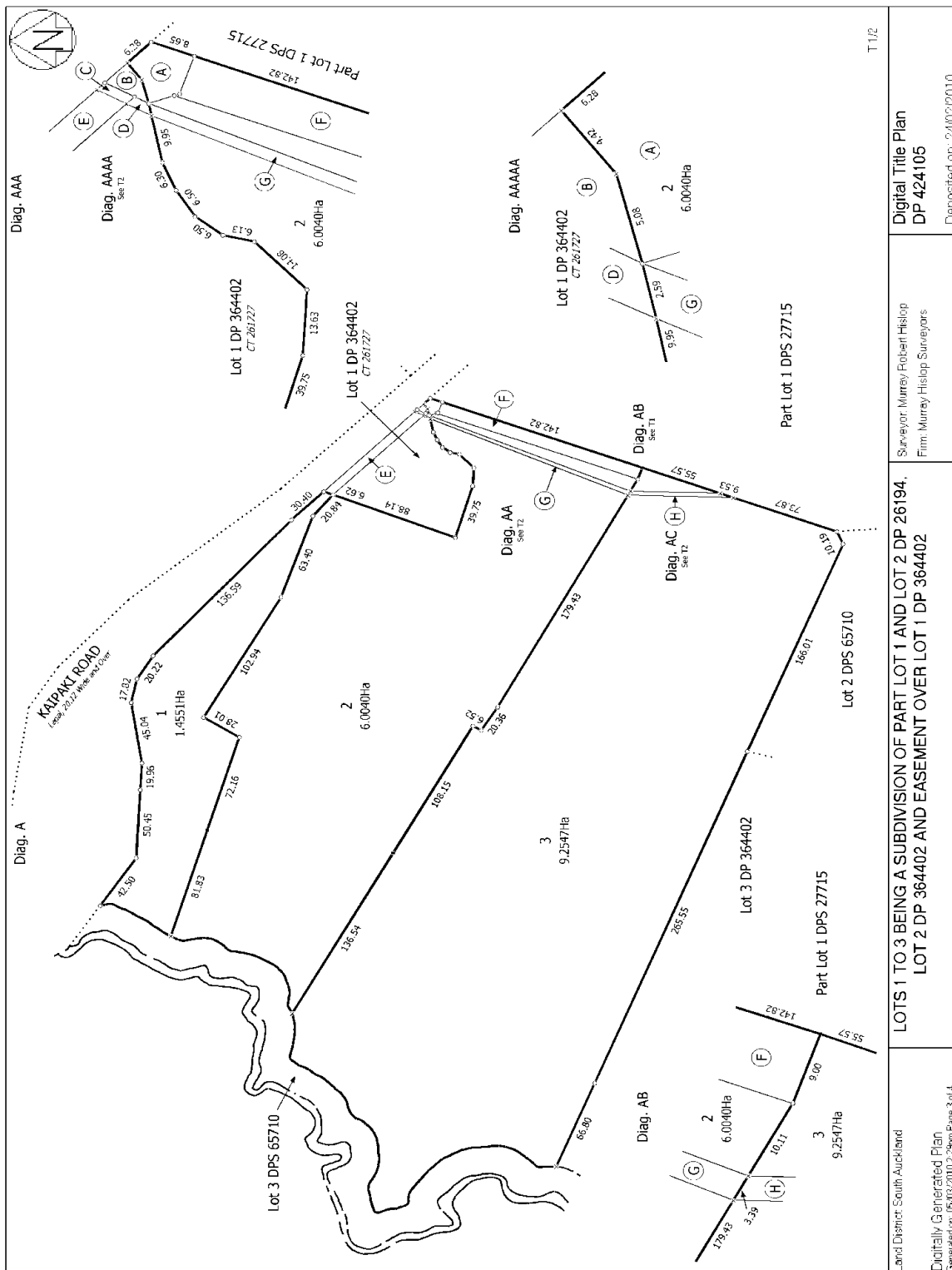
The easements created by Easement Instrument 6814910.6 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to transmit electricity over part marked H on DP 424105 in favour of Waipa Networks Limited created by Easement Instrument 8411152.4 - 24.2.2010 at 9:49 am

The easements created by Easement Instrument 8411152.4 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a right of way and right to convey water, electricity, telecommunications and computer media created by Easement Instrument 8411152.5 - 24.2.2010 at 9:49 am

The easements created by Easement Instrument 8411152.5 are subject to Section 243 (a) Resource Management Act 1991





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**




R.W. Muir
Registrar-General
of Land

Identifier **558891**
Land Registration District **South Auckland**
Date Issued 20 September 2011

Prior References

537052

Estate	Fee Simple
Area	40.7327 hectares more or less
Legal Description	Lot 2 Deposited Plan 444992

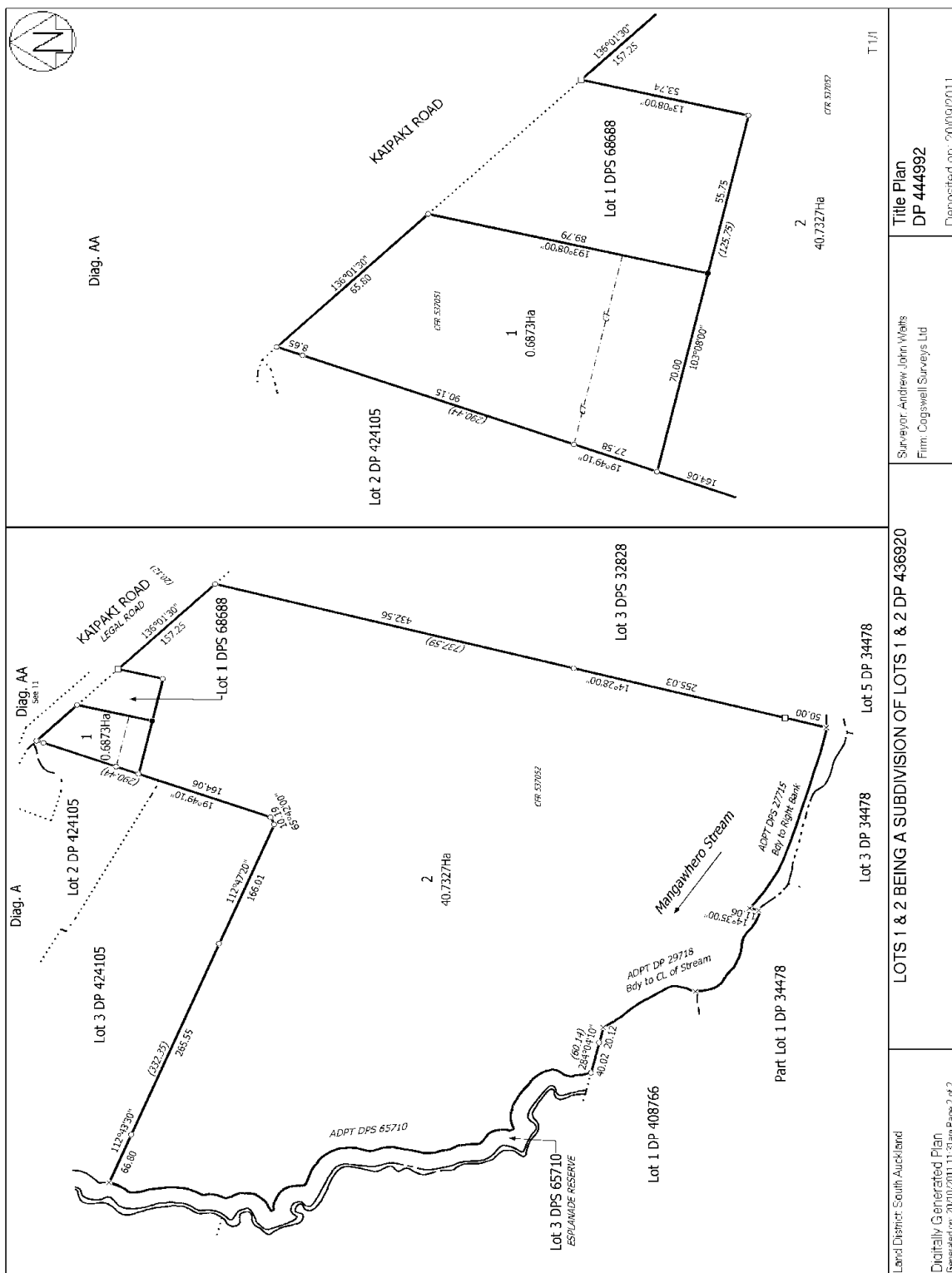
Registered Owners

Shaw's Property Holdings Limited

Interests

7237924.3 Mortgage to Bank of New Zealand - 30.3.2007 at 12:52 pm (part formerly Lot 2 DPS 65710, Lot 3 DP 364402 and Part Lot 1 DPS 27715)

8386295.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 15.11.2010 at 2:02 pm





View Instrument Details

Instrument No.	8386295.1
Status	Registered
Date & Time Lodged	15 Nov 2010 14:02
Lodged By	Bagley, Donna Marce
Instrument Type	Consent Notice under s221(4)(a) Resource Management Act 1991

Toitu te
Land *whenua*
Information
New Zealand



Affected Computer Registers	Land District
432107	South Auckland

Annexure Schedule: Contains 2 Pages.

Signature

Signed by Simon Redding Makgill as Territorial Authority Representative on 21/12/2009 01:57 PM

***** End of Report *****

CONSENT NOTICE

IN THE MATTER of the Land Transfer Act
1952

AND

IN THE MATTER of Section 221 of the
Resource Management Act
1991

AND

IN THE MATTER of the Land in Certificate of
Title 432107 (South
Auckland Registry) and Plan
No DP 419637

WHEREAS:

1. The **WAIPA DISTRICT COUNCIL** has in consideration of Section 104 and pursuant to Sections 104B and 108 of the Resource Management Act 1991 granted to **SHAW'S PROPERTY HOLDINGS LIMITED** subdivision consent for the subdivision of Lot 2 DP 408766, Part Lot 1 DPS 27715, Lot 2 DPS 65710 and Lot 3 DP 364402.
2. The subdivision to which consent has been given is shown on Plan No. DP 419637.
3. It was a condition of the said consent that pursuant to Section 108(2) of the Resource Management Act 1991 that subdivision consent has been granted for Lot 1 DP 419637 and Lot 2 DP 419637 (for which new certificates of title 474777 and 474778 respectively have been allocated) under the provisions of the Operative Waipa District Plan Rule 10.6.1.4(a) 'Dwelling for a Person with a Long Association with a Holding'. The rule states that one lot can be subdivided from the 'holding' when the applicant has resided on the land forming part of the holding continuously for a minimum period of fifteen (15) years. Only one lot per holding must be permitted notwithstanding the number of people who may qualify.

Note. A 'holding' is defined in the District Plan as a property or a collection of properties under common occupancy or in a single certificate of title which are farmed in conjunction with one another, and are contiguous.

4. The said condition is to be complied with pursuant to the provisions of Section 221 of the Resource Management Act 1991 on a continuing basis.

NOW PURSUANT TO Section 221 of the Resource Management Act 1991 the **WAIPA DISTRICT COUNCIL HEREBY CONSENTS** to the deposit of the Survey Plan of Subdivision under the Land Transfer Act 1952.

DATED at Te Awamutu this 16th day of December 2009


.....
Authorised Officer

IN THE MATTER of the Land Transfer Act 1952

AND

IN THE MATTER of Section 221 of the Resource
Management Act 1991

AND

IN THE MATTER of the Land in Certificate of
Title 432107 (South Auckland
Registry) and Plan No DP
419637

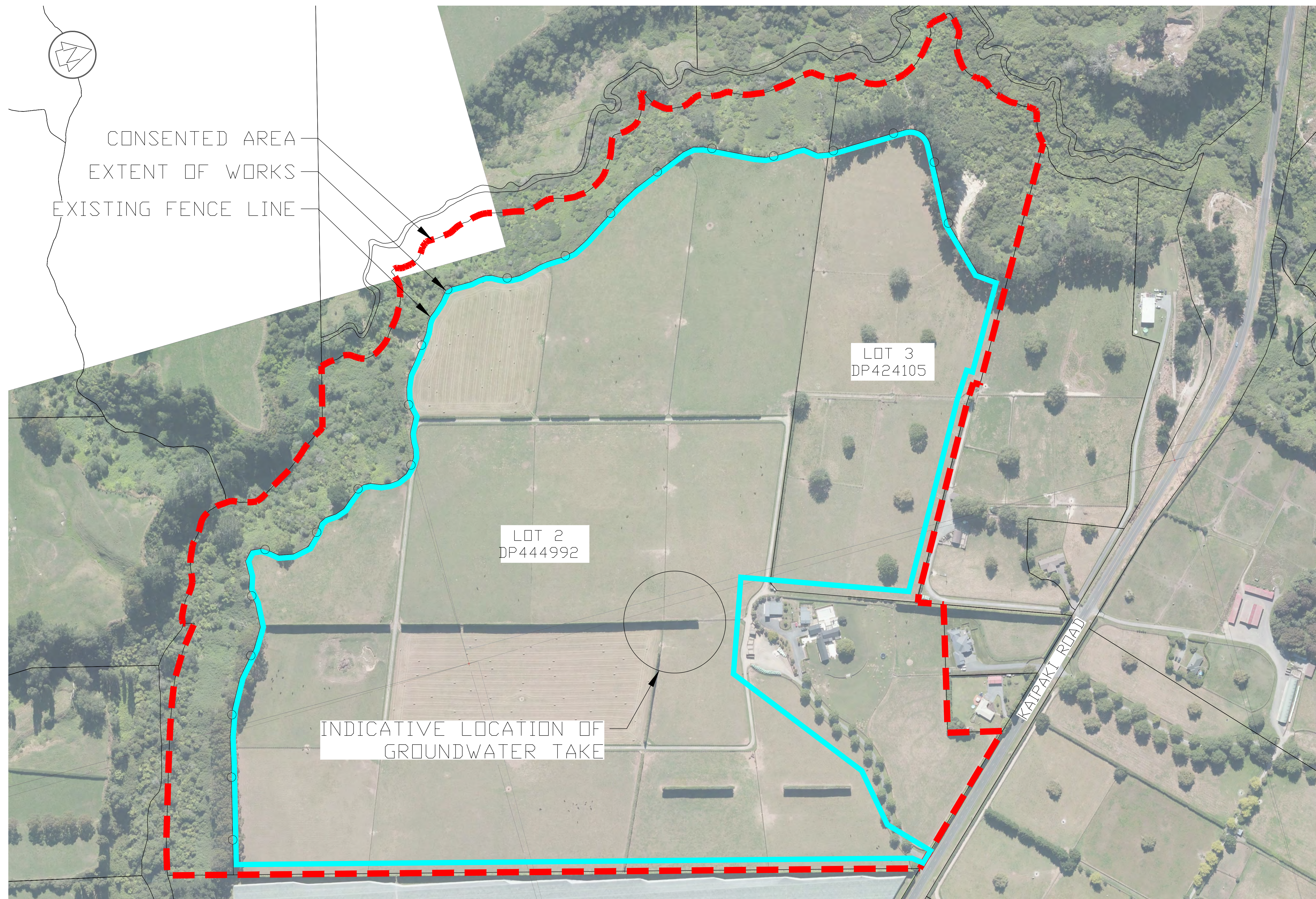
CONSENT NOTICE

LEWIS'
SOLICITORS
CAMBRIDGE



APPENDIX B

Site Plan



COGSWELL SURVEYS
SURVEYING | ENGINEERING | PLANNING
www.cogswellsurveys.co.nz

CLIENT:
**SHAWS PROPERTY
HOLDINGS**
REF: 4767

PROJECT:
KAIPAKI ROAD QUARRY

TITLE:
**PROPOSED BOUNDARY OF
CONSENTED WORKS**

NOTES:
1. The contractor is responsible for locating all underground services prior to commencing works.
2. All works and materials to comply with the WDC Development Manual 2012.
3. A meeting is required with the contractor and engineer prior to commencing works.
THIS DRAWING OR DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED, WITHOUT THE WRITTEN PERMISSION OF COGSWELL SURVEYS LTD.

SCALE: **N.T.S.**
DATE: **9/10/19**
DRAWING NUMBER: **4767-CK-001**
REV: **3**



APPENDIX C

Geotechnical Report – Mark T.
Mitchell Limited

Mark T Mitchell Ltd

Consulting Geotechnical Engineers

1150 Victoria Street
P O Box 9123
Hamilton 3240
New Zealand
Telephone 07 838 3119
Facsimile 07 839 3125
email: mtm@geocon.co.nz

Ref: W – 16002.7
5 June, 2019

Shaws Property Holdings Ltd
c/- Cogswell Surveys Ltd
PO Box 156
Cambridge

Attention: Rene Nielsen – Cogswell Surveys Ltd

Dear Sirs/Madam.

**Re: Soils Investigation, Geological Assessment and Feasibility Study
Proposed Sand Quarry – No. 928 Kaipaki Road, Cambridge**

In accordance with your request, we have carried out a Site Investigation at the above referenced property. The purpose of our studies was to determine and evaluate the subsurface conditions within the property and assess the feasibility for a proposed Sand Quarry.

Our associate company, Geocon Geotechnical Ltd carried out soil testing of the proposed quarry area and the results of that testing are presented in the attached Geocon report dated 22 May, 2019.

1. General Site Description

The existing horse stud is accessed off the south western side of 928 Kaipaki Road, Cambridge. The proposed quarry is near-level through the majority of the site, however a deeply incised gully system is located on the southern and western edge of the property. The gully includes the approximately north-south oriented Mangawhero Stream which lowers to the north-west toward the confluence with the Waikato River, approximately 0.9km to the north of site.

For the purpose of this report, the site has been divided into two areas:

- Area A – Proposed Quarry Footprint (Bore Hole Nos. 1 and 4 to 8)
- Area B – South and western Gully section (Bore Hole Nos. 2, 3, 9 and 10)

2. Soil Conditions

The near-surface soils typically consist of a thin layer of Topsoil overlying silty Loam to about 0.5 to 1.2 metres depth. Uncontrolled Filling comprising Silt, Sand and Gravel was encountered within the upper 0.5 to 0.6 metres of Bore Hole Nos. 6 and 7. This filling is likely to have been placed during a previous stage of active mining over part of the quarry.

The Topsoil and silty Loam can be excavated and placed in a temporary stockpile and then used to cover over an area where sand has been removed to its full extent. Resource Consent Conditions may limit the area of exposed ground to be less than about 2 hectare at any time.

2.1 Area A – Proposed Quarry Footprint (Bore Hole Nos. 1 and 4 to 8)

The bore holes carried out within Area A reveal the Silt loam and Filling overlie generally silica-rich Sands of the Hinuera Formation. The Sands are generally medium to coarse grained and comprise of minerals such as quartz, feldspar and rock fragments. The presence of larger grained deposits including Gravel and Cobbles indicate that some of these soils were deposited in an high-energy environment.

Bore Holes No. 1 and 7 reveal the medium to coarse grained Sands interbedded with Silt and slightly clayey Silt to at least the base of the 9.5 and 10 metre deep bore holes.

The remainder of the Area, as indicated by Bore Hole Nos. 4 to 6 and 8 have minor or no Silt content. This resulted in hole collapse at about 6.0 to 7.0 metres depth at the time of the mid-autumn site investigation.

2.1.1 Suitability of Sand Deposit – Area A

- The sand soils are generally suitable for the purpose of Pit Sand extraction, however larger gravels encountered at depths may require separating from the bulk of the Sands.
- The absence of fine material (e.g Silt or fine Sand) within some layers will reduce the amount of soil cut to waste but this also may affect the ability of the Sands to readily compact.
- Therefore some mixing at the pit sand quarry face is expected to be required so as to produce a well-graded sand that the building industry will expect.
- Also, the silty Loam found within the upper 0.5 to 1.2 metres has some value in that it will be required to mix the cleaner (ie. silt-absent) Sand to create a higher value pit sand product.

2.2 Area B – Gully Area (Bore Hole Nos. 2, 3, 9 and 10)

Below the Topsoil and Loam the soils located within Area B comprise interbedded layers of slightly clayey Silts and fine grained, pumice-rich Sands which extend to about 8.1 and at least 10 metres depth.

These soils are geologically young, as identified by the relatively high pumice content which is a characteristic of soils that are associated with the major eruption of Lake Taupo (180 AD). At that time the Waikato River flowed along its present channel, but with the abundance of light-weight pumice particles being carried down in its path.

On occasion, dams of pumice sands partially blocked off the Waikato River, resulting in overflowing of flood waters beyond that of the main river valley to form temporary lakes. These lakes would have then overflowed to spill pumice particles over the adjacent landscape. At the same time, the flowing water would have eroded the silica-rich soils of the older, Hinuera Formation, and transported those soils downstream amongst the younger, pumice sands as deltaic deposits. The resulting terrace formations which occupy the project area is an inter-fingering of pumice rich and silica rich soil layers.

Groundwater was encountered at depths which varied between 7.8 and 8.7 metres in Bore Hole Nos. 1, 3 and 7. This is at about RL 52.0m which is similar to that found across site-investigations within the wider area.



2.1.1 Suitability of Sand Deposit – Area B

It will be noted within some of the bore hole logs within Area B, silica-rich sands occur in the upper layers, with pumice-rich sands being present at lower levels. But there are also areas where pumice soils occur immediately below the ground surface.

Therefore the quarrying of pit sand from Area B is likely to result in a variable product, which may not be suitable for specific purposes, such as for filling below concrete floor slabs. However for general filling, this is unlikely to be a problem.

But where pumice sands are at a premium, selective removal of pumice sands from the quarry face may be possible.

3. Inter-bedding of Sand Strata

The two Ground Profiles presented on Geocon Drawing Nos. 16002-02 and -03 provide an illustration of soil conditions through the centre of the site. The profiles, labelled A-A and B-B, span 870 and 770 metres respectively in an east-to-west direction.

The Ground Profiles show that the upper soils within Area B comprise interbedded layers of pumice Sand ("pumice-rich") and Silt with minor layers of Silica ("silica-rich") Sand to depths of 8.1 to at least 10.0 metres below existing ground level (A - A). Furthermore, within the centre and eastern side of site these pumice-rich soils are absent and with Silt presence being minimal to low concentration (B – B).

These variations in layer thickness are expected to occur throughout the site, as might be expected for a deposit that has been formed as a deltaic formation.

Within Area B, Silica Sands are revealed at depth. However the soils to about 8 metres depth contain interbedded layers at depths around 8.0 metres, at which depth groundwater level is present. Sand mining is able to be carried out below groundwater level, but may be restricted on account of the associated steeper haul roads required and environmental considerations.

Therefore, mining of Area B may not be economically viable for general pit sand filling below residential floor slabs. However some pumice sands have a higher value following screening when used in the gardening-horticultural environment and therefore selective mining of pumice sand layers may be marketable.

4. Available Sand Volume

The area of land where sand extraction is proposed, as shown on the attached Geocon Site Plan is about 13.4 ha. However further test bore holes are required to confirm the extent of these minable soils.

If it is assumed that the economical depth to the base of the excavated area is about 7.0 metres, the total resource volume is about 900,000 cu metres, or about 1,100,000 tonnes. Therefore the operational life of the sand quarry of at least 10 years can be expected, based on this quarry supplying one-third of the local Cambridge – Eastern Te Awamutu market.



It is possible that the proposed Sand Quarry may be able to extend south towards the base of the deep gully system, but a mining plan will be required to determine the viability of this option. In particular the determination of a suitable location of an access roadway would be required. Also required in the mining plan would be the provision of environmental controls, such as bunding and ponded areas for sediment trapping.

5. Product Variations

A moderate proportion of the resource within the centre of the proposed quarry (Area A), as shown by Bore Hole No. 7, consists of slightly clayey and sandy Silt. This material may be inter-mixed with the silica Sand as it drops off the working face. The bore hole logs and Ground Profiles demonstrate the extent of this mixture of sands that are expected to be exposed on the working face of this part of the sand quarry. In this situation mixing of various sand layers may be readily accomplished by scraping down the exposed face with a front end loader.

The sand product thus obtained would be able to be turned over and mixed by a front-end loader so the product is able to be changed into a well-mixed product of silica sand with silt binder. That product could then be marketed as pit sand for use below residential and commercial buildings.

However the potential inconsistency of the product could be a deterrent for on-going sales.

A pit sand product with a relatively high pumice content may also not be acceptable on account of its low density and associated inability for it to be compacted into a stable base to be provided below a concrete slab.

However these opinions are rather subjective, being based on a scattering of bore holes and will need to be verified, by test pits across part of the property, with the product loaded into a truck after some mixing and then transported to a location where compaction trials would be carried out. Those trials could be undertaken on trial pad areas located elsewhere on the site.

6. Pit Sand for Residential and Commercial Buildings – Area A

The silica Sand resource that would be suitable for use below building foundations occurs primarily in Area A. But it is also present below the interbedded pumice-rich material in Area B.

The clean nature of the Sands encountered requires product mixing with Silt Loam, Silts and fine Sands to create a more serviceable product to be used for residential and commercial building construction.

However the above possibilities are based on a very limited sample basis from the bore hole locations selected. Therefore, prior to the site being operated as a quarry for pit sand extraction, it is essential, in our opinion that on-site trials are carried out prior to the submission to Council for a resource consent application for sand extraction.

7. Pumice Sand Use – Area B

Pumice Sand is typically used for garden use on account of its light weight and ability to hold moisture. The sand which is extracted from the upper part of the resource is expected to contain some silt (which would be acceptable) and some silica sand. However the acceptability for a pumice-silica sand mix for commercial garden supplies is expected to rely on the availability and location of associated topsoil or peat.

Equipment for the processing of a pumice-silica mix into separate the two components, and also to remove the silt content, is readily available. However those processes require a considerable volume of water and also a storage area as all process water is typically recirculated.

8. Conclusions

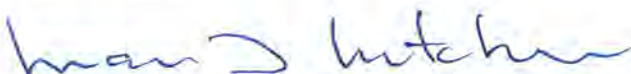
Based on cross sectional modelling and the size of the proposed new Sand Quarry (Area A), the total volumes of sand resource are considerable, with an just under 1 million cubic metres estimated of Sand available if the quarry were to be excavated to a depth of about 7 metres. However due to the clean, coarse nature of the Sands encountered the Sand will need to be mixed with finer material to produce a higher value material.

In order to confirm, or otherwise the opinions as to the viability of an economic extraction of sand from this site, it is recommended that test pits be excavated across the site. The sand obtained from these excavations would then be laid out over trial beds and compacted in place, with associated testing being carried out.

In addition, further Bore Hole tests are recommended to confirm the extent of the proposed minable sands and also to assess the uniformity of the sand products across the proposed quarry area.

Yours faithfully

Mark T Mitchell Ltd



Mark T Mitchell
Director



Geocon Geotechnical Ltd

Geotechnical Engineers

1150 Victoria Street
PO Box 9123
Hamilton, New Zealand
Facsimile 07 839 3125
Telephone 07 838 3119
email: geraint@geocon.co.nz

Ref: G-16002.1
22 May, 2019

Shaws Property Holdings Ltd
c/- Mark T Mitchell Ltd
PO Box 9123
Hamilton 3240

Attention: Rene Nielsen - Cogswell Surveys Ltd

Dear Sir,

**Re: Soils Investigation and Geological Assessment
Proposed New Sand Quarry - No. 928 Kaipaki Road, Cambridge**

In accordance with your request, we have carried out a Site Investigation at the above referenced property. The purpose of our studies was to determine and evaluate the subsurface conditions within the property and assess the feasibility for a proposed Sand Quarry.

Our company carried out a previous investigation about 2km east of the subject site at No. 1130 Kaipaki Road, Cambridge. The report dated 1 August, 2016 (Ref: 14830) provided an assessment for the feasibility for a proposed Sand Quarry at the site.

The following report is based on site conditions as observed during a site investigation carried out by our staff on 10 April, 2019 with the assistance of King Drilling Ltd.

The existing horse stud is accessed off the south western side of 928 Kaipaki Road, Cambridge. The proposed quarry is near-level through the majority of the site, however a deeply incised gully system is located on the southern and western edge of the property. The gully includes the approximately north-south oriented Mangawhero Stream which lowers to the north-west toward the confluence with the Waikato River, approximately 0.9km to the north of site.

The results of the investigation are as follows:

1. Geomorphology and Geology

The natural soils encountered at the test locations consist primarily of aeolian (Loess) and alluvial deposits (Hinuera Formation). The more recent Silt Loam (loess) is a product of wind-blown and redeposited alluvium and volcanic ash material.

The underlying soils at the test locations consist primarily of alluvial deposits known as the Hinuera Formation which was deposited at a time when the Waikato River was meandering over a vast flood plain from the latest 17,000 to 22,000 years, with rhyolitic sands, gravels and silts being laid down in irregular patterns together with occasional slack water deposits including organic silts.

Taupo Pumice alluvium (TPA) was found within bore holes located close to the gully slope. TPA is a soil that has been deposited within the last 2,000 years and which is characterised by soft silts and loose sands.

At the time of the Taupo Eruption of about 180 AD, a vast amount of pumice material was washed down the Waikato River, forming intermittent dams and breakout floods which have both eroded existing soils and accumulated new pumice rich sediment in other areas. This has resulted in an inter-fingering of pumice rich and silica rich material to be deposited either side of the river banks as water levels receded.

Due to the non-uniform manner in which the alluvial soils were deposited and the continually changing river channel alignments, variations in grain size and composition may occur within relatively short distances.

2. Field Investigation

The subsurface conditions at the site were investigated by drilling ten machine auger bore holes at the locations shown on the Site Plan. The Bore Holes are designated Nos. 1 to 10 with the Bore Hole Logs presented on Figs. A-1 to A-10.

The purpose of the borings and associated testing was to provide guidance as to the general subsurface soil profile, variability and composition of the soils. Actual conditions may vary across these areas however, and in some locations may differ slightly from those as described below.

Two representative Ground Profiles, A-A & B-B, were measured through the property using Waikato Regional Council contour data and are presented on Drawing No. 16002-02 and -03.

The ground profiles were surveyed through the site to diagrammatically present the spatial relationship of soils encountered, to illustrate the position of slopes and enable resource volume estimates to be made.

3. Subsurface Conditions

The near surface soil conditions at the site, as revealed by the bore holes consist of 100mm to 300mm of TOPSOIL overlying SILT (Loam) to about 0.5 to 1.2 metres depth. Uncontrolled FILLING comprising Silt, Sand and Gravel was encountered beneath the Topsoil to about 0.5 to 0.6 metres depth in Bore Hole Nos. 6 and 7 only.

3.1 Pumice Sand – (Bore Hole Nos. 2, 3, 9 and 10)

The Topsoil and Silt (Loam) are underlain by interbedded layers of SILT, sandy or clayey SILT, pumiceous, fine to medium grained SAND and less pumiceous, fine to coarse grained SAND and medium to coarse grained SAND (Pit Sand) to about 7.0 and 9.0 metres depth in Bore Hole Nos. 2, 3 and 9, and to at least the base of the 10.0 metre deep Bore Hole No. 10.

Fine to coarse and medium to coarse grained Sand interbedded with SILT continues to at least the base of the 10.0 metre deep Bore Hole Nos. 2, 3 and 9.



3.2 Pit Sand - High Silt Content (Bore Hole Nos. 1 and 7)

Beneath the Silt (Loam) and Filling in Bore Hole Nos. 1 and 7 are interbedded layers of slightly gravelly, fine to coarse grained SAND of various grading with clayey, fine sandy SILT and SILT throughout to at least the base of the 9.5 and 10.0 metre deep bore holes.

3.3 Pit Sand - Minor Silt Content (Bore Hole Nos. 4, 6 and 8)

Bore Hole Nos. 4, 6 and 8 reveal slightly gravelly, fine to coarse grained SAND to at least the base of the 6.5 and 7.0 metre deep bore holes. Layers of clayey SILT and SILT about 200 to 300mm thick were revealed between 2.5 and 4.8 metres depth in all bore holes.

3.4 Pit Sand - No Silt Content (Bore Hole No. 5)

The Silt (Loam) is underlain by fine to medium, fine to coarse grained SAND to at least the base of the 7.0 metre deep bore hole. A layer of sandy fine GRAVEL was encountered at 6.2 to about 6.7 metres depth.

3.5 Groundwater

Groundwater was dipped during our mid-autumn site investigation. The presence of saturated soils and hole collapse within the bore hole tests indicate groundwater is present at the following depths:

Bore Hole No.	Groundwater (m)	Bore Hole No.	Groundwater (m)
1	8.2	6	No Groundwater
2	No Groundwater	7	7.8
3	8.7	8	No Groundwater
4	No Groundwater	9	No Groundwater
5	No Groundwater	10	No Groundwater

Yours faithfully

Geocon Geotechnical Ltd.



Ramona White
Engineering Geologist

Report Approved by:

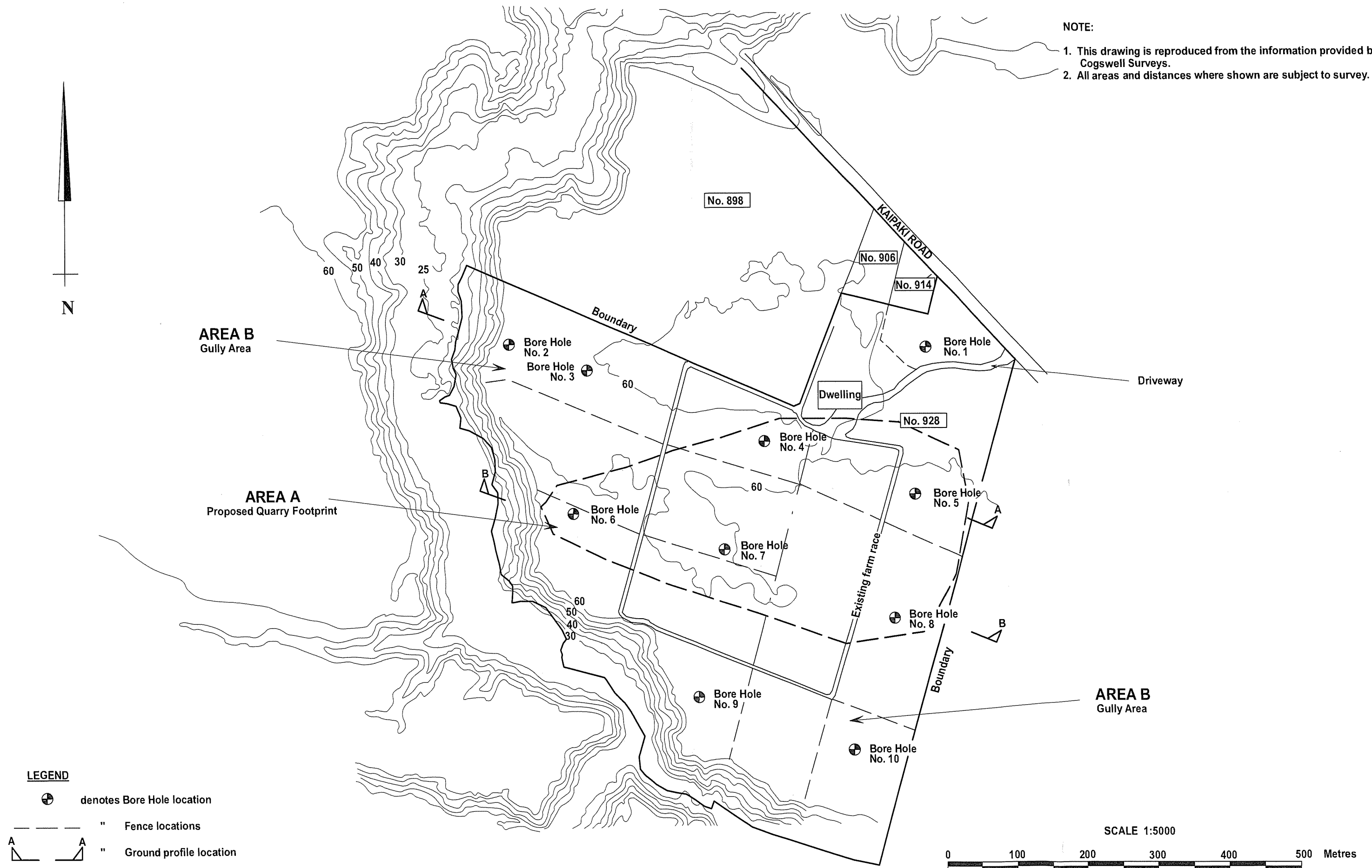


Alexandra Johansen
Senior Engineering Geologist



NOTE:

1. This drawing is reproduced from the information provided by Cogswell Surveys.
2. All areas and distances where shown are subject to survey.



LEGEND

⊕ denotes Bore Hole location

--- " Fence locations

--- " Ground profile location

SHAWS PROPERTY HOLDINGS LTD

Site Investigation for Proposed New Quarry
No. 928 Kaipaki Road, Cambridge

SITE PLAN

DRAWING No. 16002-01

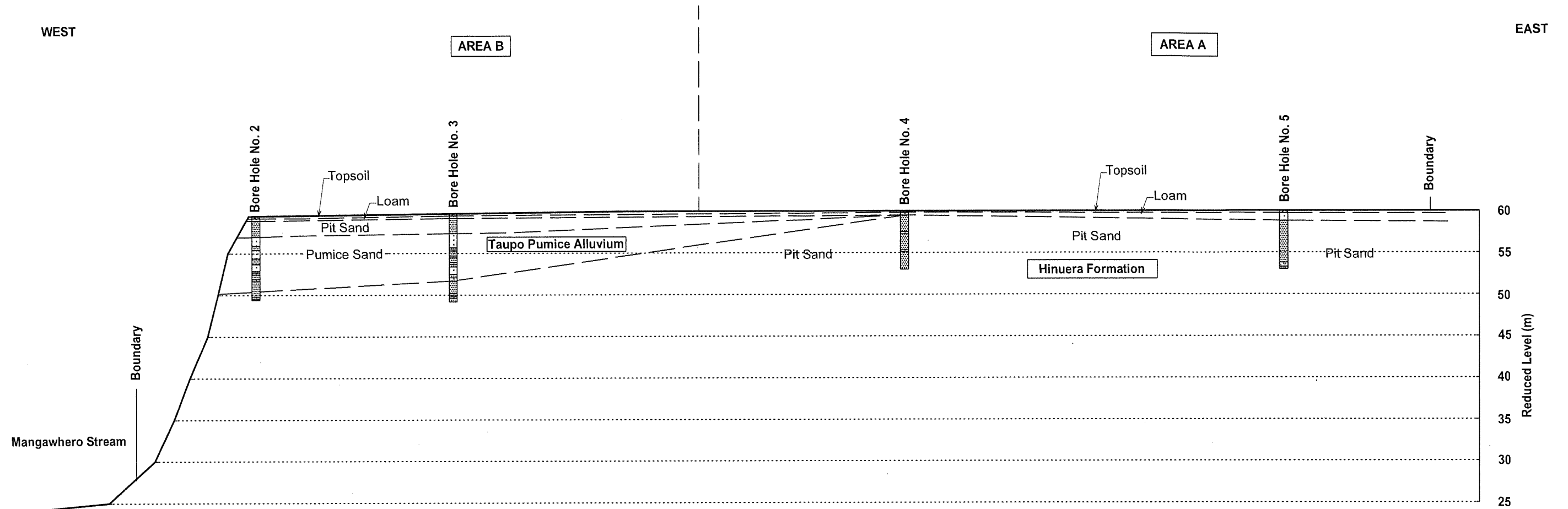
INITIAL DATE May 2019

ISSUE DATE 22.05.2019

Geocon Geotechnical Ltd

Consulting Geotechnical Engineers

1150 Victoria Street, P.O. Box 9123, Hamilton



GROUND PROFILE A - A
1:5 SCALE

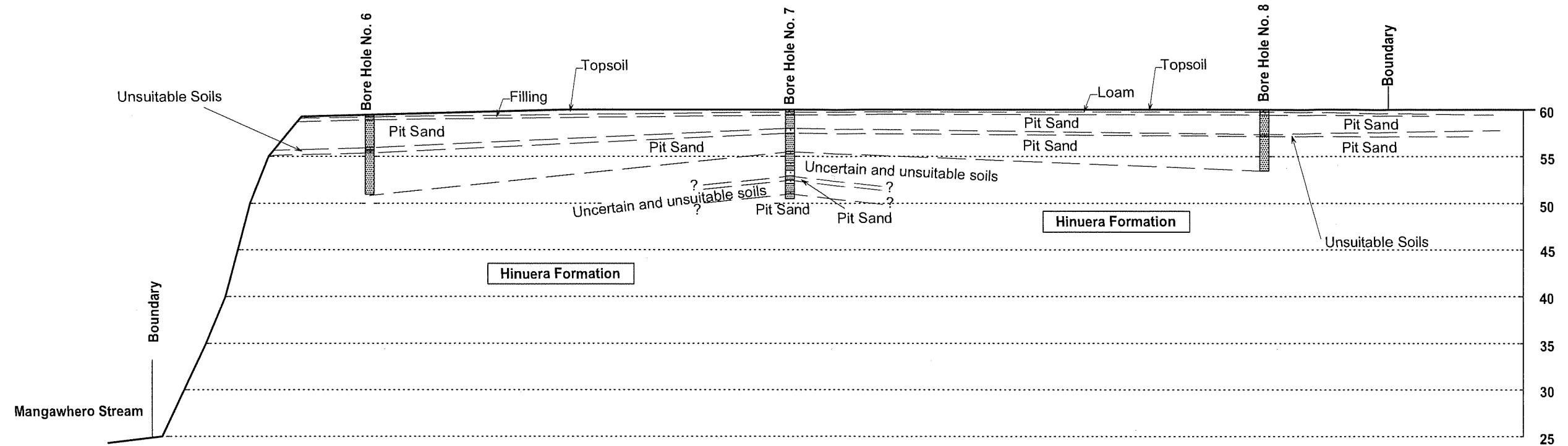
HORIZONTAL SCALE 1:2500



WEST

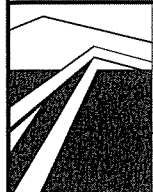
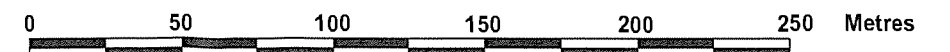
AREA A

EAST



GROUND PROFILE B - B
1:5 SCALE

HORIZONTAL SCALE 1:2500



Geocon Geotechnical Ltd

Consulting Geotechnical Engineers

1150 Victoria Street, P.O. Box 9123, Hamilton

SHAWS PROPERTY HOLDINGS LTD


Investigation for Proposed Sand Quarry
No. 928 Kaipaki Road, Cambridge


**GROUND PROFILE
B - B**

DRAWING No. 16002-03

DATE May 2019


ISSUE DATE 22.05.2019

GRAPHIC LOG	BORE HOLE LOG No. 1	DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	SOIL DESCRIPTION														
	TOPSOIL		T/S	N											
XXXX	SILT with trace clay. Dry, yellowish brown.		Loam												
	fine to medium SAND with trace fine gravel. Dry to moist, yellowish brown.														
	fine to coarse gravelly SAND. Dry to moist, siliceous, light yellowish brown. Becoming light grey @ 1.3 metres.	1													
	" medium to coarse SAND with minor to some fine to coarse gravel and dark greyish brown @ 1.5 metres.														
		2		S											
	medium to coarse SAND with trace fine gravel. Moist, siliceous, light grey. Becoming fine to coarse SAND @ 2.2 metres.														
	" coarse SAND with minor gravel and cobbles @ 2.6 metres.	3													
	" medium SAND with minor silt and trace fine to coarse gravel @ 3.0 metres.														
	" moist to wet @ 3.5 metres.	4													
	" heavily iron stained @ 4.2 metres.														
XXXX	clayey SILT. Moist, moderately to highly plastic, slightly iron stained, light grey.			N											
XXXX	fine sandy SILT. Moist, light grey.			UC											
XXXX	silty fine SAND. Moist, light grey.	5													
	fine to medium SAND with trace coarse sand and trace fine gravel. Moist, siliceous, light grey. Becoming slightly iron stained and grey and containing trace pumiceous and lithic fine to medium gravel @ 5.5 metres. Becoming moist to wet @ 6.2 metres.			S											
XXXX	SILT with minor clay. Moist to wet, slightly plastic, light yellowish grey.			N											
XXXX	fine to medium SAND. Moist to wet, light brown.			S											
XXXX	fine sandy SILT. Moist to wet, slightly iron stained, light grey.			S											
XXXX	fine to medium SAND. Moist to wet, brown.	7													
XXXX	silty fine SAND. Moist to wet, light grey.														
XXXX	clayey SILT. Moist to wet, moderately to highly plastic, dilatant, light grey.														
XXXX	fine sandy SILT with minor pumiceous fine gravel. Moist to wet, light grey.			N											
XXXX	clayey SILT with minor fine to medium sand and pumiceous gravel. Wet, low to moderately plastic, grey.	8													
XXXX	fine sandy SILT. Moist, light grey.														
XXXX	clayey SILT. Wet, dilatant, light grey.														
XXXX	Containing minor fine gravel and becoming saturated @ 8.2 metres.														
XXXX	fine sandy SILT with minor pumiceous gravel. Moist to wet, dilatant, light grey.	9													
XXXX	clayey SILT with minor fine to medium SAND. Wet to saturated, dilatant, moderately to highly plastic, brown.			S											
XXXX	medium to coarse SAND with trace silt. Wet to saturated, siliceous, dark grey. Becoming saturated @ 9.5 metres.	10													
	Bottom of Bore Hole completed 10/04/19														
		11													
		12													
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain															
JOB NAME: SHAW'S PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W-16002		DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray		LOGGED: RW DATE LOGGED: 10/04/19 CHECKED: <i>82</i>										PLOTTED: AV	
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton		BORE HOLE LOG		BORE HOLE No. 1 LOCATION: Refer Site Plan SHEET: 1 OF 1										RL (m): Fig. No. A-1	

GRAPHIC LOG	BORE HOLE LOG No. 2		DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL	
	SOIL DESCRIPTION					1	2	3	4	5	6	7	8	9	10		
	TOPSOIL.			T/S	N												
x x x	SILT. Dry, yellowish brown.			Loam	N												
	fine to coarse gravelly fine to coarse SAND. Dry to moist, well graded, moderately iron stained, siliceous, dark yellowish brown. Becoming light grey @ 0.8 metres.		1	Taupo Pumice Alluvium	S												
	" moist @ 1.0 metres.																
	Containing trace fine to medium cobbles and trace gravel @ 1.1 metres.		2														
	" fine to coarse SAND @ 1.3 metres.																
	Becoming heavily iron stained @ 1.5 metres.		3														
x x x	clayey SILT. Moist to wet, dilatant, slightly organic, light grey.				N												
x x x	fine sandy SILT with trace pumiceous gravel. Wet, dilatant, light grey.																
x x x	fine SAND. Moist, pumiceous, whitish grey.		4		UC												
x x x	SILT with trace clay and fine sand. Moist to wet, slightly plastic, slightly iron stained, light grey.				N												
x x x	Containing SILT with minor clay and becoming wet and dilatant @ 4.5 metres.		5														
	silty fine to medium SAND. Moist to wet, pumiceous, light grey.			S													
x x x	SILT with some sand. Moist to wet, light grey.			N													
x x x	SILT with minor clay and trace fine sand. Moist to wet, moderately plastic, light brownish grey.		6	UC													
x x x	fine pumiceous SAND. Moist, light grey.			N													
x x x	SILT with trace clay. Moist to wet, slightly plastic, light grey.		7	UC													
	fine pumiceous SAND. Moist, light grey. Becoming wet and containing trace silt @ 7.2 metres.			N													
x x x	SILT with some clay. Moist to wet, slightly plastic, slightly iron stained, light grey.		8	UC													
	fine SAND. Moist to wet, pumiceous, light brownish grey.		9	S													
	fine to coarse SAND with trace fine to medium gravel. Wet, siliceous, dark grey. Becoming iron stained @ 9.5 metres.			N													
x x x	SILT with trace fine sand. Moist to wet, iron stained, light grey.		10	S													
	medium to coarse SAND with trace fine gravel. Moist, siliceous, light grey.																
	Bottom of Bore Hole completed 10/04/19		11														
			12														
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. -- S = Suitable soils / N = Unsuitable soils / UC - Uncertain																	
JOB NAME: SHAWS PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W-16002			DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray			LOGGED: RW PLOTTED: AV DATE LOGGED: 10/04/19 CHECKED: <i>Sh</i>											
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton			BORE HOLE LOG			BORE HOLE No. 2 LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-2											

GRAPHIC LOG	BORE HOLE LOG No. 3	DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL	
					1	2	3	4	5	6	7	8	9	10		
	SOIL DESCRIPTION															
	TOPSOIL.		T/S	N												
	SILT. Dry, yellowish brown.		Loam													
	gravelly fine to coarse SAND. Dry to moist, well graded, siliceous, slightly iron stained, light grey. Becoming moist @ 1.0 metres.	1	Taupo Pumice Alluvium	S												
	fine to medium SAND. Moist, well graded, siliceous, brownish grey. Becoming fine to coarse SAND @ 1.8 metres. " heavily iron stained and wet @ 2.2 metres.	2														
	clayey SILT. Wet, moderately plastic, slightly iron stained, light grey. Becoming SILT with minor clay and minor sand @ 2.8 metres.	3		N												
	fine sandy SILT with trace fine pumiceous gravel. Wet, light grey. Becoming SILT and dilatant @ 3.3 metres. " fine sandy SILT and moist to wet @ 3.5 metres. " SILT with minor clay, iron stained and moist @ 3.8 metres.	4														
	fine SAND. Moist, pumiceous, light grey.			UC												
	SILT with minor clay. Moist, light grey.			N												
	fine SAND. Moist, pumiceous, slightly iron stained, light grey. Becoming wet @ 4.7 metres.			UC												
	SILT. Moist to wet, light brownish grey.	5		N												
	fine to medium SAND with trace fine pumiceous gravel. Moist to wet, light whitish grey. Becoming silty fine SAND @ 5.5 metres.			S												
	fine sandy SILT. Moist to wet, light grey.	6		N												
	fine SAND. Moist to wet, light grey.			UC												
	SILT with minor clay. Moist to wet, moderately plastic, dilatant. Becoming fine sandy SILT, moist to wet and light grey @ 6.8 metres.			N												
	clayey SILT with some minor fine sand. Wet, dilatant, moderately plastic, grey. Becoming fine sandy SILT, moist to wet and light grey @ 6.8 metres.	7		UC												
	silty fine SAND with minor clay and medium sand and trace fine to coarse gravel. Moist to wet, slightly to moderately plastic, light greyish brown.			N												
	SILT with minor fine sand and minor clay. Moist to wet, slightly to moderately plastic, light grey.	8		UC												
	fine SAND. Moist to wet, heavily iron stained, light grey.			S												
	fine to coarse SAND with trace fine gravel. Moist to wet, poorly graded, siliceous, brownish grey. Becoming silty fine to medium SAND @ 8.5 metres. " fine to coarse SAND, wet to saturated, well graded, siliceous and heavily iron stained @ 8.7 metres. Becoming silty SAND @ 9.0 metres.	9	N													
	SILT with minor clay. Moist to wet, moderately to highly plastic, light grey.		S													
	silty fine to medium SAND with trace fine to medium gravel. Saturated, brown.		N													
	SILT with minor clay. Wet, moderately plastic, light grey.	10	S													
	silty fine to coarse SAND. Saturated, brown. Becoming heavily iron stained @ 9.8 metres.															
	Bottom of Bore Hole completed 10/04/19	11	Hinuera Formation													
		12														
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain																
JOB NAME: SHAWS PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W - 16002			DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray			LOGGED: RW PLOTTED: AV DATE LOGGED: 10/04/19 CHECKED: SN										
Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton			BORE HOLE LOG			BORE HOLE No. 3 LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-3										

After Drilling

GRAPHIC LOG	BORE HOLE LOG No. 4	DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	SOIL DESCRIPTION														
	TOPSOIL.		T/S												
XXXX	SILT. Dry, yellowish brown.		Loam	N											
	fine to medium gravelly fine to coarse SAND. Dry to moist, heavily iron stained, grey. Becoming dark grey and containing minor gravel @ 0.8 metres. " fine to medium SAND and well graded @ 1.2 metres. " fine to coarse gravelly fine to medium SAND, moist to wet and light grey @ 1.5 metres. Containing coarse SAND and becoming heavily iron stained @ 2.4 metres.	1 2		S											
XXXX	SILT with minor clay. Moist, light grey. Becoming fine sandy SILT @ 2.7 metres.			N											
	fine to medium SAND with minor silt. Moist to wet, well graded, brownish grey. Becoming heavily iron stained and containing fine to medium gravel @ 3.4 metres. Becoming slightly iron stained @ 3.5 metres. " fine to coarse SAND with some fine to coarse gravel and dark yellowish grey @ 3.6 metres. Becoming medium SAND and siliceous @ 4.0 metres.	3 4		S											
XXXX	clayey SILT. Moist to wet, moderately plastic, light grey.			N											
	fine SAND. Moist, light grey. Becoming fine to medium sand with trace fine to medium gravel, moist to wet and light grey @ 5.0 metres. Containing coarse pumiceous sand and fine pumiceous gravel @ 5.7 metres. Becoming wet and brownish grey @ 6.0 metres.	5 6		UC											
		7		S											
	Bottom of Bore Hole completed 10/04/19	8 9													
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain															
JOB NAME: SHAWS PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W-16002			DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray		LOGGED: RW PLOTTED: AV DATE LOGGED: 10/04/19 CHECKED: <i>SW</i>										
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton			BORE HOLE LOG		BORE HOLE No. 4 LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-4										

GRAPHIC LOG	BORE HOLE LOG No. 5		DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL	
	SOIL DESCRIPTION					1	2	3	4	5	6	7	8	9	10		
	TOPSOIL			T/S													
	SILT with trace fine sand. Dry to moist, yellowish brown. Containing rootlets @ 1.2 metres.		1	Loam	N												
	fine to medium SAND with minor fine to coarse gravel. Dry to moist, well graded, light grey. Containing fine to coarse SAND @ 2.1 metres. Becoming dark grey @ 2.3 metres. " grey @ 2.7 metres. " fine to medium SAND, moist to wet, well graded and siliceous @ 2.8 metres. Containing fine pumiceous gravel @ 3.2 metres. Becoming fine to coarse SAND with some rounded fine to coarse gravel, wet, siliceous and grey @ 3.5 metres. Containing minor fine to medium gravel @ 4.2 metres. Becoming fine to medium SAND moist to wet and grey @ 5.3 metres. Becoming medium to coarse SAND with minor fine to coarse gravel and light grey @ 5.5 metres.		2 3 4 5 6	Hinuera Formation	S												
	fine to coarse sandy fine GRAVEL. Wet, iron stained, light grey.				UC												
	fine to medium SAND. Moist to wet, dark grey.		7		S												
	Bottom of Bore Hole completed 10/04/19		8 9														
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain																	
JOB NAME: <u>SHAWS PROPERTY HOLDINGS LTD</u> JOB LOCATION: <u>No. 928 Kaipaki Road, Cambridge</u> JOB NUMBER: <u>W-16002</u>				DRILL METHOD: <u>Machine Auger</u> RIG: <u>King Drilling - 250 mm dia.</u> DRILLER: <u>Ray</u>				LOGGED: <u>RW</u> PLOTTED: <u>AV</u> DATE LOGGED: <u>10/04/19</u> CHECKED: <u>SW</u>									
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton				BORE HOLE LOG				BORE HOLE No. 5 LOCATION: <u>Refer Site Plan</u> RL (m): SHEET: 1 OF 1 Fig. No. A-5									

GRAPHIC LOG	BORE HOLE LOG No. 6		DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL
	SOIL DESCRIPTION					1	2	3	4	5	6	7	8	9	10	
	TOPSOIL.			T/S												
	FILLING: Silt, Sand, and Gravel. Uncontrolled, dry, brown.			Fll	N											
	fine to medium SAND with minor fine to medium gravel. Dry to moist, yellowish grey.		1	Hinuera Formation	S											
	medium to coarse SAND with fine gravel. Moist, siliceous, heavily iron stained, grey. Becoming coarse SAND @ 2.0 metres.		2													
	" gravelly and heavily iron stained @ 2.3 metres.															
	" dark grey @ 2.4 metres.															
	" well graded fine to medium SAND with minor fine to medium gravels and brownish grey @ 2.5 metres.															
	" dark grey and containing fine to medium SAND @ 2.8 metres.		3													
	" fine to coarse SAND and heavily iron stained @ 2.9 metres.															
	SILT with some clay. Moist, slightly iron stained, moderately plastic, light grey.			N												
fine to coarse SAND. Moist to wet, pumiceous, light grey.			S													
SILT with minor clay. Moist, light grey.		4	N													
	fine to medium SAND. Moist, well graded, light grey. Becoming fine to coarse SAND and wet @ 4.3 metres.		5	Hinuera Formation	S											
	" fine to medium SAND, moist to wet, siliceous, and containing trace fine gravel @ 4.5 metres.															
	" fine to coarse SAND and wet @ 4.7 metres.															
	" silty and iron stained @ 5.3 metres.															
	" fine SAND and moist @ 5.5 metres.															
	" fine to medium SAND, pumiceous, containing trace fine pumiceous gravel @ 5.7 metres.		6													
	" siliceous, well graded and becoming light brownish grey @ 6.0 metres.															
	" silty @ 6.5 metres.															
	" fine to medium SAND, moist, well graded, and light grey @ 6.8 metres.															
	" silty, brown and heavily iron stained @ 7.5 metres.		7													
" fine to coarse SAND and wet @ 7.9 metres.																
" fine to medium gravelly fine to coarse SAND @ 8.0 metres.		8														
Bottom of Bore Hole completed 10/04/19		9														
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain																

JOB NAME: SHAWS PROPERTY HOLDINGS LTD	DRILL METHOD: Machine Auger	LOGGED: RW	PLOTTED: AV
JOB LOCATION: No. 928 Kaipaki Road, Cambridge	RIG: King Drilling - 250 mm dia.	DATE LOGGED: 10/04/19	
JOB NUMBER: W-16002	DRILLER: Ray	CHECKED: Sw	

 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton	BORE HOLE LOG	BORE HOLE No. 6
		LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-6

GRAPHIC LOG	BORE HOLE LOG No. 7		DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL		
	SOIL DESCRIPTION					1	2	3	4	5	6	7	8	9	10			
	TOPSOIL.			T/S														
	FILLING: Mixture of Silt and Gravel. Uncontrolled, dry, contains rootlets, yellowish brown.			Fill	N													
	gravelly fine to coarse SAND. Dry to moist, siliceous, grey. Becoming moist to wet, well graded and light grey @ 1.0 metres. " medium to coarse SAND @ 1.5 metres. " heavily iron stained @ 1.9 metres.		1	Hinuera Formation	S													
	clayey SILT with trace fine sand. Wet, moderately plastic, containing rootlets, slightly iron stained, light grey.		2		N													
	fine to medium SAND. Moist to wet, well graded, siliceous, light grey. Containing coarse gravel and fine cobbles @ 3.1 metres. Becoming coarse sand with fine gravel @ 3.3 metres. " fine to coarse SAND, siliceous, and well graded @ 3.5 metres. " heavily iron stained @ 4.0 metres. " fine to medium SAND and moist @ 4.2 metres.		3		S													
	SILT with some clay. Moist to wet, light greyish brown.		4		N													
	silty fine SAND. Moist, light grey. Becoming fine SAND @ 5.0 metres. " silty @ 5.1 metres.		5		UC													
	fine sandy SILT. Moist, light grey.		6		N													
	fine SAND. Moist, light grey.		7		UC													
	clayey SILT with some fine to medium sand. Moist to wet, moderately plastic, light greyish brown.		8		N													
	fine sandy SILT. Moist, light grey.		9		S													
	silty fine to medium SAND with trace fine to medium pumiceous gravel. Wet, light grey.		10		N													
	clayey SILT with minor fine to medium sand. Wet, slightly to moderately plastic, brownish grey.		11		S													
	silty fine SAND. Highly iron stained (iron pan), dark orangey brown.		12		UC													
	fine to medium SAND with minor silt. Wet to saturated, brownish grey.				N													
	silty fine SAND. Wet, dilatant, containing interbedded fine sandy silt, light grey.				S													
	clayey SILT. Moist, slightly iron stained, whitish light grey.																	
	silty fine to coarse SAND. Saturated, brown.																	
Bottom of Bore Hole completed 10/04/19			10															
			11															
			12															
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain																		

JOB NAME: SHAWS PROPERTY HOLDINGS LTD
 JOB LOCATION: No. 928 Kaipaki Road, Cambridge
 JOB NUMBER: W-16002

DRILL METHOD: Machine Auger
 RIG: King Drilling - 250 mm dia.
 DRILLER: Ray


LOGGED: RW
 DATE LOGGED: 10/04/19
 CHECKED:

Geocon Geotechnical Ltd
 Geotechnical Engineers
 1150 Victoria Street, P.O. Box 9123, Hamilton

BORE HOLE LOG

BORE HOLE No. 7
 LOCATION: Refer Site Plan
 SHEET: 1 OF 1


RL (m):
 Fig. No. A-7

GRAPHIC LOG	BORE HOLE LOG No. 8	DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	SOIL DESCRIPTION														
	TOPSOIL.		T/S												
x x x	SILT. Dry to moist, yellowish brown.		Loam	N											
x x x	gravelly fine to medium SAND with some fine to coarse gravel. Moist, brownish grey. Containing minor coarse SAND and becoming grey @ 1.3 metres.	1		S											
	fine to medium SAND with trace fine gravels. Moist, well graded, siliceous, light grey. Containing fine to coarse gravels and fine cobbles and becoming dark greyish brown @ 2.0 metres. Containing coarse gravel and becoming heavily iron stained and well graded @ 2.5 metres.	2													
x x x	clayey SILT. Moist to wet, iron stained, light grey.			N											
	fine SAND. Moist, siliceous, light grey. Becoming fine to medium SAND @ 3.0 metres. " fine to coarse SAND and well graded @ 3.3 metres. " fine to medium SAND and light grey @ 3.5 metres.	3		UC											
	fine to coarse SAND with fine gravel. Moist to wet, pumiceous, well graded, light grey. Becoming fine to medium SAND with minor fine gravel @ 3.9 metres. Containing coarse SAND and fine to medium gravel @ 4.2 metres. Becoming medium to coarse SAND, siliceous and grey @ 4.5 metres. " wet and containing trace fine SAND @ 5.0 metres. " coarse SAND with minor fine to medium sand and fine to medium gravel, wet, brownish grey @ 6.0 metres.	4 5 6	Hinuera Formation	S											
	Bottom of Bore Hole completed 10/04/19	7													
		8													
		9													
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain															
JOB NAME: SHAWS PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W-16002			DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray		LOGGED: RW PLOTTED: AV DATE LOGGED: 10/04/19 CHECKED: <i>SW</i>										
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton			BORE HOLE LOG			BORE HOLE No. 8 LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-8									

GRAPHIC LOG	BORE HOLE LOG No. 9		DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL						
	SOIL DESCRIPTION					1	2	3	4	5	6	7	8	9	10							
	TOPSOIL.			T/S																		
	SILT with trace fine sand. Moist, yellowish brown. Becoming light brown @ 0.5 metres.		1	Loam	N																	
	fine SAND. Moist, pumiceous, light grey.			Taupo Pumice Alluvium	UC																	
	SILT with minor clay and trace fine sand. Moist, light grey.		2		N																	
	fine SAND with trace fine gravel. Moist, pumiceous, light grey.				UC																	
	fine sandy SILT. Moist, light grey.				N																	
	clayey SILT. Moist, moderately to highly plastic, light grey.				UC																	
	fine to medium SAND with some fine to medium pumiceous gravel. Wet, well graded, light grey.		3		N																	
	SILT with minor clay. Moist iron stained, moderately plastic, light grey.				UC																	
	silty fine to medium SAND with minor clay. Moist to wet, slightly to moderately plastic, light brownish grey.		4		N																	
	SILT with minor clay. Moist iron stained, moderately plastic, light grey.				N																	
	fine to medium SAND with minor coarse sand and fine to coarse gravel. Wet, heavily iron stained, reddish brown. Becoming fine to medium SAND with trace fine to medium gravel, wet, well graded, and greyish brown @ 4.5 metres.		5		S																	
	" fine to coarse SAND and pumiceous @ 5.0 metres.																					
	" fine to medium SAND with trace fine to medium gravel @ 5.3 metres.																					
	" siliceous and containing coarse gravels @ 5.5 metres.																					
	heavily iron stained and containing some fine gravel @ 5.9 metres		6																			
	SILT with some clay. Moist, moderately plastic, slightly iron stained, light grey. Becoming clayey SILT @ 6.5 metres.		7		N																	
	silty fine SAND with minor clay and trace fine gravel. Moist to wet, slightly plastic, light grey.			UC																		
	SILT with some clay. Moist, moderately plastic, slightly iron stained, light grey. Becoming fine sandy SILT @ 7.4 metres.		8	N																		
	fine SAND. moist, pumiceous, light grey. Becoming silty fine SAND with minor fine pumiceous gravel, wet and light brownish grey @ 8.0 metres			UC																		
	fine sandy SILT with minor pumiceous gravel. Moist to wet, light grey. Becoming iron stained @ 8.9 metres.		9	N																		
	silty fine SAND with minor clay. Moist to wet, slightly plastic, light grey. Containing some clay @ 9.5 metres.		10	Hinuera Formation	UC																	
	fine to medium SAND with trace fine gravel. Wet, dark grey. Becoming iron stained @ 9.8 metres.																					
	Bottom of Bore Hole completed 10/04/19		11																			
			12																			
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain																						

JOB NAME: SHAW'S PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W-16002		DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray		LOGGED: RW DATE LOGGED: 10/04/19 CHECKED: <i>Sw</i>		PLOTTED: AV	
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 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton	BORE HOLE LOG		BORE HOLE No. 9	
			LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-9	

GRAPHIC LOG	BORE HOLE LOG No. 10		DEPTH (metres)	GEOLOGICAL FORMATION	Suitability of Soils	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL	
	SOIL DESCRIPTION					1	2	3	4	5	6	7	8	9	10		
	TOPSOIL			T/S													
x x x	SILT. Dry to moist, yellowish brown.			Loam	N												
	silty fine to medium SAND. Dry to moist, heavily iron stained.		1		S												
	fine to medium SAND. Dry to moist, well graded, dark grey. Becoming fine to medium gravelly fine to coarse SAND, siliceous, well graded, moist and heavily iron stained @ 1.7 metres.		2		N												
x x x	SILT with minor clay and trace fine sand. Moist, moderately plastic, light grey.				S												
	fine to medium SAND. Moist, well graded, light grey. Becoming heavily iron stained @ 2.6 metres.				N												
x x x	SILT. Moist, light grey.		3		S												
	fine to medium SAND. Moist, well graded, light grey. Becoming heavily iron stained and red @ 3.0 metres.				UC												
	fine to medium SAND. Moist to wet, siliceous, yellowish grey.				N												
	silty fine SAND. Moist, light grey.		4		UC												
	fine SAND. Moist, pumiceous, light grey.				N												
x x x	SILT with minor clay and trace fine sand. Moist, moderately plastic, light grey.				UC												
	fine SAND. Moist, pumiceous, light grey. Containing trace silt and becoming wet @ 5.1 metres. Becoming fine SAND and moist @ 5.3 metres.		5		N												
x x x	clayey SILT with trace fine sand. Moist to wet, moderately plastic, light brown grey.				UC												
	silty fine SAND. Moist, light grey.																
x x x	SILT with minor clay. Moist, light grey. Becoming clayey SILT, wet and dilatant @ 6.1 metres.		6														
x x x	" SILT with trace clay and trace fine sand @ 6.4 metres.				UC												
	silty fine SAND. Moist, light grey.				N												
x x x	SILT with minor clay. Wet, light grey.		7		UC												
	silty fine SAND. Moist to wet, light grey.				N												
x x x	SILT with minor clay and trace fine gravel. Moist to wet, dilatant, light grey.																
	silty fine SAND. Moist to wet, light grey. Containing minor SILT and becoming moist @ 7.7 metres. " silty and wet @ 8.0 metres. Becoming fine SAND and moist @ 8.2 metres. Containing minor clay and some silt @ 8.5 metres. " silty SAND with minor fine to medium pumiceous gravel @ 8.6 metres. Becoming fine SAND and moist @ 8.8 metres.		8		UC												
	fine sandy SILT with trace clay. Wet, slightly plastic, light grey. Containing minor clay and becoming slightly to moderately plastic @ 9.5 metres.		9		N												
x x x	silty fine SAND. Moist to wet, light grey. Containing fine to medium sand and trace pumiceous gravel @ 9.8 metres.		10		UC												
	Bottom of Bore Hole completed 10/04/19		11														
			12														
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - S = Suitable soils / N = Unsuitable soils / UC - Uncertain																	
JOB NAME: SHAWS PROPERTY HOLDINGS LTD JOB LOCATION: No. 928 Kaipaki Road, Cambridge JOB NUMBER: W-16002			DRILL METHOD: Machine Auger RIG: King Drilling - 250 mm dia. DRILLER: Ray			LOGGED: RW PLOTTED: AV DATE LOGGED: 10/04/19 CHECKED: SW											
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton			BORE HOLE LOG			BORE HOLE No. 10 LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-10											



APPENDIX D

Quarry and Cleanfill Management Plan
– Cogswell Surveys Limited



COGSWELL SURVEYS
SURVEYING | ENGINEERING | PLANNING

Quarry and Cleanfill Management Plan

928 Kaipaki Road Ohaupo

Shaws Property Holdings Limited

Our Reference: 4767



Revision History

Revision	Name	Description	Date
1	Rene Nielsen	Draft Review	25/07/19
2	Rene Nielsen	Updated For Review	05/04/20

Quality Assurance

	Name	Date
Prepared By	Rene Nielsen – 021 181 8899	25/07/19
Reviewed & Finalised by		

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1. PURPOSE

The primary purpose of this Quarry and Cleanfill Management Plan (QCMP) is to document all management, monitoring and operational procedures that will be implemented at the Kaipaki Road Sand Quarry and Cleanfill site to minimise environmental effects both within and beyond the boundary of the site.

This QCMP also provides objectives and measures to ensure ongoing compliance with the site's resource consents. To this extent, this QCMP is to be read in conjunction with all regional and district council consent summarised below.

2. RESOURCE CONSENTS

<insert summary of consents>

Copies of the site's Resource Consents are provided in **Appendix A**.

3. RESPONSIBILITY

The Site Manager is responsible for reviewing operations, developing and implementing management systems and providing sufficient resources to ensure compliance and appropriate training.

The Site Manager is also responsible for day-to-day operations, including implementation and enforcement of the owner's health and safety programme, environmental management, compliance with the site's resource consents and responding to complaints.

The Site Manager will also control this QCMP and ensure it is reviewed no less than once every two years and any amended versions are submitted to the Waikato Regional Council (WRC).

The site will have sufficient staff at all operating times so that the measures set out in this QCMP can be implemented to ensure full compliance with consent conditions.

4. CONTACT DETAILS

Contact details for the site and key personnel are set out below;

Physical Address: 928 Kaipaki Road

Site Manager <insert name>
e-mail: <insert e-mail>
Mobile: <insert mobile number>

Alternate / Delegate <insert name>
e-mail: <insert e-mail>
Mobile: <insert mobile number>

5. BACKGROUND

The existing property at 928 Kaipaki Road is currently used as primarily as a horse stud and dry stock. The purpose of the quarry is to extract sand from the ground for use in building and roading construction. The Quarry will operate in stages, limiting the area of exposed ground and operations at any one time. In



addition to the sand extraction, the site will also accept cleanfill onto the property. This will be used for filling the land once the sand has been extracted. The current (existing) ground levels will be reinstated as part of the cleanfilling and rehabilitation/landscaping works.

5.1 Location

The quarry site is located at 928 Kaipaki Road, approximately 4km West of Cambridge Road (Figure 1). The south-western boundary of the property is located on an existing steep gully, where the Mangawhero Stream is located.



Figure 1: Site Location

6. SITE DESCRIPTION

6.1 General

The site comprises of two fee simple titles with a combined (total) area of approximately 49.93 hectares and is currently utilised for general farming purposes (dry stock and horse grazing). Surrounding land use activities are farming, horticulture, horse training and lifestyle blocks.

Figure 2 shows the location of the site and surrounding rural area. Reference numbers denote locations of neighbouring land parcels, some of which contain dwellings.



Figure 2: Aerial Photo showing the location of the application site and neighbouring land / dwellings.

6.2 Extent of Works

Figure 3 shows the extent of sand quarry and clean filling works (refer blue line).

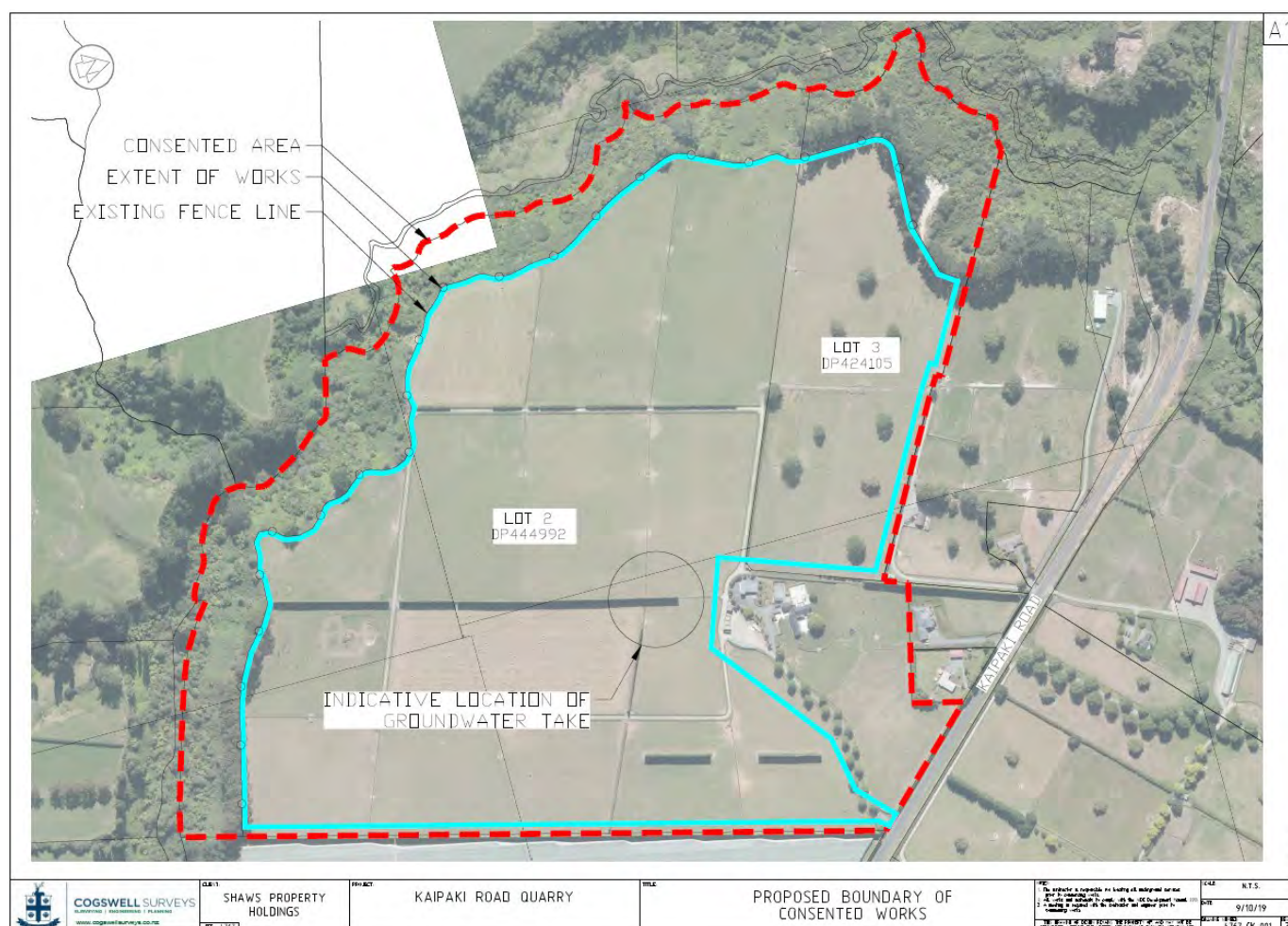


Figure 3: Quarry Site Plan – Extent of Works Boundary (light blue Line)

6.3 Local Receptors

The site adjoins Kaipaki Road and other rural properties to the north, an existing kiwifruit block to the east, and the Mangawhero Stream (and its associated gully corridor) along its south and western site boundaries (refer Figure 2). Neighbouring land and dwellings are also shown in Figure 2 (refer white reference numbers). Table 1 lists landowner details (where known) along with setback distances between dwellings and the extent of works boundary (where relevant).

Most sensitive receptors (dwellings) are located to the north and northeast of the site.

Table 1 : Neighbouring Landowner / Dwelling Details

Neighbour Location (Figure 2 Reference Number)	Landowner / Occupier Name and Address	Legal Description	Dwelling Setback from Extent of Works Boundary
1	Janet and Ronald	LOT 1 DP 364402	120m
2	Taylor	LOT 2 DP 424105	N/A (No Dwelling)
10	898 Kaipaki Road	LOT 1 DP 424105	140m



Neighbour Location (Figure 2 Reference Number)	Landowner / Occupier Name and Address	Legal Description	Dwelling Setback from Extent of Works Boundary
	RD 3 Cambridge 3495		
3	Unknown		430m (Dwelling not shown on Figure 2)
4	Michael and Helen Moran 906 Kaipaki Road RD3 Cambridge 3495	Lot 1 DP 444992	52m
5	Deborah and Robin Comes 914 Kaipaki Road (Ohaupo)	Lot 1 Deposited Plan South Auckland 68688,	120m
6	Whitehall Fruitpackers Holdings Limited	Parcel ID # 4430283, Lot 3 Deposited Plan South Auckland 32828 (SA31D/868)	N/A (No Dwelling)
7	A & K Walker 899 Kaipaki Road (Ohaupo)		277m
8	Ralph and Sarah Manning 951 Kaipaki Road (Ohaupo)		225m
9	Unknown		N/A (No Dwelling)

6.4 Archaeological Sites

Figure 4 shows the location of recorded archaeological sites (blue stars) within, or in the case of site s15/715, partially within the extent of works. Based on the locations of these sites, it is unlikely they can be avoided. As the preliminary site works will require removal of the upper levels of soil and extraction of the sand layers below them, all of these sites will be destroyed, or in the case of site s15/715, partially destroyed by the activity.

Separate authorisations are required under the HNZPTA before these sites can be modified.





Figure 4: Aerial photo showing the location of the recorded archaeological sites.

7. QUARRY OPERATIONS

7.1 Health and Safety

All operations and activities at the quarry will be regulated under the Health and Safety at Work Act 2015. The Act and related regulations require that workers and others are given the highest level of protection from workplace health and safety risks, so far as reasonably practicable.

7.2 Hours of Operation

Opening of the Quarry for general sales will be restricted to the following hours:

Monday to Friday	7:00am – 5:30pm
Saturday	7:00am – 12:00pm
Sunday & Public Holiday	Closed



7.3 Staging

To minimise potential visual and amenity effects, and effects from dust, erosion and sediment runoff, the construction activities will be limited to a total area of 3Ha (for both cleanfill and sand extraction). The staging takes the following into account:

- Extraction volumes
Annual maximum sand extraction of 200,000m³
- Cleanfilling volumes
Annual maximum cleanfilling of 100,000m³
- Groundwater levels
No works are to be undertaken below groundwater (no dewatering) and excavations will maintain 1.0m freeboard from groundwater levels identified in the Geocon Geotechnical Report
- Noise and visual impacts
Extraction/cleanfilling will begin from the southern corner of the site and expanding to the north.

Based on the above, it is estimated that approx. 2-4Ha of land will be disturbed annually. Refer to the Staging Plan in Appendix B for the proposed order of operations.

8. SAND EXTRACTION

8.1 Mining Processes

The process of extracting sand involves using heavy machinery for the following processes:

- Remove existing vegetation
Using bulldozers and/or excavators and trucks, any existing vegetation, trees and structures within the extent of works will be removed.
- Topsoil stripping and stockpiling
Topsoil and organic materials will be stripped, transported and stockpiled using motor scrapers, bulldozers and/or excavators and trucks. These materials will be stockpiled on site. Some of this material will be used for construction of bunds for landscaping, noise control and erosion & sediment control.
- Sand Extraction, processing and stockpiling
Quarrying of the sand uses excavators and trucks and/or loaders to excavate and transport the sand materials to the processing plant or stockpiles. Any unsuitable materials will be added to cleanfill for landscaping/rehabilitation. Maximum excavation depth will be approximately 7 metres.
- Storage and distribution
Sand products will be stockpiled onsite, where loaders are used to load customers trucks for transportation off site. Records will be kept of individual truck volumes taken from site.

9. CLEANFILL MANAGEMENT

9.1 Cleanfill Process

The process of receiving cleanfill involves using heavy machinery for the following processes:

- Receipt of material to site
Trucks will discard their loads and material will be spread and compacted on site, using loaders, bulldozers, rollers and/or excavators and trucks.
- Compaction of material



The cleanfill will be placed in layers approx. 300mm deep and compacted using loaders, bulldozers, rollers and/or excavators and trucks. Compaction shall produce an in-situ density no less than that of the original material prior to excavation. There shall be a minimum of 4 tests per 1Ha in a 50m grid. Backfill will be tested using Scala Penetrometer.

9.2 Cleanfill Acceptance Criteria

In accordance with the WasteMinz Guidelines, the cleanfill site is defined as a Class 5 landfill, with the following Waste Acceptance Criteria (WAC):

- virgin excavated natural materials (VENM), including soil, clay, gravel and rock; and
- maximum incidental¹ inert manufactured materials (e.g. concrete, brick, tiles) to be no more than 5% by volume per load; and
- maximum incidental¹ or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load; and
- maximum chemical contaminant limits are local natural background soil concentrations.

9.3 Records, Verification and Monitoring

Records

Prior to accepting any cleanfill on site, the following detailed information will be obtained and recorded (daily) from the disposer:

- Date and time materials were received;
- Details of any random load inspections;
- Vehicle and driver identification;
- Source of the waste;
- Confirmation that the waste has not been contaminated;
- Copies of any soil testing results (If available);
- Copies of any resource consents (If available); and
- Confirmation that soils meet the WAC criteria.

All daily records will be provided annually to WRC.

Monitoring

Throughout the clean filling process, materials will be visually monitored at the tipping face for any inappropriate constituents. Where these are identified, the removal and/or treatment of the offending materials will take place as soon as practicable

Random Load Inspections

Incoming loads will be selected on a random basis (approximately 1 in 50 loads) and recorded. Random load inspection methodology will be dependent on the size of the incoming vehicle:

- **Vehicles with low sided trays/trailers (typically cars to medium sized trucks)**
Load contents will be visually inspected on vehicle/trailer prior to discarding at fill location
- **Vehicles with high sided trays/trailers (typically large trucks)**
Load will be directed to and partially unloaded at the quarantine area, where contents can be visually inspected prior to discarding at fill location.

¹ Incidental items or materials are those present in small quantities that cannot practically be separated from the materials intended for disposal.



Notification of Alternatives

Where loads are found to be non-compliant, the disposer will be informed of near-by suitable facilities that are able to accept the material. Where multiple non-compliances are recorded against a disposer, both WRC and Waipa District Council (WRC) will be advised.

9.4 Verification

Verification sampling and testing will be completed on both a random and annual basis:

- **Random Sampling**
Collected from incoming loads, based on approximately 1 sample per 500m³ of incoming material to site.
- **Annual Sampling**
Collected from the deposited waste sites across the landfill.

All cleanfill material shall meet the Waikato Regional Plan definition of Cleanfill and the parameters identified in the Table 2.

Table 2: Cleanfill Testing Criteria

Constituent	Threshold Concentration (mg/kg dry weight) Total recoverable fraction
Arsenic	20
Boron	15
Cadmium	1
Chromium	56 95
Copper	120
Lead	78 90
Mercury	1
Nickel	33 60
Zinc	175
Benzene	1.10
Toluene	68.00
Ethylbenzene	53.00
Xylenes	48.00
Naphthalene	7.20
Acenaphthylene	50
Acenaphthene	90
Fluorene	80
Hexachlorobenzene	0.02
Phenanthrene	90
Anthracene	800
Fluoranthrene	320
Pyrene	160
Benzo[a]pyrene	0.27 2
Gamma BHC (Lindane)	0.02
Heptachlor	0.02
Aldrin	0.02
Dieldrin	0.02
Sum of DDT, DDD and DDE	0.70



Constituent	Threshold Concentration (mg/kg dry weight) Total recoverable fraction
Sum of PAH's	80
TPH C7-C9	2700
TPH C10-C14	560
TPH C15-C36	4000

All test results are to be forwarded to Waikato Regional Council within one month of test results being received.

10. MODIFICATION OF ARCHAEOLOGICAL SITES

As recorded archaeological sites S15/ 285, S15/546, S15/547, S15/631 and S15/715 cannot be avoided, an Authority must be applied for under Section 44(a) of the HNZPTA and granted by Heritage NZ prior to the start of any works that will affect those sites. (Note that this is a legal requirement).

That the authority should cover all areas of works subject to the staging of the project, as authorities are usually granted for a term of five years.

Because it is possible that additional unrecorded sites may be exposed during earthworks, the Authority application will include any additional sites that may be discovered when works are under way.

11. ACCIDENTAL DISCOVERY PROTOCOLS

In the event of any archaeological site, koiwi or waahi tapu being discovered or disturbed, while undertaking earthworks, the activity shall cease immediately in the area of the discovery, and Nga Iwi Toopu O Waipa, the WDC's Senior Enforcement Officer, Heritage New Zealand (HNZ), WRC, and in the case of koiwi, the NZ Police shall be notified within 48 hours. Works may recommence with the written approval of the WDC and WRC.



12. EROSION AND SEDIMENT CONTROL

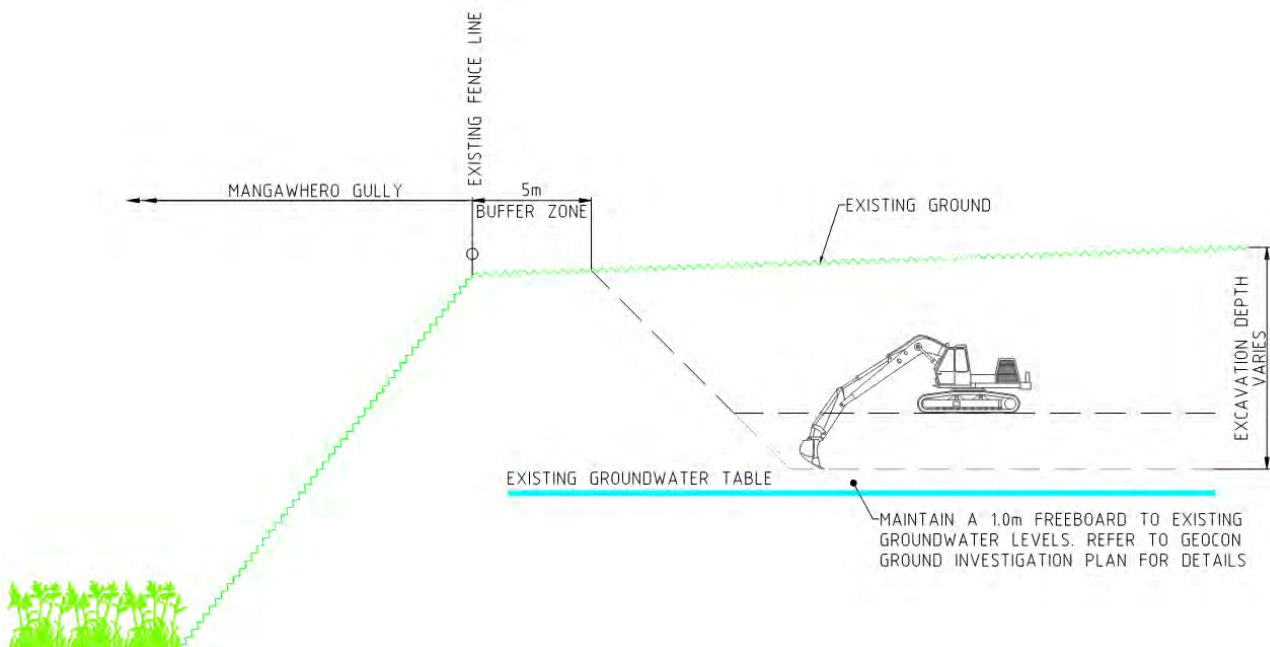
Erosion and Sediment Control is an integral part of quarrying and cleanfilling on site and all activities involving soil disturbance shall incorporate erosion and sediment controls. Erosion and sediment control measures shall be in place prior to commencement of any earthworks and will only be removed after the site/stage has been stabilised to protect it from erosion.

All sediment and erosion controls will be designed, installed, maintained and removed in accordance with the WRC's "Erosion & Sediment Control Guidelines for Soil Disturbing Activities January 2009".

The Erosion and Sediment Control Plan for the initial stage of the site's operation is provided in Appendix C.

12.1 Stormwater & Sediment Control

The proposed erosion and sediment control philosophy is to compound all stormwater runoff within the site. The mining operation will excavate down, effectively bunding around the perimeter of the works removing the risk of damage to surrounding properties, while also providing stormwater storage and soakage through the underlain sandy subsoils.



Clean Runoff

To minimise the volume of stormwater to be managed onsite, perimeter controls (diversion drains, silt fences and/or earth bunds) will be implemented to divert clean water away from the proposed works area.

Contaminated Runoff

Protection of the Mangawhero Stream from any disturbance/contamination/sediment is a key driver for managing and controlling potentially contaminated runoff from the site. It is proposed utilise the sandy soils and sub-soils and the working quarry pit, and associated high soakage capabilities, as the primary destination for the majority of runoff generated from unstabilised surfaces on site. The soakage capacity of the quarry pit, and the limitation on unstabilised ground surface area are such that avoidance of any sediment discharge from active quarry / cleanfill areas to the Mangawhero Stream is expected.

Protection of the Mangawhero Stream and associated gully is further protected by a "buffer" distance of 5 metres between the existing boundary fence, that demarcates the edge of the gully, and the sand quarry pit edge.



Any overburden or topsoil disposal /stockpile sites located beyond the working quarry pit will include appropriately designed devices to control potential sediment loss from these areas. Any soakage basins installed specifically for these areas will be designed to manage a 5 percent AEP rainfall event (in line with WRC guidelines) and maintained regularly, with trapped sediment being removed and disposed as cleanfill on site.

12.2 Hazardous Substances

Fuel storage and vehicle maintenance facilities shall include containers or bunds to contain any spillages and prevent spillages from entering groundwater or surface water.

12.3 Wheel Wash

A wheel washing facility will be used at the exit of the facility will be installed to reduce the potential of material from trucks to be deposited on the roadway outside the site. The wheel wash will be located approximately 200m before the exit to the main road, with the remaining area between the wheel-wash and Kaipaki Road to be chip-sealed. This will minimise the amount of sediment tracking onto Kaipaki Road.

Sediment laden water from the wheel wash will be discharged to the active quarry pit (or appropriately sized soakage basin) and soaked to ground.

12.4 Monitoring and Maintenance

All erosion and sediment control measures will be inspected on a weekly basis and within 24 hours of each rainstorm event.

13.DUST MANAGEMENT

Sand extraction and cleanfilling activities have the potential to generate dust – particularly during dry and windy conditions. This section of the QCMP documents all management, monitoring and operational procedures that will be implemented on site to minimise dust emissions beyond the boundary of the site and avoid objectionable or offensive dust effects on neighbouring landowners and/or residents (refer receptor locations in Figure 2 and associated details in Table 1 above)

13.1 Potential Sources of Dust

Site activities will involve the removal of topsoil and the creation of an open sand quarry below the existing ground level. This exposes the ground to the elements and inherently increases the risk of dust being generated. In turn, this also increases the risk of dust migrating beyond the site boundary where it may create a nuisance effect for local receptors.

The risk of dust generation can also be exacerbated on site as a result of;

- On site traffic movements;
- Earthworks and sand excavation work;
- Cleanfill placement and compacting activities;
- High winds; and
- Dry summer conditions.

13.2 Wind Environment

Assuming wind conditions at the site are similar to Hamilton Airport, the wind rose at Figure 5 shows the predominant wind is from the westerly quarter. This figure also shows the strongest (higher velocity) winds are from the west.



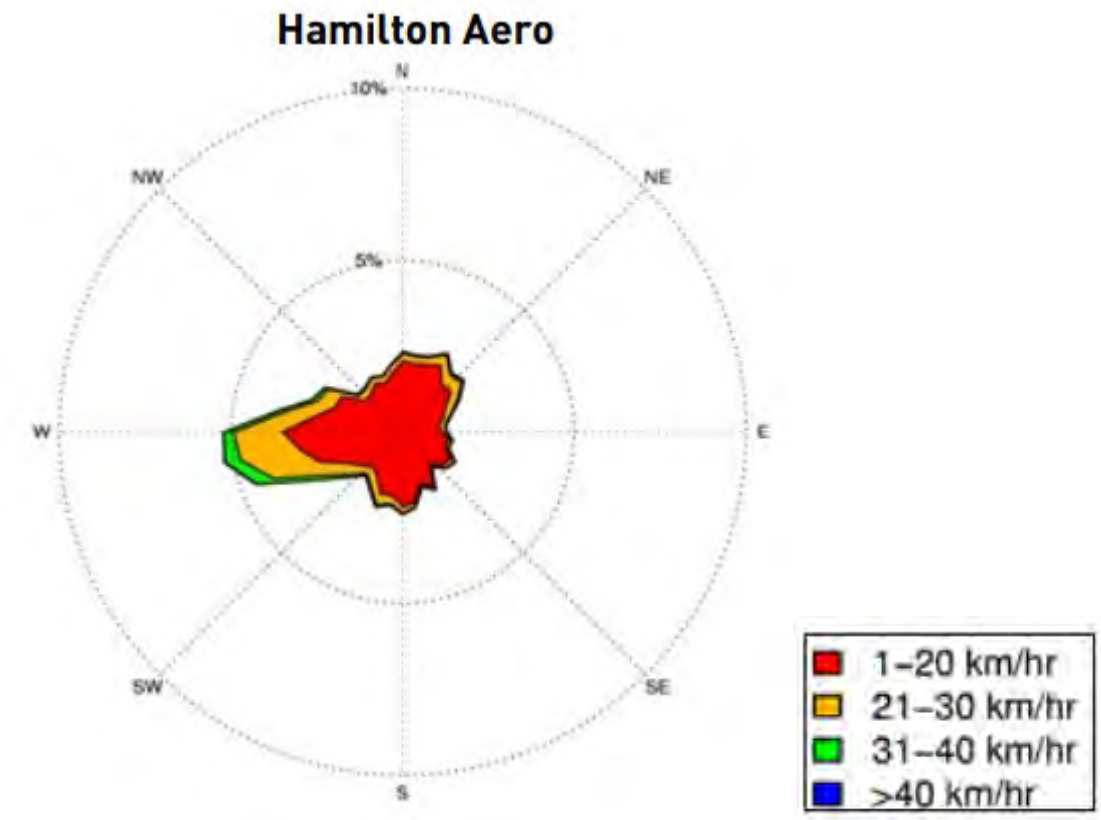


Figure 5: Mean Annual Wind frequency (%) of surface wind direction from hourly observations at Hamilton Airport. Plot shows direction from which the wind blows (Source: NIWA Report “The Climate and Weather of the Waikato” Second Edition, P.R.Chappell).

Hamilton also experiences a very marked diurnal variation in wind speed, with greatest wind speeds occurring in the early part of the afternoon. This is because at that time of day heating of the land surface is most intense and stronger winds aloft are brought down to ground level by turbulent mixing. Cooling at night generally restores a lighter wind regime.

Table 2 gives average wind speeds at three-hourly intervals for the Hamilton Airport location.

Table 3: Average wind speed (km/hr) for selected hours at Hamilton Airport

Hour	00	03	06	09	12	15	18	21
Wind Speed	8	7	7	9	14	16	14	9

Given the closest sensitive receptors are located to the north and northeast of the site’s extent of works, the risk of causing nuisance and/or objectionable dust will be highest during the following conditions / periods;

- High speed southerly or south westerly winds;
- Dry weather;
- Early afternoons (generally); and
- Periods of higher traffic and/or excavation or earth moving activities.

13.3 Dust Control Measures

Dust will be controlled on site through a combination of dust minimisation and mitigation methods based on the following key site design and operation principles;

Design Principles:

- Minimising the open quarry area to no more than 3 hectares;
- Implementation of a secure supply of water (bore),
- Establishment of contingency water carts for dust suppression;
- Establishment of a truck wheel wash;
- Retaining existing shelter belt vegetation that acts both as a barrier to wind exiting the site and a filter to intercept any entrained dust. The existence of a mature shelter belt on the eastern site boundary (i.e. the predominant down-wind site boundary) is particularly advantageous in this respect (refer Figure 6); and
- Sealing the site entrance and first 100m of the site access road; and
- Locating the accessway parallel to the existing shelter belt;



Figure 6: View of the existing shelter belt along the eastern (side) boundary

Operational Principles

- Staff training and awareness of dust generation risk factors and mitigation measures;
- Employment of water spray or water carts to dampen dust in dry / windy conditions (particularly if blowing from the south or southwest);
- Regular visual monitoring;
- Enforcement of on-site speed restrictions;
- Se of a truck wheel wash to minimise tracking of sediment by outbound trucks;
- Neighbours feedback / complaint response.

13.4 Water Supply

A bore with a 50m³ per day water take will be established on site, this will be the primary source of water for dust controls on site. The following has been assumed for the proposed water usage on site:

- Automatic wheel wash, with 200 litres of water usage per truck;
133 maximum total movements = 67 truck washes (outbound only)
13.43m³ per day;
- 10,000 litre water cart used on site a minimum of 3 times per day;
36.6m³ water available for use.

It is assumed that on extremely hot and windy days that additional dust suppression may be required over and above the 50m³ limit, however, any additional water shall be from the Waipa District Council Bulk Water Filling Station (application required). This bulk filling station is located at Matos Segedin Drive, located approximately 5.2km or 4 minutes from the quarry site.

13.5 Dust Mitigation Methods and Contingencies

Drawing on the dust management principles outlined above, the initiatives set out in Table 3 will be implemented on site to mitigate dust generation from specific sources and specific site related activities.

Table 4: Specific dust management mitigation and controls

Dust Source or Activity	Mitigation / Control
General observation and risk management	<ul style="list-style-type: none">• All staff will be trained on site specific dust risk factors and will be encouraged to be vigilant in identifying conditions that could result in objectionable dust spreading beyond the boundary of the site and to plan site works appropriately given particular environmental conditions. Examples include;<ul style="list-style-type: none">• Monitoring site conditions (weather/soil conditions) to anticipate and prevent dust effects;• Planning activities with higher dust generation potential in the morning;• Limiting or avoiding operations which have the potential to cause high dust during high wind conditions.
Observed dust issue	<ul style="list-style-type: none">• The process following identification of a dust issue, or potential dust issue, is that the quarry site manager (or acting site manager) is immediately advised and he or she then implements an appropriate management response. Options for resolving the dust issue may include:<ul style="list-style-type: none">• Directing the site water cart to the problem area or activating water sprays in that area to dampen down the dust;• Stopping the on-site activity that is causing the dust issue;• Halting and rescheduling certain high dust generation activities until wind has reduced or changed direction away from receptors.• Cleaning paved surfaces if affected by tracking of transported dust.



Dust Source or Activity	Mitigation / Control
Stockpiles (including material placement and removal)	<ul style="list-style-type: none"> • Making sure stockpiles exist for the shortest possible time. • Stockpiles oriented to maximise wind sheltering where possible. • Stockpiles positioned as far as practical away from property boundaries. • Limiting the height and slope of stockpiles. • Surfaces of stockpiles to be kept damp to reduce dust emissions (e.g. through wet suppression systems) or covered or stabilised to reduce dust generation in areas adjacent sensitive receptors.
Unpaved surfaces, such as haul roads and construction yards	<ul style="list-style-type: none"> • Unsealed surfaces kept damp to reduce dust emissions (e.g. by use of water carts). • Stabilisation of surfaces when works are completed by grassing, metalling or sealing surfaces to reduce dust emissions. • Consideration to use of polymers for surface stabilisation where there is a high risk of effects.
Vehicle movements	<ul style="list-style-type: none"> • Setting lower vehicle speed limits on unsealed surfaces in areas near sensitive receptors. • Reducing transportation of dust through regular cleaning of vehicles including wheels (e.g. wheel wash)

14. TRAFFIC

Daily traffic movements will be recorded.

The maximum number of heavy vehicle movements generated by the activity shall not exceed:

- a) Daily maximum of 133 HCV movements/day; and
- b) Daily average of 106 HCV movements /day (calculated over a one-month period)

15. NOISE

All machinery equipment shall be operated and maintained in accordance with the manufacturer's specifications, with the best practicable options are adopted to ensure that the emission of noise does not exceed a reasonable level.

The following limits are not to be exceeded within the notional boundary (20m from the most exposed external walls of any dwelling or any building used for accommodation) of any dwelling (excluding dwellings within mineral extraction sites):

- 7am to 10pm - 50dBA
- 10pm to 7am - 40dBA and a single noise event of 70dBA

In accordance with the Marshall Day Noise Report, earth bunding is required in some locations along the northern Boundary (Figure 7).

The following constraints on operations will be adopted to ensure daytime compliance is achieved at the nearest noise sensitive receivers. These constraints are as follows:



- Before topsoil stripping occurs within 180 metres of any dwelling façade (160m from any notional boundary) without a bund in place, the written approval and/or planning permission should be obtained from that party. Based on the extent of the proposed operation, bulldozer topsoil extraction cannot occur within 180 metres of the dwellings: R1 – 1/898 Kaipaki Road, R2 – 898 Kaipaki Road, R3 – 906 Kaipaki Road & R4 – 914 Kaipaki Road, unless written approval is gained from the owners/occupiers
- Before sand extraction can occur within the areas of constraint, an earth bund of 2.0-meters (gradient: 1:3) must be established.
- Nearby dwelling owners/occupants will be advised in advance where topsoil stripping will occur within 180 metres of their dwelling. This information shall be provided in writing and shall include the expected dates of the work, hours and days of the week that topsoil stripping will occur on as well as any other information relevant to the party.

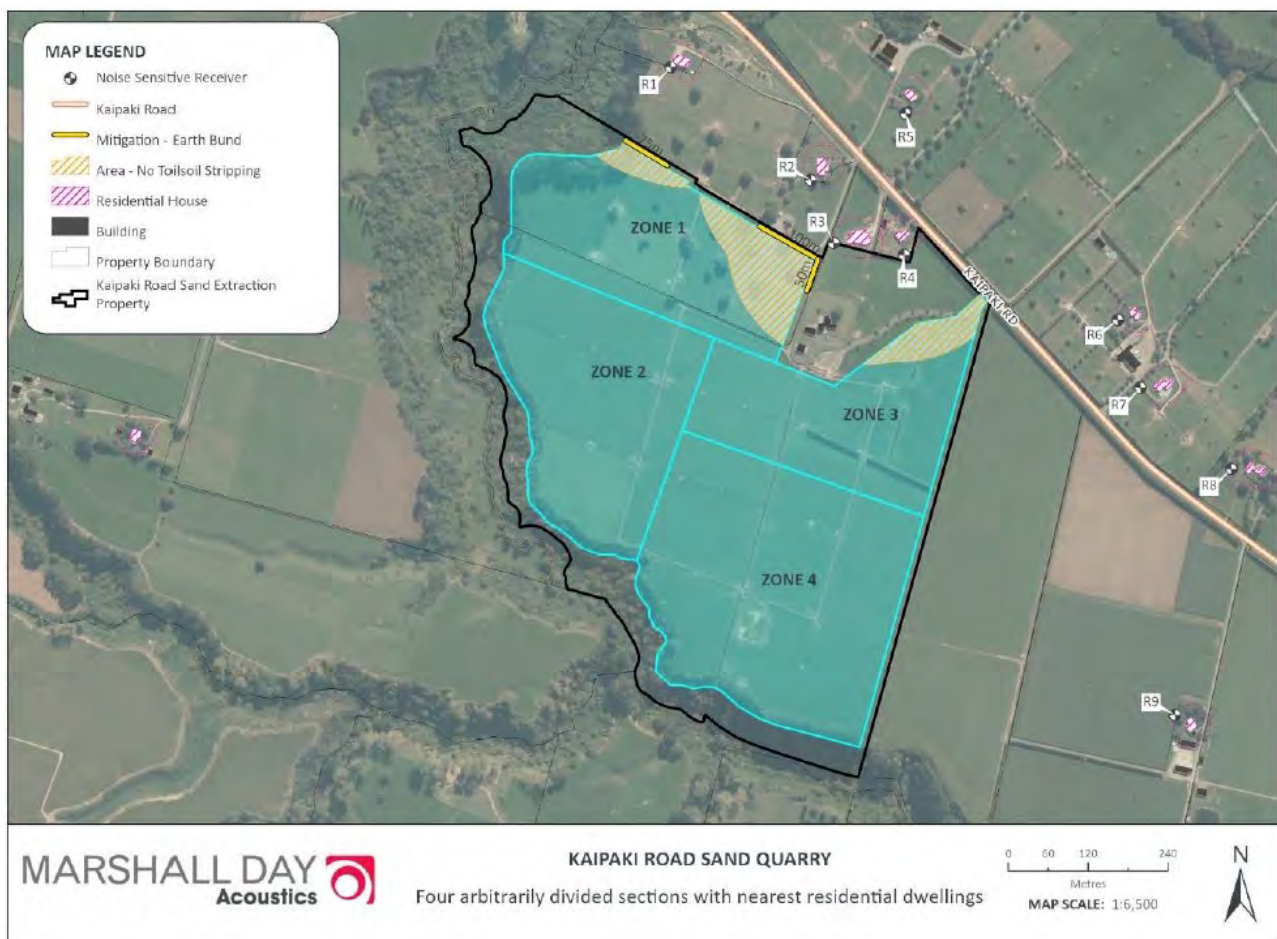


Figure 7: Site plan showing locations of required noise attenuation bunds

16.COMPLAINTS

All verbal and written complaints will be recorded and kept on site. Upon receiving a complaint, the following process will be undertaken;

- Records taken of the time and date of the complaint/s, the identity and contact details of the



complainant (if offered) and entered on a Complaint Form.

- The complainant will be asked to describe the nature and timing of effect being experienced;
 - Is it constant or intermittent,
 - How long has it been going on for,
 - Is it worse at any time of day,
 - Does it come from an identifiable source.

Information on the nature and timing of the effects to be recorded in the Complaint Form

- If known, wind direction, strength and weather conditions at the time of the incident resulting in the complaint to be recorded in the Complaint Form.
- As soon as possible after receipt of a complaint, undertake a site inspection. Note all dust generating activities taking place and the mitigation methods being used. If the complaint was related to an event in the recent past, and if possible, note any dust generating activities that were underway at that time. Initiate any remedial action necessary.
- As soon as possible (within 2 hours, where practicable), visit the area from where the complaint originated to ascertain if dust is still a problem.
- If it becomes apparent there may be a source of dust other than the construction project causing the complaint, it is important to verify this. Photograph the source and emissions.
- As soon as possible after initial investigations have been completed, contact the complainant to explain any problems found and remedial actions taken. Record this information on the Complaint Form.

All complaints received and investigated will be included in the site's Complaints Register. All records within the Complaints Register will be kept for no less than five years.

17. REHABILITATION AND LANDSCAPE WORKS

As the quarry expands throughout the property, the disturbed areas will be rehabilitated with the placement of unsuitable and imported (cleanfill) material in general accordance with the Staging Plan (Appendix B) and the Final Contour Plan (Appendix D showing existing land contours which approximate the final rehabilitation contours). This land will be top soiled and re-grassed and/or revegetated, for the return to pasture as soon as practicable.

18. REPORTING

Compliance reports will be prepared in accordance with the site's resource consents. These are summarised in Table 5.

Table 5: Site Reporting Schedule <update post consenting>

Report	Consent / Condition	Frequency	Recipients	Submission Date
Annual Report			WDC	

19. DOCUMENT REVIEW

This QCMP, inclusive of the Erosion & Sediment Control Plan and Staging plan will be reviewed at least once every two years. Any amended versions will be submitted to the Waikato Regional Council and Waipa District Council.



When reviewing this document, the following matters should be considered:

- Records of any incident reports (Health and Safety and Environment), any monitoring results and any complaints or feedback received from neighbours;
- Any internal and external audit results (health and safety or environmental);
- Records of compliance with the site's resource consents, regional and district plans and other relevant legislation; and
- Any changes to the regulatory environment.



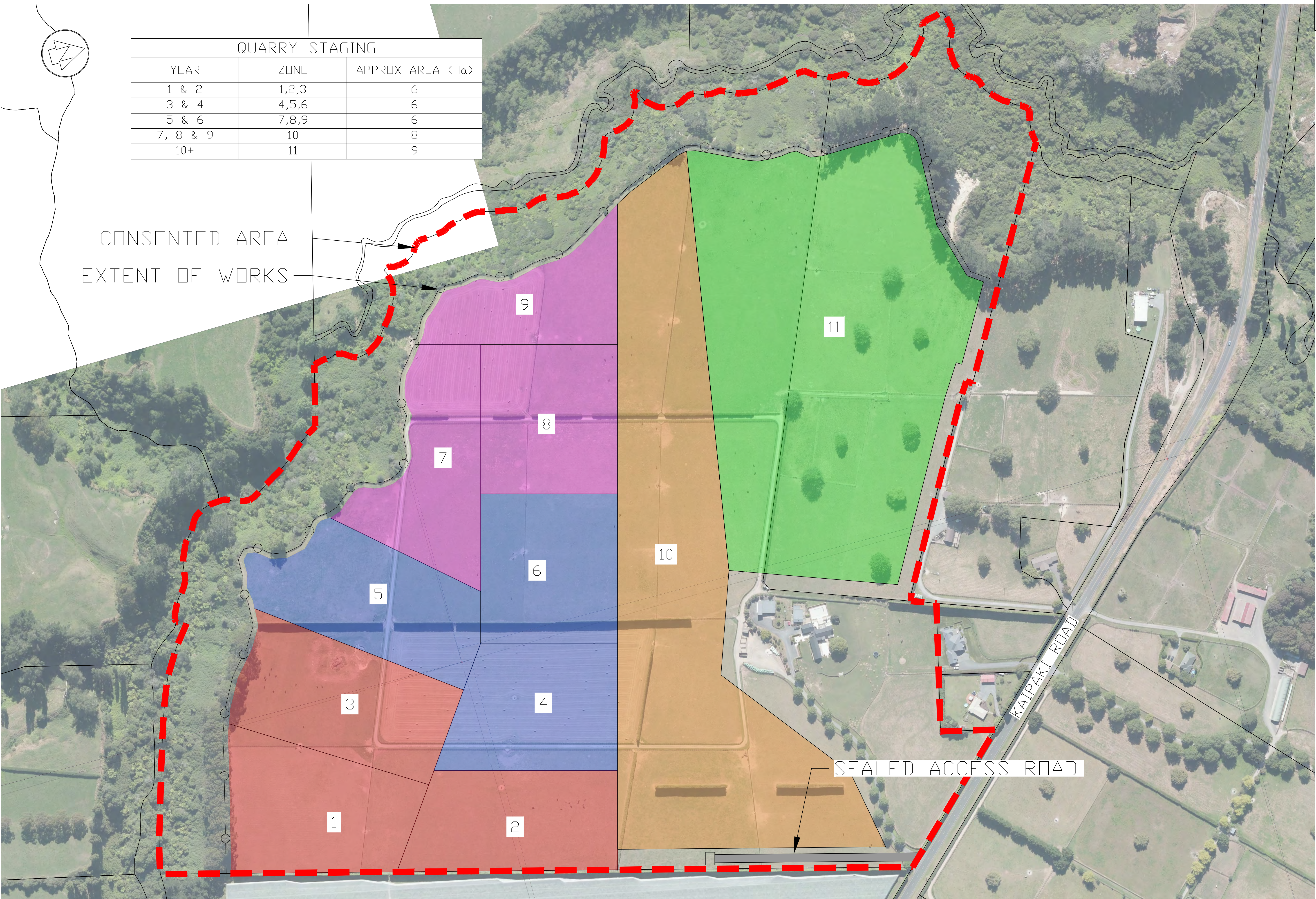
APPENDIX A – COPIES OF RESOURCE CONSENTS



APPENDIX B: STAGING PLAN



QUARRY STAGING		
YEAR	ZONE	APPROX AREA (Ha)
1 & 2	1,2,3	6
3 & 4	4,5,6	6
5 & 6	7,8,9	6
7, 8 & 9	10	8
10+	11	9



APPENDIX C: DRAFT ESCP



LEGEND

- SEALED ACCESS ROAD
— < — < — STORMWATER SWALE
— — — UNSEALED ACCESS ROAD
— 5.0m BUFFER ZONE
— — — TOPSOIL BUD

SITE DESCRIPTION

THE SITE IS APPROXIMATELY 36HA IN SIZE AND IS LOCATED AT 928 KAIPAKI ROAD, APPROXIMATELY 4KM WEST OF CAMBRIDGE ROAD. THE SOUTH-WESTERN BOUNDARY OF THE PROPERTY IS LOCATED ON AN EXISTING STEEP GULLY, WHERE THE MANGAWHERO STREAM IS LOCATED.

THE SITE TOPOGRAPHY IS GENERALLY FLAT, WITH EXISTING OVERLAND FLOW BEING GENERALLY DIRECTED TO THE CENTER OF THE PROPERTY. SITE WATER SUPPLY IS PROVIDED VIA A BORE ON SITE (CONSENT PENDING) AND ADDITION SUPPLY VIA WAIPA DISTRICT COUNCIL'S BULK WATER FILLING STATION, LOCATED AT MATOS SEGIDIN DRIVE (LOCATED 5.2KM FROM SITE).

DESCRIPTION OF WORKS

THE PROPOSAL IS TO BOTH EXTRACT SAND FROM THE QUARRY AND IMPORT CLEANFILL. THE SAND WILL BE EXTRACTED AND EXPORTED VIA TRUCK AND TRAILER WITHOUT ANY PROCESSING (WASHING, GRADING ETC.). REFER TO THE QUARRY AND CLEANFILL MANAGEMENT PLAN FOR FURTHER DETAILS.

METHODOLOGY

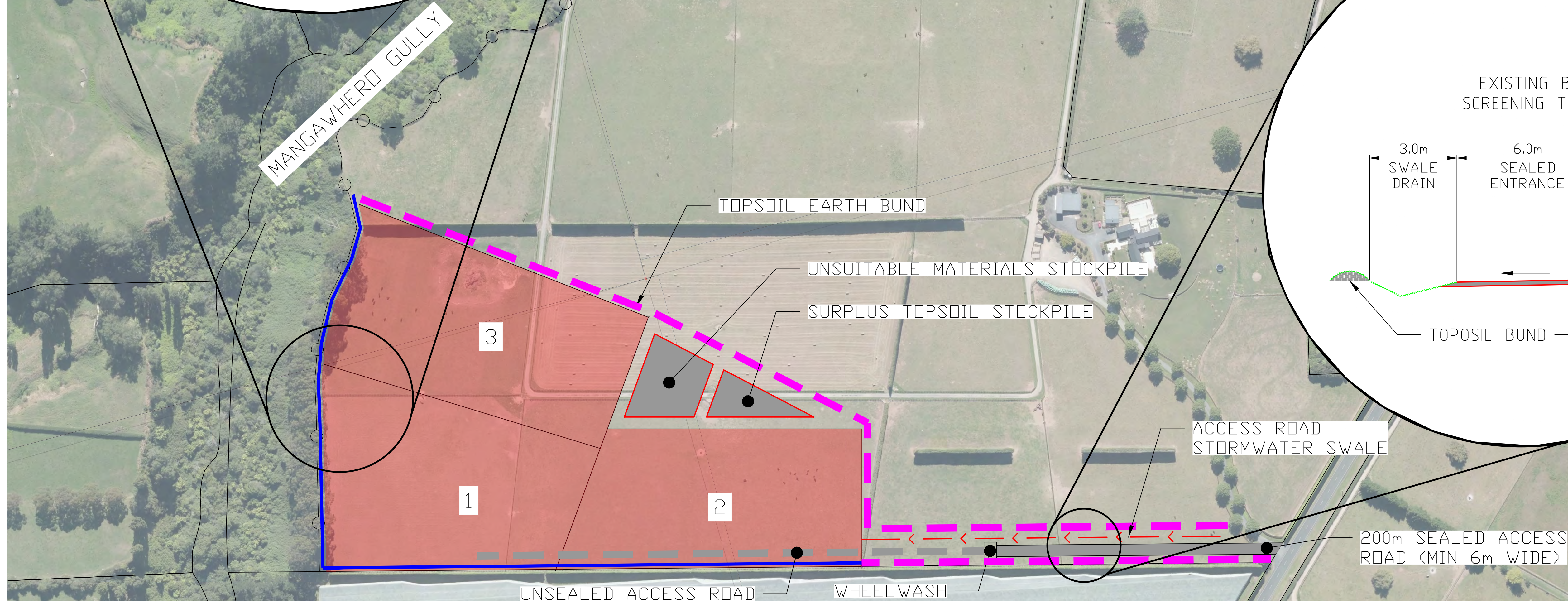
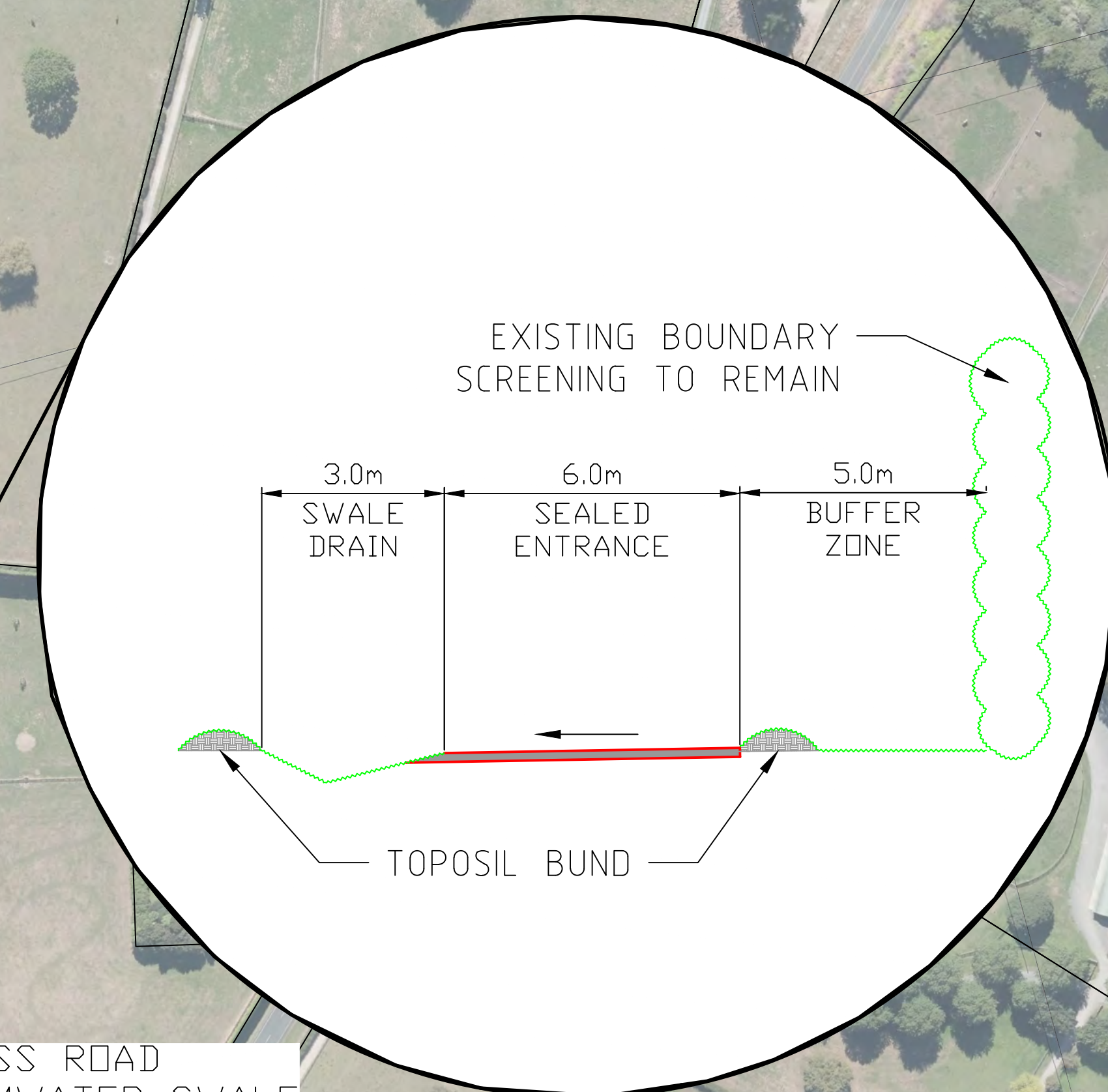
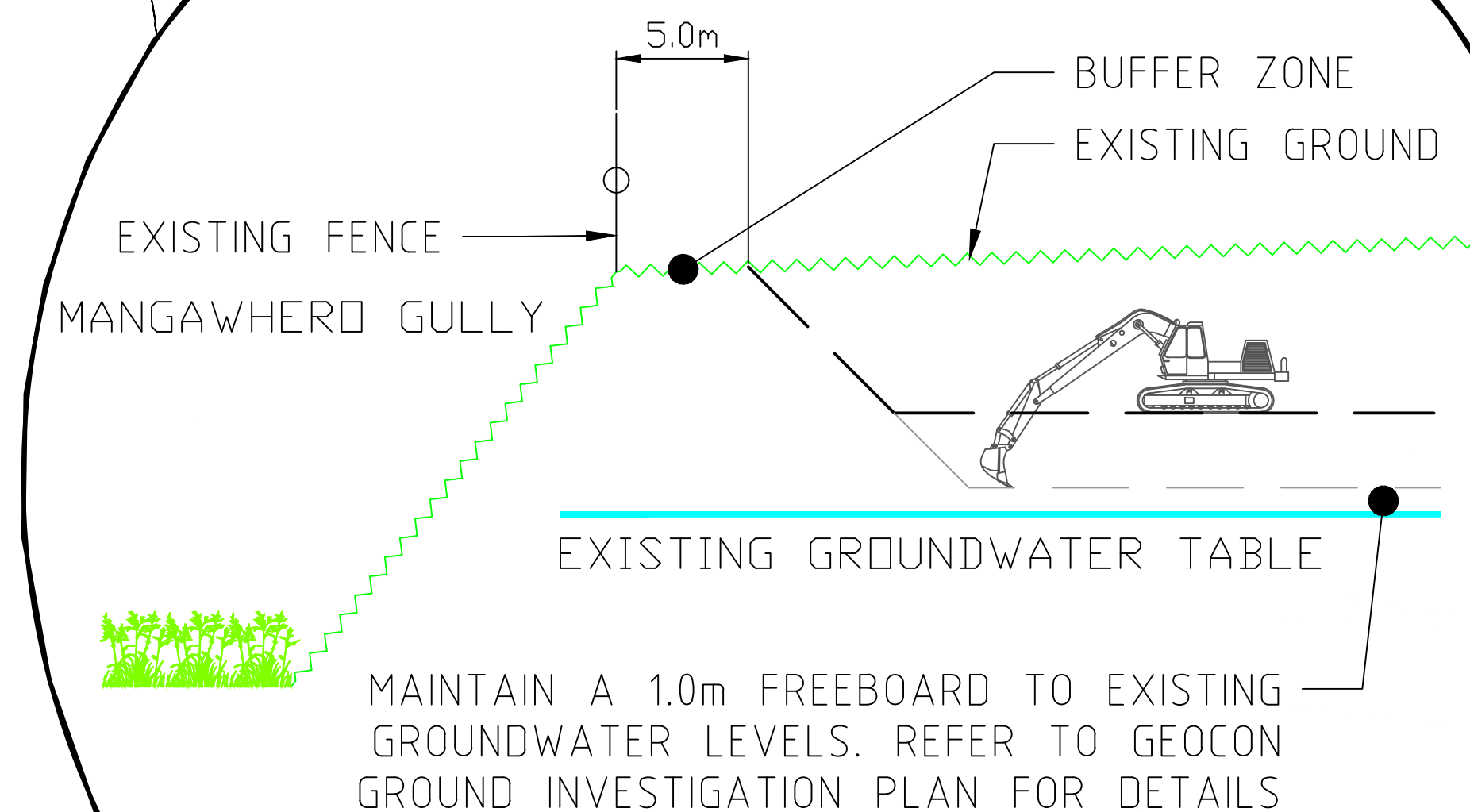
MANAGING RUNOFF ON SITE WILL BE MAINLY VIA SOAKAGE AND IMPOUNDMENT. RUNOFF AND SEDIMENT WILL BE CONTAINED WITHIN THE QUARRY EXCAVATIONS, AS THE EXCAVATION DEEPENS, STORAGE VOLUMES INCREASE.

THE GULLY WILL BE PROTECTED BY PROVIDING A 5m BUFFER, WITH NO EXCAVATION TO OCCUR ON THE GULLY SLOPE. THIS WILL ENSURE THAT ALL SEDIMENT LADEN RUNOFF WILL BE DIRECTED AWAY FROM THE GULLY.

TOPSOIL STRIP FROM THE EARTHWORKED AREAS WILL BE PLACED AROUND THE PROXIMITY OF THE WORKING AREA TO REDUCE ANY CLEAN WATER RUNOFF INTO THE EXCAVATION.

MITIGATION METHODS

- AREA OF EXPOSED EARTHWORKS WILL BE LIMITED DURING CONSTRUCTION TO 3Ha BY SPLITTING AND WORKING THE SITE IN SEVERAL ZONES.
- DUST WILL BE MANAGED ON SITE BY WATER CART, WITH WATER FROM THE BORE AND AS A CONTINGENCY, THE WAIPA DISTRICT COUNCIL BULK FILLING STATION AT MATOS SEGIDIN DRIVE.
- A WHEEL WASH WILL BE UTILISED FOR EXITING VEHICLES, PRIOR TO THE SEALED ACCESS ROAD
- DEDICATED SEALED CONSTRUCTION VEHICLE ACCESS ROAD (200M LONG) WILL BE CONSTRUCTED TO MINIMISE TRACKING OF DEBRIS ONTO KAIPAKI ROAD



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CLIENT:

SHAWS PROPERTY
HOLDINGS

REF: 4767

PROJECT:

KAIPAKI ROAD QUARRY

TITLE:

STAGE 1 - EROSION & SEDIMENT CONTROL
LAYOUT PLAN

NOTES:

1. The contractor is responsible for locating all underground services prior to commencing works;
2. All works and materials to comply with the WDC Development Manual 2012;
3. A meeting is required with the contractor and engineer prior to commencing works.

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SCALE:

N.T.S.

DATE:

13/04/20

DRAWING NUMBER:

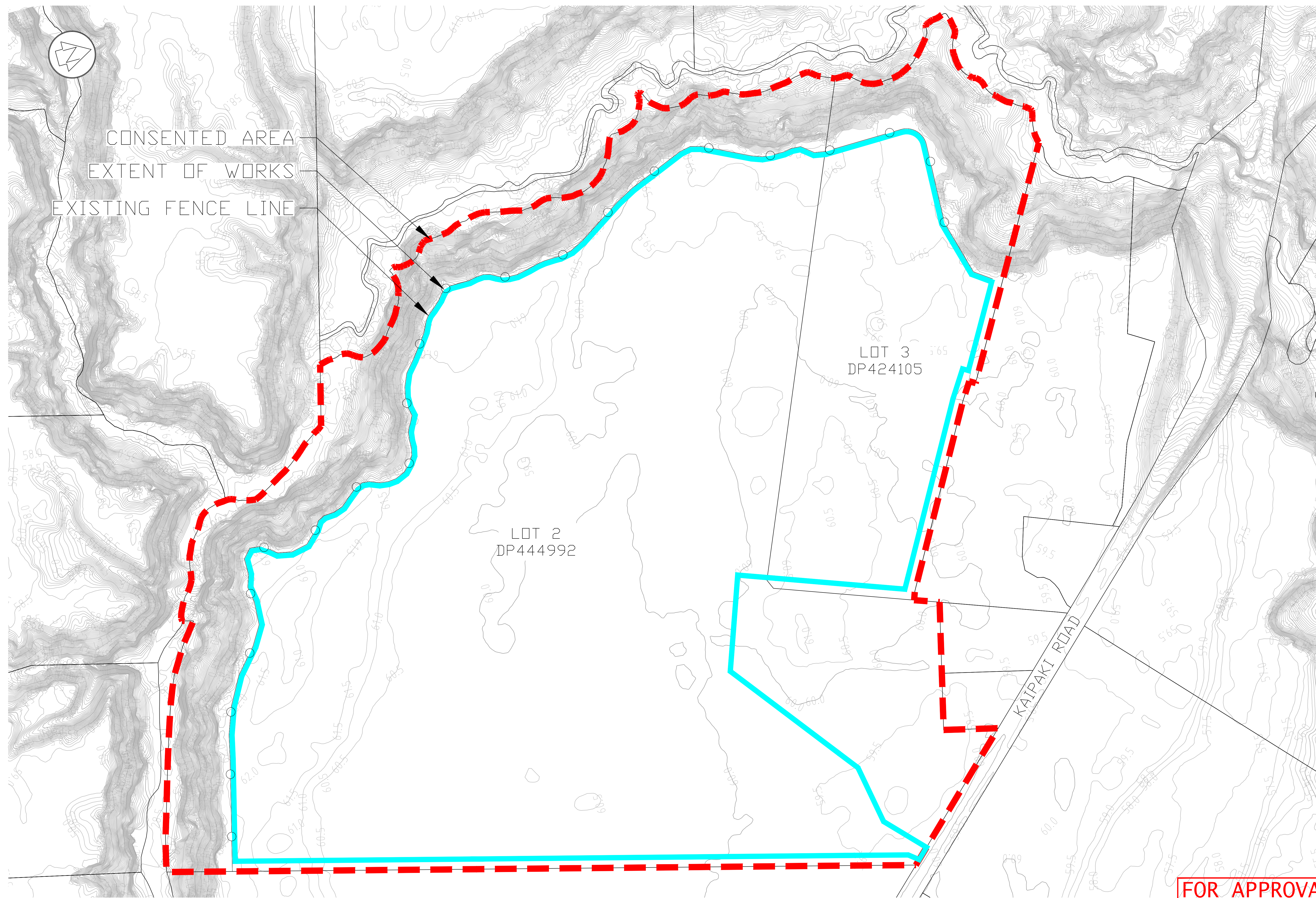
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APPENDIX D: Existing Land Contours – Approximating Final Rehabilitation Contours





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CLIENT:

SHAWS PROPERTY
HOLDINGS

REF: 4767

PROJECT:

KAIPAKI ROAD QUARRY

TITLE:

EXISTING CONTOUR
LAYOUT PLAN

NOTES:
1. LEVELS ARE IN TERMS OF
2. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND SERVICES
PRIOR TO COMMENCING WORKS;
3. ALL WORKS AND MATERIALS TO COMPLY WITH REGIONAL INFRASTRUCTURE
TECHNICAL SPECIFICATIONS (RITS)
4. A MEETING IS REQUIRED WITH THE CONTRACTOR AND ENGINEER PRIOR TO
COMMENCING WORKS.
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DATE:

13/04/20

DRAWING NUMBER:

4767-CK-002

REV:

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APPENDIX E

Integrated Traffic Assessment – Gray
Matter Limited

**Proposed Sand Quarry
928 Kaipaki Road, Cambridge
Integrated Transport Assessment**

Shaws Property Holdings Ltd

ISSUE 3, 21 APRIL 2020



**Proposed Sand Quarry
928 Kaipaki Road, Cambridge
Integrated Transport Assessment
Shaws Property Holdings Ltd**

Prepared by: 

Melanie Parsons

Approved by: 

Alastair Black

ISSUE 3, 21 APRIL 2020

2 Alfred Street
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Tel: 07 853 8997



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EXECUTIVE SUMMARY

Shaws Property Ltd is making an application for resource consent to Waipa District Council (WDC) for a proposed sand quarry and cleanfill operation located at 928 Kaipaki Road. The site has potential to supply an estimated 900,000m³ of sand over a 7-10 year period with most of the sand expected to be destined for projects in the Cambridge area.

The proposal is generally compliant with the transportation requirements of the Waipa Operative District Plan (WODP). There are no significant non-compliances and the effects from the proposed quarry can be mitigated. The scale of the effects will depend on the frequency and intensity of any peaks, although these can be managed by consent conditions.

Based on an estimated 900,000m³ of sand over 7-10 years plus cleanfilling, we expect the average trip generation to be approximately 76 veh/day including 68 HCV/day. This is equivalent to an increase in traffic of approximately 2% with up to 12% heavy vehicles. This is within the capacity of the network and is not considered a significant change in traffic volume.

Upgrading the vehicle crossing to Diagram E standard is required to provide safe and efficient access to the sand quarry, cleanfill operation and residential dwelling. We recommend detailed design approval by WDC to ensure that the design adequately provides for heavy vehicle manoeuvring and minimises the potential for conflict with vehicles using the existing residential access.

The proposal relies on the large site area to provide sufficient parking, loading and manoeuvring space and requires a degree of flexibility for operational reasons and can be managed through the Quarry Management Plan.

The potential transport related effects are from the increase in traffic (most noticeably heavy vehicle traffic), and they mainly relate to safety, efficiency, parking / maneuvering and pavement impacts.

- = The additional traffic is within the capacity of the surrounding road network and efficiency is unlikely to be adversely affected.
- = A vehicle entrance designed to Diagram E standard is expected to be sufficient to accommodate the additional traffic with no reason to expect safety issues.
- = Sufficient space is available on site to accommodate expected parking and manoeuvring. No off-site effects expected.

With appropriate conditions, the potential adverse effects of the proposal could be mitigated to be no more than minor. We recommend the following mitigation:

- = Detailed design approval of the vehicle entrance by WDC with a focus on:
 - o Diagram E widening modified to suit heavy vehicle tracking;
 - o Relocation of the existing private access and gate;
 - o Gate set back from the traffic lane a sufficient distance to allow any vehicle visiting the site to stop clear of the traffic lane (a minimum of 25m);
 - o Access road to allow two-way vehicle movement for the first 80m from Kaipaki Road; and
 - o Spacing and size of the proposed passing bays (if required).
- = Condition specifying design of the internal access road as:
 - o Minimum of 6m width for a minimum of 80m from Kaipaki Road; and
 - o Minimum of 6m width up to the site office and wheel wash areas; or
 - o Minimum of 3m wide with passing bays provided at least every 100m with visibility between the passing bays.
- = Independent Stage 3 (detailed design) road safety audit for the vehicle entrance to Kaipaki Road.

- = Specific consideration of parking, loading and manoeuvring requirements in the Quarry Management Plan.
- = Dust control through the Quarry Management Plan (this may require a wheel wash).
- = Conditions that specify the monthly average and daily peak vehicle movements.
- = Condition requiring monitoring and reporting of vehicle movements by the consent holder.
- = Temporary traffic management plan to manage construction effects.

Provided the mitigation summarised above is carried out, the transport effects are expected to be no more than minor, and there is no reason related to transport why the proposal should not proceed.

1. INTRODUCTION

1.1. Background

Shaws Property Holdings Ltd (the Applicant) is seeking resource consent to establish a sand quarry and cleanfill activity at 928 Kaipaki Road, Cambridge.

Gray Matter Ltd has been engaged by Shaws Property Holdings Ltd to prepare an Integrated Transport Assessment (ITA) to assess the transportation impacts of the proposal.

1.2. Purpose and Basis of this Report

The purpose of this ITA is to assess the traffic and transportation impacts of the proposed development on the surrounding area and against the requirements of the Waipa Operative District Plan (WODP) November 2016.

This ITA presents an assessment of the likely traffic and transportation issues associated with the proposed sand quarry and cleanfill operation. It comprises:

- = A summary description of the site, and comments on the surrounding road network, including function and traffic volumes;
- = Comments on the proposal, including traffic generation and access;
- = An assessment against traffic and transportation requirements of the WODP;
- = Evaluation of the likely traffic impacts; and
- = Conclusions, including a summary of impacts and suggested conditions of consent.

Our assessment is based on the following information:

- = A site visit (18 June 2019);
- = Traffic count and road geometry information from mobileroad.org;
- = NZ Transport Agency Crash Analysis System (CAS); and
- = NZ Transport Agency Safer Journey Risk Assessment Tool.



Figure 1: Site Location (Regional Context)

2. SITE AND SURROUNDING TRANSPORT ENVIRONMENT

2.1. Site Description

The proposed application site is located at 928 Kaipaki Road, Cambridge. The area of the site is approximately 49.98ha. The site is located within the Waipa DC Rural zone and contains one existing dwelling. Currently the site is in pasture and is utilised for cropping and grazing. Surrounding land use includes lifestyle blocks, horse stud, pastoral farming and horticulture. The site is bounded by a stream/gully to the south and west.

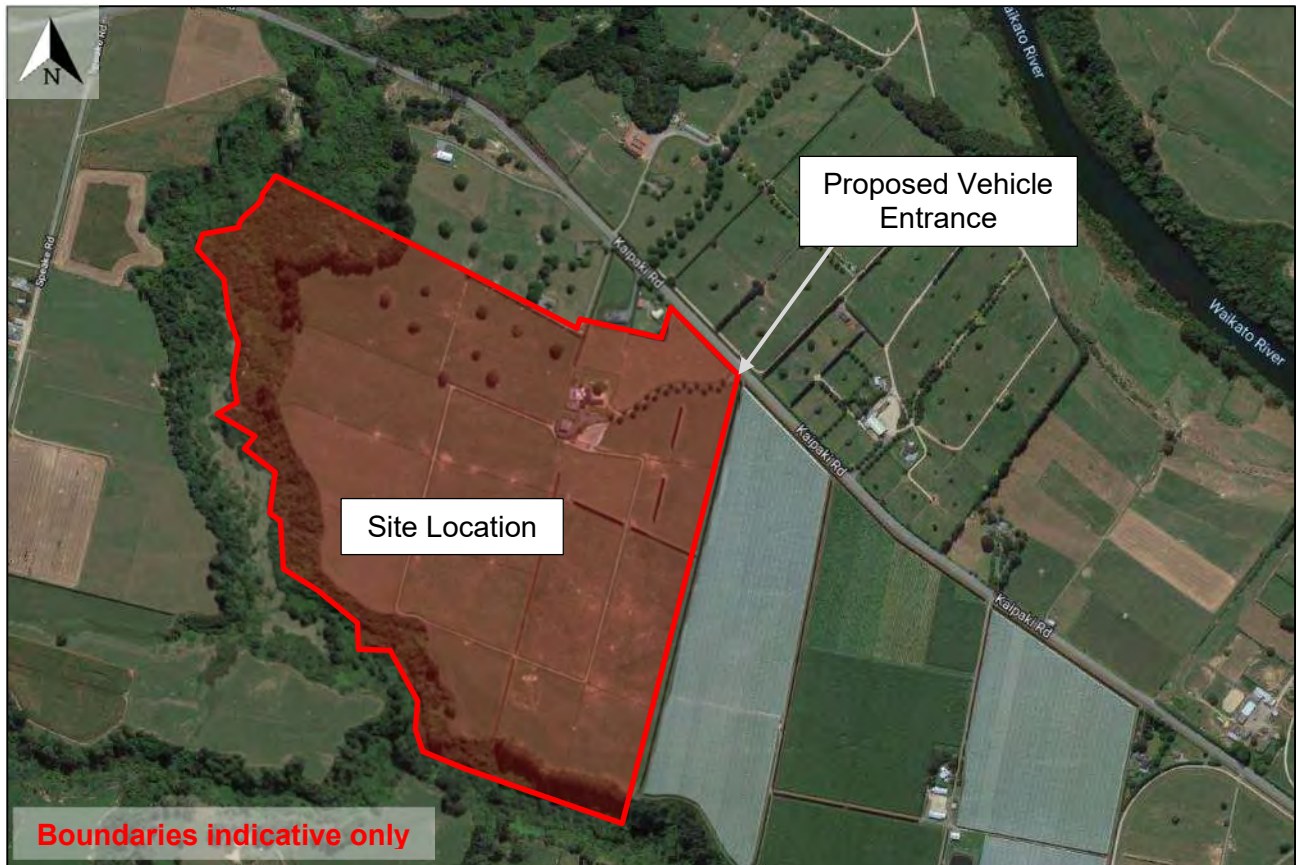


Figure 2: Site Location (Local Context)

2.2. Road Network

The road hierarchy (WODP Appendix T5) classifies Kaipaki Road as a collector road between SH3 and Mellow Road and a minor arterial route between Mellow Road and Cambridge Road. Kaipaki Road intersects Cambridge Road at its eastern end, and SH3 at its western end and is approximately 13 kilometres long. It is used as a link between Cambridge and Ohaupo, and as access from Cambridge to the Hamilton Airport, Rukuhia and south Hamilton. There are ten intersections along Kaipaki Road.



Figure 3: Existing Road Network

At the site Kaipaki Road has a 100km/h posted speed limit and a two-lane carriageway with 3.4m lane widths in each direction and average annual daily traffic (AADT) of 3,200 veh/day.

Kaipaki Road traffic volumes as recorded in mobileroad.org (as at 14/06/2019) are:

- = 1,300 vehicles per day (veh/day) including 9.3% Heavy Commercial Vehicle (HCV) from State Highway 3 to Tarr Road;
- = 2,100 veh/day including 9.3% HCV from Tarr Road to McEldownie Road;
- = 3,200 veh/day including 10.2% HCV from McEldownie Road to Cambridge Road.

The NZ Transport Agency's (NZTA's) Safer Journeys Risk Assessment Tool indicates the Safe and Appropriate Speed for the full length of Kaipaki Road is 80km/h.

The Safer Roads, Safer Waipa campaign recently¹ implemented reduced posted speed limits on the roads around the Kaipaki area to 80km/h, including:

- = Kaipaki Road: 80km/h from a point 380m west of Mellow Road to a point 200m east of McEldownie Road and variable 60/80km/h speed limit on the section of Kaipaki Road outside Kaipaki School;
- = All of Mellow Road: 80km/h;
- = All of McEldownie Road: 80km/h;
- = Mystery Creek Road: 60km/h from Airport Road (SH21) to a point 1,450m west of Angus Road, and 80km/h from a point 1,450m west of Angus Road to McEldownie Road; and

¹ <https://www.waipadc.govt.nz/repository/libraries/id:26zg4o7s1cxbyk7hfo7/hierarchy/our-council/bylawsandpolicies/bylaws/documents/Speed%20Limits%20Bylaw%202019%20-%20Adopted.pdf>

= Cambridge Road: 80km/h from a point 200m south of Kaipaki Road to a point 190m west of Ihimaera Terrace.

The proposed sand quarry is located 2.1km east of the 80km/h section of Kaipaki Road.

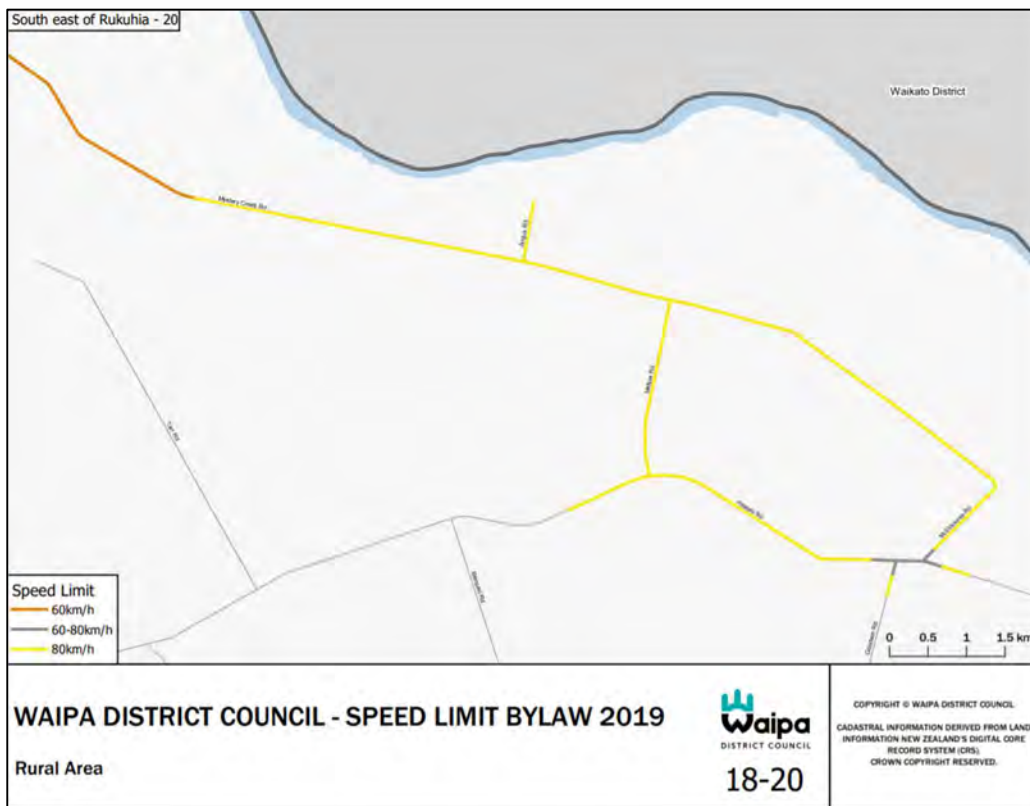


Figure 4: Speed reductions from the Waipa District Speed Limits Bylaw 2019

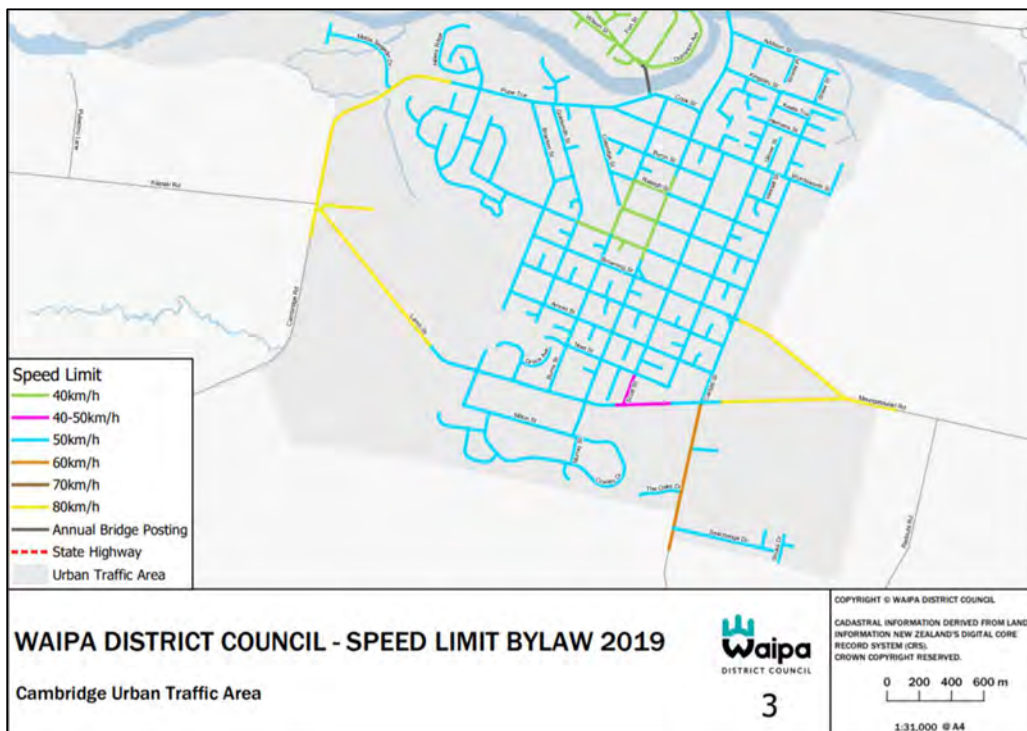


Figure 5: Speed reductions from the Waipa District Speed Limits Bylaw 2019

2.2.1. Cambridge Road Intersection

The intersection of Kaipaki Road and Cambridge Road is well formed with right-turn bays, a left-turn lane and splitter islands to guide turning vehicles and provide space for turning vehicles to wait clear of through traffic. Kaipaki Road has a stop control.

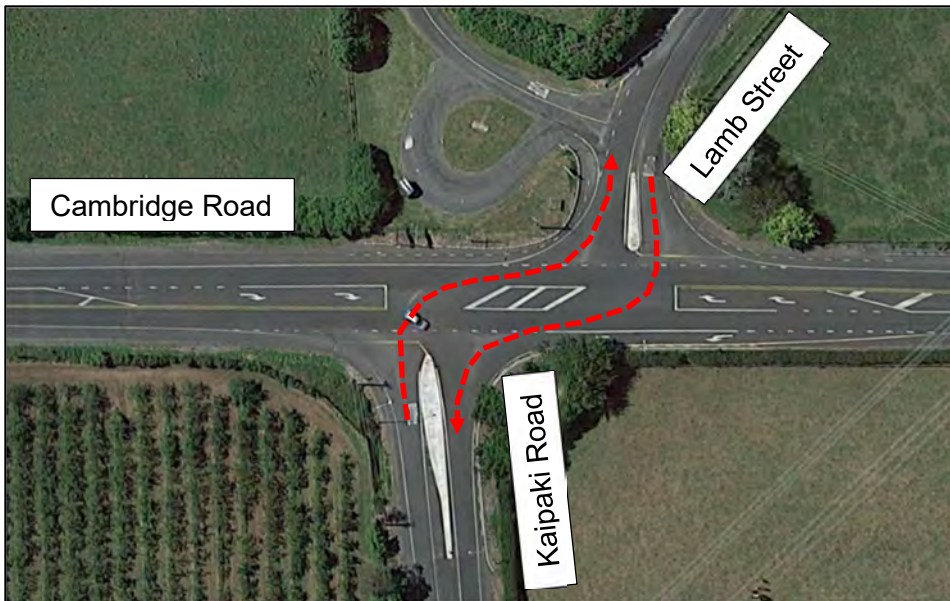


Figure 6: Intersection of Kaipaki Road and Cambridge Road

The cross-movements between Kaipaki Road and Lamb Street may be difficult for long, slow heavy vehicles to negotiate. The future needs of this intersection are currently being assessed as part of WDC's development of a structure plan for the C4 growth cell.

2.2.2. SH3 Ohaupo Road Intersection

The intersection of Kaipaki Road and SH3 (Ohaupo Road) is well formed with right-turn bays and a wide shoulder for decelerating left-turning traffic. Kaipaki Road has a stop control.

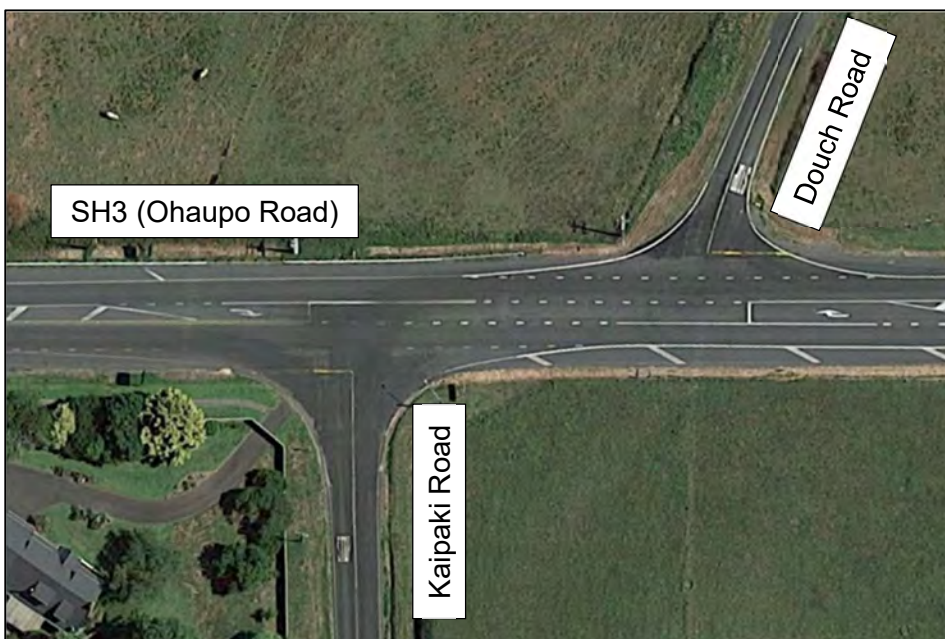


Figure 7: Intersection of Kaipaki Road and SH3 (Ohaupo Road)

2.2.3. Kaipaki Road / Mellow Road Intersection

The intersection of Kaipaki Road and Mellow Road is well formed with ample turning space for large vehicles. There are no auxiliary turning lanes. Kaipaki Road has priority and Mellow Road has a give way control.



Figure 8: Intersection of Kaipaki Road and Mellow Road

2.2.4. Mystery Creek Road / SH21 Airport Road Intersection

The intersection of Mystery Creek Road and SH21 (Airport Road) is well formed with a right-turn bay and a wide shoulder for decelerating left-turning traffic. Mystery Creek has a give way control.



Figure 9: Intersection of Mystery Creek Road and SH21 (Airport Road)

2.3. Traffic Volumes

Traffic volumes for Kaipaki Road and the surrounding road network are shown in the table below. The posted speed limit on all the roads listed is currently 100km/h.

Road Name	Waipa DC Road Classification	Traffic Volume veh/day	HCV* veh/day (%)
Kaipaki Road	Collector/ Minor arterial	1,300-3,200	121-326 (9.3-10.2%)
State Highway 3	Major Arterial	12,899	748 (5.8%)
Cambridge Road	Major Arterial	7,200	842 (11.7%)
Mellow Road	Minor Arterial	1,100	78 (7.1%)
Mystery Creek Road	Minor Arterial	2,260	210 (9.3%)
Norrish Road	Local	90	0%
Lynds Road	Local	240	0%
Tarr Road	Local	110	0%
Berquist Road	Local	55	0%
Goodwin Road	Local	195	20 (10%)
McEldownie Road	Local	1,000	94 (9.4%)
Speake Road	Local	20	-
Thrillwall Lane	Local	75	0%
Pukerimu Lane	Local	100	0%

Table 1: Traffic Volume for Road Network (* HCV figures given where listed)

2.4. Crash History 2015-2019

The NZ Transport Agency's Crash Analysis System (CAS) was used to search the crash history for the roads and intersections in the surrounding area during the last five calendar years from 2015 to 2019. Crash diagrams for the roads and intersections described below are included in Appendix 2.

There were 34 reported crashes along Kaipaki Road, including the intersections with Cambridge Road and SH3, during the five-year period. The crashes resulted in 17 minor and three severe injuries. No crashes were located at the existing vehicle entrance. There was one loss of control crash at each of the curves 550m west and 350m east of the existing vehicle entrance, resulting in two people with minor injuries.

The intersection of Kaipaki Road and Cambridge Road had three crashes occur in the 5-year analysis period. The crashes included five minor and one severe injury.

Within the 5-year analysis period there was one crash recorded at the intersection of SH3 and Kaipaki Road, with a vehicle turning right from Kaipaki Road failing to give way to a vehicle travelling south on SH3, resulting in one serious and one minor injury.

The intersection of Mellow Road and Kaipaki Road had one reported crash during the 5-year analysis period. The crash involved a vehicle turning right into Mellow Road being impacted from behind.

There does not appear to be an existing safety problem in the vicinity of the existing vehicle entrance or on any of the roads surrounding the site.

2.5. Existing Vehicle Entrances

The vehicle entrance at 928 Kaipaki Road provides access to the existing residence and farm. The driveway is formed and lined with mature trees and is accessed via electronic gates. The entrance is approximately 21m wide at the road edge and the gate is set back approximately 24m.

Immediately adjacent to the existing vehicle entrance is an access gate for the kiwifruit orchard. There is no formed vehicle entrance to this gate, and it appears that it is used infrequently. An access gate is located on the property opposite the existing vehicle entrance but appears to be unused.

There is a private vehicle entrance approximately 160m to the north-west on the same side of the road as the proposed sand quarry.



Figure 10: Looking across Kaipaki Road at the existing vehicle entrance

Sight distance looking right (south-east) is approximately 640m to the horizontal curve. Sight distance looking left (north-west) is approximately 400m to the crest vertical curve.



Figure 11: View from the proposed vehicle entrance looking south-east



Figure 12: View from the proposed vehicle entrance looking north-west (arrow indicates top of crest curve)

3. THE PROPOSAL

3.1. Description of the Proposal

The proposal is to establish a sand quarry and cleanfill operation on the site. No detailed site layout plans are available; however, details of the proposal include:

- = The site has potential to supply an estimated 900,000m³ of sand over a 7-10 year period;
- = The hours of operation for the site are to be:
 - o 7am to 5:30pm Monday-Friday
 - o 7am to 12pm Saturdays; and
 - o Closed Sundays and public Holidays;
- = Approximately four full-time staff;
- = Most of the sand is expected to be destined for projects in the Cambridge area (60-70%);
- = Cleanfill will usually be brought in by trucks arriving to pick up sand;
- = Public sales are not expected;
- = Sand extraction is to be split into stages, with only a small area being exposed at any one time to minimise effects and allow site rehabilitation;
- = Site access to be via a vehicle entrance and access road along the eastern boundary of the site;
- = There is adequate space on site for parking and manoeuvring so that vehicles will drive forwards when entering and exiting the site.

3.2. Proposed Vehicle Entrance

The proposal includes construction of a vehicle entrance to be formed alongside the existing vehicle entrance with the access along the property boundary.

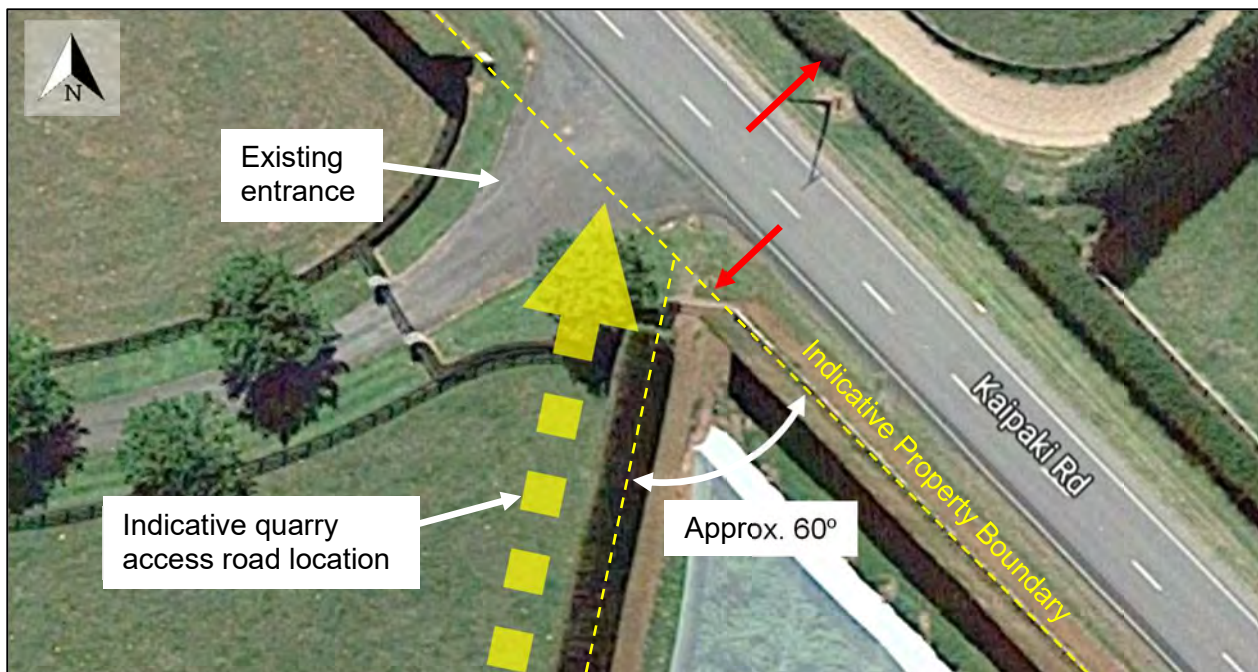


Figure 13: 928 Kaipaki Road proposed entrance and access road location showing skew angle (red arrows indicate existing property gates)

3.2.1. Entrance Separation

Rule 16.4.2.5 of the WODP requires a minimum distance of 200m between entrances on a road with a speed limit of 100km/h. The proposed location for the sand quarry access is to be shared with the existing property access and immediately adjacent to a gate to the neighbouring property (kiwifruit orchard). There is also a property access almost opposite the proposed quarry access.

3.2.2. Entrance Alignment

The property boundary is on a 60° skew angle relative to the centreline of Kaipaki Road (refer Figure 13 above).

Ideally the access would be perpendicular to Kaipaki Road, However, the RITS allows for a minimum intersection angle of 70 degrees². To achieve the minimum intersection angle, we propose that the access road be aligned to allow vehicles to straighten up on their approach to Kaipaki Road. With a realigned access road, the approach angle of a vehicle is likely to be between 70-90 degrees. Additional guidance could be provided by installation of a splitter island at the entranceway.

The observation angle for a vehicle exiting the access and looking right could be up to 120°. Austroads³ notes that the maximum observation angle for turning vehicles is 120°. It is likely that right-turning vehicles will straighten up as they approach the road edge and the observation angle will be reduced.

3.2.3. Sight Distance

Design of rural vehicle entranceways is specified in the Regional Infrastructure Technical Specification (RITS) Section 3.3.19.4 and is to be in accordance with NZTA RTS 6 Guidelines for Visibility at Driveways. For vehicle entrances generating more than 40 HCV/day or where HCVs represent more than 1:5 of the vehicle manoeuvres, then specific design is required.

RTS 6 requires 250m sight distance for a vehicle entrance in a 100km/h speed environment. Sight distance south-east is approximately 640m to the horizontal curve. Sight distance north-west is approximately 400m to the crest vertical curve.

We note that there is poor intervisibility between an entering vehicle (positioned east on Kaipaki Road) and an exiting vehicle (positioned on the internal road). We recommend that the vehicle entrance be designed to ensure two-way vehicle movement of entering and exiting vehicles to minimise the risk of collisions.

3.2.4. Diagram E Road Widening

On an arterial road with no kerbs and a speed limit of greater than 70km/h, RTS 6 requires seal widening at the vehicle entrance for a high-volume entrance, similar to NZTA Planning Policy Manual Diagram E (refer Appendix 3).

Austroads⁴ indicates that a right turn bay treatment would be required if the volume of turns exceeds 8 veh/hr. The estimated traffic volumes discussed in Sections 3.4 and 3.5 indicate that the peak hour right turn volume is unlikely to consistently exceed 8 veh/hr. Based on these estimates and proposed conditions of consent to cap heavy vehicle movements, we consider that a right turn bay is not required.

Diagram E requires the gate to be set back from the edge of the traffic lane to allow any vehicles visiting the site to stop clear of the traffic lanes to open or close the gate. We recommend that the quarry access gate is setback at least 25m and desirably 80m from the edge line to allow vehicles to stop clear of the private access gate.

For entrances that are frequently used by HCVs the sealed area is to have 15m radius curves to accommodate the swept paths of heavy vehicles. This radius is difficult to achieve with the angle of skew and location of property boundaries. However, we have checked the swept paths for both semi-trailers (the design check vehicle) and B-trains (typical truck and trailer units) to ensure two-way

² RITS Section 3.3.9.1 Intersection and Alignment Design

³ Austroads Guide to Road Design Part 4A Signalised and Unsignalised Intersections, Section 3

⁴ Austroads Guide to Road Design Part 4 Intersections and Crossings General, Figure A 10

unobstructed movement. The necessary extent of widening is indicated in our concept layout of the vehicle entrance in Figure 14 below.

We have included a splitter island at the entrance to reinforce vehicle positioning on the left of the entrance to minimise the likelihood of conflict between opposing vehicles. Whilst it is not common for splitter islands to be used at entranceways, we consider it a necessary component of the mitigation to maximise safety at the entrance.

We recommend the access be designed to Diagram E standard with a single gate and that the residential access be relocated to tie into the quarry access road a minimum setback of 20m from Kaipaki Road (refer Figure 14). This will limit the number of conflicting movements within the vehicle entrance and reduce the likelihood of vehicle-vehicle conflict. There should also be adequate space for an entering vehicle to stop at the residential gates, clear of the sand quarry entrance area, to wait while the gates open.

Screenshots showing the heavy vehicle swept paths are included in Appendix 3.

3.2.5. Entrance Concept Design

Our proposed entrance concept design is shown in the figure below.

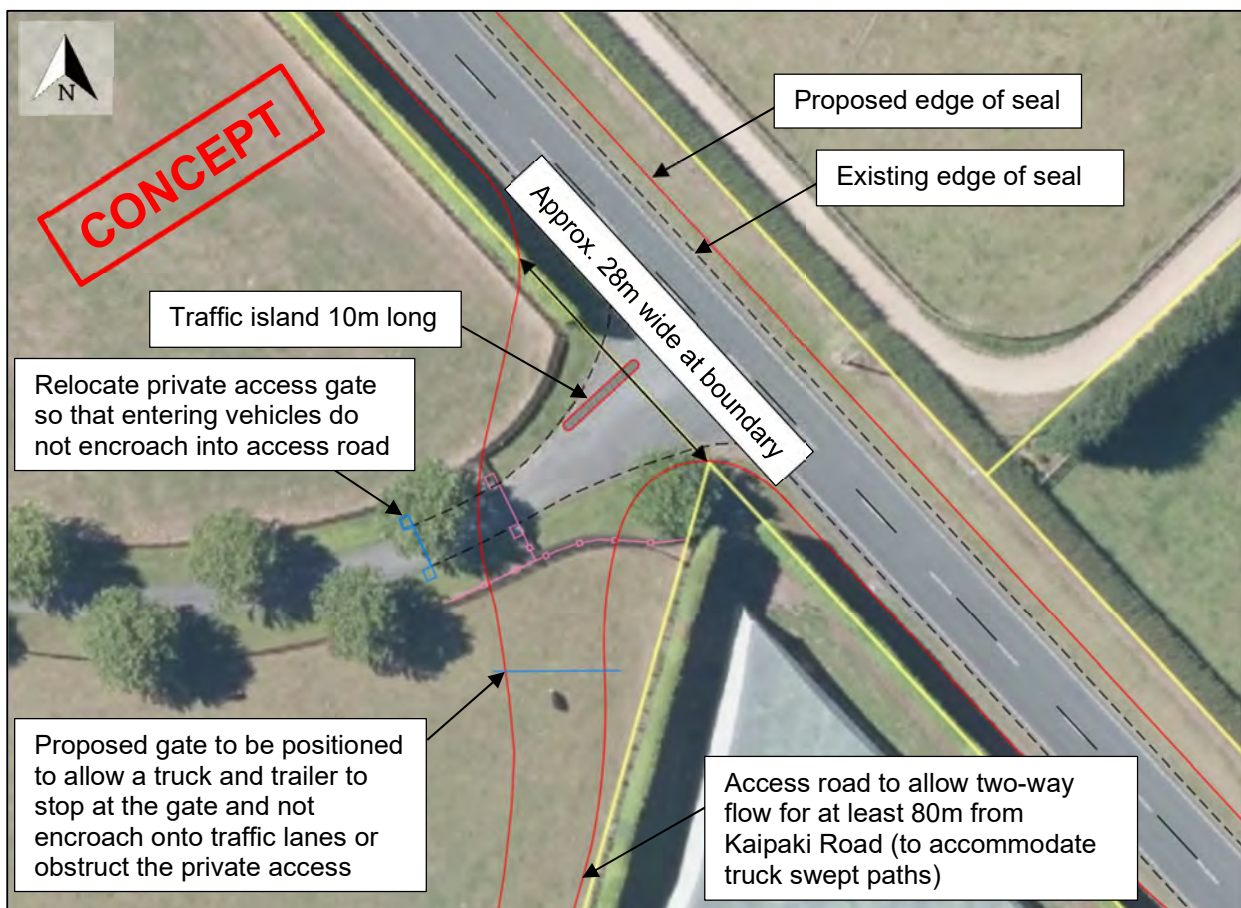


Figure 14: Concept layout of proposed vehicle entrance location showing approximate extent of seal widening for Diagram E layout and suggested relocation of gate for private access

3.3. Proposed Access Road

The proposed accessway follows the eastern boundary of the site. The proposed accessway will be formed and chip sealed for approximately 200m length. Truck movements are expected to be kept on the sealed areas where possible. It is proposed that heavy vehicles will go through a wheel wash if required (expected during winter months) before leaving the site.

The access road will need to be wide enough allow two vehicles to pass each other. This can be accommodated through widening the access road to at least 6m or 3m with passing bays at least as far as the site office and wheel wash area.

NZS 4404 Land Development and Subdivision Infrastructure, Section 3.3.16 states that “*Rural accesses may have passing bays at up to 100m distances where visibility is available from bay to bay*”. The bays should be designed to accommodate a truck and trailer unit. If there is not visibility between the passing bays, there is a risk that opposing vehicles will not see each other and proceed without being able to pass. Providing passing bays at the 100m spacing as outlined in NZS 4404 would minimise the risk of conflict on the access road.

3.4. Trip Generation

The trip generation is based upon the site providing an estimated 900,000m³ of sand over a 7-10 year period. We have considered various sand extraction rates to determine the likely traffic effects. For the cleanfill operation we have assumed that approximately half of the trucks visiting the site will bring in a load of cleanfill before picking up their load of sand. We have also assumed an additional 10% of trips to the site will be only for cleanfill drop off. Trip generation calculations are included in Appendix 4.

The average trip generation has been estimated using a five and a half day work week for 52 weeks of the year, equating to approximately 276 working days (taking into account public holidays). If the site was to operate on a full 6 or 7-day work week, the average and peak daily trip generation would be slightly lower. The trip generation is based on an average load of 15m³/HCV.

We have converted to equivalent car movements (ECM) using the WODP conversion⁵ factors.

The trip generation can be summarised as:

- = Four staff members potentially generating 8 veh/day by light vehicles;
- = Sand haulage based on an estimated 900,000m³ over 7 years, with total extraction volume and rate of extraction determining the likely total trips; and
- = Cleanfill haulage based on 50% of trucks importing cleanfill before departing with sand and an additional 10% trips for cleanfill import only (departing empty). This equates to approximately 540,000m³ of cleanfill over the 7-year duration of the activity.

Duration	7 year	Yearly maximum	Assumed weekly maximum
Extraction volume (m ³)	900,000	200,000	5,000
HCV/day	68	106	133
Total veh/day	76	114	141
Peak veh/hr (10%)	8	11	14
ECM/day	350	539	675
Peak ECM/hr (10%)	35	54	67

Table 2: Trip generation by extraction rate

3.5. Trip Distribution

The applicant expects most of the sand to be used in the Cambridge area with the predominant traffic movements to and from the south-east, being right-turn out and left-turn in to the site (60-70%). The likely transport routes for the quarry are shown in the figure below:

⁵ Rule 16.4.2.25 calculates equivalent car movements (ECM) as 1 car to and from property = 2 ECM, 1 truck (greater than 3.5 tonnes) to and from property = 10 ECM

- = Route A – Kaipaki Road to the south-east, connecting to Cambridge Road, providing access to destinations in Cambridge and surrounding areas – approximately 70% of trips;
- = Route B – Kaipaki Road to the north-west, connecting to SH3, providing access to Ohaupo, Te Awamutu, Rukuhia and Hamilton – approximately 10% of trips; and
- = Route C – Mystery Creek Road via Kaipaki Road to the north-west and Mellow Road, connecting to SH21, providing access to Rukuhia, Tamahere, Matangi, and Hamilton – approximately 20% of trips.

If the quarry were to get a large supply contract, it is possible that 100% of quarry traffic could be directed to a single route for the duration of that contract.

For the cleanfill trips, we have assumed the same origin-destination (and routes) for the backloads (i.e. the cleanfill comes from the same site that the sand is going to) and the additional 10% of trips that are for cleanfill drop off only will use a similar distribution of routes and does not require separate analysis.

3.5.1. Trip Distribution at Average Extraction Rate

We have assessed the traffic increase using the trips generated from extracting 900,000m³ over 7 years, with 70% of quarry traffic travelling to the south-east and 30% travelling to the north-west, with two-thirds of this traffic going to SH21. The proportion of quarry traffic on each road and the resultant increase in traffic is summarised in the table below.

Roads	Existing traffic	Additional quarry traffic	Percentage increase in traffic	HCV as proportion of total traffic (% increase)
Kaipaki Road (Cambridge Road to McEldownie Road)	3,200 veh/day 326 HCV/day	70% of trips 53 veh/day 48 HCV/day	1.7% Total 14.7% HCV	11.5% (1.3%)
Kaipaki Road (McEldownie Road to Tarr Road)	2,100 veh/day 195 HCV/day	30% of trips 23 veh/day 20 HCV/day	1.1% Total 10.3% HCV	10.1% (0.8%)
Kaipaki Road (Tarr Road to SH3)	1,300 veh/day 121 HCV/day	10% of trips 8 veh/day 7 HCV/day	0.6% Total 5.8% HCV	9.8% (0.5%)
Mellow Road	1,100 veh/day 78 HCV/day	20% to SH21 15 veh/day 14 HCV/day	1.4% Total 17.9% HCV	8.3% (1.2%)
Mystery Creek Road	2,260 veh/day 210 HCV/day	20% to SH21 15 veh/day 14 HCV/day	0.7% Total 6.7% HCV	9.8% (0.6%)

Table 3: Percentage increase in daily traffic with expected distribution of quarry traffic

The increase in HCVs will be the most noticeable, however the percentage increase of HCVs is relatively low at around 6-18% and total traffic increase of less than 2%. A 2% increase in traffic with up to 12% heavy vehicles is within the capacity of the network and not considered a significant change in traffic.

Traffic during the peak hour is likely to be in the order of 10% of the daily traffic. This is approximately 8 veh/hr at the quarry entrance, with 5 veh/hr during the peak hour on the Cambridge Road end of Kaipaki Road.

3.5.2. Trip Distribution at Maximum Weekly Extraction Rate

To assess the effects of peak periods of sand extraction we have calculated the trip generation and distribution from extraction of 5,000 m³/week. This includes a corresponding increase in cleanfilling activity. The trip distribution from the maximum weekly extraction is summarised in the table below.

Roads	Existing traffic	Additional quarry traffic	Percentage increase in traffic	HCV as proportion of total traffic (% increase)
Kaipaki Road (Cambridge Road to McElownie Road)	3,200 veh/day 326 HCV/day	70% of trips 99 veh/day 93 HCV/day	3.1% Total 28.5% HCV	12.7% (2.5%)
Kaipaki Road (McElownie Road to Tarr Road)	2,100 veh/day 195 HCV/day	30% of trips 42 veh/day 40 HCV/day	2.0% Total 20.5% HCV	11.0% (1.7%)
Kaipaki Road (Tarr Road to SH3)	1,300 veh/day 121 HCV/day	10% of trips 14 veh/day 13 HCV/day	1.1% Total 10.7% HCV	10.2% (0.9%)
Mellow Road	1,100 veh/day 78 HCV/day	20% to SH21 28 veh/day 26 HCV/day	2.5% Total 33.3% HCV	9.2% (2.1%)
Mystery Creek Road	2,260 veh/day 210 HCV/day	20% to SH21 28 veh/day 26 HCV/day	1.2% Total 12.4% HCV	10.3% (1.0%)

Table 4: Percentage increase in daily traffic at maximum weekly extraction rate

At the maximum weekly extraction rate, the percentage increase of HCVs is 10-33% and total traffic increase of around 3%. The most significant change is on Mellow Road where the HCV/day could increase by 33% however, HCVs remain less than 10% of total traffic. An overall increase in traffic of 3% with up to 13% heavy vehicles is within the capacity of the network and is not considered a significant change in traffic.

For the maximum weekly extraction rates, traffic during the peak hour is likely to be in the order of 10% of the daily traffic. This is approximately 14 veh/hr at the quarry entrance, with 10 veh/hr during the peak hour on the Cambridge Road end of Kaipaki Road.

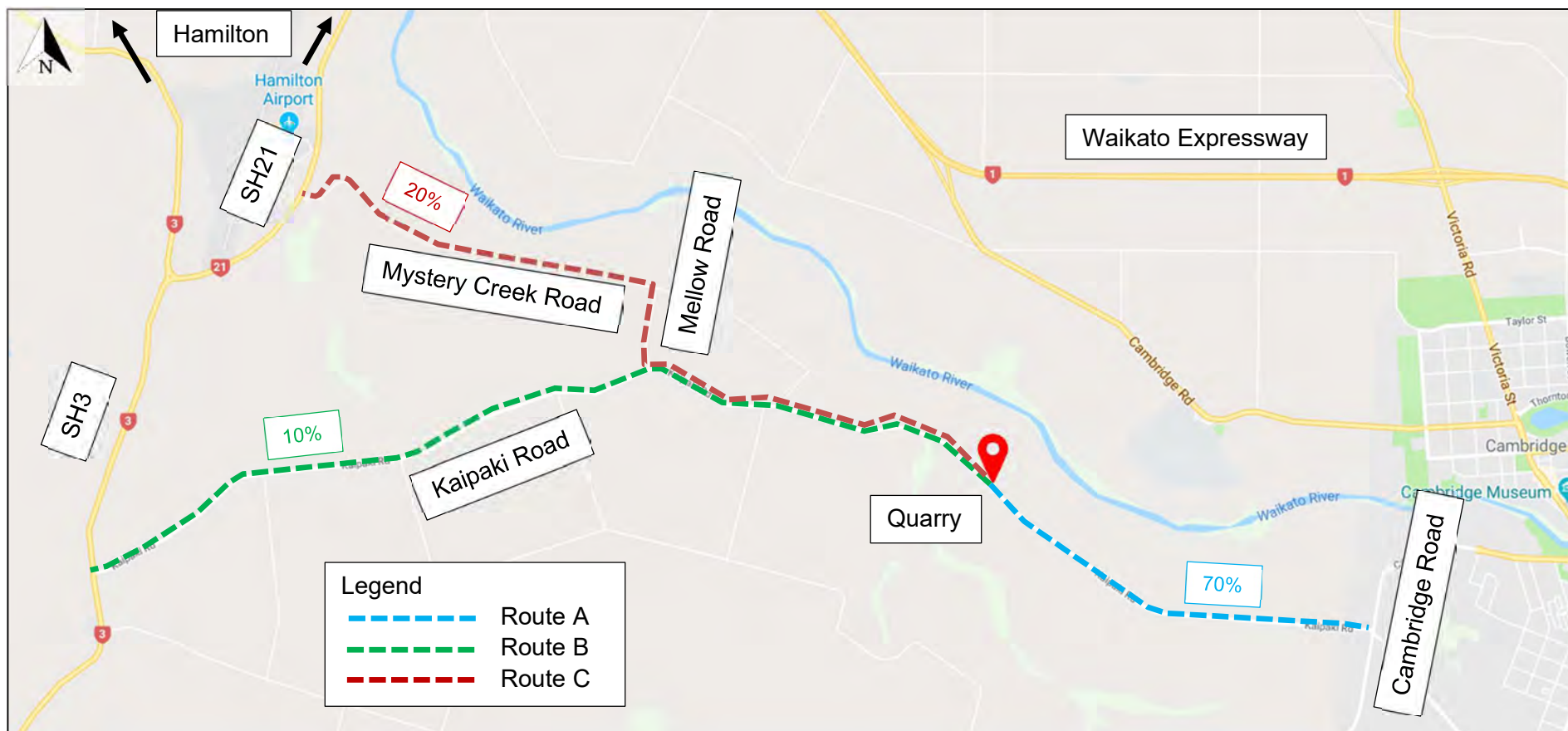


Figure 15: Likely transport routes for the quarry

3.6. Parking Demand

The site will be closed to external traffic, and therefore parking demand is limited to staff and visitors (e.g. material testing, mechanics, etc). There will be up to four staff on site at any time.

Based on our maximum trip generation assessment, the number of HCVs is 80 trucks/day. We would expect up to eight trucks to visit the site during the peak hour. It is unlikely that all eight trucks will be on site at the same time (arrival and departures times will be spread throughout the hour). Trucks are unlikely to spend a long time on site and are unlikely to require parking spaces.

There should be adequate room on site for trucks to queue and manoeuvre near the loading area. The 200m long chip sealed access road provides a significant queuing area before there would be any off-site effects.

We consider the parking demand to be four spaces for employees plus a minimum of two spaces for visitors. A total of six spaces is likely to be sufficient to accommodate the estimated parking demand for the site.

A dedicated car parking area should be provided adjacent to the office or amenity block on the site. The area may not be formally marked, but it should be:

- = Signposted;
- = Large enough to accommodate staff and some visitors (i.e. sufficient space for at least six light vehicles); and
- = Located clear of loading and manoeuvring areas for HCVs.

3.7. Pavement Impacts

The pavement impact has been calculated using the Waipa District Council methodology⁶ to determine the financial contribution for traffic and pedestrian routes.

The following assumptions were made:

- = Traffic volumes and proportion of HCV's on the affected roads are as stated in Section 3.5 above. Kaipaki Road has been split into segments to reflect the decreasing traffic volumes to the west of the proposed quarry;
- = We have assumed the cleanfill quantity to be imported over the duration of the activity is 540,000m³, based on 50% of truck trips being backloads of sand with an additional 10% of trips being cleanfill drop offs only (trucks leave empty);
- = Renewal cost of \$350,000/km; and
- = Material quantities have been converted as flows:
 - o Sand: quantity of 900,000m³ at a rate of 1.6t/m³ equals 1,440,000 tonnes of sand; and
 - o Cleanfill: quantity of 540,000m³ at a rate of 1.7t/m³ equals 918,000 tonnes of cleanfill.

The financial contribution is calculated as \$77,236 or \$0.057/tonne. Details of the calculation are attached as Appendix 5. Waipa DC currently receives NZ Transport Agency funding assistance at a rate of 51%⁷, if this is taken into account then the financial contribution would be \$0.028/tonne (or approximately \$5,407/year based on a seven-year life).

⁶ Waipa Operative District Plan, Rule 18.4.2.14

⁷ <https://nzta.govt.nz/planning-and-investment/planning-and-investment-knowledge-base/planning-and-investment-principles-and-policies/funding-assistance-rates-principles-and-policy/2018-21-nltp-normal-funding-assistance-rates/>

If the quarry were to get a large supply contract, it is possible that 100% of quarry traffic could be directed to a single route for the duration of that contract. This could significantly alter the pavement impacts – reducing the impact on some routes and increasing the impact on the dominant route.

3.8. Discussion of Transportation Effects

The following table provides a summary of the potential safety and efficiency effects on the three routes used by quarry traffic.




Route	Description and Potential Destinations	Potential Effects
A – Kaipaki Road to the south-east to Cambridge Road 	<ul style="list-style-type: none"> Route to Cambridge and surrounding area Mainly rural activities Expected to be approximately 70% of trips 	<ul style="list-style-type: none"> Intersection with Cambridge Road well formed – safety effects likely to be no more than minor. Upgrade likely as part of growth cell development. Minor delay to through traffic as trucks slow to turn left into the site – no more than minor with Diagram E upgrade.
B – Kaipaki Road to the north-west to SH3 	<ul style="list-style-type: none"> Route to Ohaupo and surrounding area Mainly rural activities Passes Kaipaki School Expected to be approximately 10% of trips 	<ul style="list-style-type: none"> Intersection with SH3 well formed – safety effects likely to be no more than minor. Potential for safety effects outside school, which is within proposed 80km/h speed zone. Minor delay to through traffic as trucks slow to turn right into the site – no more than minor with Diagram E upgrade. Diagram E widening is considered appropriate because peak right turn traffic unlikely to consistently exceed 8 veh/hr (even with all trips to/from north).
C – Mystery Creek Road to SH21 	<ul style="list-style-type: none"> Route to Peacocke, Tamahere, Hamilton and surrounding areas Mainly rural activities, with some rural residential Passes Kaipaki School Expected to be approximately 20% of trips 	<ul style="list-style-type: none"> Intersection with SH21 well formed – safety effects likely to be no more than minor. Intersection with Mellow Road satisfactory – possible adverse effects if peak extraction rates combine with large supply contract that uses this route (may require right turn bay) Potential for safety effects outside school, which is within proposed 80km/h speed zone. Minor delay to through traffic as trucks slow to turn right into the site – no more than minor with Diagram E upgrade. Diagram E widening is considered appropriate because peak right turn traffic unlikely to consistently exceed 8 veh/hr (even with all trips to/from the north). Potential for safety and efficiency effects at Mystery Creek when events are on. Mystery Creek Road has proposed 60km/h and 80km/h speed zones.

Figure 16: Comparison of Potential Routes

3.8.1. Route A – Kaipaki Road (south-east to Cambridge Road)

Currently, there is approximately 326 HCV/day (total of 3,200 veh/day) in the vicinity of the site. This is estimated to increase by 48 HCV/day. The total traffic volume is estimated to increase by 53 veh/day.

The effects on the Kaipaki Road route are considered acceptable. Road users are likely to notice the increased traffic in the vicinity of the proposed sand quarry and at the Cambridge Road intersection, mostly due to the increase in heavy vehicle traffic of 5 HCV/hr in a peak hour period. As the Cambridge Road intersection is of a good standard, the increase in crashes is expected to be no more than minor.

The scale of the effects will depend on the frequency and intensity of any peaks, although these can be managed by consent conditions that limit daily and monthly trip generation.

There will be an effect on the pavement, which is separately considered in Section 3.7 above. There may also be an increase in the adverse amenity effects (e.g. noise) experienced by residents along this section of Kaipaki Road. Our understanding is that for there to be a noticeable increase in noise (approx. 3dB) the traffic volume would need to double.

There appears to be a low risk of adverse safety and efficiency effects along this route related to quarry traffic for the extraction rates assessed.

3.8.2. Route B – Kaipaki Road (north-west to SH3)

The quarry traffic is estimated to increase traffic on this route by up to 23 veh/day, including 20 HCV/day. The effects on Kaipaki Road are considered acceptable. The increased traffic from the proposed sand quarry is likely to be approximately 2 HCV during a peak hour period and road users are unlikely to notice this increase in traffic.

As the SH3 (Ohaupo Road) intersection is of a good standard, the increase in crashes is expected to be no more than minor.

The potential effects include adverse safety effects outside the school during drop-off and pick-up times and increased risk of crashes at minor intersections and individual property accesses. The scale of the effects will depend on the frequency and intensity of any peaks, although these can be managed by consent conditions.

There will be an effect on the pavement, which is separately considered in Section 3.7 above. There may also be an increase in the adverse amenity effects (e.g. noise) experienced by residents along this section of Kaipaki Road. Our understanding is that for there to be a noticeable increase in noise (approx. 3dB) the traffic volume would need to double.

There appears to be a low risk of adverse safety and efficiency effects along this route related to quarry traffic for the extraction rates assessed.

3.8.3. Route C – Mystery Creek Road (north-west to SH21)

The quarry traffic is estimated to increase traffic on this route by up to 15 veh/day, including 14 HCV/day. The effects on the Mellow Road, Mystery Creek Road route are considered acceptable. The increased traffic from the proposed sand quarry is likely to be approximately 1 HCV during a peak hour period and road users are unlikely to notice this minor increase in traffic.

If this becomes a predominant route for quarry traffic, there is potential for adverse safety effects arising from the high number of right-turns from Kaipaki Road into Mellow Road. If the number of right-turning vehicles consistently exceeds 8 veh/hr a right-turn bay may be required to mitigate the adverse safety effects.

The potential effects include adverse safety effects outside the school during drop-off and pick-up times and increased risk of crashes at minor intersections and individual property accesses. The scale of the effects will depend on the frequency and intensity of any peaks, although these can be managed by consent conditions.

There will be an effect on the pavement, which is separately considered in Section 3.7 above. There may also be an increase in the adverse amenity effects (e.g. noise) experienced by residents along this route and potential conflicts with events at Mystery Creek. Our understanding is that for there to be a noticeable increase in noise (approx. 3dB) the traffic volume would need to double.

There appears to be a low risk of adverse safety and efficiency effects along this route related to quarry traffic for the extraction rates assessed.

3.8.4. Effects of Peak Trip Generation

The effects arising from peak trip generation (i.e. 133 HCV/day) over an extended period could be significant. The duration and intensity of peak trip generation is an important factor to consider. It would be appropriate to limit trip generation (daily and monthly average) to minimise the potential adverse effects. A daily cap would restrict the maximum number of movements per day, while a monthly average would control the frequency/intensity of these peak days.

This allows the applicant to increase sand extraction to meet peaks in demand and provides the community with more certainty about the frequency and intensity of these peaks.

We recommend the following condition to manage the effects of peak trip generation:

The maximum number of heavy vehicle movements generated by the activity shall not exceed:

- *Daily maximum of 133 HCV movements/day; and*
- *Daily average of 106 HCV movements/day (calculated over a one-month period)*

3.8.5. Effects of Trip Distribution

A large supply contract which alters the trip distribution may result in different transport effects. The distribution of 100% of quarry trips onto a single route (in the case of a large supply contract) may cause different safety and efficiency effects and will significantly alter the pavement impacts.

3.8.6. Right-turns at Vehicle Entrance

If there is significant demand for sand north-west of the quarry this may result in a higher number of right turn movements into the site (and fewer right turns out). If 100% of quarry traffic were to travel to/from the north-west, the estimated vehicle movements for the proposed quarry indicate that the peak right turn movements could be up to 7 veh/hr (refer Appendix 4). This does not trigger the need for a right turn bay at the quarry access.

It would be appropriate for the consent to be reviewed should the proposed quarry be awarded a significant project that resulted in more than 8 veh/hour (or approximately 80 veh/day) to the north-west. If sustained over a period of time (e.g. several months) this level of trip generation could trigger the need for a right-turn bay at the vehicle entrance to mitigate the adverse safety effects.

3.8.7. Shared Vehicle Entrance

There is potential for vehicle-vehicle conflict at the vehicle entrance especially as it is shared with the existing residential dwelling (owned and occupied by the Applicant). If the entrance is not formed to an appropriate width to accommodate two-way movements and the swept paths of heavy vehicles, there is a risk of conflict between entering and exiting vehicles.

We recommend the quarry access be the primary vehicle entrance and the residential access be relocated to tie into the quarry access road a minimum setback of 20m from Kaipaki Road, as

indicated in Figure 14 (Section 3.2) above. There should also be adequate space for an entering vehicle to stop at the residential gates, clear of the sand quarry entrance area, to wait while the gates open.

4. ASSESSMENT AGAINST DISTRICT PLAN REQUIREMENTS

4.1. Zoning and Activity Status

The site is located in the Rural zone and we understand that the activity is Discretionary.

4.2. Assessment Against Requirements of the District Plan

We have assessed the proposal against the requirements of the Waipa District Plan relevant to transportation.

District Wide Objectives	Policies	Comments
16.3.2 Integrating land use and transport: ensuring a pattern of land uses and a land transport system which is safe, effective and compatible	Land use and transport systems successfully interface with each other through attention to design, safety and amenity Policies = Integrating land use and transport = Enhancing pedestrian safety = Safe roads = Managing effects on character and amenity	Location of site supports integrated transport system – near strategic routes (major arterials and state highways). Site is located in the rural zone.
16.3.3 Maintaining transport network efficiency	To maintain the ability of the transport network to distribute people and goods safely, efficiently and effectively Policies = Effects of development or subdivision on the transport network = Location of network utilities	Multiple transport routes to distribute traffic west, north and east. Additional traffic likely to be noticeable but existing road network has sufficient capacity.
16.3.4 Provision of vehicle entrances, parking, loading and manoeuvring areas	The provision of adequate and well-located vehicle entrances and parking, loading and manoeuvring areas that contribute to both the efficient functioning of the site and the adjacent transport network Policies = Location of vehicle entrances = Ensuring adequate parking, loading and manoeuvring areas on site	Sufficient space for parking, loading and manoeuvring on site. Vehicle entrance requires upgrade to Diagram E and is subject to approval of WDC.
16.3.5 Minimising adverse effects of the transport network	The transport network can have effects on the adjacent environment that must be mitigated through design Policies = Natural environment = Noise and vibration	Site can be developed to minimise adverse transport effects, increase in traffic approx. 2% of existing traffic. Conditions proposed to manage peak trip generation. Sealed access road along eastern boundary of site to manage potential dust effects.

Table 5: Assessment against relevant district wide objectives and policies

21.1.1.6 Traffic Assessment Criteria	Comments
<p>(a) The impacts on the safe, efficient and effective provision of the transportation system including, but not limited to:</p> <ul style="list-style-type: none"> (i) Impacts on the road network and the effective operation of the road hierarchy; and (ii) Infrastructure provision, including works needed to maintain the safety, efficiency and effectiveness of the transportation system such as any upgrades necessary to pedestrian and cycle facilities, intersections, pavements and structures on the system affected by the proposed activity; and (iii) Timing and staging of development; and (iv) Connectivity between adjacent areas of development. 	<p>Upgrade of existing access with shoulder widening will allow through traffic to pass a turning vehicle, minimising disruption to through traffic.</p> <p>Pavement impacts can be mitigated through collection of financial contribution.</p>
<p>(b) Whether sufficient provision has been made for alternative modes of transportation where this is available and practicable, including but not limited to:</p> <ul style="list-style-type: none"> (i) Public transport; and (ii) Cycle and pedestrian movement; and (iii) The establishment of cycleways, walkways and public transport stops; and (iv) The establishment of cycle stands; and (v) Connectivity to alternative transport modes such as rail and air transport. 	<p>There are no public transport services in the area.</p> <p>There are no existing pedestrian or cyclist facilities.</p>
<p>(c) The extent to which the location of the activity on the site has given regard to:</p> <ul style="list-style-type: none"> (i) The need for acceleration and deceleration lanes; and (ii) The type, frequency and timing of traffic; and (iii) The safety of road users, cyclists and pedestrians; and (iv) The ability for access to roads other than arterial roads or State Highways; and (v) The need for forming or upgrading roads and pavements potentially affected by the activity; and (vi) The need for additional maintenance, inspection or traffic monitoring; and (vii) The need for traffic control, including signs, signals and traffic islands; and (viii) The ability for parking and manoeuvring to be carried out on site. 	<p>The proposed vehicle entrance upgrade to Diagram E standard provides the necessary acceleration and deceleration space for turning vehicles.</p> <p>Widened shoulders in vicinity of vehicle entrance provides more space for vehicles and cyclists to pass.</p>
<p>(d) The extent to which the location of the site access way has given regard to:</p> <ul style="list-style-type: none"> (i) Safety for vehicles, and pedestrians with particular regard to the effect on the safety and functioning of the road and/or level crossing. (ii) The practicality and adequacy of the proposed access having regard to the location, nature and operation of the proposed activity and/or development. 	<p>The proposed access location has excellent sight distance in both directions.</p> <p>There are no apparent existing safety concerns at the proposed vehicle entrance location.</p> <p>Vehicle entrance requires specific design and is subject to approval of WDC.</p>
<p>(e) The extent to which the location of the land use activity on the site has given regard to:</p> <ul style="list-style-type: none"> (i) Visibility and sight distances particularly the extent to which vehicles entering or exiting the level crossing are able to see trains. (ii) The extent to which failure to provide adequate level crossing sightlines will give rise to level crossing safety risks. 	<p>Not applicable.</p>

Table 6: Comments on relevant assessment criteria

Rule	Comment
Rule - Road hierarchy	
16.4.2.1 All structure plans, plan changes, developments, and subdivisions must be consistent with the road hierarchy, as contained in Appendix T5.	Complies - No change to the road hierarchy.
Rule - Vehicular access to sites in all zones	
16.4.2.4 Every site shall be provided with vehicle access to a formed road that is constructed to a permanent standard. The vehicle access shall be designed to accommodate the demands of all traffic from the activity on that site, taking into account the form and function of the road.	Complies - Vehicle entrance to Diagram E standard.
Rule - Vehicle entrance separation from intersections and other vehicle entrances	
<p>16.4.2.5 The minimum distance of a vehicle entrance (accessway) from an intersection or other entrance shall be as follows:</p> <p>For 100km/h posted speed limit -</p> <ul style="list-style-type: none"> - A minimum of 200m from intersections - A minimum of 200m between accessways 	<p>Does not comply - Two adjacent accessways are seldom used.</p> <p>Existing neighbouring access to private dwelling 160m north-west is well positioned with clear sight distance and no existing safety issues.</p> <p>Existing access to residential dwelling to be relocated as part of vehicle entrance upgrade as shown in Figure 14.</p>
Rule - Parking, loading and manoeuvring area.	
16.4.2.13 All activities that involve the erection, construction or substantial reconstruction, alteration or addition to a building on any site, or changes the use of any land or building, shall provide parking and loading/unloading for vehicles on the site as set out in Appendix T1	Complies - Provision on site for at least six light vehicles for four employees and two visitors.
<p>16.4.2.15 Vehicle parking, loading/unloading, and manoeuvring areas shall:</p> <p>(a) Not encroach on any setback, outdoor living area, or bicycle parking spaces; and loading/unloading areas and manoeuvring areas shall not encroach over vehicle parking spaces; and</p> <p>(b) Be designed, formed, and constructed in accordance with Appendix T2 and ensure that the surface of the required area provides a dust free environment; and</p> <p>(c) Provide for the safe and efficient disposal of surface stormwater clear of any adjoining access or road surface in a way that does not result in ponding or scouring; and</p> <p>(d) Be constructed to accommodate the anticipated use of the area by all traffic likely to access the site in the zone in which it is located, including construction traffic taking into account pavement, surfacing, demarcation of spaces, aisles and circulation roads; and</p> <p>(e) Be provided on the site on which the building, activity or proposal is located, except where the provisions of Rules 16.4.2.16 and 16.4.2.17 apply.</p>	<p>Complies - Sufficient space on site to provide separation from loading/unloading and manoeuvring areas.</p> <p>Drainage and disposal of surface water can be accommodated on site.</p> <p>All accessways and manoeuvring spaces to be designed to accommodate swept paths of heavy vehicles.</p>
Rule - Car park landscaping and lighting	
<p>16.4.2.23 Other than in the St Peters School Zone, all car parks must:</p> <p>(a) Provide at least one tree planted for every 5 car parking spaces at a grade of no less than PB95. For the avoidance of doubt, PB95 is equivalent to a tree that is at least 1.5m tall at the time of planting; and</p> <p>(b) Ensure lighting is designed to avoid shading areas or isolating areas of public use. Provided that in the Commercial Zone, car parks with more than 25 car parking spaces shall be a restricted discretionary activity.</p>	<p>Provision of six parking spaces requires one tree planted.</p> <p>Carpark is not for use by the public or during hours of darkness (quarry operation between 7am and 5pm) – lighting is not required.</p>

Rule	Comment
Rule - Provision of bicycle parking facilities	
16.4.2.24 In areas other than the Rural Zone and Pedestrian Frontages, activities employing more than ten people must provide bicycle parking facilities at a rate of one bicycle park for every ten people employed.	Complies - Maximum of 4 employees – no bicycle parking required.

Table 7: Assessment against relevant rules

4.3. Discussion

The proposal is generally compliant with the requirements of the WODP. There are no significant non-compliances and the transport effects from the proposed quarry and cleanfill operation can be mitigated.

The proposal relies on the large site area to provide sufficient parking, loading and manoeuvring space and requires a degree of flexibility for operational reasons. It may be appropriate for parking, loading and manoeuvring space to be specifically identified in the Quarry Management Plan. Facilities such as a wheel wash may be required to prevent mud and loose material being tracked on to Kaipaki Road.

We suggest that detailed design of the vehicle entrance (to Diagram E standard) is subject to approval by WDC to ensure that the design adequately provides for heavy vehicle manoeuvring and minimises the potential for conflict with vehicles using the existing private access.

5. EVALUATION OF TRANSPORT EFFECTS

5.1. Summary of Effects

The transport effects of the development relate to safety and efficiency from an increase in heavy vehicle movements. We have not considered the consequential effects of traffic such as visual effects and noise effects. The following table comments on the key traffic aspects and effects.

Traffic Aspect	Comment on Effects
Property access	<p>There will be an increase in heavy vehicle movements at the proposed vehicle entrance which could lead to safety and efficiency effects. Design and construction of the vehicle crossing in accordance with Diagram E and maintaining adequate sight distance will minimise the risk of crashes.</p> <p>Diagram E provides for 6m widening from the centreline and will allow through vehicles to pass a vehicle waiting to turn right into the site. A formal right turn treatment is only required if the turning volume consistently exceeds 8 veh/hr which is unlikely with the expected trip distribution.</p> <p>The existing private access should be relocated to tie into the quarry access road and setback a minimum of 20m from Kaipaki Road to minimise the risk of crashes at the vehicle entrance gate.</p> <p>Space should be provided for an entering vehicle to stop at the residential gates, clear of the sand quarry entrance area, to wait while the gates open.</p> <p>The proposed quarry access road should be formed to a width of 6m to allow opposing vehicle to pass each other or 3m wide with passing bays every 100m (as per NZS 4404). At least the first 80m from Kaipaki Road should allow two-way vehicle movement (minimum 6m width).</p>
Efficiency effects	<p>Increased number of heavy vehicle movements and potential for delays at intersections and vehicle entrances.</p> <p>An increase in heavy traffic is likely to be noticeable on the transport routes. The effects from a 2% increase in traffic on Kaipaki Road with 12% heavy vehicles (average) is expected to be no more than minor. There may be some delays to other road users during periods of peak sand extraction.</p> <p>Peak traffic effects will be managed by conditions. Applying a daily cap and monthly average will assist in managing the intensity and frequency of these peaks.</p>
Safety effects	<p>The potential for adverse safety effects is low.</p> <p>Safety effects at the intersections are likely to be minimised as the intersections are of a good standard and the estimated traffic increase is relatively low.</p>
Queuing, Manoeuvring and Parking	<p>The proposal relies on the large site area to provide sufficient parking, loading and manoeuvring space and requires a degree of flexibility for operational reasons.</p> <p>There is sufficient space on site for trucks to queue and it is expected that there will be queuing space on site away from parking and manoeuvring areas.</p> <p>The site can provide a parking area for employees and visitors that is signposted and located clear of loading and manoeuvring areas.</p>
Pavement effects	<p>Pavement effects are expected to be greatest on Kaipaki Road (south-east to Cambridge Road). A financial contribution is recommended to mitigate these effects.</p>
Construction effects	<p>The potential for adverse effects from construction related traffic include delays, crashes, dust and noise. These effects could be mitigated through implementation of an approved construction traffic management plan that includes temporary traffic management.</p> <p>The trip generation and traffic effects from construction activities are not considered significant.</p>

Table 8: Summary of Traffic Effects

5.2. Mitigation

With appropriate conditions, the potential adverse effects of the proposal could be mitigated to be no more than minor. We recommend the following mitigation:

- = Detailed design approval of the vehicle entrance by WDC with a focus on:
 - Diagram E widening modified to suit heavy vehicle tracking;
 - Relocation of the existing private access and gate;
 - Gate set back from the traffic lane a sufficient distance to allow any vehicle visiting the site to stop clear of the traffic lane (a minimum of 25m);
 - Access road to allow two-way vehicle movement for the first 80m from Kaipaki Road; and
 - Spacing and size of the proposed passing bays (if required).
- = Condition specifying design of the internal access road as:
 - Minimum of 6m width for a minimum of 80m from Kaipaki Road; and
 - Minimum of 6m width up to the site office and wheel wash areas; or
 - Minimum of 3m wide with passing bays provided at least every 100m with visibility between the passing bays.
- = Independent Stage 3 (detailed design) road safety audit for the vehicle entrance to Kaipaki Road.
- = Specific consideration of parking, loading and manoeuvring requirements in the Quarry Management Plan.
- = Dust control through the Quarry Management Plan (this may require a wheel wash).
- = Conditions that specify the monthly average and daily peak vehicle movements.
- = Condition requiring monitoring and reporting of vehicle movements by the consent holder.
- = Temporary traffic management plan to manage construction effects.

6. CONCLUSION

6.1. Impacts and Extent

The proposed sand quarry is expected to generate an average of 68 HCV/day with daily peaks of up to 133 HCV/day at its maximum weekly extraction. Trip generation is based on an estimated 900,000m³ of sand extracted over a 7-10 year period, with 10% additional trips for importing cleanfill.

The expected market for the sand is south-east of the site with left-in and right-out the dominant vehicle movements (to/from Cambridge). The most likely routes are:

- = Route A – Kaipaki Road to the south-east, connecting to Cambridge Road, providing access to destinations in Cambridge and surrounding areas – approximately 70% of trips;
- = Route B – Kaipaki Road to the north-west, connecting to SH3, providing access to Ohaupo, Te Awamutu, Rukuhia and Hamilton – approximately 10% of trips; and
- = Route C – Mystery Creek Road via Kaipaki Road to the north-west and Mellow Road, connecting to SH21, providing access to Rukuhia, Tamahere, Matangi, and Hamilton – approximately 20% of trips.

The potential transport related effects are from the increase in traffic (most noticeably heavy vehicle traffic), and they mainly relate to safety, efficiency, parking / maneuvering and pavement impacts.

- = The additional traffic is within the capacity of the surrounding road network and efficiency is unlikely to be adversely affected.
- = A vehicle entrance designed to Diagram E standard is expected to be sufficient to accommodate the additional traffic with no reason to expect safety issues.
- = Sufficient space is available on site to accommodate expected parking and manoeuvring. No off-site effects expected.

If 100% of quarry traffic were to travel to/from the north-west, the estimated vehicle movements for the proposed quarry indicate that the peak right turn movements could be up to 7 veh/hr. This does not trigger the need for a right turn bay at the quarry access.

6.2. Conditions

We recommend it be subject to conditions that require:

- = upgrade of the vehicle entrance to a modified version of Diagram E;
- = vehicle entrance and access road design approval by Council;
- = detailed design safety audit of the vehicle crossing;
- = capping of daily peak and monthly average vehicle movements; and
- = a pavement impact fee.

Our proposed transport related conditions are attached as Appendix 6.

Provided the mitigation recommend in this ITA is implemented, the transport effects are expected to be no more than minor, and there is no reason related to transport why the proposal should not proceed.

APPENDIX 1: PHOTOS

Photos



Kaipaki Road at the intersection with State Highway 3



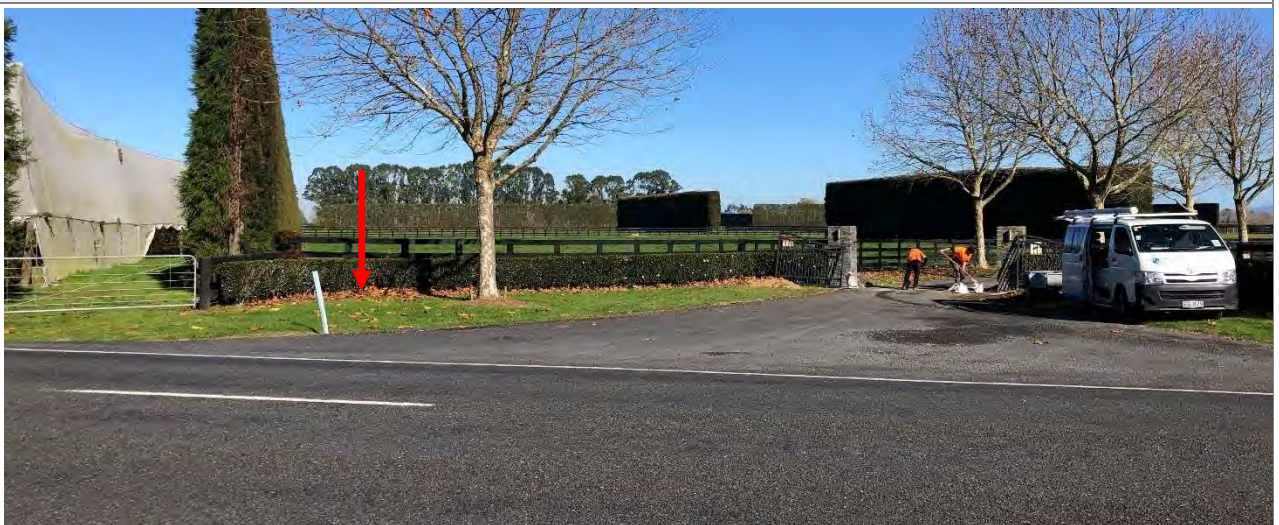
Mellow Road at the intersection with Kaipaki Road



Kaipaki Road at the intersection with Cambridge Road.



Looking north-west along Kaipaki Road past the existing vehicle entrance



Looking across Kaipaki Road at the proposed entrance location (red arrow)

APPENDIX 2: CRASH DIAGRAMS 2015-2019

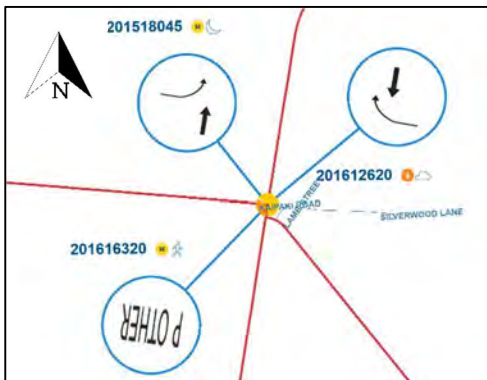


Figure 17: Crash Diagram, Kaipaki Road and Cambridge Road Intersection

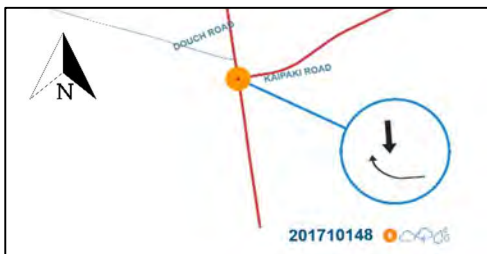


Figure 18: Crash Diagram, SH3 and Kaipaki Road Intersection

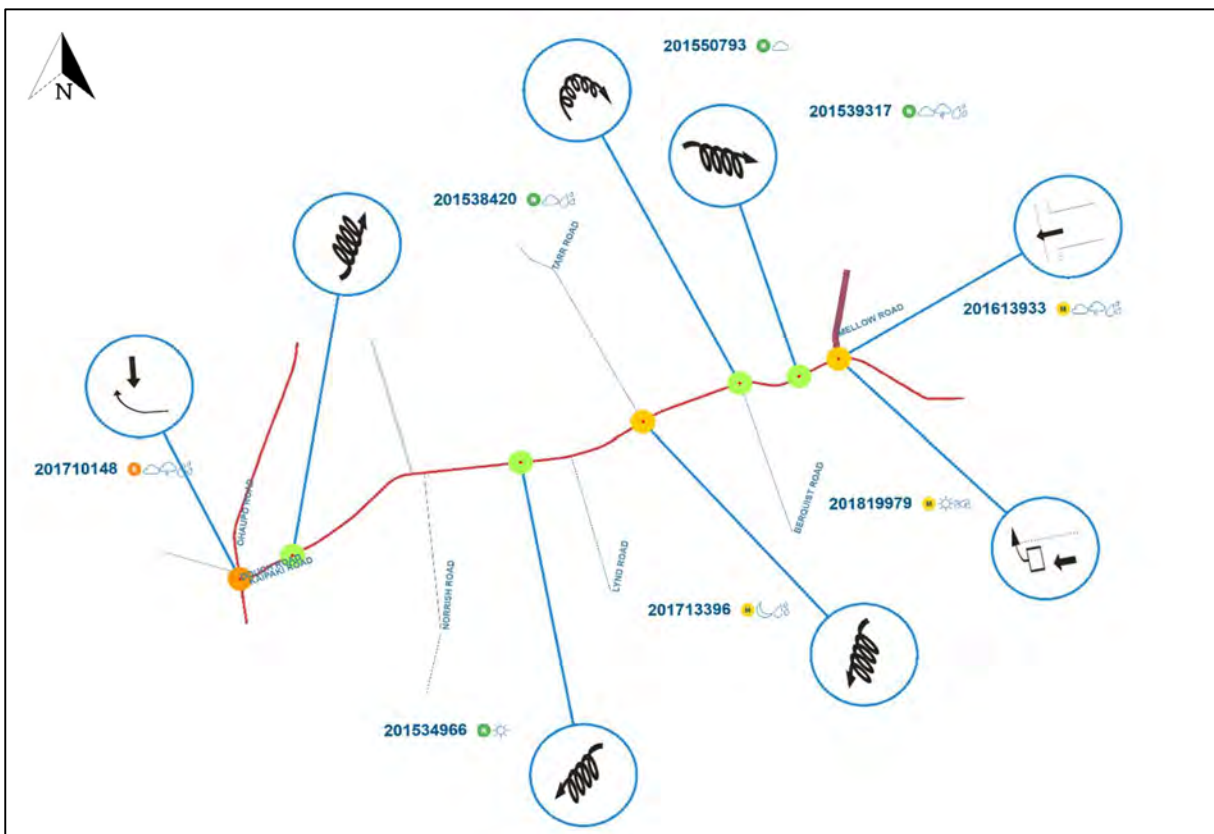


Figure 19: Crash Diagram, Kaipaki Road – SH3 to Mellow Road

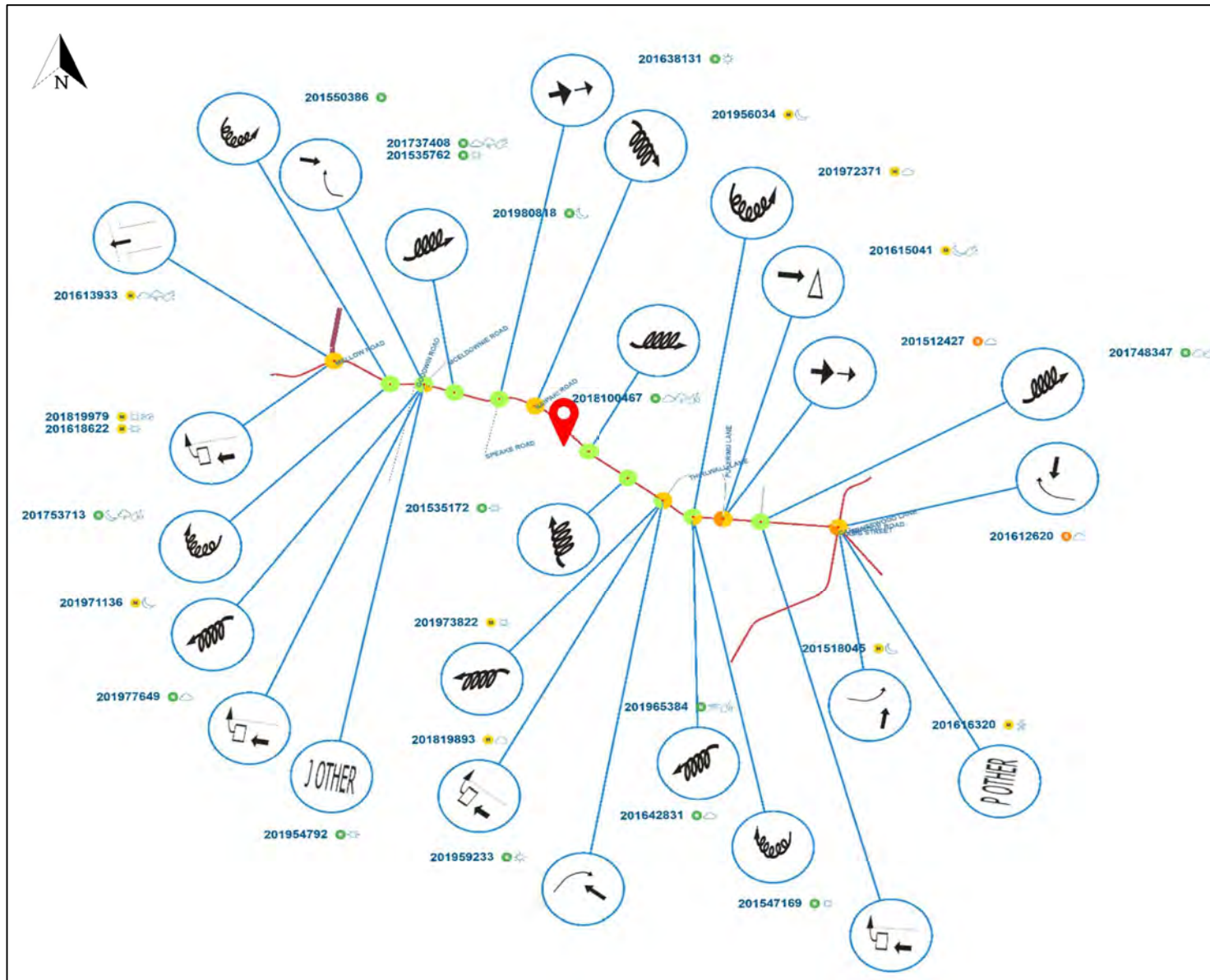
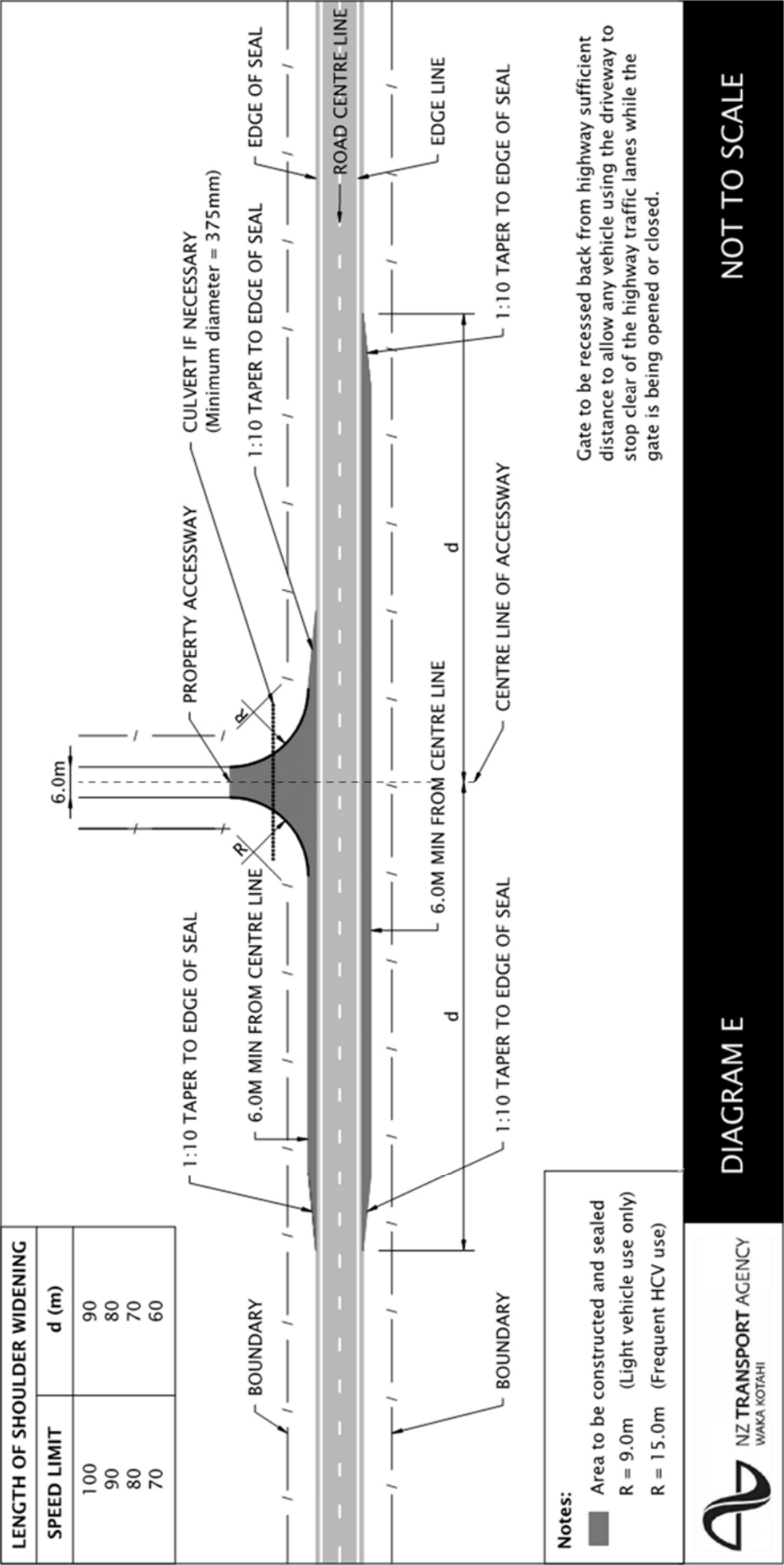


Figure 20: Crash Diagram, Kaipaki Road – west of Mellow Road to Cambridge Road

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APPENDIX 3: PROPOSED VEHICLE ENTRANCE (NZTA PLANNING POLICY MANUAL)





Semi-trailer swept paths at the proposed vehicle crossing



Figure 21: B-Train swept paths at the proposed vehicle crossing



Figure 22: B-train swept paths for entering and exiting vehicle

APPENDIX 4: TRIP GENERATION CALCULATIONS

SAND AND CLEANFILL

	Average extraction	Yearly maximum	Weekly maximum
Total sand volume	900,000		
Duration (years)	7		
Operation (weeks/year)	52	52	
Operation (days/week)	5.5	5.5	5.5
Operation (hours/day)	9	9	9
Operation (days/year)	276	276	
Staff (veh/day)	8	8	8
Volume/year	128,571	200,000	
Volume/week	2,473	3,846	5000
Volume/day	466	725	909
Average load size (m3)	15.0	15.0	15.0
Total number of loads	60,000		
Loads/year	8,571	13,333	
Loads/day (HCV)	31	48	61
SAND/CLEANFILL shared trips			
HCV/day	62	97	121
veh/day	70	105	129
Peak veh/hr (10%)	7	10	13
ECM/day	319	491	614
Peak ECM/hr (10%)	32	49	61
CLEANFILL only trips (+10%)			
HCV/day	6	10	12
SAND and CLEANFILL trips combined			
Total HCV/day	68	106	133
Total veh/day	76	114	141
Peak veh/hr (10%)	8	11	14
ECM/day	350	539	675
Peak ECM/hr (10%)	35	54	67
Proportion travelling to/from south-east	70%	70%	70%
veh/day	53	80	99
HCV/day	48	74	93
Peak left turning traffic veh/hr	3	4	5
Proportion travelling to/from north-west	30%	30%	30%
veh/day	23	34	42
HCV/day	20	32	40
Peak right turning traffic veh/hr	1	2	2
Right turn bay required?	No	No	No
Test highest proportion turning right	100%	100%	100%
Peak right turning traffic veh/hr	4	6	7
Right turn bay required?	No	No	No

APPENDIX 5: CALCULATION OF FINANCIAL CONTRIBUTION FOR PAVEMENT IMPACTS

LUC0015/16 Sand Quarry, 928 Kaipaki Road - Assessment of Pavement Impacts

Waipa District Council Methodology, Proposed District Plan Rule 18.4.2.14

	Current Traffic Volume	%HCV	Baseline HV	Road length	Direction factor	Pavement life	HVs in each lane	ESAs/ HVAG	NHVAG	ESA/ vehicle	DESA [F]
	vpd		HCV/day	(km)		(yrs)	365day/yr				
10% SH3, 20% SH21, 70% Camb											
Kaipaki Road (west to McEldownie)	3200	10.2%	326.4	2.3	0.5	40	59,568	0.6	2.4	1.44	3,431,117
Kaipaki Road (McEldownie to Mellow Road)	2100	9.3%	195.3	1.3	0.5	40	35,642	0.6	2.4	1.44	2,052,994
Kaipaki Road (Mellow Road to Tarr Road)	2100	9.3%	195.3	1.8	0.5	40	35,642	0.6	2.4	1.44	2,052,994
Kaipaki Road (Tarr Road to SH3)	1900	9.3%	176.7	3.8	0.5	40	32,248	0.6	2.4	1.44	1,857,470
Mellow Road (north)	1100	7.1%	78.1	0.75	0.5	40	14,253	0.6	2.4	1.44	820,987
Mystery Creek Road (to SH21)	2260	7.1%	160.46	3.6	0.5	40	29,284	0.6	2.4	1.44	1,686,756
Kaipaki Road (east to Cambridge Road)	3200	10.2%	326.4	3.9	0.5	40	59,568	0.6	2.4	1.44	3,431,117

Proposed Development Traffic									
Proportion	Additional traffic	Direction factor	Activity Duration	HVs in each lane	ESAs/ HVAG	NHVAG	ESA/ vehicle	DESA [G]	
62	HCV/day		(yrs)	250					
			days/year						
30%	18.6	0.5	7	2,325	0.6	3	1.8	29,295	
30%	18.6	0.5	7	2,325	0.6	3	1.8	29,295	
10%	6.2	0.5	7	775	0.6	3	1.8	9,765	
10%	6.2	0.5	7	775	0.6	3	1.8	9,765	
20%	12.4	0.5	7	1,550	0.6	3	1.8	19,530	
20%	12.4	0.5	7	1,550	0.6	3	1.8	19,530	
70%	43.4	0.5	7	5,425	0.6	3	1.8	68,355	

Renewal cost (\$/km)	Financial Contribution
\$ 350,000	
\$ 805,000	\$ 6,815
\$ 455,000	\$ 6,401
\$ 630,000	\$ 2,982
\$ 1,330,000	\$ 6,955
\$ 262,500	\$ 6,099
\$ 1,260,000	\$ 14,422
\$ 1,365,000	\$ 26,662

Rule - Determination of the maximum amount of financial contribution

18.4.2.14 The maximum amount of financial contribution for traffic and pedestrian routes that may be taken shall be determined on the basis of the following:

$$\$[(G)/[F] + (G)] \times (H)$$

where:

F = the volume of vehicular traffic (measured in equivalent standard axes for a 40 year design period) currently using routes that will require construction, upgrading or earlier renewal as a consequence of the development.

G = the volume of heavy vehicular traffic (measured in equivalent standard axes for a 40 year design period) directly attributable to the development.

H = the cost of construction, upgrading or renewal of traffic and pedestrian routes as a consequence of the development.

Advice Notes:

- The fee will be charged as a lump sum where the activity is expected to continue for less than three years. Where the development activity is expected to continue for longer than three years, the fee may by agreement be allocated on the basis of a unit rate related to the materials transported.
- In respect of the Significant Mineral Extraction Zone only - Council, at its sole discretion, may accept any monetary value of financial contribution required, as a supply of aggregate for Council use up to the equivalent monetary value at the market rate at time of calculation.

Assumptions and Notes:

- based on average of 60 HCV/day, which is the 5.5 day x 52 week medium duration extraction rate of 900,000 over 7 years

- A conversion factor of 1.6t/m³ has been used to calculate the sand quantity in tonnes.

	Total Cost	\$/t
	\$ 70,338	0.049
Quantity (m ³)	900,000	
Conversion factor	1.6	
Quantity (tonne)	1,440,000	

Annual cost \$ 10,048.24

With FAR	51%
Cost per tonne	\$ 0.024
Annual cost	\$ 4,923.64

LUC0015/16 Cleanfill Operation, 928 Kaipaki Road - Assessment of Pavement Impacts

Waipa District Council Methodology, Proposed District Plan Rule 18.4.2.14

	Current Traffic Volume vpd	%HCV	Baseline HV HCV/day	Road length (km)	Direction factor	Pavement life (yrs)	HVs in each lane 365day/yr	ESAs/ HVAG	NHVAG	ESA/ vehicle	DESA [F]
10% SH3, 20% SH21, 70% Camb											
Kaipaki Road (west to McEldownie)	3200	10.2%	326.4	2.3	0.5	40	59,568	0.6	2.4	1.44	3,431,117
Kaipaki Road (McEldownie to Mellow Road)	2100	9.3%	195.3	1.3	0.5	40	35,642	0.6	2.4	1.44	2,052,994
Kaipaki Road (Mellow Road to Tarr Road)	2100	9.3%	195.3	1.8	0.5	40	35,642	0.6	2.4	1.44	2,052,994
Kaipaki Road (Tarr Road to SH3)	1900	9.3%	176.7	3.8	0.5	40	32,248	0.6	2.4	1.44	1,857,470
Mellow Road (north)	1100	7.1%	78.1	0.75	0.5	40	14,253	0.6	2.4	1.44	820,987
Mystery Creek Road (to SH21)	2260	7.1%	160.46	3.6	0.5	40	29,284	0.6	2.4	1.44	1,686,756
Kaipaki Road (east to Cambridge Road)	3200	10.2%	326.4	3.9	0.5	40	59,568	0.6	2.4	1.44	3,431,117

Proposed Development Traffic									
Proportion	Additional traffic HCV/day	Direction factor	Activity Duration (yrs)	HVs in each lane 250 days/year	ESAs/ HVAG	NHVAG	ESA/ vehicle	DESA [G]	
6									
30%	1.8	0.5	7	225	0.6	3	1.8	2,835	
30%	1.8	0.5	7	225	0.6	3	1.8	2,835	
10%	0.6	0.5	7	75	0.6	3	1.8	945	
10%	0.6	0.5	7	75	0.6	3	1.8	945	
20%	1.2	0.5	7	150	0.6	3	1.8	1,890	
20%	1.2	0.5	7	150	0.6	3	1.8	1,890	
70%	4.2	0.5	7	525	0.6	3	1.8	6,615	

Renewal cost (\$/km)	Financial Contribution
\$ 350,000	
\$ 805,000	\$ 665
\$ 455,000	\$ 627
\$ 630,000	\$ 290
\$ 1,330,000	\$ 676
\$ 262,500	\$ 603
\$ 1,260,000	\$ 1,410
\$ 1,365,000	\$ 2,627

Rule - Determination of the maximum amount of financial contribution

18.4.2.14 The maximum amount of financial contribution for traffic and pedestrian routes that may be taken shall be determined on the basis of the following:

$$\frac{F}{G} \times (G) + (G) \times (H)$$

where:

F = the volume of vehicular traffic (measured in equivalent standard axes for a 40 year design period) currently using routes that will require construction, upgrading or earlier renewal as a consequence of the development.

G = the volume of heavy vehicular traffic (measured in equivalent standard axes for a 40 year design period) directly attributable to the development.

H = the cost of construction, upgrading or renewal of traffic and pedestrian routes as a consequence of the development.

Advice Notes:

- The fee will be charged as a lump sum where the activity is expected to continue for less than three years. Where the development activity is expected to continue for longer than three years, the fee may by agreement be allocated on the basis of a unit rate related to the materials transported.
- In respect of the Significant Mineral Extraction Zone only - Council, at its sole discretion, may accept any monetary value of financial contribution required, as a supply of aggregate for Council use up to the equivalent monetary value at the market rate at time of calculation.

Assumptions and Notes:

- based on an additional 10% of trucks arriving to the site to drop cleanfill (and not picking up sand), equating to 540,000m³ of cleanfill over 7 years.

- A conversion factor of 1.7t/m³ has been used to calculate the cleanfill quantity in tonnes.

Total Cost	\$/t
\$ 6,898	0.008

Quantity (m ³)	540,000
Conversion factor	1.7
Quantity (tonne)	918,000

Annual cost \$ 985.42

With FAR	51%
Cost per tonne	\$ 0.004
Annual cost	\$ 482.86

APPENDIX 6: SUGGESTED CONDITIONS

This section only considers consent conditions that directly relate to transport matters.

Suggested conditions of consent	
Annual Report	
The consent holder must provide Waipa District Council's Enforcement Officer with an annual report which shall include details of the following:	
a) daily numbers of truck movements; and	
b) monthly sand volumes extracted.	
Sand Excavation	
A maximum of 200,000m ³ of sand may be removed from the site in any 12-month period.	
The consent holder must keep a register of daily truck movements and sand volume leaving the site. This information must be made available to an authorised officer of the Waipa District Council within 10 working days upon request.	
The maximum number of heavy vehicle movements generated by the activity shall not exceed:	
- Daily maximum of 133 HCV movements/day; and	
- Daily average of 106 HCV movements /day (calculated over a one-month period)	
Roading	
All access to the property for vehicles visiting the sand excavation and cleanfill activities must be via the proposed access which shall be established in general accordance with the design shown on the Stamped Approved Plans at 928 Kaipaki Road, Cambridge.	
The consent holder shall submit engineering plans detailing the vehicle crossing and proposed haul road to the Council's Manager Development Engineering in advance of any construction works being undertaken. The design should be in general accordance with NZTA Planning Policy Manual Diagram E and include:	
- Heavy vehicle tracking for the design vehicle;	
- Details for the location and size of the splitter island;	
- Location of the proposed gate;	
- Details of access to the residential dwelling;	
- Details of the proposed sealed access road 6m wide or 3m wide with passing bays at maximum 100m spacings; and	
- Size and spacing of any passing bays on the proposed access road.	
The consent holder shall arrange for an independent detailed design road safety audit of the proposed vehicle crossing to the sand quarry to be undertaken in accordance with the 'Road Safety Audit Procedures for Projects Guidelines, May 2013'.	
A copy of the road safety audit shall be provided to Council's Manager Development Engineering.	
Any audit recommendations and design changes arising from the road safety audit shall be agreed with the Council's Manager Development Engineering prior to construction being undertaken.	
Financial Contribution	
The consent holder shall pay the Waipa District Council a financial contribution of \$0.03/tonne for each tonne of material that is transported by public road.	
Note: The financial contribution of \$0.03/tonne takes into account the NZ Transport Agency financial assistance rate of 51%.	



APPENDIX F

Archaeological Report – Clough and
Associates Limited

928 KAIPAKI ROAD, CAMBRIDGE, PROPOSED SAND QUARRY: ARCHAEOLOGICAL ASSESSMENT

Prepared for Shaw Property Holdings Ltd

September 2019



By

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INTRODUCTION

Project Background

Shaw Property Holdings Ltd proposes to create a new sand quarry at 928 Kaipaki Road, Cambridge (The Project Area). The legal description of the property is Lot 2 DP 444992 and Lot 3 DP 424105 covering an area of 49.98 Hectares (Figure 1). The sand quarry is proposed to be located over most of the property as shown in Figure 2. The property is currently in operation as a thoroughbred stud.

An archaeological assessment was commissioned by Shaw Property Holdings Ltd to establish whether the proposed sand quarry is likely to impact on archaeological values. This report has been prepared as part of the required assessment of effects accompanying a resource consent application under the Resource Management Act 1991 (RMA) and to identify any requirements under the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA). Recommendations are made in accordance with statutory requirements.

Methodology

The New Zealand Archaeological Association's (NZAA) site record database (ArchSite), Waipa District Plan schedules and the Heritage New Zealand Pouhere Taonga (Heritage NZ) New Zealand Heritage List/Rārangī Kōrero were searched for information on sites recorded in the vicinity. Literature and archaeological reports relevant to the area were consulted (see Bibliography). Early survey plans and aerial photographs were checked to establish the history of the property.

A site visit to the proposed sand quarry site in Lot 2 DP 444992 at 928 Kaipaki Road was conducted on 25 June 2019. The ground surface was examined for evidence of former occupation (in the form of shell midden, depressions, terracing or other unusual formations within the landscape, or indications of 19th century European settlement remains). Exposed and disturbed soils were examined where encountered for evidence of earlier modification, and an understanding of the local stratigraphy. Subsurface testing with a probe was carried out in the areas considered likely to contain archaeological sites (based on identification through old aerial photographs) to determine whether buried archaeological deposits could be identified or establish the nature of possible archaeological features. Sites were photographed, GPS readings taken and site record forms written or updated. Lot 3 DP 424105 was not included in the quarry area at the time of the site visit and the assessment for this lot is based on the results of desk-based study (including historical plans, aerial photographs and written descriptions) and observations of the general area during the original survey.



Figure 1. Upper map showing the regional location of the Project Area containing the proposed sand quarry and lower inset showing the details of the property (source: Waipa District Intramaps)

September 2019 928 Kaipaki Road Sand Quarry Archaeological Assessment

HISTORICAL BACKGROUND

Maori Settlement

In oral tradition the Tainui canoe, captained by chief Hoturoa, made its final landfall at Kawhia some 800 years ago. The canoe had travelled around various parts of the central North Island, including the Bay of Plenty, the Coromandel, the Manukau Heads and the Hauraki Gulf, with some people leaving the voyage and settling in these areas (Te Ara). Hoturoa is said to have made his base at Kawhia and over the years the Tainui people expanded inland from there. This included movement into the Waikato and Maori settlements spread throughout the region, with many concentrated along the coast to exploit the rich resources available there. Further inland, settlements were made along navigable waterways, such as the Waikato and Waipa Rivers and their tributaries, with numerous pa sites identified as well as gardening and food storage sites. Intertribal conflicts occurred periodically as a result of alliances, disputes and competition for resources. In the late 18th century there was a major encounter near Ohaupo, referred to as the battle of Hingakaka, which saw the defeat of Ngati Toa by the Waikato tribes (Sole 2005: 137).

During the early years of the 19th century contact with European traders and missionaries increased, one result being the introduction of muskets into Maori intertribal conflicts. In the early years the northern tribes were the first to arm themselves in this way and gained some advantage in battles with tribes who had not obtained such weaponry. However, by the 1830s most tribes were more or less equally equipped and were unable to sustain the long-term and large-scale warfare often referred to as 'The Musket Wars' that had occurred over the previous two decades. In the years that followed, European influence increased and conflicts between Maori and the colonial government over the European demand for land became an ongoing issue, resulting in open conflict by the early 1840s. Contentious land sales, and the demands of settlers for land that was not properly secured, continued to result in conflicts and in 1845-46 these were centred in the north. However, confrontations between Maori and government forces continued with skirmishes, raids and battles taking place to the south, in the Hutt Valley and Wanganui in the late 1840s (Cowan 1955: 100-103; 143-144).

The New Zealand Wars

Tensions between Maori and the government continued to worsen and in 1858 resulted in the founding of the King Movement (Kingitanga) in the Waikato. This movement aimed to unite Maori under a single leader to strengthen their ability to oppose the loss of their land from the growing demands of the ever-increasing number of European settlers arriving in New Zealand (Belich 1986). The Waikato, with its proximity to Auckland and now as the seat of the King movement, was a concern to the government and on 11 July 1863, the governor of New Zealand, Sir George Grey, issued an ultimatum to the chiefs of the Waikato, ordering that they pledge allegiance to Queen Victoria or face the consequences. Without providing adequate time for the Maori leaders to respond, on 12 July, British forces marched into the territory of the Maori King crossing the boundary (aukati) between the Pakeha and Maori lands and marking the beginning of the Invasion of the Waikato (Belich 1986; New Zealand History Website). The Waikato campaign lasted for nine months and ended with the Maori defeat at Orakau Pa in April 1864. At this time, a new boundary (autaki) was established south of the Punui River, leaving the land to the north in the hands of the government (Cowan 1955: 408-410).

The Waikato Militia and Military Settlement

Just after the outbreak of hostilities in the Waikato, the government had devised a scheme to form militia regiments that would provide a population base for military settlements in the Waikato once the government had taken control of the area (Allen 1969:33). The settlements were intended to prevent further unrest within the Maori population by establishing a larger European presence in the area and to guard from further attacks from the Kingites living to the south of the Puniu River (Cowan 1955: 412). Many of the soldiers were recruited from the gold fields of Otago and Australia, with the main incentive to join up being the provision of a 1-acre town allotment and a larger farm allotment (50 acres in size for the lower ranks and larger ones for the officers) to each soldier after completing three years of military service. Enlistment began in August 1863 with the men being divided into the four Waikato regiments (Allen 1969:35). The land for the settlements was to be confiscated from Maori by the government and by mid-1864, military settlements were being planned at four locations in the Waikato at Alexandra (later renamed Pirongia), Kihikihi, Hamilton and Cambridge. The sites were chosen as defensive positions and to overlook the Waikato and Waipa Rivers. As the settlements were intended to be self-sufficient, it was also important that the sites chosen contained enough surrounding land suitable for farming. The strategic importance of the sites, in most cases, however, outweighed other factors and in the case of Cambridge, its location was ultimately decided as it guarded the head of navigation on the Waikato River (Allen 1969: 47).

The settlement at Cambridge was established in July 1864 and the site soon became the headquarters of the Third Waikato Regiment. Construction works on three redoubts soon commenced. The Star Redoubt was located within the settlement at Cambridge. The other two redoubts were located across from each other on the north and south sides of the Waikato River to the east of the Project Area. The redoubts were only used for a very short period and were abandoned by the end of 1864 (Cambridge Museum Website).

Whilst the soldiers were put to tasks of building facilities, including two redoubts, surveyors were at work laying out the new settlement in 1-acre town allotments and larger farm allotments in the surrounding area. The town allotments were laid out in rectangular grids situated around the two redoubts, one on each side of the Waikato River. The farm allotments were intended to spread out from the edges of the town but were planned to be kept as close to the town as possible for defensive reasons. Unfortunately, the military settlement process at Cambridge did not run particularly smoothly, as noted in the in the 29 November 1864 Edition of the *Daily Southern Cross*:

‘Cambridge is laid out on both sides of the Horotiu River, about 30 miles above Ngaruawahia, and is the headquarters of the third Waikato Regiment. There are about 600 men up here at present. The town is laid out in one-acre allotments, and the surveyors are busy laying out the roads for the fifty-acre allotments, and yet the men of this regiment have not got any of the acre allotments given to them, although the township has been surveyed these last two months. It is not possible, therefore, for anyone to make improvements on his acre. We hear that the men of the 2nd Regiment have some of their land in potatoes and other crops, but there is nothing of the kind here.’

The town lots were eventually provided to the men, but more problems arose with the farm allotments, the main one being an abundance of swamp land. The size of the farm lot granted was dependent on the rank of the soldier, with privates receiving 50 acre lots, corporals 60 acres, sergeants 80 acres, subalterns 200 acres, 250 acres for surgeons, 300 acres for captains and 400 acres for field officers. The farm blocks were laid out in 50m

units and the higher-ranking men would choose the appropriate number of blocks to make up their allotment, apart from the 60 and 80 acre farms for corporals and sergeants, which were laid out separately, shown in Figure 3. (Allen 1969:76). Many of the lower ranking men received 50 acres of poor-quality swampy land and as many had no previous farming experience, the process of creating farms proved too difficult to manage. Many sold their land as soon as their military service was finished, or in some cases they sold the land and transferred the military service to the new owner.

The higher-ranking soldiers fared much better, often receiving better quality land and also being able to combine their 50 acre lots into larger farms. The area to the east of Cambridge, including at Kaipaki, was described as being broken up by several large gullies, including Walker's Gully, which lies on the western and southern boundaries of the Project Area and contains the Mangawhero Stream, with the section boundaries surveyed along the edges of the gullies where possible (Allen 1969:82). This area of better-quality land was an exception, with the vast majority of the land allotted to the soldiers being inferior, and the military settlement scheme at Cambridge was for the most part considered a failure, with only a small number of the soldiers and their families remaining on their land (Cambridge Museum Website).

Ownership of the Project Area

The Project Area is located in Kaipaki which was one of the oldest European settlements in the Cambridge area and was described as being covered in fern and ti tree prior to clearance for farming. It also contained some of the better-quality land included in the farm allotment scheme of the military settlement. The earliest European settlers in the area were brothers James and Robert Fisher and Joseph Gane, who took up their military farm allotments in 1865/1866 (Cambridge Museum Website). As can be seen on the plan in Figure 4, the name Jas. Fisher is marked on Allotment 45 and 45A which form part of the Project Area. James did not continue in farming but soon moved away to work in the mining industry. He was said to have first been attracted to mining soon after the family's arrival in New Zealand and went to Gabriel's Gully near Lawrence Township, Otago when gold was discovered there in the early 1860s and a gold rush ensued. He later went to Hokitika and for a short time to Thames when gold was discovered there. It was noted in his obituary that he came back to Cambridge to reside with his sister in 1908 and he passed away in 1910 at the age of 70 (*Waikato Independent* 31 May 1910; *Waikato Argus* 1 June 1910). As well, the names R. Fisher and J. Fisher are present on neighbouring allotments. Robert Fisher and John Fisher were brothers of James and all three arrived in New Zealand in 1858 from Ayrshire Scotland with their mother and father and three sisters, Kate, Agnes and Margaret ('Obituary of Miss Margaret Fisher' *Waikato Independent* 23 October 1934).

As can also be seen in the 1865 plan in Figure 4, the land making up the eastern part of the Project Area, allotment 44, has the name John Bryant. No detailed information was able to be found for John Bryant apart from the fact that he soon sold his allotment to John Fisher and may possibly have left the district. An undated plan shown in Figure 5 shows the northern part of Allotments 44 and 45. It is noted that 'gravel pit' has been written on an area of land to the northwest of Allotment 45, but no further information is included.

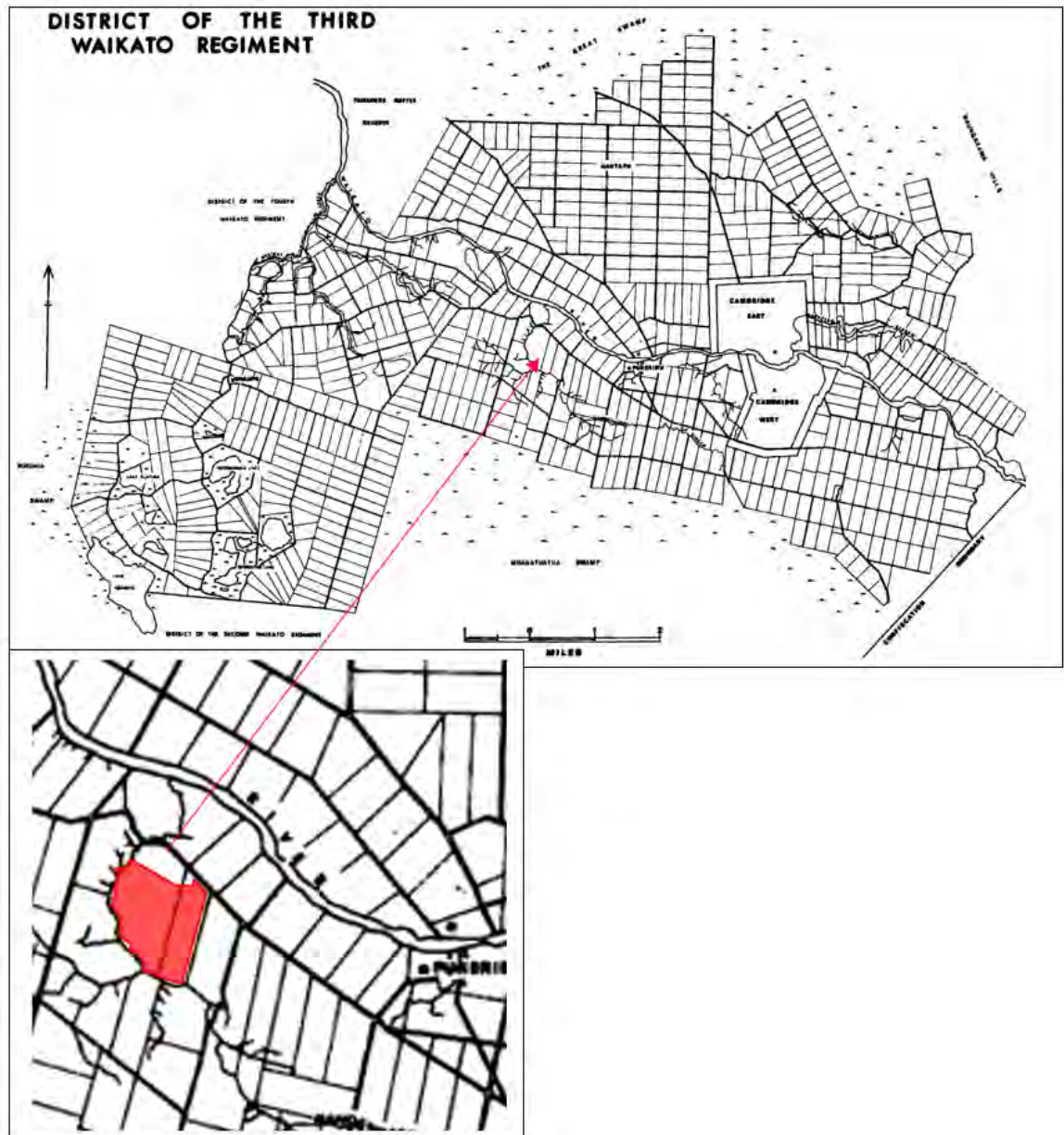
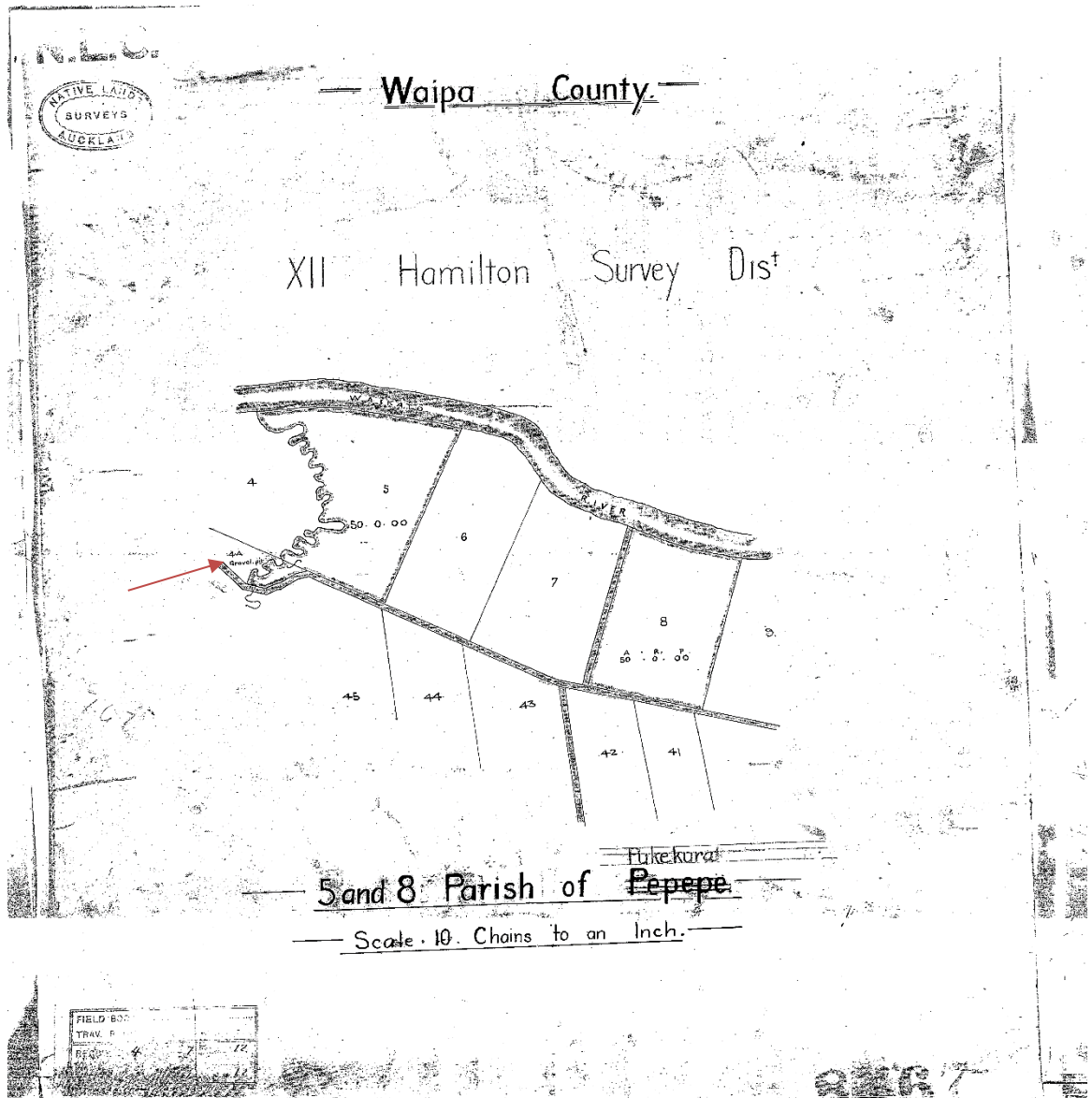


Figure 3. Plan of the militia farm allotments around Cambridge with the Project Area outlined and shaded in red (source: Allen 1969)



Figure 4. HNC SO 3331 I plan of the 1865 survey of Pukerimu with the Project Area (Lot 2 DP 444992) and additional property (Lot 3 DP 424105) outlined in red (source: Quickmap)



Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified September 2018, Plan is not current as at 27/06/2019

Figure 5. HN ML 8467 I 1 undated plan showing Allotments 44 and 45 and annotation of 'Gravel Pit' indicated by brown arrow to the northeast of Allotment 45 (source: Quickmap)

ARCHAEOLOGICAL BACKGROUND

Recorded Archaeological Sites

Five archaeological sites (S15/285, S15/546, S15/547, S15/631 and S15/715) have been previously recorded in the Project Area (Figure 6). All of these sites are borrow pits associated with Maori horticulture. Borrow pits are common features in the archaeological landscape of the Waikato. The pits were dug to collect sands and gravels that were present below the upper soil layers. The extracted material was then added to the topsoil to create a 'made soil' for gardening. The purpose of this 'made soil' was to improve soil quality (drainage, friability) for the cultivation of plants brought to New Zealand from warmer climates by Maori. Borrow pits are often found in proximity to gardening soils and it has been noted that the pits were often located near to the gardening areas (Walton and Cassels 1992: 166). Four of the archaeological sites on the Project Area were identified from review of aerial photographs and the locations are shown on the aerial photograph in Figure 7. These sites are S15/546 (three borrow pits), S15/547 (five borrow pits), S15/631 (a single borrow pit) and S15/715 (nine borrow pits). The fifth site, S15/285, was visited in 1983 and 10 borrow pits were identified. The pits were described as partially infilled and damaged from stock activity. The aerial photograph used to identify these sites with their locations marked is shown in Figure 7.

A number of additional archaeological sites associated with Maori settlement and horticulture have been recorded in the general vicinity of the Project Area and a selection of sites within c. 600m are described below to create a better understanding of and provide a background to the archaeological setting (Figure 6 and Table 1).

Two of the sites have been recorded as pa sites (S15/40 and S15/91). S15/40 is a small promontory pa located just to the northwest of the Project Area. It contains a single ditch and embankment that has been badly damaged, as it was previously excavated as a sand quarry. S15/91 is located near the south bank of the Waikato River to the northeast of the Project Area. It has not been confirmed as a pa site and its function has not been established but is likely to have been associated with Maori gardening. The remaining 10 recorded sites consist of borrow pits. As can be seen on the map in Figure 6 three of these sites, S15/510 (six borrow pits), S15/544 (four borrow pits) and S15/545 (two borrow pits) are located along the Mangawhero Stream to the southeast of the Project Area. None of these sites have been visited in the past and their current status is not known. One borrow pit site has also been recorded in the vicinity of the pa site, S15/40, S15/717 (single borrow pit). The site record does not include any information apart from the coordinates and number of pits identified. Another site described as containing 32 borrow pits is located to the north of the Project Area, again with no additional information provided on the site record (S15/716). The final five sites are located in a cluster to the northeast of the Project Area on the south side of the Waikato River near S15/91 (possible pa site). These sites consist of S15/288 (4 borrow pits), S15/659 (two borrow pits), S15/660 (four borrow pits), S15/661 (single borrow pit) and S15/662 (two borrow pits).

Archaeological Landscape

The presence of archaeological sites in the general area shows that the borrow pits recorded in the Project Area are part of a much larger archaeological landscape situated along the Waikato River and Mangawhero Stream. In general, the Waikato District contains a large number of such archaeological sites, with the majority being located along the coast or in the vicinity of major waterways. The main site types that have been recorded are

Pit/Terrace, Pa, Midden/ Oven, borrow pits and modified gardening soils (Hutchinson and Simmons 2016:17). Previous research and investigations have revealed past Maori occupation with both pa sites and sites associated with gardening predominating and with many of these sites clustered around the Waikato River. This clustering would appear to be the result of location preference, but also influenced by the focus of past archaeological surveys and investigations (Campbell 2012: 18-20). As noted by Campbell, there is also currently not enough available data to reconstruct the temporal progression of occupation in the wider Waikato Basin and the date of the first occupation has not been established (Campbell 2012:57). Currently, the earliest radiocarbon dates would suggest a date from the mid-14th century at sites located approximately 4km to the east of the Project Area.¹ The activities associated with early occupation are thought to have been forest clearance in desirable gardening areas, as evidence has indicated that the gardens were established in areas formerly covered by primary forest, which became fern land after the gardens were abandoned (Campbell 2012:58).

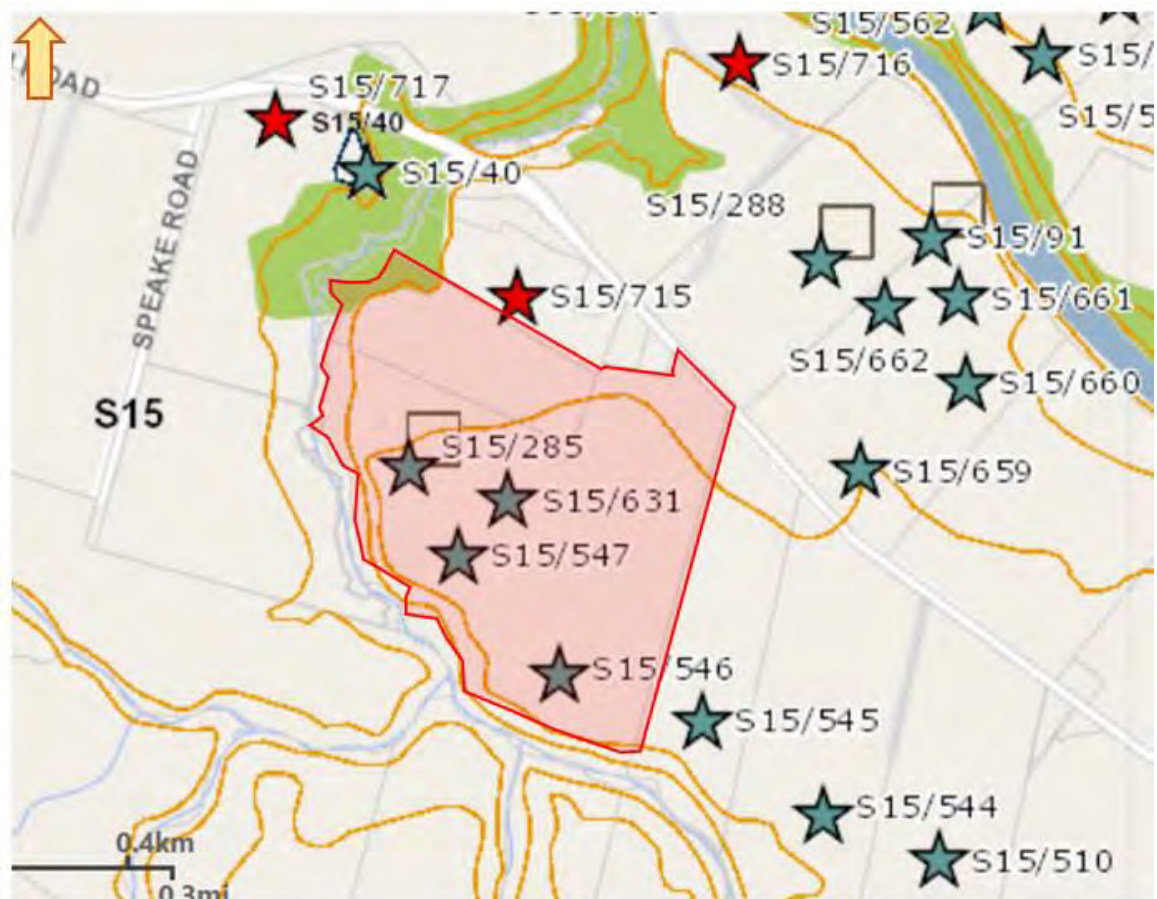


Figure 6. Map showing the location of recorded archaeological sites in the vicinity within c.600m of the Project Area, which is outlined and shaded in red (source: Archsite Website)

¹ Sites S15/639, S15/641 and S15/757 (source: Gumbley and Laumea 2018)



Figure 7. Aerial photograph dated 1943 (Crown 266 835 55) showing the archaeological sites recorded in the Project Area (sourced from <http://retrolens.nz> and licensed by LINZ CC-BY 3.0)

Table 1. Brief description of selected archaeological sites in and within c. 600m of the Project Area, with sites located in the Project Area shaded grey (source: NZAA Archsite Website)

NZAA #	Site Type	Description	NZTM Easting	NZTM Northing
S15/40	Pa Site	Located on a promontory overlooking the Mangawhero Stream with a single ditch and internal bank. Damaged from sand quarrying.	1811301	5803555
S15/91	Pa Site	Possible pa site or site associated with Maori gardening located on a raised area of land near the Waikato River.	1812394	5803427
S15/285	Borrow Pits	10 borrow pits (8-20m in diameter and 1-1.5m in depth) identified during a brief site visit in 1983.	1811378	5802984
S15/288	Borrow Pits	24 borrow pits covering an area of c.780 x 300m. Some damage from sand quarrying and agricultural uses.	1812177	5803385
S15/510	Borrow Pits	6 borrow pits identified from a 1943 aerial photograph SN26683556.	1812406	5802223
S15/544	Borrow Pits	4 borrow pits identified from a 1943 aerial photograph SN26683556. .	1812183	5802309
S15/545	Borrow Pits	2 borrow pits identified from a 1943 aerial photograph SN26683556.	1811949	5802491
S15/546	Borrow Pits	3 borrow pits in an area of 80 x 50m identified from 1943 aerial photograph SN266 835 55.	1811672	5802583
S15/547	Borrow Pits	5 borrow pits in an area of 90 x 60m, identified from 1943 aerial photograph SN266 835 55.	1811474	5802811
S15/631	Borrow Pit	Single borrow pit identified from 1943 aerial photograph SN266/835/55.	1811573	5802920
S15/659	Borrow Pits	2 borrow pits in an area of 30 x 20m identified on aerial photograph SN266 835 56.	1812252	5802978
S15/660	Borrow Pits	4 borrow pits identified from aerial photograph SN26683556.	1812459	5803148
S15/661	Borrow Pits	Single borrow pit identified from aerial photograph SN26683556.	1812446	5803312
S15/662	Borrow Pits	2 borrow pits identified from aerial photograph SN26683556.	1812302	5803294
S15/715	Borrow Pits	9 borrow pits – no additional information.	1811588	5803313
S15/716	Borrow Pits	32 borrow pits – no additional information.	1812018	5803766
S15/717	Borrow Pits	Single borrow pit – no additional information.	1811121	5803659

PHYSICAL ENVIRONMENT

Geology and Geomorphology

The geology of the Waipa region consists predominantly of volcanic material, including tephra. The geology of the region has been impacted by volcanic events, such as eruptions coming from the Taupo region, depositing large volumes of alluvial material (Waipa District Council 2008). Volcanic features can be found across the Waipa region, an example being Pirongia Mountain, a basaltic-andesite volcanic cone. Along with volcanic events, the region has been shaped by flooding events from the Waikato and Waipa rivers, carving out channels that can be found near the rivers.

The proposed sand quarry is situated on volcanogenic alluvium consisting of silt, sand and gravel (the Hinuera Formation) deposited by the ancient migrations of the ancient Waipa and Waikato River systems over the past c.100,000 years, with deposits up to 60m thick (Figure 8). These ancient alluvial deposits swept around an even older pre-existing hilly landscape, partially burying it and creating a mostly flat alluvial surface with only remnants of the older hills protruding in places (Lowe 2010). The last depositional episode was between 22,200 and 17,000 years ago and the deposits above the surface consist of numerous thin tephra layers (ibid.).

Recent boreholes taken as part of the soil assessment for the proposed sand quarry indicated that topsoil on the site overlies a silty loam down to depths between 0.5 to 1.2m below surface. Below this silica rich sands were found in the central part of the property, while other parts contained coarse-grained sands interbedded with silt and slightly clayey silt. Other areas displayed a similar topsoil and loam deposit with interbedded layers of slightly silty clayey silts and fine-grained pumice-rich sands. These soils are younger and are related to more recent depositional episodes associated with a major eruption of Lake Taupo in 180 AD (Geocon Geotechnical Ltd 2019).

Topography, Vegetation and Past Land use

The European settlement of the area containing the proposed sand quarry was originally part of the military settlement in the 1860s; the land was allocated for farming and has been in use for agricultural purposes since that time. It has been noted that after abandonment Maori gardening areas tended to become fern land and this matches the description of the land made by the early settlers. The majority of the Project Area is located on generally flat land with deep gullies along the western and southern boundaries leading down to the Mangawhero Stream as can be seen in the contour plan in (Figure 9). The property is divided into fenced paddocks with shelter belt and there is one residential building.

Past farming activities in the Project Area have affected the former Maori gardening landscape as the aerial photographs from the 1943 in Figure 7 shows the presence of borrow pits which are no longer visible on modern aerial photographs. Agricultural activities in the form of crop planting and stock grazing have continued to obscure the surface evidence of many of the borrow pits through infilling of pits and levelling out of the land. A review of aerial photographs taken between 1957 and 2002 (not shown) show that Lot 2 DP 444992 has been used for growing crops and stock grazing and that some earthmoving had taken place and a dirt bike track constructed in the paddock containing archaeological site S15/546. The aerial photographs showed only grassed paddocks in Lot 3 DP 424105 over this period, although some trees were planted across the property in the 1990's and early 2000's.

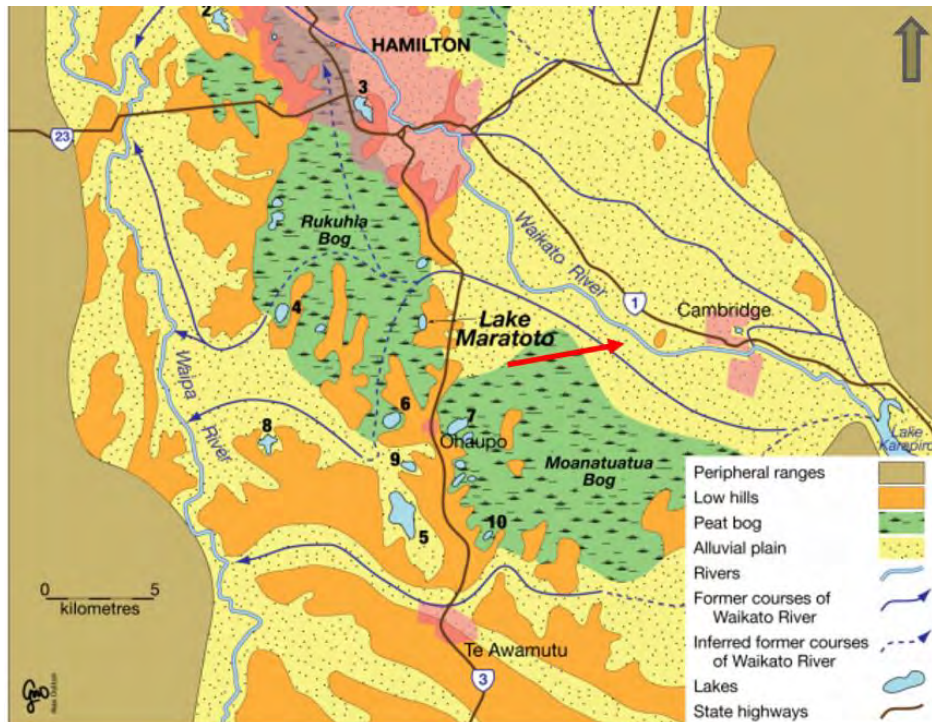


Figure 8. Map showing the modern landscape features in the central and southern part of the Hamilton Basin with approximate location of the Project Area shown by red arrow (source: Lowe 2010)

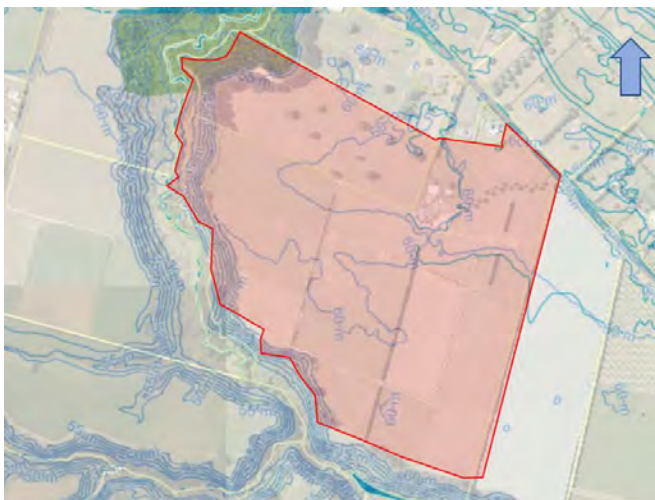


Figure 9. Aerial plan with contours showing the mostly flat landscape of the Project Area, which is outlined in red (source: Waipa District Intramaps)

FIELD ASSESSMENT

Field Survey Results

A survey of Lot 2 DP 444992 was made on 25 June 2019 and the entire property was accessible. The survey included part of the sand quarry footprint and surrounding paddocks. The steep banks leading down to the Mangawhero Stream were not included as they will not be affected by the proposed works. The property was in use as a thoroughbred stud at the time of the survey and was divided into fenced paddocks containing horses. It was noted that a number of mature shelter belts were also present and it was explained by the owner that the property had formerly been used as an asparagus farm and the shelter belts had been planted during that period. It was also suggested that the ground had been levelled out and many of the depressions that could be seen on the old aerial photographs had been infilled.

The majority of the features of the recorded archaeological sites (Figure 10) could not be relocated during the field survey. This indicates that the landscape has undergone significant modification through historic farming practices, especially infilling, levelling and stock damage. It should be noted that while some of the features recorded from early aerials are no longer visible on the surface it is likely that much of the deeper archaeology and features will have survived. This is particularly the case for borrow pits, which can exist to significant depths. A summary of the findings is provided below.

The proposed quarry footprint is located across both records of title. Five archaeological sites – S15/285 (10 borrow pits), S15/546 (3 borrow pits), S15/547 (five borrow pits) and S15/631 (a single borrow pit) in Lot 2 DP 444992 and S15/715, which is partially located in Lot 3 DP424105 – had been identified from previous reviews of a 1943 aerial photograph. Apart from S15/285 none of the sites had been visited in the past. A plan showing the locations of the archaeological sites based on the information provided in the site records and also the location of the identified borrow pit identified during the survey is shown in Figure 10.

According to the farm manager there were still some partially infilled depressions spread across the property. Upon inspection the ground surface was found to have been artificially levelled out and only two possible borrow pits were able to be identified. The first was near the recorded location of S15/547. Based on visual inspection, it appeared to be c.5m x 10m in diameter and a maximum of 20cm in depth from the current ground surface. As the pit had been affected by infilling, it should be noted that the actual size is likely to have been larger and deeper although no clear estimates were possible from probing. Coordinates of E1811498 N5802838 +/-4m were taken and a photograph is provided in Figure 11. While other undulations in the ground were noted, they could not be confirmed to be the locations of borrow pits. Just to the north of S15/547, another archaeological site S15/631, where a single borrow pit was identified from a 1943 aerial photograph, was also inspected, but no evidence of the pit could be detected, although it is considered likely that some subsurface evidence of the borrow pit could still be present at deeper levels (photograph in Figure 12).

The second possible borrow pit was located in the western paddock around the recorded location of S15/285, where a depression partially filled with water was observed. The area had been affected by horse activity with the horses using the depression to roll in. It is considered possible that this area does, however, represent a borrow pit as the grass around the central water-filled area varied from the general pasture grass and probing indicated a

softer soil in an area of c.5 x 10m. Coordinates were taken by handheld GPS at E1811338 N5803002 +-3m. It is considered likely that infilling has obscured the remaining surface evidence of the other pits noted during the 1988 site visit and again it is considered likely that subsurface evidence at deeper levels is still present (photograph in Figure 13).

The final area to be inspected was the south-eastern paddock where archaeological site S15/546 had been recorded. The paddock had been modified for use as a dirt bike track and no evidence of borrow pits could be identified on the ground surface. It is considered possible, however, that subsurface archaeological remains at deeper levels may survive (photograph in Figure 14).

Finally, as noted previously, Lot 3 DP 424105 which contains archaeological site S15/715 was not included in the survey, however, based on the desk-based findings it is considered likely that borrow pits may still be present, although not necessarily detectable from surface inspection. This is based on a review of aerial photographs that indicate this property has been used for agricultural purposes that would likely have obscured surface evidence but with no major modifications to the property that would have destroyed the borrow pits.

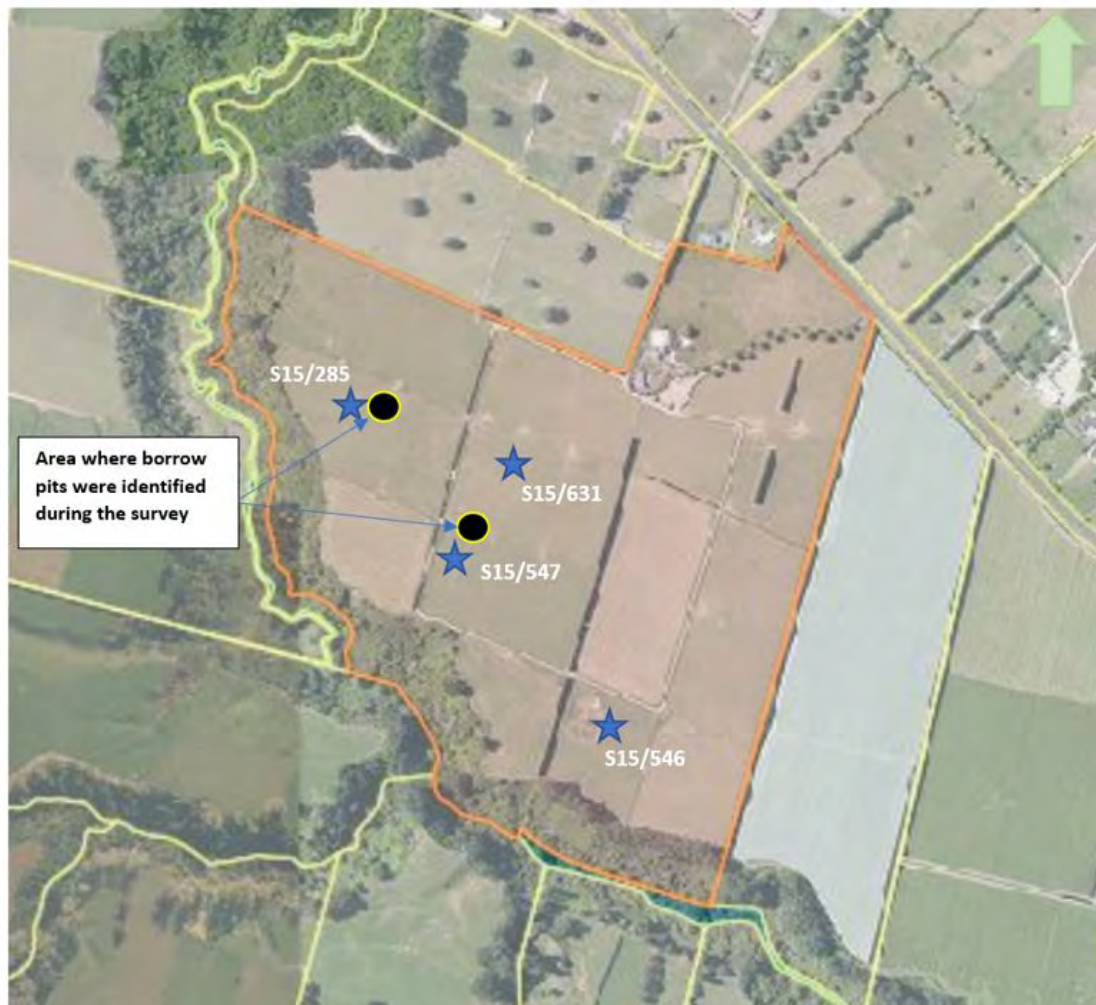


Figure 10. Aerial photograph showing the location of the recorded archaeological sites (blue stars) in the area covered by the survey (red shaded area) and the location where evidence of borrow pits was able to be detected during the survey indicated (source: Waipa District Intramaps)



Figure 11. Photograph showing evidence of the possible borrow pit at S15/547 (looking southeast)



Figure 12. Photograph showing the paddock where archaeological site S15/631 was identified from aerial photographs (looking northeast)



Figure 13. Photograph showing the possible location of a borrow pit at S15/285 (looking northeast)



Figure 14. Photograph of the paddock where archaeological site S15/546 is recorded, with modifications for the dirt bike track visible (looking southwest)

DISCUSSION AND CONCLUSIONS

Summary of Results

Five archaeological sites have been previously recorded in the Project Area. All of the sites consist of borrow pits and are associated with Maori horticulture. Borrow pits are a common site type in the area and the sites are part of the broader archaeological landscape of Maori settlement and horticulture in the Waikato. Three of the sites, S15/546, S15/547 and S15/631, were originally recorded from a review of historic aerial photographs and had not been visited prior to the field survey conducted for this assessment. A fourth, S15/285 had been previously visited in 1983. As noted previously, archaeological site S15/715 which is located in Lot 3 DP 424105 was not included in the area surveyed, however, based on desk-based research it is considered likely that sub-surface remains of borrow pits are still present.

The current survey identified the presence of one possible borrow pit near recorded archaeological site S15/547 (five pits were originally recorded); and another possible borrow pit near S15/285 (10 pits were originally recorded). No clear evidence of the borrow pits recorded at S15/631 and S15/546 were able to be identified. It was noted that the upper layers of the soil have been modified through past activities, including infilling, levelling and stock movements and, in the case of S15/546, for creation of a dirt bike track that would have damaged or destroyed archaeological remains that may have existed close to the ground surface. However, borrow pits are generally deep features and archaeological remains are likely to be present at deeper levels.

Maori Cultural Values

This is an assessment of effects on archaeological values and does not include an assessment of effects on Maori cultural values. Such assessments should only be made by the tangata whenua. Maori cultural concerns may encompass a wider range of values than those associated with archaeological sites. The historical association of the general area with the tangata whenua is evident from the recorded sites, traditional histories and known Maori place names.

Survey Limitations

It should be noted that archaeological survey techniques (based on visual inspection and minor sub-surface testing) cannot necessarily identify all sub-surface archaeological features or detect wahi tapu and other sites of traditional significance to Maori, especially where these have no physical remains.

Archaeological Value and Significance

The Waikato Regional Policy Statement (RPS) identifies several criteria for evaluating the significance of historic heritage places. In addition, Heritage NZ has provided guidelines setting out criteria that are specific to archaeological sites (condition, rarity, contextual value, information potential, amenity value and cultural associations) (Heritage NZ 2006: 9-10). Both sets of criteria have been used to evaluate the value and significance of the five archaeological sites that are situated in the Project Area (S15/285, S15/546, S15/547,

S15/631 and S15/715). As all of the sites consist of borrow pits and have similar values they have been evaluated together in Table 2 and Table 3.

Overall, the five archaeological sites are considered to have limited archaeological value based on the criteria discussed. This relates mainly to the nature of the sites as borrow pits, which are very common in the area. As well, borrow pits have been extensively studied in previous archaeological investigations and it is not considered likely that the borrow pit sites would contribute any significant new information to the understanding of Maori horticultural practices. However, borrow pits at other archaeological sites in the area have been found to contain material suitable for carbon dating. If such material is present in the borrow pits, the archaeological value of the sites would be increased based on their information potential regarding dates of usage, which could provide information on how Maori settlement patterns developed over time, a subject which is not clearly understood at present. As well, if gardening soils are present they would represent another element of the archaeological landscape but would not add significantly to the archaeological value of the sites, as gardening soils are commonly associated with borrow pits and their usage is well understood.

Table 2. Assessment of the archaeological values of sites S15/285, S15/546, S15/547, S15/631 and S15/715 based on Heritage NZ criteria (Heritage NZ 2006: 9-10)

Value	Assessment
Condition	The landscape has undergone significant modification through historic farming practices, specifically infilling and stock damage and in general archaeological features are no longer visible on the surface. However, it is likely that much of the deeper archaeology and features have survived.
Rarity	The sites are not rare as borrow pits are a very common site type in the area.
Contextual value	The borrow pits are associated with an archaeological landscape associated with Maori settlement and horticulture in the local and regional area. The presence of gardening soils has not been confirmed, but if present they would not add significantly to the archaeological value of the sites.
Information potential	The formation and usage of borrow pits is well understood and it is not considered likely that the archaeological sites would contribute any new or significant information to the site type. It is, however, noted that dates of early settlement and occupation patterns in the area are not well understood and the two archaeological sites have the potential to contain material suitable for radiocarbon dating, which could add to the understanding of these processes.
Amenity value	The borrow pits are situated on private land and most surface evidence has been obscured.
Cultural associations	The sites have Maori cultural association. The cultural significance of the sites is for tangata whenua to determine.
Other	No other values have been identified.

Table 3. Assessment of the heritage significance of sites S15/547 and S15/631 based on the Waikato Regional Policy Statement (Section 10A Table 10.1)

Archaeological Qualities	
Information	The sites have limited potential to provide new information on horticultural activities in the area and the creation and use of borrow pits is well understood
Research	The sites have limited to moderate potential to provide dating information that could add to the understanding of Maori settlement over time in the local area along the Waikato River and Mangawhero Stream.
Recognition or Protection	The sites are recorded in the NZAA Site Recording Scheme and as pre-1900 archaeological sites are protected under the provisions of HNZPT Act 2014.
Architectural Qualities	
Not applicable to these sites.	
Cultural Qualities	
Sentiment	The sites are not currently important as a focus of spiritual, political, national or other cultural sentiment. Their Maori cultural value should be determined by tangata whenua.
Identity	The sites are not currently a context for community identity or sense of place and do not provide evidence of cultural or historical continuity.
Amenity or Education	Limited, as the sites are situated on private land and any evidence of the sites is only visible from close up.
Historic Qualities	
Associative Value	The sites do not have any known direct association with, or relationship to, a person, group, institution, event or activity that is of historical significance to Waikato or the nation.
Historical Pattern	If appropriate material is present for dating purposes it could be used to provide information on temporal patterns of Maori settlement in the local area.
Scientific Qualities	
Information	The sites do not have any particular potential to contribute information about an historic figure, event, phase or activity.
Potential Scientific Research	The research potential of the sites is of an archaeological nature and is addressed under the first heading.
Technological Qualities	
Technical Achievement	The creation of manmade gardening soils was an innovative adaptation to a new environment and the borrow pits as part of this process have some limited technical value.

Effects of the Proposal

The proposed sand quarry will affect five recorded archaeological sites, S15/285, S15/546, S15/547, S15/631 and S15/715 based on the locations of these sites it is unlikely that they can be avoided, except for the northern part of S15/715 which has borrow pits identified from a 1943 aerial within Lot 3 DP 424105 as well as pits identified on the property to the north (Figure 15). As the preliminary site works will require removal of the upper levels of soil and extraction of the sand layers below them, all of these sites will be either partially or completely destroyed by the proposed activity. An Authority will be required under the HNZPTA before the sites can be modified.

In any area where archaeological sites have been recorded in the general vicinity it is possible that additional unrecorded subsurface remains may be exposed during development. In this case, it is considered likely, based on the presence of borrow pits, which are often found in association with gardening soils and other subsurface archaeological features. Any additional archaeological remains should be provided for under the Authority obtained from Heritage NZ, which should include all works associated with the quarry operation. Details of works will be required as part of the Authority application.

Lot 3 DP 424105 which contains archaeological site S15/715 has only had a desk-based assessment, however, based on these findings it is considered likely that borrow pits may still be present, although not necessarily visible from surface inspection. This is based on a review of aerial photographs² (not shown) that indicate this property has been used for agricultural purposes with no major modifications to the property that would have destroyed the site.

As sites S15/285, S15/546, S15/547, S15/631 and S15/715 are considered to have limited archaeological value, the overall effects on archaeological values are considered likely to be minor and can be mitigated through collection of information (particularly through collection of material suitable for radiocarbon dating) under the provisions of the HNZPTA. It is also noted that the presence of additional archaeological remains (which may include the presence of gardening soils) is considered likely and that these will not be able to be identified prior to topsoil stripping as previous impacts to upper ground layers have obscured or destroyed much of the surface evidence of archaeological sites. The potential effects can be appropriately addressed through archaeological monitoring and recording of archaeological sites (or parts of sites) affected by future development under the provisions of the HNZPTA, to recover information relating to the history of the area. Effects on the wider archaeological landscape are also considered to be minor as the affected sites make a relatively minor contribution to the archaeological landscape.

² Aerial photographs reviewed: Crown 1039 2619 20 (dated 1957); Crown 3470 4513 20 (dated 1971); Crown 3730 L 10 (dated 1974); Crown 5479 I 26 (dated 1979) and Crown 8178 C 6 (dated 1983), Crown 9401 D 8 (dated 1995) sourced from: <http://retrolens.nz> and licensed by LINZ CC-BY 3.0) 2002 aerial photograph source: Waipa District Intramaps; 2008 and 2018 aerial photographs sourced from GoogleEarth

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Figure 15. Aerial plan showing the recorded locations of archaeological sites in the Project Area, note S15/715 is only partially located in the Project Area (source: Waipa District Intramaps)

Resource Management Act 1991 Requirements

Section 6 of the RMA recognises as matters of national importance: ‘the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga’ (S6(e)); and ‘the protection of historic heritage from inappropriate subdivision, use, and development’ (S6(f)).

All persons exercising functions and powers under the RMA are required under Section 6 to recognise and provide for these matters of national importance when ‘managing the use, development and protection of natural and physical resources’. There is a duty to avoid, remedy, or mitigate any adverse effects on the environment arising from an activity (S17), including historic heritage.

Historic heritage is defined (S2) as ‘those natural and physical resources that contribute to an understanding and appreciation of New Zealand’s history and cultures, deriving from any of the following qualities: (i) archaeological; (ii) architectural; (iii) cultural; (iv) historic; (v) scientific; (vi) technological’. Historic heritage includes: ‘(i) historic sites,

structures, places, and areas; (ii) archaeological sites; (iii) sites of significance to Maori, including wahi tapu; (iv) surroundings associated with the natural and physical resources’.

Regional, district and local plans contain sections that help to identify, protect and manage archaeological and other heritage sites. The plans are prepared under the provisions of the RMA. The Waipa District Plan is relevant to the proposed activity.

This assessment has established that the proposed activity will affect archaeological sites S15/285, S15/546, S15/547, S15/631 and S15/715. Of these sites, only S15/285 is identified as a scheduled site on the Waipa Operative District Plan. It should be noted that items listed in this schedule were identified as part of an upgrade to the New Zealand Archaeological Association Database in 2009 and reflect known sites in the District at that time. These and all other as yet unrecorded archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act 2014. The WDP permits the demolition (partial demolition) of an archaeological site where an authority has been obtained from Heritage New Zealand. The proposed activity also has the potential to affect unidentified subsurface archaeological remains that may be exposed during the works. Any unavoidable effects on archaeological deposits or features can be appropriately mitigated through archaeological investigation and recording to recover information relating to the history of Maori settlement in the local and regional area.

If resource consent is granted, it is recommended that an advice note regarding the provisions of the HNZPTA is included, as an Authority under that Act will be required for any modification and investigation of archaeological remains relating to S15/285, S15/546, S15/547, S15/631 and S15/715.

Heritage New Zealand Pouhere Taonga Act 2014 Requirements

In addition to any requirements under the RMA, the HNZPTA protects all archaeological sites whether recorded or not, and they may not be damaged or destroyed unless an Authority to modify an archaeological site has been issued by Heritage NZ (Section 42).

An archaeological site is defined by the HNZPTA Section 6 as follows:

‘archaeological site means, subject to section 42(3), –

(a) any place in New Zealand, including any building or structure (or part of a building or structure) that –

(i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and

(ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and

(b) includes a site for which a declaration is made under section 43(1)’³

³ Under Section 42(3) an Authority is not required to permit work on a pre-1900 building unless the building is to be demolished. Under Section 43(1) a place post-dating 1900 (including the site of a wreck that occurred after 1900) that could provide ‘significant evidence relating to the historical and cultural heritage of New Zealand’ can be declared by Heritage NZ to be an archaeological site.

Authorities to modify archaeological sites can be applied for either in respect to archaeological sites within a specified area of land (Section 44(a)), or to modify a specific archaeological site where the effects will be no more than minor (Section 44(b)), or for the purpose of conducting a scientific investigation (Section 44(c)). Applications that relate to sites of Maori interest require consultation with (and in the case of scientific investigations the consent of) the appropriate iwi or hapu and are subject to the recommendations of the Maori Heritage Council of Heritage NZ. In addition, an application may be made to carry out an exploratory investigation of any site or locality under Section 56, to confirm the presence, extent and nature of a site or suspected site.

As the currently proposed plans for the new sand quarry will affect sites S15/285, S15/546, S15/547, S15/631 and S15/715 an Authority must be obtained from Heritage NZ before any work can be carried out that may affect these sites. It is also noted that any currently unrecorded archaeological sites would also require an authority before any actions take place that would cause modification to the sites. An authority covering all areas of works is therefore recommended subject to the proposed phasing of the project, as authorities are usually granted for a term of five years. The conditions of the authority are likely to include the archaeological recording/investigation of any remains affected.

Conclusions

The proposed sand quarry will impact on five recorded archaeological sites, S15/285, S15/546, S15/547, S15/631 and S15/715 (borrow pits). These sites are located within the area proposed for sand extraction and based on their location it is considered unlikely that they can be avoided. Any works that are likely to result in modification of an archaeological site require an archaeological Authority under the HNZPTA, which must be granted prior to the start of works.

Overall, it is considered that any adverse effects on archaeology resulting from the proposed sand quarry are likely to be minor, due to the nature and limited significance of the archaeological sites known to be affected. It is considered that if additional subsurface archaeological remains are identified during development, they are unlikely to be extensive or of high significance. The adverse effects on archaeology could be appropriately mitigated through the recovery of archaeological information, in particular through recovery of material suitable for radiocarbon dating to provide data relating to the chronology of Maori settlement in the local and regional area.

RECOMMENDATIONS

- As recorded archaeological sites S15/ 285, S15/546, S15/547, S15/631 and S15/715 cannot be avoided, an Authority must be applied for under Section 44(a) of the HNZPTA and granted by Heritage NZ prior to the start of any works that will affect the sites. (*Note that this is a legal requirement*).
- That the authority should cover all areas of works subject to the proposed phasing of the project, as authorities are usually granted for a term of five years.
- Because it is possible that additional unrecorded sites may be exposed during earthworks, the Authority application should include any additional sites that may be discovered when works are under way.
- The adverse effects should be mitigated by archaeological recording, sampling and analysis in accordance with the conditions of an Authority issued by Heritage NZ.
- In the event of koiwi tangata (human remains) being uncovered, work should cease immediately in the vicinity of the remains and tangata whenua, Heritage NZ, the NZ Police and Council should be contacted so that appropriate arrangements can be made.
- As the affected sites relate to Maori occupation, the tangata whenua should be consulted regarding the cultural effects of the proposal (this will be required as part of the authority application and is likely to be required for resource consent purposes).

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Old Newspaper articles accessed at Papers Past: <https://paperspast.natlib.govt.nz/>

Waikato Independent 23 October 1934

Waikato Independent 31 May 1910

Daily Southern Cross 24 November 1864

The News and Theatre Courier 12 August 1936 accessed at <http://cambridge.museum.org.nz/pukerimu>

Aerial Photographs reviewed


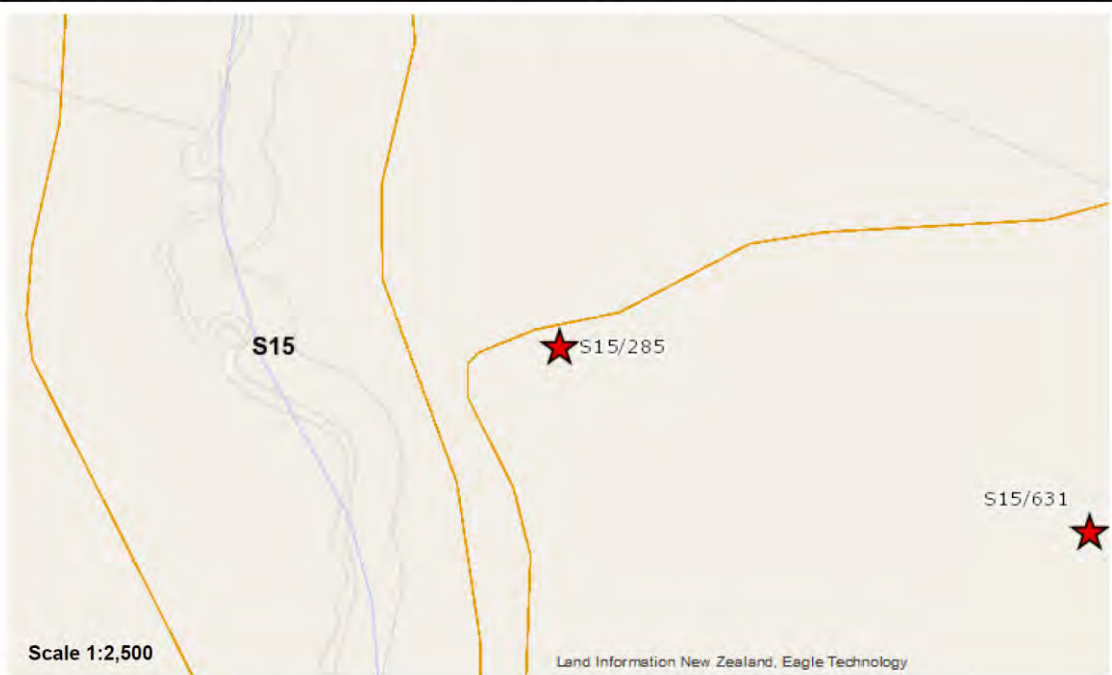
1943 (Crown 266 835 55); 1957 (Crown 1039 2619 20); 1967 (Crown 1889 5057 14); 1971 (Crown 3470 4513 20); 1979 (Crown 5479 1 26) 1983 (Crown 8178 C 6); 1995 (Crown 9401 D 8) (all sourced from <http://retrolens.nz> and licensed by LINZ CC-BY 3.0.)

2002 aerial photograph (source: Waipa District Intramaps)

2008, 2010 and 2018 aerial photographs (source: GoogleEarth)

APPENDIX A: SITE RECORD FORMS

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 Site Record Form		NZAA SITE NUMBER: S15/285 SITE TYPE: Maori horticulture SITE NAME(s): DATE RECORDED:
SITE COORDINATES (NZTM) Easting: 1811338 Northing: 5803002 Source: Handheld GPS		
IMPERIAL SITE NUMBER:		METRIC SITE NUMBER: S15/285
		
Finding aids to the location of the site The site is located in a paddock bordering the gully on the western side of the property.		
Brief description BORROW PITS		
Recorded features Borrow pit		
Other sites associated with this site		

Printed by: ellencameron

31/07/2019

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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	NZAA SITE NUMBER: S15/285
<p>Site description</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen Grid reference (E1811338 / N5803002)</p> <p>Ten borrow pits were identified in 1983 and described as partially filled in. During the site visit in June 2019 further infilling had occurred and the presence of only one borrow pit could be established from surface evidence.</p> <p>Condition of the site</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen</p> <p>Although the surface evidence has been for the most part obscured it is considered likely that subsurface evidence of the borrow pits is present.</p> <p>Statement of condition</p> <p>Current land use:</p> <p>Threats:</p>	

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD INVENTORY	NZAA SITE NUMBER: S15/285
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Supporting documentation held in ArchSite

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION SITE RECORD FORM (NZMS260) NZMS 260 map number S15/7.1 NZMS 260 map name 1:10 000 NZMS 260 map edition Cadastral		NZAA METRIC SITE NUMBER S15/285 DATE VISITED 16 - 18/3/83 SITE TYPE Borrow pits SITE NAME: MAORI OTHER												
Grid References Easting <u>2 7 2 1 6 0 0</u>		Northing <u>6 3 6 4 6 0 0</u>												
1. Aids to relocation of site (attach a sketch map) Between Cambridge-Ohaupo Rd and Mangawhero Stream 4km west of junction with Te Awamutu-Cambridge Rd.														
2. State of site and possible future damage In pasture, partially filled in. Further infilling likely due to stock erosion and other farming activities.														
3. Description of site (Supply full details, history, local environment, references, sketches, etc. If extra sheets are attached, include a summary here) Ten borrow pits between 8 and 20m diameter and 1-1.5m deep.														
4. Owner Address Pt Sec 45A and Pt Sec 45, Fukekura Parish, Blk XII, Hamilton S.D. J.S. & R.W. Taylor	Tenant/Manager Address S. C. EDSON WAIKATO ART MUSEUM BOX 937 HAMILTON													
5. Nature of information (hearsay, brief or extended visit, etc.) Brief visit Photographs (reference numbers, and where they are held) Aerial photographs (reference numbers, and clarity of site) Air Maps (NZ) L ^T d 154322 Unclear to don't show at all														
6. Reported by Address B. McFadgen NZHPT	Filekeeper Date S. C. EDSON 14. 4. 1983													
7. Key words														
8. New Zealand Register of Archaeological Sites (for office use) NZHPT Site Field Code														
Latitude S <table border="1"> <tr><td>C</td><td>Z</td></tr> <tr><td>A</td><td>L</td></tr> <tr><td>A</td><td>E</td></tr> </table> Type of site Local environment today Land classification FC	C	Z	A	L	A	E	Longitude E <table border="1"> <tr><td>B</td><td>B</td></tr> <tr><td>A</td><td>A</td></tr> <tr><td>I</td><td>D</td></tr> </table> Present condition and future danger of destruction Security code Local body	B	B	A	A	I	D	
C	Z													
A	L													
A	E													
B	B													
A	A													
I	D													

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11/04/2019



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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

Photograph of borrow pit at S15/285 taken by Ellen Cameron June 25 2019



NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>ARCH SITE archaeological site recording scheme</p>		<p>Site Record Form</p>
<p>NZAA SITE NUMBER: S15/546</p> <p>SITE TYPE: Maori horticulture</p> <p>SITE NAME(s):</p> <p>DATE RECORDED: 05/04/2012</p>		
<p>SITE COORDINATES (NZTM) Easting: 1811672 Northing: 5802583 Source: On Screen</p>		
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER:</p>		
		
<p>Finding aids to the location of the site The site is located at the southern end of the property in a paddock bordering the gully of the Mangawhero Stream</p>		
<p>Brief description 3 borrow pits in an area of 80 x 50 m, visible on aerial photo SN266/835/55.</p>		
<p>Recorded features Borrow pit</p>		
<p>Other sites associated with this site</p>		

Printed by: ellencameron

31/07/2019

1 of 3

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	NZAA SITE NUMBER: S15/546
<p>Site description</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen Grid reference (E1811672 / N5802583)</p> <p>The paddock containing the site had been used as dirt bike track and the ground modifications did not allow for identification of any evidence of the borrow pits on the surface. It is considered likely that subsurface evidence is still present. The neighbouring paddocks were also inspected with no evidence of borrow pits identified.</p> <p>Updated: 05/04/2012 - NZTM E1811672 / N5802583 (On Screen). 3 borrow pits in an area of 80 x 50 m, visible on aerial photo SN266/835/55. Aerial photo dates from 1943. The site has not been visited and its current condition has not been ascertained. Updated by: Campbell, Matthew.</p> <p>Condition of the site</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen</p> <p>The paddock has been modified for use as dirt bike track obscuring all surface evidence of the borrow pits.</p> <p>Statement of condition</p> <p>Current land use:</p> <p>Threats:</p>	

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION


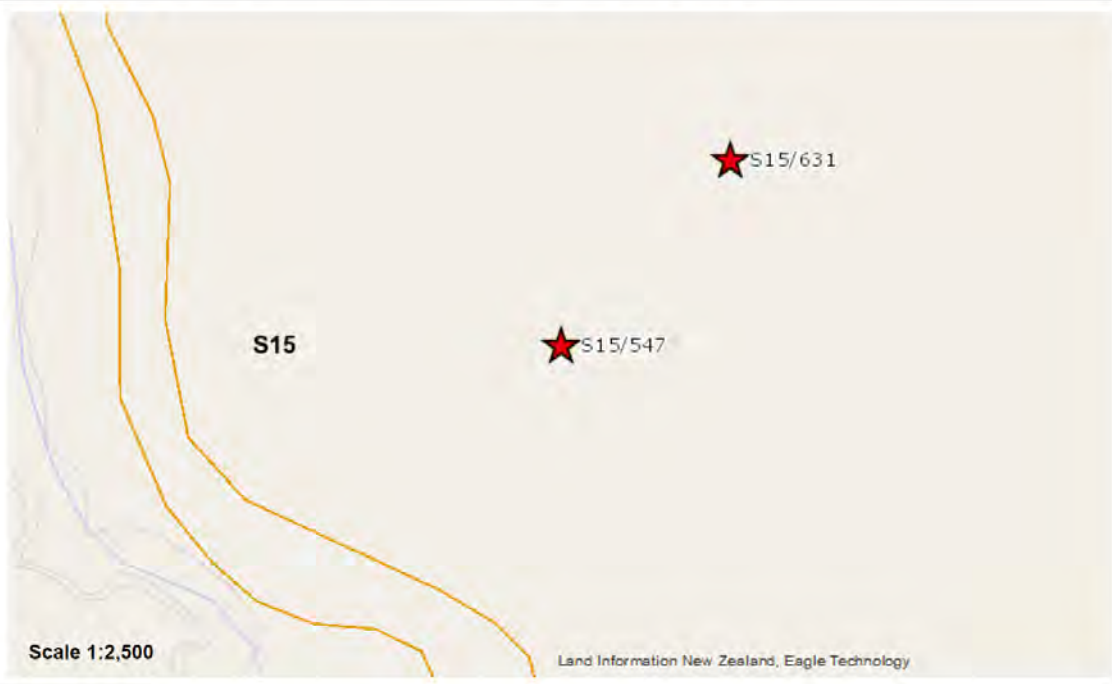
SITE RECORD INVENTORY	NZAA SITE NUMBER: S15/546
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Supporting documentation held in ArchSite

Photograph of area containing borrow pits S15/546 taken by Ellen Cameron 25 June 2019



NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 Site Record Form		NZAA SITE NUMBER: S15/547 SITE TYPE: Maori horticulture SITE NAME(s): DATE RECORDED: 05/04/2012
SITE COORDINATES (NZTM) Easting: 1811498 Northing: 5802838 Source: Handheld GPS		
IMPERIAL SITE NUMBER:		METRIC SITE NUMBER:
		
Finding aids to the location of the site The site is located in paddocks in the central part of the property.		
Brief description 5 borrow pits in an area of 90 x 60 m, visible on aerial photo SN266/835/55.		
Recorded features Borrow pit		
Other sites associated with this site		

Printed by: ellencameron

31/07/2019

1 of 3

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	NZAA SITE NUMBER: S15/547
<p>Site description</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen Grid reference (E1811498 / N5802838)</p> <p>Evidence of one borrow pit was identified, the pit was mostly infilled.</p> <p>Updated: 05/04/2012 - NZTM E1811474 / N5802811 (On Screen). 5 borrow pits in an area of 90 x 60 m, visible on aerial photo SN266/835/55. Aerial photo dates from 1943. The site has not been visited and its current condition has not been ascertained. Updated by: Campbell, Matthew.</p> <p>Condition of the site</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen</p> <p>The presence of only one of the 5 borrow pits could be identified from surface evidence as infilling has been ongoing for many years.</p> <p>Statement of condition</p> <p>Current land use:</p> <p>Threats:</p>	

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION


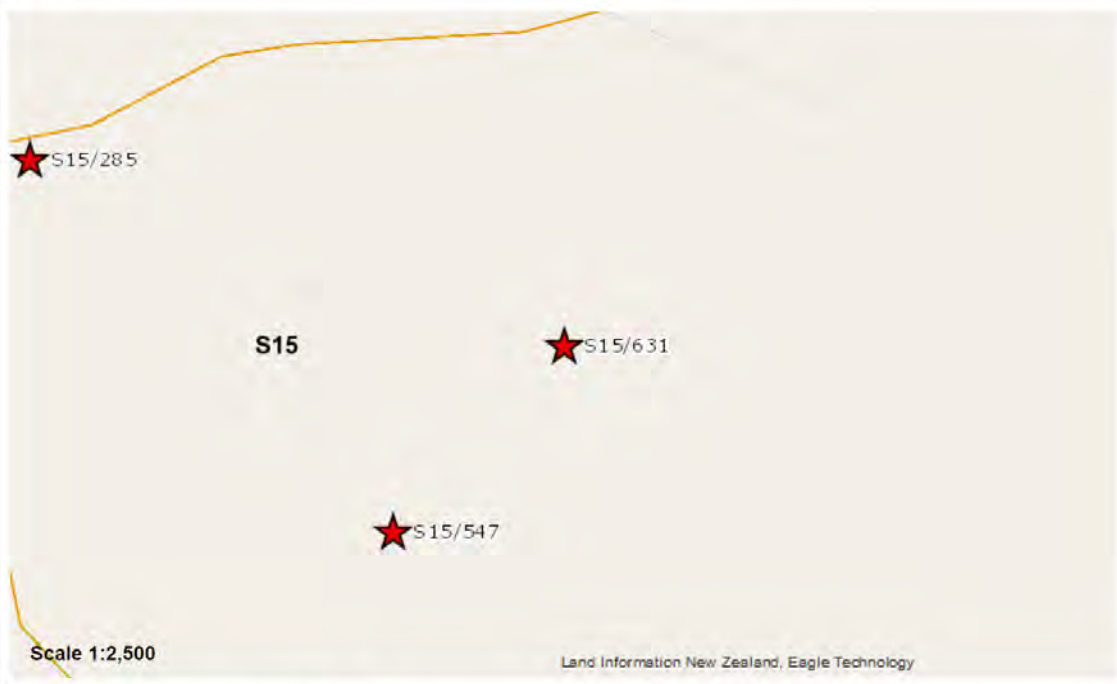
SITE RECORD INVENTORY	NZAA SITE NUMBER: S15/547
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Supporting documentation held in ArchSite

Photograph of borrow pit at site S15/547 taken by Ellen Cameron 25 June 2019



NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>ARCH SITE archaeological site recording scheme</p> <p>Site Record Form</p>	<p>NZAA SITE NUMBER: S15/631</p> <p>SITE TYPE: Maori horticulture</p> <p>SITE NAME(s):</p> <p>DATE RECORDED: 26/04/2012</p>
<p>SITE COORDINATES (NZTM) Easting: 1811573 Northing: 5802920 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER:</p>	
 <p>Scale 1:2,500</p> <p>Land Information New Zealand, Eagle Technology</p>	
<p>Finding aids to the location of the site The site is located in a central paddock on the property.</p>	
<p>Brief description Single borrow pit visible on aerial photo SN266/835/55.</p>	
<p>Recorded features Borrow pit</p>	
<p>Other sites associated with this site</p>	

Printed by: ellencameron

31/07/2019

1 of 3

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	NZAA SITE NUMBER: S15/631
<p>Site description</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen Grid reference (E1811573 / N5802920)</p> <p>No evidence of the borrow pit could be detected from surface inspection. It is considered that the pit has been infilled, although subsurface remains are likely to be present at deeper levels.</p> <p>Updated: 26/04/2012 - NZTM E1811573 / N5802920 (On Screen). Single borrow pit visible on aerial photo SN266/835/55. Aerial photo dates from 1943. The site has not been visited and its current condition has not been ascertained. Updated by: Campbell, Matthew.</p> <p>Condition of the site</p> <p>Updated 31/07/2019 (Field visit), submitted by ellencameron , visited 25/06/2019 by Cameron, Ellen</p> <p>Surface evidence of the site has been obscured through infilling. It is considered likely that sunsurface evidence is still present.</p> <p>Statement of condition</p> <p>Current land use:</p> <p>Threats:</p>	

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION


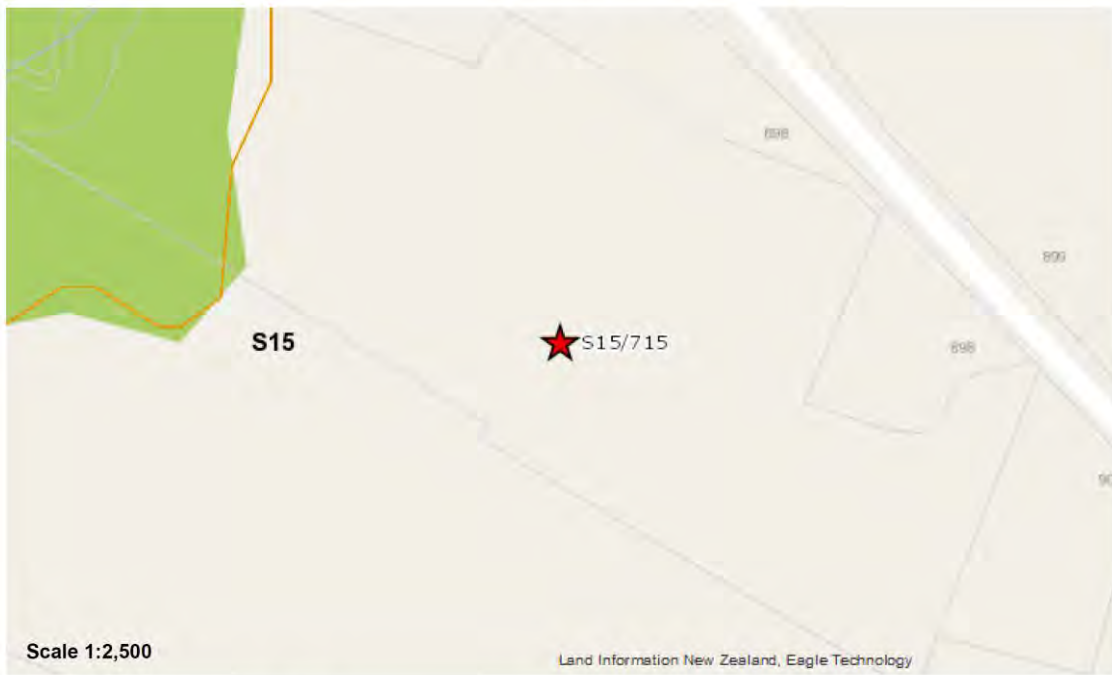
SITE RECORD INVENTORY	NZAA SITE NUMBER: S15/631
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Supporting documentation held in ArchSite

Photograph of area containing S15/631 taken by Ellen Cameron 25 June 2019



NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>Site Record Form</p>	<p>NZAA SITE NUMBER: S15/715</p> <p>SITE TYPE: Maori horticulture</p> <p>SITE NAME(s):</p> <p>DATE RECORDED: 17/12/2013</p>
<p>SITE COORDINATES (NZTM) Easting: 1811588 Northing: 5803313 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER:</p>	
 <p>Scale 1:2,500</p> <p>Land Information New Zealand, Eagle Technology</p>	
<p>Finding aids to the location of the site</p>	
<p>Brief description</p> <p>9 borrow pits</p>	
<p>Recorded features</p> <p>Borrow pit, Unclassified</p>	
<p>Other sites associated with this site</p>	

Printed by: ellencameron

28/07/2019

1 of 3

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	NZAA SITE NUMBER: S15/715
<p>Site description Updated: 17/12/2013 - to follow</p> <p>Condition of the site</p> <p>Statement of condition</p> <p>Current land use:</p> <p>Threats:</p>	

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD INVENTORY	NZAA SITE NUMBER: S15/715
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Supporting documentation held in ArchSite



APPENDIX G

Noise Assessment – Marshall Day
Acoustics



MARSHALL DAY
Acoustics



**PROPOSED KAIPAKI ROAD SAND QUARRY
ASSESSMENT OF NOISE EFFECTS**

Rp 001 r01 20190589 | 17 September 2019

Project: **PROPOSED KAIPAKI ROAD SAND QUARRY**
Assessment of Noise Effects

Prepared for: **Shaws Property Holdings Ltd**
c/o Mitchell Daysh
1130 Kaipaki Road
Cambridge 3495

Attention: **Jonny Schick**

Report No.: **Rp r01 001 20190589**

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
APPROVED	00	-	31 Jul 2019	L. Jansen	M. Cottle
	r01	Revised received client comments	17 Sept 2019	L. Jansen	M. Cottle

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APPENDIX F QUARRY EQUIPMENT AT KAIPAKI SAND EXTRACTION SITE

APPENDIX G PREDICTED NOISE LEVELS FROM OPERATIONS FOR NOISE ZONE 1

1.0 REPORT SUMMARY

Sound from the proposed Sand Extraction Operation is predicted to comply with the Rural daytime noise limits of the Operative Waipa District Plan (OWDP), with operational constraints in place when the activities approach nearby receivers.

The sand extraction activity will generate reasonable sound levels.

Shaws Property Holdings Limited has engaged Marshall Day Acoustics to assess potential acoustic impacts associated with a proposed sand quarry located near Cambridge. The extraction would occur over two lots, Lot 2 DP 444992 and Lot 3 DP 424105, known as 928 Kaipaki Road.

The daily sound emission from sand extraction (including truck movements), is the primary issue of concern addressed in this report. Occasional topsoil removal, that will generate higher noise levels, would remain compliant with the limit, when limited in the areas specified.

We recommend that the Council adopt the Rural zone's noise rules as a condition of consent, should resource consent be granted. The conditions are summarised in Section 6.0 of this report.

The extracted sand is classified as pit-sand and consequently, no processing, such as screening or washing are required. Thus, all heavy vehicles would enter the site and move directly to the active cut-face to collect sand.

Daily vehicle movement (82 heavy vehicles per day) would enter and exit the site, on weekdays. The expected number of trucks on Saturdays would be fewer because the site would be operational for half the day.

Ambient noise measurements undertaken at the site indicated that the daytime background sound levels range between 34 and 38 dB L_{A90} .

The proposed sand extraction would comply with the OWDP daytime limit of 50 dB L_{Aeq} . The highest predicted levels, under worst-case conditions, range between 40 and 50 dB L_{Aeq} . When activities are closest to receivers, it is possible that it would be audible above the background and would remain compliant with OWDP limits.

The sound level generated during construction activities would readily comply with the NZS6803:1999 Residential-rural daytime limit of 75 dB L_{Aeq} .

Appendix A contains a glossary of terminology used in this report.

2.0 SITE AND PROJECT DESCRIPTION

The proposed sand extraction site, 928 Kaipaki Road, is 5 km west of Cambridge and is within the jurisdiction of the Waipa District Council. The farm is currently operated as a horse stud with large grass pastures covering most of the farm. The farm and surrounding properties are zoned Rural under the OWDP.

Access to the site is gained from Kaipaki Road, that form a part of the northern boundary. The northern boundary follows the property boundary that extends to the west. The Mangawhero stream forms the western and southern edge of the property. The eastern boundary of the Farm is shared with a kiwi fruit orchard.

The client proposes to extract the sand layer found between 2-8m of the whole farm, expect at the existing farmhouse and infrastructure.

The sand extraction operations would be operational on weekdays, between 7:00 am and 7:00 pm (during the summer and between 7:00 am and 6:00 pm during winter). Operations on Saturdays would stop earlier at midday.

The traffic impact assessment¹ Prepared by GrayMatter anticipates that the entire project could generate approximately 90 vehicles per day. Of this, 82 HCVs per day would enter the site to collect sand from the cut-face.

HCV's would enter the site from Kaipaki Road, travel on the haul road to collect sand at the active sand extraction area, within the excavated pit. The sand layer is classified as pit-sand and would require no post-processing or washing. The sand extraction would occur in two hectare sections, one half containing stripped topsoil and the remainder quarried.

The machinery that will be used on-site are:

- Two excavators (1x12 tonne and 1x30 tonne)
- Front-end Loader (FEL)
- Bulldozer – as required
- Road trucks (Heavy Commercial Vehicles - HVC's) entering and exiting the site

Operation of machinery (excavators, heavy vehicles and front-end loaders) will change location throughout the life of the proposed quarry.

The sand winning equipment (excavators and FEL) would be within the pit (approximately 6-metres below ground surface level). Consequently, the edge of the escarpment would provide acoustic screening, that would minimise the need for acoustic barriers during excavation activities.

Front-end loaders and/or excavators would primarily be used to removing and stockpiling topsoil. On occasion, the activity might involve a bulldozer to strip large areas. Additionally, the topsoil would be managed and positioned in such a manner to act as an earth bund where required.

The process of forming earth bunds and establishing hauling roads are classified as construction activities.

Refer to Appendix B for the site layout plan and extent of the site boundary and planned pit area.

2.1 Recommended Constraints on Operation

We recommended the following minor constraints on operations to ensure daytime compliance is achieved at the nearest noise sensitive receivers. These constraints are as follows:

- Before topsoil stripping occurs within 180 metres of any dwelling façade (160m from any notional boundary) without a bund in place, the written approval and/or planning permission should be obtained from that party.
Based on the extent of the proposed operation, bulldozer topsoil extraction cannot occur within 180 metres of the dwellings: R1 – 1/898 Kaipaki Road, R2 – 898 Kaipaki Road, R3 – 906 Kaipaki Road & R4 – 914 Kaipaki Road, unless written approval is gained from the owners/occupiers
- Before sand extraction can occur within the areas of constraint, an earth bund of 2.0-meters (gradient: 1:3) must be established
- The operational management plan shall ensure nearby dwelling owners/occupants are advised in advance where topsoil stripping will occur within 180 metres of their dwelling. This information shall be provided in writing and shall include the expected dates of the work, hours and days of the week that topsoil stripping will occur on as well as any other information relevant to the party

Subject to the above measures, no further noise control or operating restrictions will be required to comply with the District Plan noise rules. The operational constraints are shown in Figure 2.

¹ Proposed Sand Quarry 928 Kaipaki Road, Cambridge - Integrated Transport Assessment, July 2019

2.2 Nearest Receiver Locations

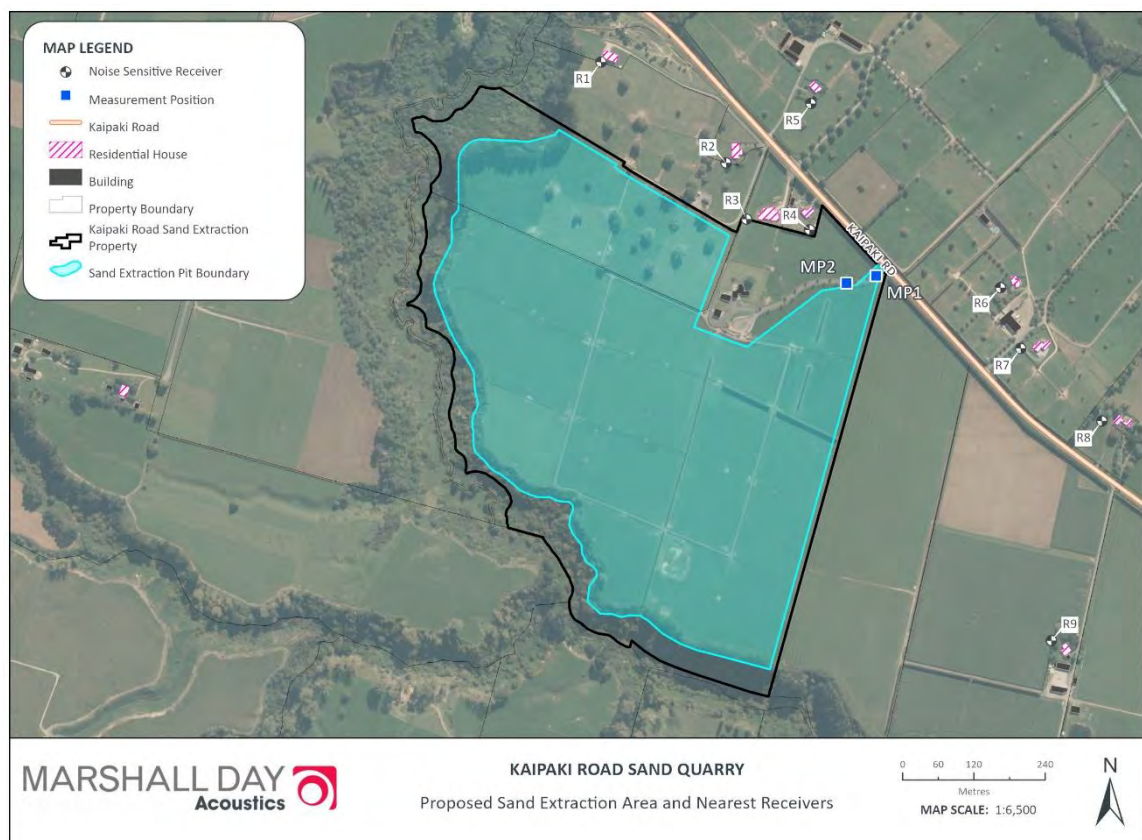
The existing dwellings near the site are shown in Figure 1. The house on-site is owned and occupied by the client. The closest residence to the south and west is more than 1 kilometre away and will not be affected by the site activities.

Table 1 lists the nine nearest dwellings and the shortest distance to the sand extraction pit boundary.

Table 1: Nearest noise sensitive receiver

Receiver – Address	Distance to closest extraction boundary, from Notional Boundary
R1 - 1/898 Kaipaki Road	453
R2 - 898 Kaipaki Road	257
R3 - 906 Kaipaki Road	146
R4 - 914 Kaipaki Road	132
R5 - 899 Kaipaki Road	343
R6 - 1/951 Kaipaki Road	277
R7 - 951 Kaipaki Road	298
R8 - 983 Kaipaki Road	432
R9 - 982 Kaipaki Road	472

Figure 1: 928 Kaipaki Road Property boundary and sand extraction pit area



3.0 EXISTING AMBIENT NOISE ENVIRONMENT

The measured daytime ambient levels are consistent with a rural environment with one controlling noise source – Kaipaki Road. The traffic flow varies during the day - thus, the measured results provide a snapshot of the existing noise present at the time of the measurement.

Table 2 summarises the measured levels.

Table 2: Measurement Noise Level Summary

Measurement Position	Measured levels, dBA		Comments
	L _{eq}	L ₉₀	
MP1 20m from the road edge	63	38	Kaipaki Rd traffic noise
MP2 60m from road edge	53	40	Traffic noise with intermittent bird calls. No other noise sources in the area

Notes to table:

- (1) An explanation of technical terms is provided in Appendix A
- (2) Refer Figure 1 for the location of measurement positions

The survey, on 9 July and 29 July, was conducted to determine the ambient and background noise levels of the area. The measured positions represent the ambient level at the dwellings located between 20m and 60m from Kaipaki Road.

Noise measurements were conducted following NZS6801:2008. Meteorological conditions during both visits were suitable with a gentle breeze blowing from the south-west, with broken cloud cover (5-7 octas) throughout the survey.

Refer to Appendix D for the full summary of noise measurements.

4.0 PERFORMANCE STANDARDS AND LEGISLATION

4.1 Operative Waipa District Plan

4.1.1 Operational Noise

In short, Rule 4.4.2.15 of the OWDP restricts sound emissions, from the Site, when measured at any point within the notional boundary of any dwelling, to 50 dB L_{Aeq} (7:00 am to 10:00 pm). According to the rule, sound levels should be measured following the standard NZS 6801:2008 and assessed following NZS6802:2008.

Section 6.3 of NZS6802:2008, addresses the issue of special audible character (SAC), stating that a +5-decibel adjustment to the sound level is appropriate, where the source contains SAC. Our opinion is that the proposed activity would not exhibit any special audible character, different from that expected in the current receiving environment.

Therefore, no SAC penalty adjustment is justified.

Section 6.4 of NZS6802:2008 allows averaging of activities that occur for only a few hours, over the 15-hour day period (7:00 am to 10:00 pm). Thus, the weekday operations result in a minus 1-decibel adjustment to the predicted levels (Saturdays receive a minus 4-decibel adjustment).

The site will not operate on Sundays and Public Holidays.

4.1.2 Construction Noise

For construction noise, we recommend the OWDP rule be adopted as a condition of consent should the activity be granted. The construction noise rule would be limited to the establishment of any permanent haul roads, turning areas, and/or the establishment of site offices and earth bunds.

The rule (Rule 4.4.2.19) references New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise".

We have reproduced the rule and the relevant table from NZS6803:1999 in Appendix E.

4.2 Resource Management Act of 1991 (RMA)

Under the provisions of the RMA, there is a duty to adopt the best practicable option to ensure that noise (including vibration) from any development does not exceed a reasonable level. Specifically, Sections 16 and 17 reference noise effects as follows.

Section 16 states that "every occupier of land (including any premises and any coastal marine area), and every person carrying out an activity in, on, or under a water body or the coastal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level".

Section 17 states that "every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of the person, whether or not the activity is in accordance with –

(a) Any of sections 10, 10A, 10B and 20A; or

(b) A national environmental standard, a rule, a resource consent, or a designation."

This report uses the guiding principles of Sections 16 and 17 of the RMA as noted above in assessing effects and recommending mitigation measures.

5.0 PREDICTED NOISE LEVELS

5.1 Methodology

Sound emission from the site is predicted in accordance with the algorithms detailed in ISO 9613-2: 1996² and implemented in SoundPLAN® environmental noise modelling software. ISO 9613 considers a range of frequency-dependent attenuation factors including atmospheric absorption, ground and barrier effects, directivity, as well as spherical spreading.

The sound level from the operation has been calculated within the notional boundary of the surrounding dwellings. Calculations have assumed the following:

- The extraction and loadout excavators or loaders operate continuously with around 164 movements occurring on a typical day
- Calculations have assumed that topsoil extraction can co-occur with pit works as part of a simulation of the worst-case conditions. Topsoil extraction was not calculated in the demarcated areas in Figure 2
- The site is operational within the OWDP daytime, for up to 12 hours. No heavy earthmoving machinery will operate before 7:00 am, although a small number (4 cars) of passenger vehicles (staff) may arrive before 7:00 am at times
- Mobile equipment operated for shorter periods per day (bulldozer - stripping topsoil) has been duration corrected accordingly
- All operations would cease by 7:00 pm and will not occur during the night-time period (10:00 pm to 7:00 am)
- We used the measured ambient levels, and knowledge of existing traffic flows³ on Kaipaki Road to calculate (using the CoRTN Standard) the existing ambient noise level at the surrounding houses. The results are included in Table 2 column 3
- Bunds will be established at the specified location (Appendix C) when sand extraction is active in Noise Zone 1

5.2 Predicted Noise Levels from Sand Extraction Activities

Sound levels have been predicted for four arbitrarily divided sections. The sound power level (L_w) of the equipment are summarised in Appendix F. The highest noise level per receiver per noise zone was predicted and summarised in Table 3.

Because topsoil extraction is less likely to be screened by the quarry escarpment, this will potentially dominate the overall noise level, when top soil is being actively stripped.

Figure 2 illustrates the four arbitrarily divided sections and the surrounding nearest residential dwellings.

² ISO 9613-2: 1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

³ ITA Section 2.2 page 4: 1,300 vpd on Kaipaki Road with 9.3% HCV

Figure 2: Four arbitrarily divided pit extraction sections, nearest dwellings and operational restrictions

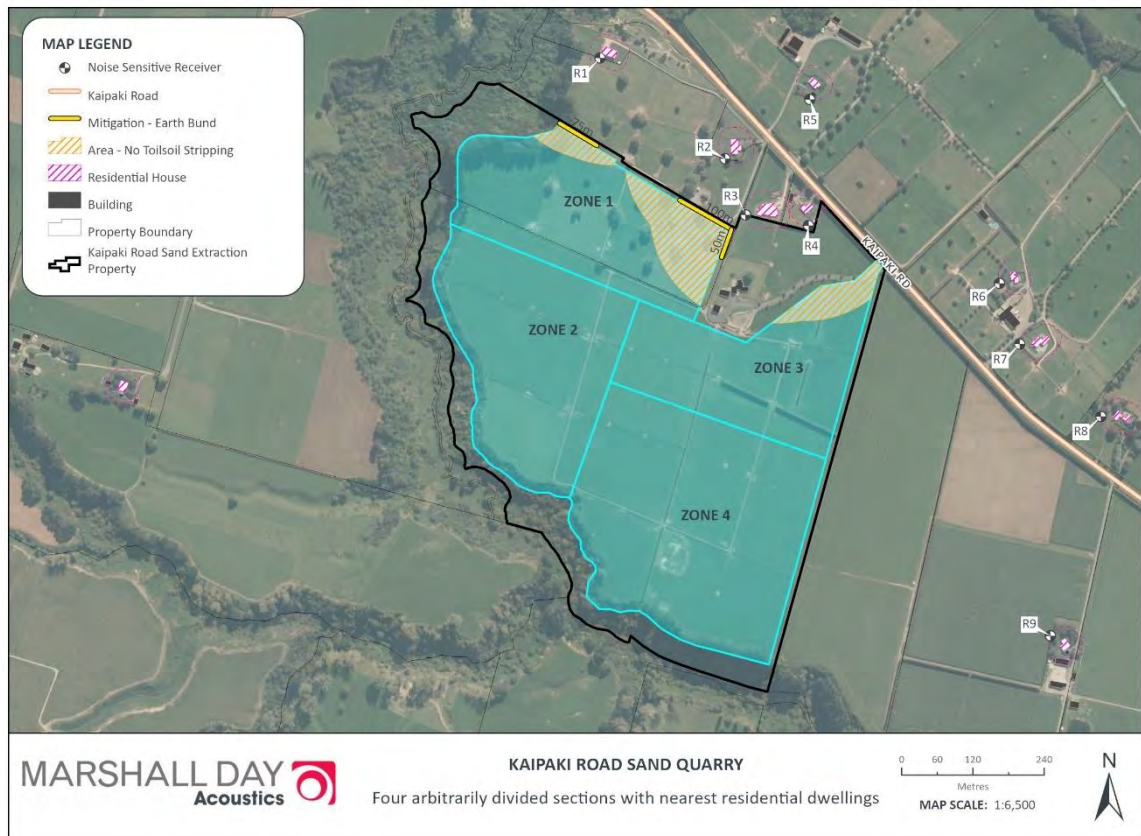


Table 3: Predicted Rating Noise Level (typical day – 82 trucks per day)

Loc.	Address	Predicted Rated Noise Level ⁽¹⁾ (dB L _{Req})				Complies with ODP Limit?
		Existing Ambient Level	Zone 1	Zone 2	Zone 3	
R1 - 1/898 Kaipaki Rd	49	50	44	41	40	Yes
R2 - 898 Kaipaki Rd	48	49	44	44	42	Yes
R3 - 906 Kaipaki Rd	53	49	45	47	44	Yes
R4 - 914 Kaipaki Rd	50	45	43	48	44	Yes
R5 - 899 Kaipaki Rd	54	45	42	42	41	Yes
R6 - 1/951 Kaipaki Rd	51	39	39	44	42	Yes
R7 - 951 Kaipaki Rd	50	38	38	44	42	Yes
R8 - 983 Kaipaki Rd	54	35	36	40	40	Yes
R9 - 982 Kaipaki Rd	54	34	35	39	41	Yes

Notes to table:

- (1) The predicted noise levels include the -1 decibel of averaging (see Section 3.1)
Daytime timeframe: 07:00 am to 10:00 pm
- (2) The highest predicted noise level is highlighted in **BOLD**
- (3) Earth bund is required when extracting sand in this zone – See Appendix C

The proposed sand extraction operation is predicted to comply with the OWDP limit of 50 dB L_{Aeq} at all dwellings, throughout the expected lifetime of the project. The highest predicted level, during operations and topsoil removal, is between 40-50 dB L_{Req} within Noise Zone 1. R1 can comply if an earth bund is established, as specified in Appendix C, before sand extraction operations can occur within 180m of the residential dwelling.

Short-term measurements show that background level is between 38 and 40 dB L_{A90} , with Kaipaki Road controlling the ambient level (between 53 to 63dB L_{Aeq}) in the region.

Noise from the proposed activity received at near-by dwellings would be audible, particularly during lulls in traffic movements on Kaipaki Road. However, given the activity is predicted to comply with the 50dB L_{Aeq} rural zone limit and would generate noise lower than road traffic noise (refer to Table 1), the potential effects are considered to be acceptable.

5.3 Sound from Construction Activities

Provided that standard construction practices are used for the new site office building, internal access roads and earth bunds, and given the distance to the nearest residence, the activity is anticipated to readily comply with the noise limits in New Zealand Standard NZS 6803:1999 *"Acoustics: Construction Work"*.

6.0 RECOMMENDED CONDITIONS OF CONSENT (ACOUSTICS)

It is recommended that the following conditions be attached to any planning consent granted:

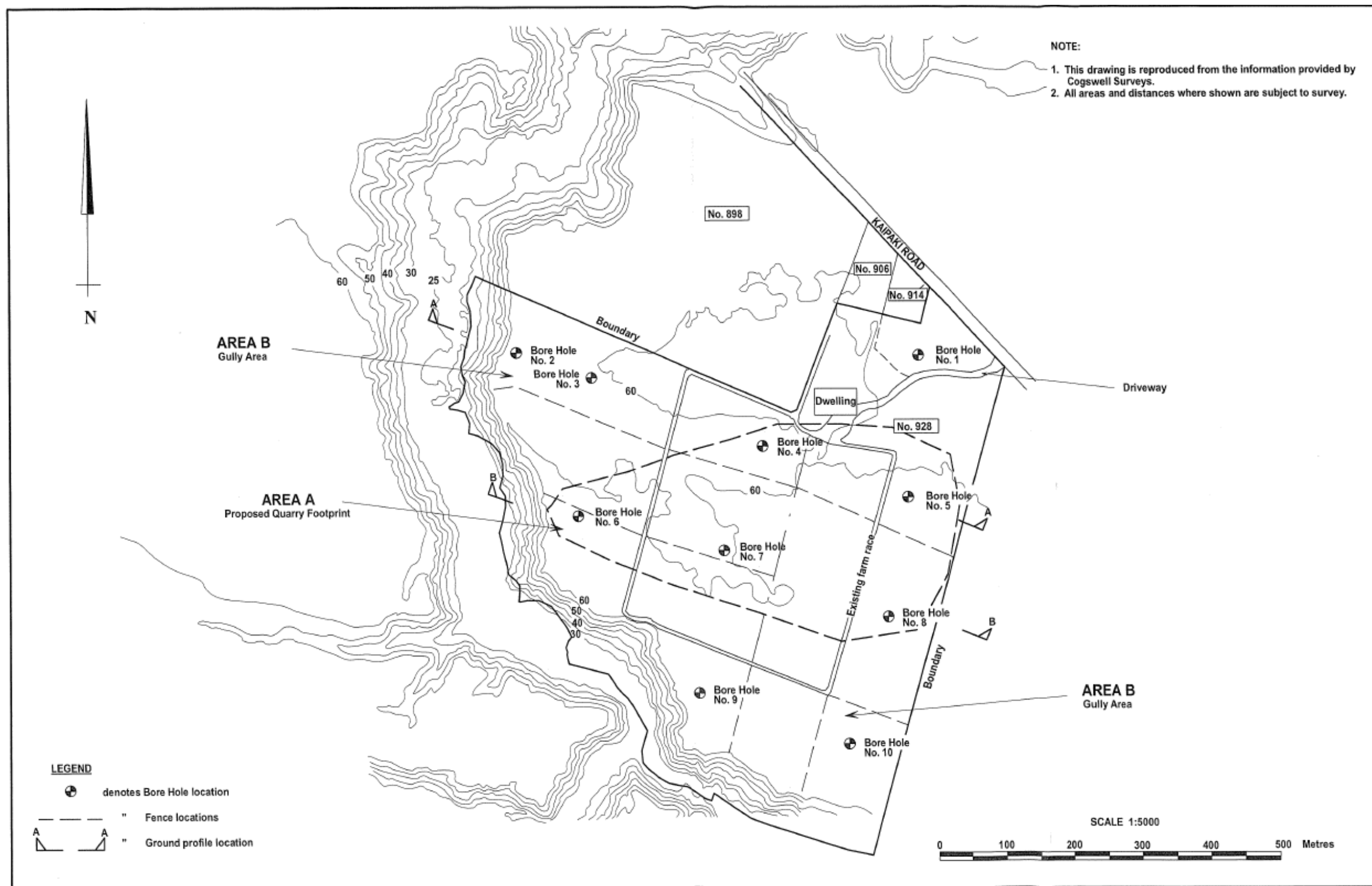
- (i) Noise generating activity shall be conducted designed and used to ensure that it does not exceed the following limits within the notional boundary of any dwelling (excluding dwellings on the same property as the consented activity or those where completed written approval of potentially affected parties has been obtained):
 - a. Day time - 7:00 am to 10:00 pm 50 dB L_{Aeq}
 - b. Night-time - 10:00 pm to 7:00 am 40 dB L_{Aeq} and single noise event 70 dB L_{AFmax}
- (ii) The noise levels shall be measured following the requirements of *NZS 6801:2008 – Acoustics – Environmental Sound* and assessed following *NZS 6802:2008– Acoustics – Environmental Noise*.
- (iii) Construction noise generated from the construction of any permanent haul roads, turning areas, site offices, buildings or any other "construction activities" shall meet the relevant limits recommended in and be measured and assessed following *NZS 6803:1999 Acoustics – Construction Noise*.

APPENDIX A GLOSSARY OF TERMINOLOGY

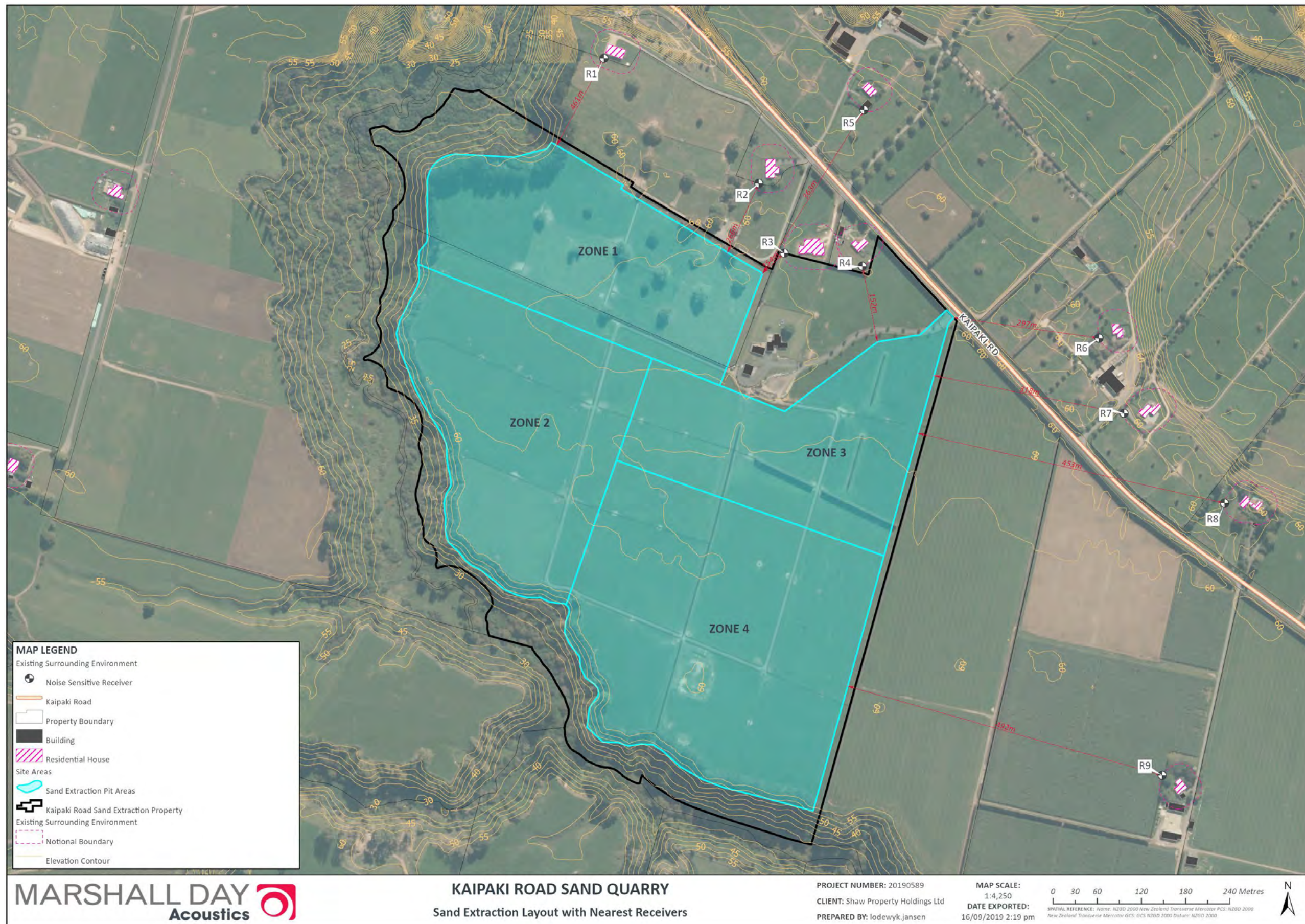
A-weighting	<p>The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.</p> <p>All noise levels are quoted relative to a sound pressure of $2 \times 10^{-5} \text{Pa}$</p>
dB	<p>Decibel. The unit of sound level.</p> <p>Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r = 20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$</p>
dBA	<p>The unit of sound level, which has its frequency characteristics modified by a filter (A-weighted) to approximate the frequency bias of the human ear.</p>
HCV	<p>Heavy Commercial Vehicle (HCV) is a classification/grouping of heavy rigid trucks with or without a trailer, or articulated vehicle with at least three or four axles. A vehicle capable of being laden to a gross laden weight exceeding 3.5 tonnes.</p>
$L_{A90}(t)$	<p>The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.</p> <p>The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.</p>
$L_{Aeq}(t)$	<p>The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.</p>
NZS 6801:2008	<p>New Zealand Standard NZS 6801:2008 "Acoustics – Measurement of environmental sound"</p>
NZS 6802:2008	<p>New Zealand Standard NZS 6802:2008 "Acoustics - Environmental Noise"</p>
NZS 6803:1999	<p>New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"</p>
SWL or L_w	<p><u>Sound Power Level</u></p> <p>A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.</p>

APPENDIX B PROPOSED SITE LAYOUT AT 928 KAIPAKI ROAD

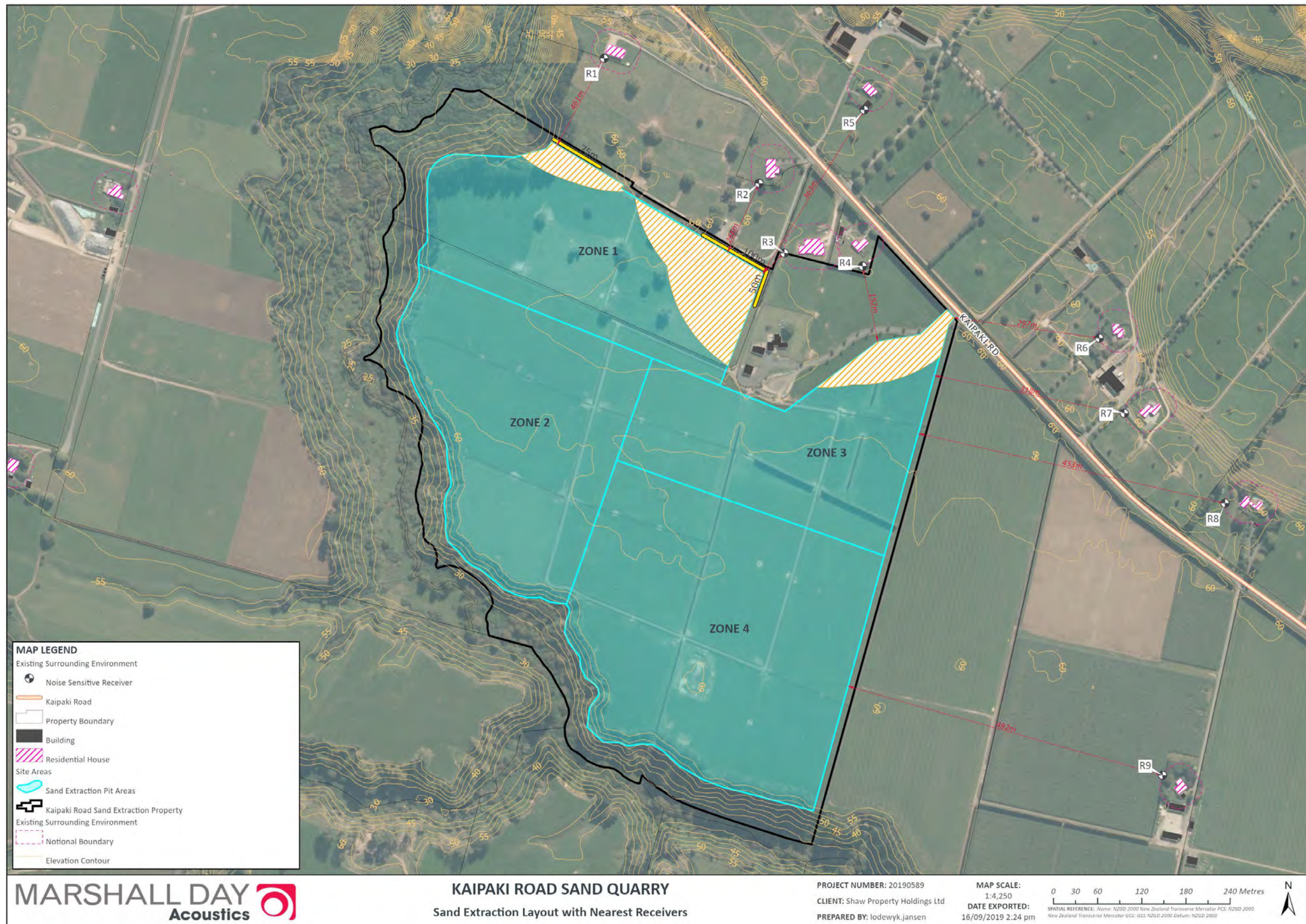
Geotechnical Report – 928 Kaipaki Road with the tested prospecting drill locations



Site property extent and identified surrounding residential dwellings



APPENDIX C KAIPAKI ROAD SAND EXTRACTION SITE – OPERATIONAL CONSTRAINTS



APPENDIX D MEASURED NOISE LEVEL

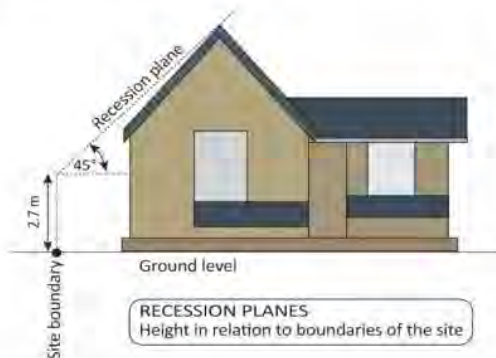
Measurement Position	Measurement details	Measured levels, dB				Comments
	Date	L _{AFmax}	L _{A10}	L _{Aeq}	L _{A90}	
	Start / Finish Time					
MP1 <i>20m from road edge</i> NZTM: X: 1811979 Y: 5803086	9 Jul 2019	82	67	63	38	Kaipaki Rd traffic noise (110 vehicles passing in 15minutes)
	S: 1:55 pm					
	F: 2:10 pm					
MP2 <i>60m from road edge</i> NZTM: X: 1811929 Y: 5803074	29 Jul 2019	70	57	53	40	Traffic noise with intermittent bird calls
	S: 1:45 pm					
	F: 2:00 pm					

APPENDIX E NOISE RULES

E1 Operational Noise – Operative Waipa District Plan

Rule - Daylight control

- 4.4.2.12 No building shall penetrate a recession plane at right angles to a boundary inclined inwards and upwards at an angle of 45° from 2.7m above the ground level of the front, side or rear boundaries of a site.



Activities that fail to comply with this rule will require a resource consent for a restricted discretionary activity with the discretion being restricted over:

- Visual effects including bulk, scale and location of the building; and
- Effects on rural character and amenity; and
- Effects on surrounding properties; and
- Loss of daylight to adjoining sites.

These matters will be considered in accordance with the assessment criteria in Section 21.

Rule - Processing and storage of produce grown on site

- 4.4.2.13 Buildings for the processing and/or storage of horticultural or floricultural produce shall only be used for produce grown on the site or holding (other than honey and bee products) and shall not exceed 250m² GFA (including packing sheds, cold storage).

Advice Note: If buildings are used for produce brought in from off site, then the use becomes a rural based industry.

Activities that fail to comply with this rule will require consent for a resource consent discretionary activity.

Rule - Housing and keeping of pigs

- 4.4.2.14 Except for outdoor (extensive) pig farming where groundcover is maintained; no land, building, yard, pen or similar enclosure shall be used for the keeping, raising and/or breeding of pigs and their progeny in excess of 12 pigs older than eight weeks at any one time of which not more than five are sows.

Activities that fail to comply with this rule will require a resource consent for a discretionary activity.

Rule - Noise

- 4.4.2.15 Noise generating activity other than that from farm animals including farm dogs, agricultural vehicles (when not being used for recreational purposes), agricultural machinery or equipment (including produce packing facilities where the only produce packed is grown on site) operated

and maintained in accordance with the manufacturer's specifications and in accordance with accepted management practices (e.g. for milking, spraying, harvesting, packing and the like, but not including frost fans) and provided that the best practicable option (including the option for the activity to take place at another time of the day), is adopted to ensure that the emission of noise does not exceed a reasonable level; shall be conducted and buildings located, designed and used to ensure that they do not exceed the following limits within the notional boundary of any dwelling (excluding dwellings within mineral extraction sites):

- | | |
|------------------------------------|--------------|
| (a) Day time - 7.00am to 10.00pm | 50dBA (Leq) |
| (b) Night time - 10.00pm to 7.00am | 40dBA (Leq) |
| (c) Night time single noise event | 70dBA (Lmax) |

The noise levels shall be measured and assessed in accordance with the requirements of NZS 6801:2008 – Acoustics – Environmental Sound and assessed in accordance with NZS 6802:2008 – Acoustics – Environmental Noise. Provided that this rule shall not apply to the use or testing of station and vehicle sirens or alarms used by emergency services.

Activities that fail to comply with this rule will require a resource consent for a discretionary activity.

Rule - Mineral extraction air blast over pressure

- 4.4.2.16 The air blast over pressure from blasting activities within the notional boundary of any dwelling not owned or controlled by the quarry owner or operator undertaking the air blast over pressure blasting activity shall not exceed 115dBA 95 percentile, 120dBL maximum.

Activities that fail to comply with this rule will require a resource consent for a discretionary activity.

Rule - Helicopter noise

- 4.4.2.17 Helicopter landings and take offs shall be in accordance with NZS6807:1994 Noise Management and Landing Use Planning for Helicopter Landing Areas where there are more than 10 landings per annum.

Advice Note: This rule does not apply to any helicopter movement associated with military or emergency purposes.

Activities that fail to comply with this rule will require a resource consent for a non-complying activity.

Rule - Vibration

- 4.4.2.18 Vibration emanating from a site shall not exceed the limits recommended in and be measured and assessed in accordance with New Zealand Standard NZS 4403:1996 Code of Practice for Storage, Handling, and Use of Explosives.

Activities that fail to comply with this rule will require consent for a restricted discretionary activity, with the discretion being restricted over:

- Safety; and
- Time and duration of effect; and
- Effects on buildings and structures, either on site or on surrounding properties.

These matters will be considered in accordance with the assessment criteria in Section 21.

Rule - Construction noise

- 4.4.2.19 Construction noise emanating from a site shall meet the limits recommended in and be measured and assessed in accordance with New Zealand Standard NZS 6803:1999 Acoustics – Construction Noise.

Activities that fail to comply with this rule will require a resource consent for a restricted discretionary activity with the discretion being restricted over:

- Time and duration of effect; and
- Effects on surrounding properties.

These matters will be considered in accordance with the assessment criteria in Section 21.

Rules - Noise: audible bird scaring devices

- 4.4.2.20 Any audible bird scaring devices shall be operated as follows:
- (a) Only between sunrise and sunset; and
 - (b) At a frequency of not more than six clusters of up to three shots from gas operated devices or three multiple shot from firearms in rapid succession per device in any 60 minute period of the day; and
 - (c) At a maximum density of one device per 10ha of crop.
- 4.4.2.21 The noise from any bird-scaring device shall not exceed 85dBA unweighted peak level at a Residential Zone boundary or the notional boundary of a dwelling on any Rural Zone property.

Activities that fail to comply with these rules will require a resource consent for a discretionary activity.

Rule - Noise: wind farms

- 4.4.2.22 Wind farm noise shall be managed and measured in accordance with NZS 6808:2010, Acoustics – Wind Farm Noise.

Activities that fail to comply with this rule will require a resource consent for a discretionary activity.

Rules - Noise: temporary military activities

- 4.4.2.23 Noise measured from a line 20m from and parallel to the façade of any dwelling or the legal boundary where this is closest to the dwelling shall not exceed the following limits:

Time (any day)	Noise Limits		
	L10	L95	Lmax
0630 - 0730	60	45a	70
0730 - 1800	75	60	90
1800 - 2000	70	55	85
2000 - 0630 (except as provided for below)	35	-	65
For no more than 5 days in any 4 week period:			
2000 - 0630	40	-	65

E2 Construction Noise - NZS6803:1999 “Acoustics - Construction Noise”

Table 2 of New Zealand Standard NZS 6803: 1999 “Acoustics - Construction Noise”. Referred to in Appendix 11.6.4 of PC4 is reproduced below:

Table 2 – Recommended upper limits for construction noise received in residential zones and dwellings in rural areas

Time of week	Time period	Duration of work					
		Typical duration (dBA)		Short-term duration (dBA)		Long-term duration (dBA)	
		L _{eq}	L _{max}	L _{eq}	L _{max}	L _{eq}	L _{max}
Weekdays	0630-0730	60	75	65	75	55	75
	0730-1800	75	90	80	95	70	85
	1800-2000	70	85	75	90	65	80
	2000-0630	45	75	45	75	45	75
Saturdays	0630-0730	45	75	45	75	45	75
	0730-1800	75	90	80	95	70	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75
Sundays and public holidays	0630-0730	45	75	45	75	45	75
	0730-1800	55	85	55	85	55	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75

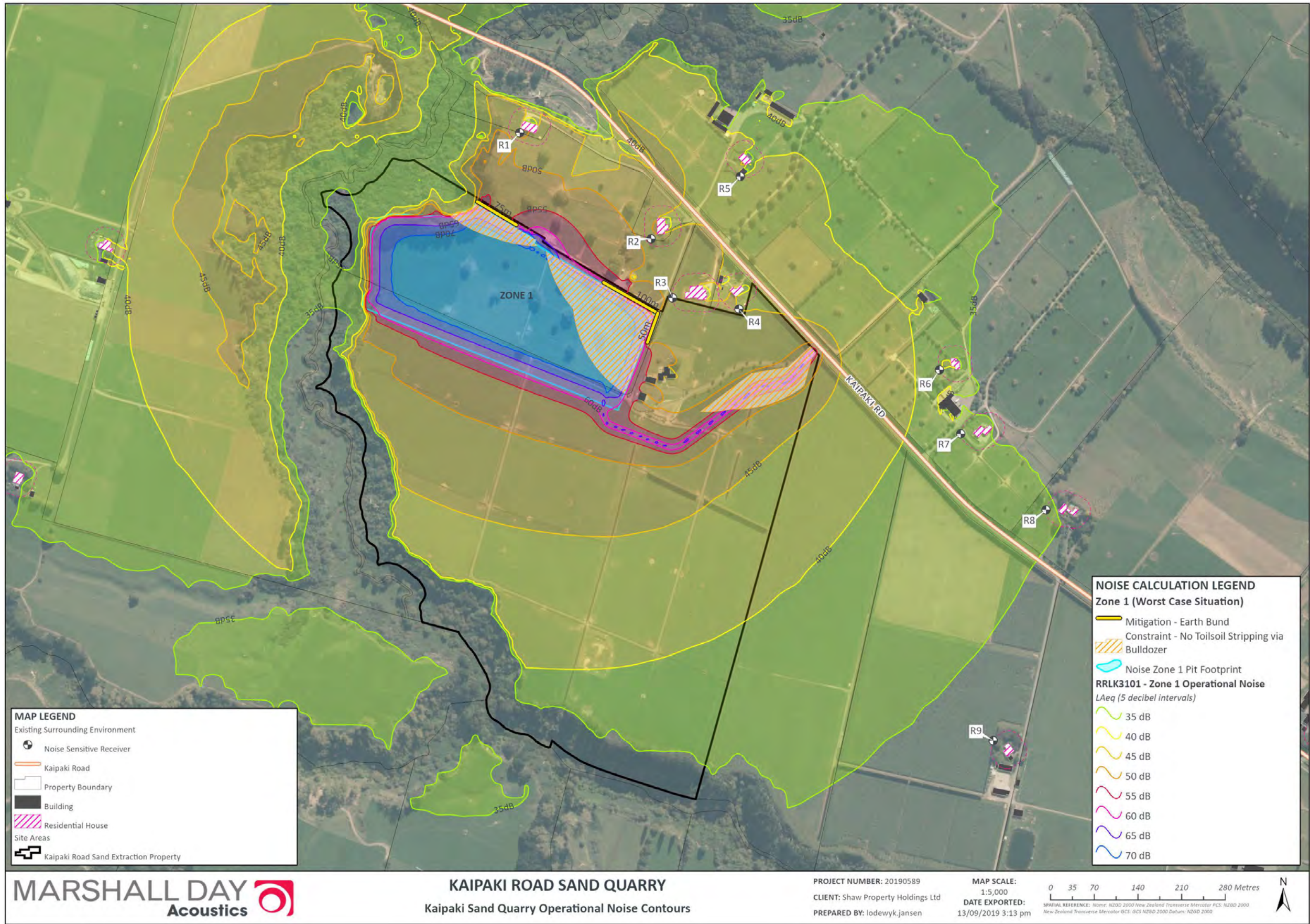
APPENDIX F QUARRY EQUIPMENT AT KAIPAKI SAND EXTRACTION SITE

The following is a list of machinery and the corresponding approximate numbers of each plant group that could be used to transfer blasted rock from the quarry benches to the Primary Processing Plant and as used in the computer model of noise emissions.

MDA ID	Type of Machinery	Make	Model	Used for	Sound Power Level dBA
4219	Dozer	CAT	D8R	Topsoil Stripping Moving source	108
4211	Excavator	Volvo	290	Topsoil Stripping & Quarry face	105
3631	Excavator	Komatsu	PC200	Topsoil Stripping & Quarry face – Loading Trucks	106
2566	Road Truck			Transport Sand	63 dB L_{WA} per meter of travel (15 km/hr)
3808	Front-end Loader	Volvo	L220	Loading and managing stockpiles	107

APPENDIX G PREDICTED NOISE LEVELS FROM OPERATIONS FOR NOISE ZONE 1

Noise contour is representative of the highest possible noise level throughout the life cycle of Noise Zone 1.





APPENDIX H

Suggested Consent Conditions -
Waikato Regional Council

Number	Condition
	Generally in accordance
1.	<p>Sand quarry and clean filling activities shall be carried out in general accordance with the “Resource Consent Application and Assessment of Environmental Effects: Kaipaki Road - Sand Quarry” document dated 26 April 2020 prepared by Mitchell Daysh Limited, and supporting information, including plan 4767-CK-001 REV3 provided in Schedule One of this consent. For the avoidance of doubt, all earthworks, sand extraction and clean filling activities shall be confined to the area within the “extent of works” denoted by the blue line in Schedule One of this consent.</p> <p>The resource consent conditions below shall prevail should any inconsistencies between the application documentation, management plans and the conditions occur.</p>
2.	The consent holder shall be responsible for all sub-contracted operations relating to the exercise of this consent and must ensure staff and sub-contractors are made aware of the conditions of this consent and ensure compliance with those conditions.
3.	A copy of this resource consent must be kept on-site at all times during the operation of the sand quarry authorised by this consent and shall be produced without unreasonable delay upon request from a servant or agent of the Waipa District Council.
	NES for Assessing and Managing Contaminants in Soil to Protect Human Health
4.	A preliminary site investigation (PSI) must be done to determine if it is highly unlikely there will be a risk to human health associated with the quarrying activity. The findings of the investigation must be documented in a PSI Report and be provided to Council’s Environmental Health Manager for assessment prior to the commencement of any earth disturbance.
5.	In the event the findings of the PSI determine it is not highly unlikely there will be a risk to human health associated with the quarrying activity, then the consent holder shall undertake a detailed site investigation (DSI) to determine if contaminants of concern are present in the soil that pose a risk to human health given the intended activities.
6.	In the event that the results of the DSI indicate that the soil contamination exceeds the applicable standards and the dwelling site presents an unacceptable risk to human health or the environment (on-site or off-site) then a Site Remedial Action Plan (RAP) must be prepared and provided to Council’s Environmental Health Manager for approval prior to any remediation activity being carried out.
7.	After any necessary remediation has been completed, and prior to the commencement of dwelling construction works, a site validation report must be prepared that demonstrates the site is now suitable for the intended activities. The report shall be provided to Council’s Environmental Health Manager for assessment as soon as practicable after remediation of the site has been completed.
8.	If any soil disturbance is required to be managed, a Site Management Plan must be prepared and provided to Council’s Environmental Health Manager for approval prior to the commencement of any soil disturbance works. The Plan must detail how soils will be managed on site giving due regard to exposure and removal issues. The Plan must include the appropriate controls to protect human health by ensuring exposure pathways are minimised for the duration of the soil disturbance works.

9.	Any contaminated soil is to be removed under controlled conditions to a licensed waste facility or landfill for disposal in accordance with the requirements of the disposal site and the relevant authority. Receipts of transport and disposal are required to be included in the Site Validation Report.
10.	All investigations are to be carried out by a suitably qualified and experienced practitioner. The site shall be investigated and reported on in strict accordance with the requirements of the RMA (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.
	Pre-Start
11.	The consent holder shall inform the Waipa District Council in writing at least 5 working days prior to the commencement of activities of the start date of the works authorised by this consent.
12.	The consent holder shall appoint a representative(s) prior to the exercise of this consent who shall be the Waipa District Council's principal contact person(s) regarding matters relating to this consent. The consent holder shall inform the Waipa District Council of the representative(s) name and how they can be contacted, prior to this consent being exercised. Should that person(s) change during the term of this resource consent, the consent holder shall immediately inform the Waipa District Council and shall also give written notice to the Waipa District Council of the new representative's name and how they can be contacted.
13.	The consent holder shall arrange and conduct a pre-construction site meeting and invite, with a minimum of 5 working days' notice, the Waipa District Council, the site representative(s) nominated under condition 12 of this consent, the contractor and any other party representing the consent holder prior to any work authorised by this consent commencing on site.
	Advice note: In the case that any of the invited parties, other than the site representative does not attend this meeting, the consent holder will have complied with this condition, provided the invitation requirement is met.
	Earthworks
14.	All earthworks must be undertaken in general accordance with the Waikato Regional Council's "Erosion and Sediment Control - Guidelines for Soil Disturbing Activities (2009)" including the corresponding fact sheets. See http://www.waikatoregion.govt.nz/Environment/Natural-resources/Land-and-soil/Erosion/Earthworks-Erosion-and-Sediment-Control/
15.	The consent holder shall minimise the tracking of dirt and loose material onto the public road as far as practicable. Any spillage onto the public roadway must be cleaned as soon as practicable.
16.	There shall be no particulate matter as a result of the activities authorised by this resource consent that causes an objectionable or offensive effect beyond the boundary of the site being that land described as LOT 2 DP 444992 and Lot 3 DP 424105 comprised in Record of Titles 558891 and 493900.
17.	All areas of bare earth shall be re-vegetated or re-grassed as soon as practicable.
	Tangata Whenua, Accidental Discovery and Archaeological
18.	If taonga, koiwi or any archaeological artefacts are discovered in any area of earthworks, the consent holder shall cease work within a 50-metre radius of the discovery immediately and contact local iwi, Heritage New Zealand (HNZ) and the Waipa District Council within 48 hours. Works shall not recommence within this

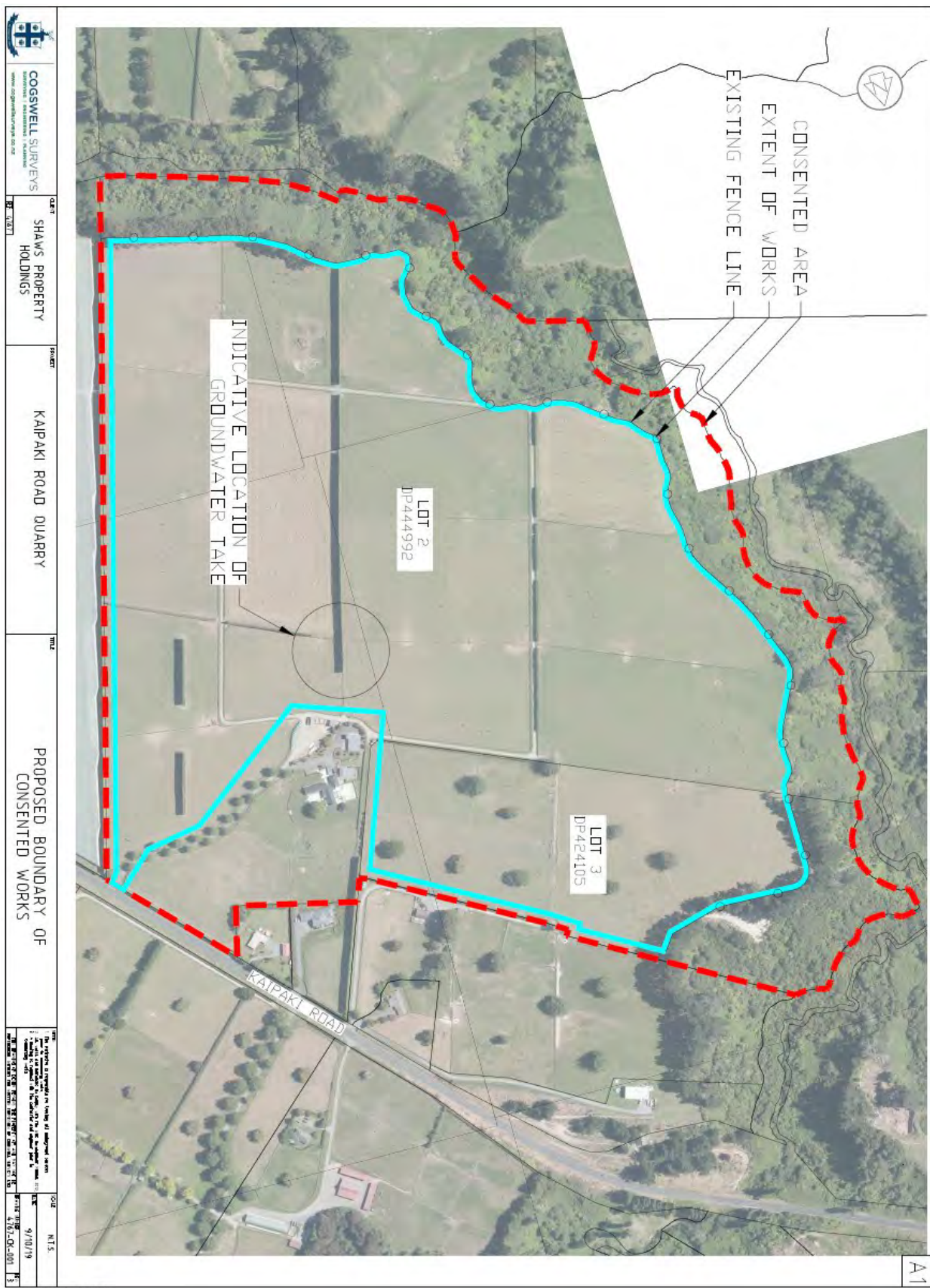
	<p>area until a site inspection is carried out by iwi, HNZ and/or the Waipa District Council (if any consider this necessary) and appropriate action has been taken. Works may recommence on the written advice of the Waipa District Council after considering:</p> <ul style="list-style-type: none"> (i) The interests and values of Tangata Whenua; and (ii) The consent holder's interests; and (iii) Any archaeological or scientific evidence; and (iv) Any Heritage New Zealand authorisations.
	Quarry Management
19.	<p>The consent holder shall provide the Waipa District Council with a "Quarry and Cleanfill Management Plan" (QCMP), at least 10 working days prior to the commencement of activities authorised by this consent. The information presented in the QCMP shall be of a similar scope and standard to that within the Draft QCMP provided in Appendix D of the application for this consent described in Condition 1. The QCMP shall be approved in writing by the Waipa District Council acting in a technical certification capacity prior to any works authorised by this consent commencing. The QCMP shall include, but may not be limited to, the following:</p> <ul style="list-style-type: none"> (i) acceptance criteria for cleanfill to be disposed on site; (ii) a description of operational procedures and monitoring that will be implemented to; <ul style="list-style-type: none"> a. record truck movements; b. record sand volumes extracted; c. record cleanfill volumes entering the site; and d. minimise unauthorised or contaminated material entering the site; (iii) a site staging plan; (iv) specific design details, construction and certification procedures to ensure long term stability of cleanfill areas; (v) erosion and sediment control plans for quarry stages (as relevant); (vi) timetable and nature of progressive site rehabilitation and re-vegetation to ensure the cumulative area of unstabilised earth on site does not exceed 3 hectares; (vii) an indicative final rehabilitated contour plan; (viii) contingency and mitigation measures; (ix) maintenance, monitoring, and inspection procedures; (x) specific dust control measures to ensure that dust emissions are kept to a practicable minimum; (xi) procedures for recording and dealing with complaints; (xii) site plan showing the location of infrastructure and all other relevant information; (xiii) description of operational measures to; <ul style="list-style-type: none"> a. minimise noise; b. comply with the noise limits prescribed in this consent; and c. address the operational constraints recommended in the Noise Effects Assessment report prepared by Marshall Day Acoustics, provided in Appendix G of the application for this consent described in Condition 1; (xiv) traffic management protocols; (xv) accidental discovery protocols; and (xvi) procedures for reviewing the QCMP.
20.	The Consent Holder shall run the site in accordance with the approved QCMP.
21.	A maximum volume of sand removed from the site in any 12-month period shall not exceed 200,000m ³ .

	Hours of Operation
22.	<p>The hours of operation of the sand quarrying and cleanfilling activities, including the use of heavy vehicles carting machinery or material entering or leaving the site, shall be between:</p> <ul style="list-style-type: none"> • 7:00am to 5:30pm, Monday to Friday. • 7:00am to 12:00pm, Saturday. • Closed Sunday and Public Holidays
	Noise
23.	<p>Noise generating activity shall be conducted designed and used to ensure that it does not exceed the following limits within the notional boundary of any dwelling (excluding dwellings on the same property as the consented activity or those where completed written approval of potentially affected parties has been obtained):</p> <ul style="list-style-type: none"> (i) Day time - 7:00am to 10:00pm 50 dB L_{Aeq} (ii) Night-time - 10:00pm to 7:00am 40 dB L_{Aeq} and single noise event 70 dB L_{AFmax}
24.	The noise levels shall be measured following the requirements of NZS 6801:2008 –Acoustics –Environmental Sound and assessed following NZS 6802:2008–Acoustics –Environmental Noise.
25.	Construction noise generated from the construction of any permanent haul roads, turning areas, site offices, buildings or any other "construction activities" shall meet the relevant limits recommended in and be measured and assessed following NZS 6803:1999 Acoustics –Construction Noise.
	Traffic, Access and Rooding
26.	<p>The consent holder shall, no later than 31 March each year, provide Waipa District Council's Enforcement Officer with an annual report detailing the following information for the previous calendar year:</p> <ul style="list-style-type: none"> (i) Daily numbers of truck movements; (ii) Monthly sand volumes extracted; and (iii) Monthly clean fill volumes entering the site.
27.	The consent holder must keep a register of daily truck movements, daily sand volume leaving the site and daily cleanfill material entering the site. This information must be made available to an authorised officer of the Waipa District Council within 10 working days upon request.
28.	<p>The maximum number of heavy vehicle movements generated by the activity shall not exceed:</p> <ul style="list-style-type: none"> (i) Daily maximum of 133 HCV movements/day; and (ii) Daily average of 106 HCV movements/day (calculated over a one-month period)
29.	<p>The consent holder shall submit engineering plans detailing the vehicle crossing and proposed haul road to the Council's Manager Development Engineering for approval in a technical certification capacity in advance of any construction works being undertaken. The design should be in general accordance with NZTA Planning Policy Manual Diagram E and include:</p> <ul style="list-style-type: none"> (i) Heavy vehicle tracking for the design vehicle; (ii) Details for the location and size of the splitter island; (iii) Location of the proposed gate; (iv) Details of access to the residential dwelling;

	<p>(v) Details of the proposed sealed access road 6m wide or 3m wide with passing bays at maximum 100m spacings; and</p> <p>(vi) Size and spacing of any passing bays on the proposed access road.</p>
30.	All access to the property for vehicles visiting the sand excavation and cleanfill activities must be via the access approved by Council's Manager Development Engineering in accordance with Condition 29.
31.	<p>Prior to undertaking any work within either the formed or unformed road corridor, the Consent Holder shall submit a Corridor Access Request (CAR) through 'beforeudig.co.nz' which has been prepared by a qualified Site Traffic Management Supervisor (STMS). No works shall be undertaken within the road reserve until such time as the CAR is approved by the Council's Monitoring Officer in writing.</p> <p>Advice Note: Worksites within the formed and / or unformed road corridor must be made safe at all times for road users, contractors and workmen through the implementation of the Traffic Management Plan (TMP) approved during the Corridor Access Request process.</p>
32.	The consent holder shall arrange for an independent detailed design road safety audit of the proposed vehicle crossing to the sand quarry to be undertaken in accordance with the 'Road Safety Audit Procedures for Projects Guidelines, May 2013'. A copy of the road safety audit shall be provided to Council's Manager Development Engineering. Any audit recommendations and design changes arising from the road safety audit shall be agreed with the Council's Manager Development Engineering prior to construction being undertaken.
	Complaints Register
33.	<p>The consent holder shall maintain and keep a complaint register for complaints regarding all aspects of operations at the site related to the exercise of this consent, received by the consent holder. The register shall record:</p> <ul style="list-style-type: none"> i) the date, time and duration of the event/incident that has resulted in a complaint, ii) the location of the complainant when the event/incident (if possible, specify nature of incident e.g. dust nuisance) was detected, iii) the possible cause of the event/incident, iv) the weather conditions and wind direction at the site when the event/incident allegedly occurred, v) any corrective action is undertaken by the consent holder in response to the complaint vi) any other relevant information. <p>The register shall be available to the Waikato Regional Council at all reasonable times. Complaints received by the consent holder that may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.</p>
	Administration
34.	The consent holder shall pay to the Waipa District Council any administrative fixed charge in accordance with section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with the regulations under section 360 of the Resource Management Act.
	Financial Contribution
35.	The consent holder shall pay the Waipa District Council a financial contribution of \$0.03/tonne for each tonne of material that is transported by public road.

	Advice Note: The financial contribution of \$0.03/tonne takes into account the NZ Transport Agency financial assistance rate of 51%
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SCHEDULE ONE:





APPENDIX I

Suggested Consent Conditions –
Waipa District Council

Large Scale Clean Fill Disposal Consent	
Number	Condition
	Generally in accordance
1.	<p>Sand quarry and clean filling activities shall be carried out in general accordance with the “Resource Consent Application and Assessment of Environmental Effects: Kaipaki Road - Sand Quarry” document dated 26 April 2020 prepared by Mitchell Daysh Limited, and supporting information, including plan 4767-CK-001 REV3 provided in Schedule One of this consent. For the avoidance of doubt, all earthworks, sand extraction and clean filling activities shall be confined to the area within the “extent of works” denoted by the blue line in Schedule One of this consent.</p> <p>The resource consent conditions below shall prevail should any inconsistencies between the application documentation, management plans and the conditions occur.</p>
2.	The consent holder shall be responsible for all sub-contracted operations relating to the exercise of this consent and must ensure staff and sub-contractors are made aware of the conditions of this consent and ensure compliance with those conditions.
3.	A copy of this resource consent must be kept on-site at all times during the operation of the sand quarry authorised by this consent and shall be produced without unreasonable delay upon request from a servant or agent of the Waikato Regional Council.
	Pre-Start
4.	The consent holder shall inform the Waikato Regional Council in writing at least 5 working days prior to the commencement of activities of the start date of the works authorised by this consent.
5.	The consent holder shall appoint a representative(s) prior to the exercise of this consent who shall be the Waikato Regional Council’s principal contact person(s) regarding matters relating to this consent. The consent holder shall inform the Waikato Regional Council of the representative(s) name and how they can be contacted, prior to this consent being exercised. Should that person(s) change during the term of this resource consent, the consent holder shall immediately inform the Waikato Regional Council and shall also give written notice to the Waikato Regional Council of the new representative’s name and how they can be contacted.
6.	The consent holder shall arrange and conduct a pre-construction site meeting and invite, with a minimum of 5 working days’ notice, the Waipa District Council, the site representative(s) nominated under condition 12 of this consent, the contractor and any other party representing the consent holder prior to any work authorised by this consent commencing on site.
7.	Advice note: In the case that any of the invited parties, other than the site representative does not attend this meeting, the consent holder will have complied with this condition, provided the invitation requirement is met.
	Tangata Whenua, Accidental Discovery and Archaeological
8.	If taonga, koiwi or any archaeological artefacts are discovered in any area of earthworks, the consent holder shall cease work within a 50-metre radius of the discovery immediately and contact local iwi, Heritage New Zealand (HNZ) and the Waikato Regional Council within 48 hours. Works shall not recommence within this area until a site inspection is carried out by iwi, HNZ and/or the Waikato Regional

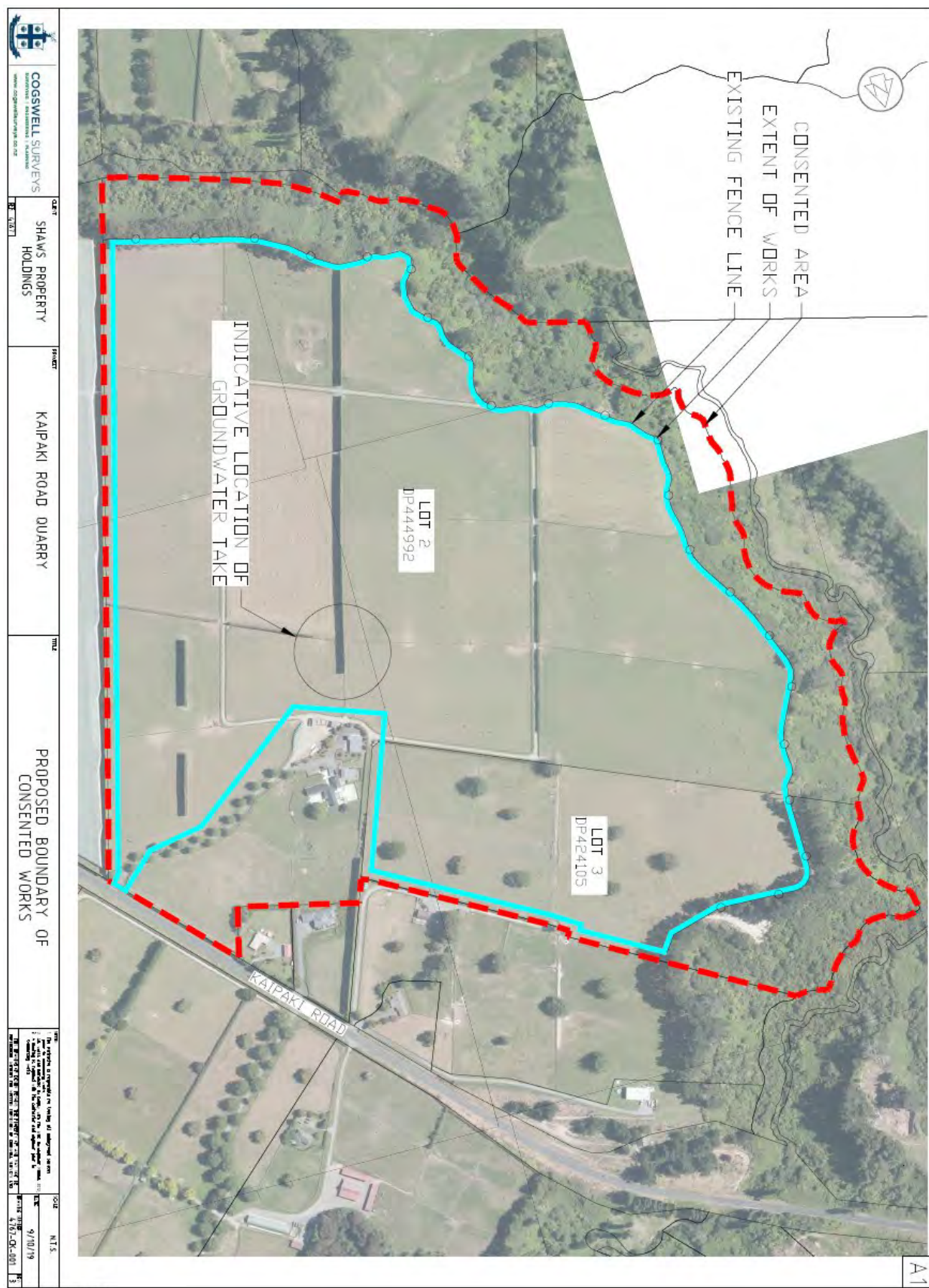
	<p>Council (if any consider this necessary) and appropriate action has been taken. Works may recommence on the written advice of the Waikato Regional Council after considering:</p> <ul style="list-style-type: none"> (i) The interests and values of Tangata Whenua; and (ii) The consent holder's interests; and (iii) Any archaeological or scientific evidence; and (iv) Any Heritage New Zealand authorisations.
	<p>Quarry and Cleanfill Management</p>
9.	<p>The consent holder shall provide the Waikato Regional Council with a "Quarry and Cleanfill Management Plan" (QCMP), at least 10 working days prior to the commencement of activities authorised by this consent. The information presented in the QCMP shall be of a similar scope and standard to that within the Draft QCMP provided in Appendix D of the application for this consent described in Condition 1. The QCMP shall be approved in writing by the Waikato Regional Council acting in a technical certification capacity prior to any works authorised by this consent commencing. The QCMP shall include, but may not be limited to, the following:</p> <ul style="list-style-type: none"> (i) acceptance criteria for cleanfill to be disposed on site; (ii) a description of operational procedures and monitoring that will be implemented to; <ul style="list-style-type: none"> a. record truck movements; b. record sand volumes extracted; c. record cleanfill volumes entering the site; and d. minimise unauthorised or contaminated material entering the site; (iii) a site staging plan; (iv) specific design details, construction and certification procedures to ensure long term stability of cleanfill areas; (v) erosion and sediment control plans for quarry stages (as relevant); (vi) timetable and nature of progressive site rehabilitation and re-vegetation to ensure the cumulative area of unstabilised earth on site does not exceed 3 hectares; (vii) an indicative final rehabilitated contour plan; (viii) contingency and mitigation measures; (ix) maintenance, monitoring, and inspection procedures; (x) specific dust control measures to ensure that dust emissions are kept to a practicable minimum and compliance with conditions 18 and 19 of this consent are achieved; (xi) procedures for recording and dealing with complaints; (xii) site plan showing the location of infrastructure and all other relevant information; (xiii) accidental discovery protocols; and (xiv) procedures for reviewing the QCMP.
10.	<p>The Consent Holder shall operate the site in accordance with the approved QCMP.</p>
11.	<p>All cleanfill deposition authorised by this consent shall be limited to natural materials such as clay, soil and rock, and other inert materials such as concrete and brick, or mixtures of any of the above. Cleanfill, deposition authorised by this consent shall exclude;</p> <ul style="list-style-type: none"> (i) material that has combustible, putrescible or degradable components (ii) materials likely to create leachate by means of biological or chemical breakdown (iii) any products or materials derived from hazardous waste treatment, hazardous (iv) waste stabilisation or hazardous waste disposal practices

	<ul style="list-style-type: none"> (v) materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health (vi) soils or other materials contaminated with hazardous substances or pathogens (vii) hazardous substances.
	Erosion and Sediment Control
12.	The consent holder shall be responsible for the provision and maintenance of any erosion and sediment control works that become necessary as a result of the exercise of this resource consent.
13.	The consent holder shall ensure that sediment losses to natural water arising from the exercise of this resource consent are minimised for the duration of the works and during the term of this consent. In this respect appropriate sediment control practices shall be undertaken which are in general accordance with the document prepared by the Waikato Regional Council titled "Erosion & Sediment Control Guidelines for Soil Disturbing Activities January 2009" (Environment Waikato Report No 2009/02) and relevant factsheets.
14.	The consent holder shall stockpile topsoil and subsoil stripped from the site and shall use this stockpiled material for rehabilitation purposes.
15.	The consent holder shall ensure stockpiles (overburden) and areas of clean fill shall be stabilised against erosion as soon as practically possible. Stabilisation shall be undertaken by providing adequate measures (vegetative and/or structural) that will prevent erosion of exposed soil
16.	All disturbed or cut vegetation, soil or debris shall be deposited or placed in a position where it will not enter any water body or cause diversion, damming or erosion of any waterway.
17.	The area of unstabilised land open (exclusive of access roads) shall not exceed 3 hectares at any one time and shall include land open for cleanfilling and operational sand quarry working areas.
	Dust
18.	There shall be no particulate matter as a result of the activities authorised by this resource consent that causes an objectionable or offensive effect beyond the boundary of the site being that land described as LOT 2 DP 444992 and Lot 3 DP 424105 comprised in Record of Titles 558891 and 493900.
19.	<p>The consent holder shall manage the sand quarry, cleanfill and ancillary activities in such a manner to ensure that dust emissions are kept to a practicable minimum, including;</p> <ul style="list-style-type: none"> (i) the use of water carts and/or sprinklers to suppress dust from stockpiles, bund, access roads and any disturbed land, on an as and when basis; (ii) The use of dust stabilisation systems (water, water plus additives or mulch); (iii) the stabilisation of disturbed land, which is currently not being worked; (iv) the stabilisation of topsoil stockpiles; (v) where practical, locating topsoil stockpiles where they provide wind protection for exposed/excavated areas; (vi) the maintenance of sealed road 150 metres in length from the site entrance; and

	(vii) to cover or dampen loads on vehicles leaving the quarry which could create a dust nuisance.
20.	<p>Should an emission of particulate matter occur that has an objectionable or offensive effect, the consent holder shall inform the Waikato Regional Council within 24 hours of the incident and provide a written report to the Waikato Regional Council within five days of being notified of the incident. Should the consent holder be informed by the Waikato Regional Council of such an emission, the consent holder shall provide a written report within 5 days. In both cases the report shall specify:</p> <ul style="list-style-type: none"> (i) the cause(s) or likely cause(s) of the event and any factors that influenced its severity; (ii) the nature and timing of any measures implemented by the consent holder to avoid, remedy or mitigate any adverse effects; and the steps to be taken in future to prevent recurrence of similar events. (iii) The steps planned to be taken to prevent reoccurrence of similar events.
	Complaints Register
21.	<p>The consent holder shall maintain and keep a complaint register for complaints regarding all aspects of operations at the site related to the exercise of this consent, received by the consent holder. The register shall record:</p> <ul style="list-style-type: none"> i) the date, time and duration of the event/incident that has resulted in a complaint, ii) the location of the complainant when the event/incident (if possible, specify nature of incident e.g. dust nuisance) was detected, iii) the possible cause of the event/incident, iv) the weather conditions and wind direction at the site when the event/incident allegedly occurred, v) any corrective action is undertaken by the consent holder in response to the complaint vi) any other relevant information. <p>The register shall be available to the Waikato Regional Council at all reasonable times. Complaints received by the consent holder that may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.</p>
	Hazardous Substances
22.	All machinery shall be operated in a manner which ensures that spillages of fuel, oil and similar contaminants are prevented from entering any perennial waterbody particularly during refuelling and machinery servicing and maintenance. Refuelling and lubrication activities shall be carried out away from any water body such that any spillage can be contained so it does not enter stormwater drainage systems or surface watercourses.
23.	Fuel storage facilities shall include containers or bunds to contain any spillages and prevent spillages from entering groundwater or surface water.
24.	All major servicing and maintenance of non-tracked vehicles, in which vehicle fluids removal occurs, shall be carried out on an impervious surface to contain any spillages and prevent any spillages from entering groundwater or surface water.
	Plant Pest Management

25.	<p>The consent holder shall ensure that all machinery used in the exercising of this consent is cleaned prior to being transported to the site to ensure that all seed and/or plant matter has been removed and documented in accordance with the document titled 'KEEP IT CLEAN - Machinery hygiene guidelines and logbook to prevent the spread of pests and weeds (June 2013)'</p> <p>(http://www.waikatoregion.govt.nz/Documents/Keepitclean.pdf).</p>
	Administration
26.	<p>The consent holder shall pay to the Waipa District Council any administrative fixed charge in accordance with section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with the regulations under section 360 of the Resource Management Act.</p>

SCHEDULE ONE:



Groundwater Take	
Number	Condition
	Generally in accordance
1.	<p>Groundwater abstraction activities shall be carried out in general accordance with the “Resource Consent Application and Assessment of Environmental Effects: Kaipaki Road - Sand Quarry” document dated <XX XXX XXXX> prepared by Mitchell Daysh Limited, and supporting information, including plan 4767-CK-001 REV3 provided in Schedule One of this consent.</p> <p>The resource consent conditions below shall prevail should any inconsistencies between the application documentation, management plans and the conditions occur.</p>
2.	The water taken pursuant to this resource consent shall be used for dust mitigation, wheel wash supply and general quarry and cleanfill site management purposes.
3.	The maximum volume of groundwater to be taken in any 24 hour period shall not exceed 50 cubic metres.
4.	A water measuring system shall quantify the combined volume of water taken pursuant to this consent on a cumulative basis. The system shall have reliable calibration to water flow and shall be maintained to an accuracy of +/- 5%
5.	<p>An as-built plan of the water measuring device shall be provided to the Waikato Regional Council prior to exercising this consent.</p> <p>Advice Note: This can be a drawn diagram or photograph of the water meter set-up and shall include information on all pipe diameter, the length of straight pipe before and after the water meter, and any filters, outlets or chemical injection points.</p>
6.	Calibration of the water meter shall be undertaken by the consent holder at the written request of the Waikato Regional Council. The calibration shall be undertaken by an independent person within the timeframe specified in the written request from the Waikato Regional Council. Evidence documenting the calibration shall be forwarded to the Waikato Regional Council within 10 working days of the calibration being completed.
	Access to the bores to perform pumping tests, and for the measurement of static water levels and water quality sampling, shall be provided to the staff and agents of the Waikato Regional Council at all times
7.	The consent holder shall keep a continuous record of the volume of groundwater taken (cubic metres) on a weekly basis.
8.	Water records required by condition 7 of this consent shall be made available to the Waikato Regional Council at all reasonable times and by 01 July each year the consent holder shall forward to the Waikato Regional Council these records from the preceding calendar year.



APPENDIX J

Written Approvals

To be completed by affected party:

Owner to Complete

I / we are also the occupiers(s)

Full name of all property owners:

Robert Ralph Manning

Of (contact postal address of all property owners):

R.D.1 Cambridge

Being the owner/s of (state street address and/or legal description) Street address:

951 Kaipaki Rd.
Cambridge

Legal description:

I / we have authority to sign on behalf of all of the owners of the property


I / we have read the full application for resource consent, the Assessment of Environmental Effects and any associated site plans and I / we have signed and dated each page

Declaration

In signing this written approval, I / we understand that the Council must decide that I / we are no longer an affected person, and Council must not have regard to any adverse effect on me.

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

Signed* (All owners or authorised persons):



Date: 21.4.20

Fax/email:

Contact daytime phone:

Occupier to Complete

Full name of all occupiers:

Of (contact postal address of all property occupiers):

Being the occupier/s of (state street address and/or legal description) Street address:

Legal description:

I / we have authority to sign on behalf of all of the occupiers of the property

I / we have read the full application for resource consent, the Assessment of Environmental Effects and any associated site plans and I / we have signed and dated each page

Declaration

In signing this written approval, I / we understand that the Council must decide that I / we are no longer an affected person, and Council must not have regard to any adverse effect on me.

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

Signed* (All occupiers or authorised persons):

Date:

Fax/email:

Contact daytime phone:

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

Written Approval of Affected Persons

Affected person's written approval to an activity that is the subject of a resource consent application

Note to affected person(s) signing written approval:

Before asking for your approval the applicant should fully explain the proposal to you. You should see a description of the activity and the accompanying plans. If you decide to give written approval to this application, you must complete the form and sign the applicant's plans. You should only sign this form if you fully understand the proposal. You should seek expert or legal advice if you need the proposal or resource consent process explained to you. You may also contact Council for assistance. Conditional written approval **cannot** be accepted. There is no obligation to sign this form, and no reasons need to be given. If you do not sign this form, resource consent may be required, and you may have the opportunity to submit on the application.

If signing on behalf of a trust or company, please provide additional written evidence that you have signing authority.

To be completed by applicant

To: Name of Council who is the consent authority for this application **Waipa District Council**

Applicant Name

Full name: **Shaw's Property Holdings Limited**

Location of Proposed Activity

Please complete with as many details as you can, so the site for your proposal is clearly identifiable. Include details such as unit number, street number, street name and town.

Property Address:

928 Kaipaki Road, Cambridge

Legal description:

Lot 2 DP 444992 and Lot 3 DP 424105

Description of Proposed Activity

Please provide a brief description of your proposal, including which District Plan rules or standards are infringed.

Land Use Consent to establish and operate a mineral extraction activity as a Discretionary Activity in the Rural Zone - Refer Exec Summary



To be completed by affected party:**Owner to Complete**

I / we are also the occupiers(s)

Full name of all property owners:

MICHAEL JOSEPH MORAN
HELEN MARY MORAN

Of (contact postal address of all property owners):

906 KAIPAKI Rd CAMBRIDGE

Being the owner/s of (state street address and/or legal description) Street address:

906 KAIPAKI RD CD3
CAMBRIDGE 3495

Legal description:

I / we have authority to sign on behalf of all of the owners of the property

I / we have read the full application for resource consent, the Assessment of Environmental Effects and any associated site plans and I / we have signed and dated each page

Declaration

In signing this written approval, I / we understand that the Council must decide that I / we are no longer an affected person, and Council must not have regard to any adverse effect on me.

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

Signed* (All owners or authorised persons):

[Signature] Helen M. Moran

Date:

12 / 3 / 2020

Fax/email:

Contact daytime phone:

Occupier to Complete

Full name of all occupiers:

Of (contact postal address of all property occupiers):

Being the occupier/s of (state street address and/or legal description) Street address:

Legal description:

I / we have authority to sign on behalf of all of the occupiers of the property

I / we have read the full application for resource consent, the Assessment of Environmental Effects and any associated site plans and I / we have signed and dated each page

Declaration

In signing this written approval, I / we understand that the Council must decide that I / we are no longer an affected person, and Council must not have regard to any adverse effect on me.

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

Signed* (All occupiers or authorised persons):

Date:

Fax/email:

Contact daytime phone:

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



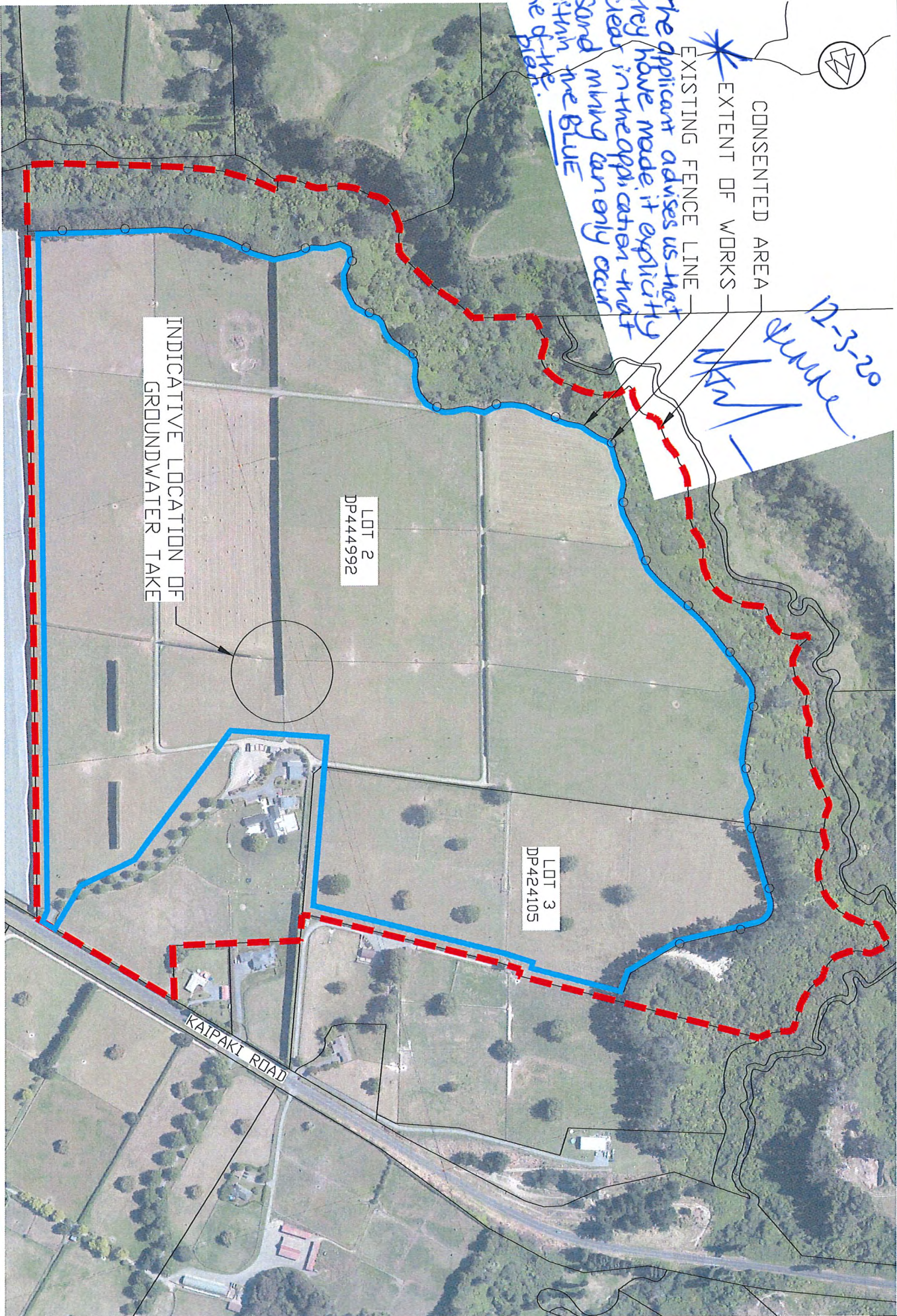
CONSENTED AREA

EXTENT OF WORKS

EXISTING FENCE LINE

The applicant advises us that they have made it explicitly clear in the application that sand mining can only occur within the blue line of the plan.

12-3-20
K. [Signature]



COGSWELL SURVEYS
SURVEYING | ENGINEERING | PLANNING
www.cogswellsurveys.co.nz

CLIENT
SHAW'S PROPERTY
HOLDINGS

PROJECT
KAIPAKI ROAD QUARRY

TITLE

PROPOSED BOUNDARY OF
CONSENTED WORKS

NOTES
1. Prepared by reference to existing survey data.
2. A survey is required with the relevant and proposed plan.
3. THE SURVEYOR HAS MADE THE PROPERTY OF THE CLIENT AND NOT THE SURVEYOR'S RESPONSIBILITY TO OBTAIN ALL NECESSARY INFORMATION.

SCALE
N.T.S.
DATE
9/10/19
DRAWN
4761-CK-001
3

Written Approval of Affected Persons

Affected person's written approval to an activity that is the subject of a resource consent application

Note to affected person(s) signing written approval:

Before asking for your approval the applicant should fully explain the proposal to you. You should see a description of the activity and the accompanying plans. If you decide to give written approval to this application, you must complete the form and sign the applicant's plans. You should only sign this form if you fully understand the proposal. You should seek expert or legal advice if you need the proposal or resource consent process explained to you. You may also contact Council for assistance.

Conditional written approval **cannot** be accepted. There is no obligation to sign this form, and no reasons need to be given. If you do not sign this form, resource consent may be required, and you may have the opportunity to submit on the application.

If signing on behalf of a trust or company, please provide additional written evidence that you have signing authority.

To be completed by applicant

To: Name of Council who is the consent authority for this application **Waipa District Council**

Applicant Name

Full name: **Shaw's Property Holdings Limited**

Location of Proposed Activity

Please complete with as many details as you can, so the site for your proposal is clearly identifiable. Include details such as unit number, street number, street name and town.

Property Address:

928 Kaipaki Road, Cambridge

Legal description:

Lot 2 DP 444992 and Lot 3 DP 424105

Description of Proposed Activity

Please provide a brief description of your proposal, including which District Plan rules or standards are infringed.

Land Use Consent to establish and operate a mineral extraction activity as a Discretionary Activity in the Rural Zone - Refer Exec Summary



To be completed by affected party:**Owner to Complete**

/ we are also the occupiers(s)

Full name of all property owners:

Cain & Stephanie Taylor

Of (contact postal address of all property owners):

PO Box 1160, Cambridge

Being the owner/s of (state street address and/or legal description) Street address:

898/1 Kaipaki Road
Cambridge

Legal description:

I / we have authority to sign on behalf of all of the owners of the property

I / we have read the full application for resource consent, the Assessment of Environmental Effects and any associated site plans and I / we have signed and dated each page

Declaration

In signing this written approval, I / we understand that the Council must decide that I / we are no longer an affected person, and Council must not have regard to any adverse effect on me.

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

Signed* (All owners or authorised persons):

Date: 27.1.20

Fax/email:

Contact daytime phone:

Occupier to Complete

Full name of all occupiers:

Cain & Stephanie Taylor

Of (contact postal address of all property occupiers):

PO Box 1160, Cambridge

Being the occupier/s of (state street address and/or legal description) Street address:

898/1 Kaipaki Road
Cambridge

Legal description:

I / we have authority to sign on behalf of all of the occupiers of the property

I / we have read the full application for resource consent, the Assessment of Environmental Effects and any associated site plans and I / we have signed and dated each page

Declaration

In signing this written approval, I / we understand that the Council must decide that I / we are no longer an affected person, and Council must not have regard to any adverse effect on me.

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

Signed* (All occupiers or authorised persons):

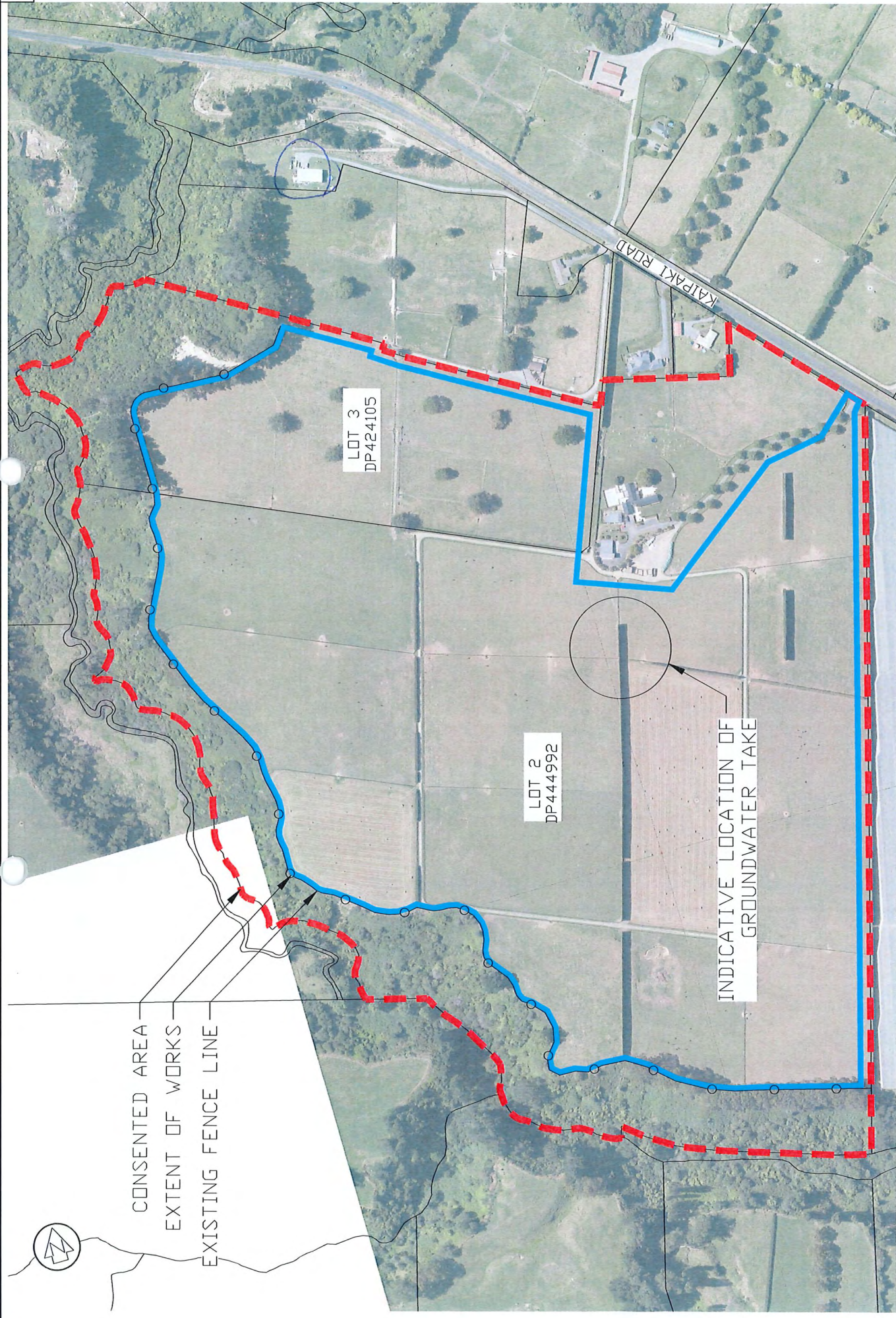
 


Date: 27.1.20

Fax/email:

Contact daytime phone:

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



 COGSWELL SURVEYS SURVEYS ENGINEERING PLANNING www.cogswellsurveys.co.nz	CLIENT: SHAW'S PROPERTY HOLDINGS	PROJECT: KAIPAKI ROAD QUARRY	TITLE:	SCALE: N.T.S.	DATE: 9/10/19
					DRAWING NUMBER: 4767-CK-001

NOTES:
1. The contractor is responsible for liability of underground services.
2. All works and activities to comply with the Resource Management Act 1991.
3. All works and activities to comply with the Resource Management Act 1991.
4. All works and activities to comply with the Resource Management Act 1991.
5. All works and activities to comply with the Resource Management Act 1991.
6. All works and activities to comply with the Resource Management Act 1991.
7. All works and activities to comply with the Resource Management Act 1991.
8. All works and activities to comply with the Resource Management Act 1991.
9. All works and activities to comply with the Resource Management Act 1991.
10. All works and activities to comply with the Resource Management Act 1991.

Hayley Thomas

From: Hayley Thomas
Sent: Wednesday, 9 September 2020 1:10 PM
To: Hayley Thomas
Subject: LU/0108/20 - Clarification

Afternoon Notified Parties,

On 14 August 2020, you received a letter regarding the resource consent application from Shaw's Property Holdings Limited seeking for the establishment and operation of a mineral extraction activity (sand quarry) at 928 Kaipaki Road, Leamington, Cambridge (Council reference LU/0108/20). Following a query from one of the notified parties I have been provided with further clarification from the agent as follows:

- The annual maximum extraction limit of 200,000m³ is the parameter used to determine overall effects (particularly those relating to traffic);
- The 900,000 m³ figure came from the geotechnical assessment which set out, in the very early stages, to "prove" there was an economic level of resource on the site prior to embarking on a full consent application process. The results of this assessment showed there was good resource focussed within a 13.4 hectare area of the site (Area A) while other areas of the site (Area B) were likely to contain less economical product. To this extent, the total estimate of 900,000m³ of sand (Area A) will be the minimum volume expected.
- Assuming the resource beneath Area B is also saleable, the applicant would hope to have a volume of approximately 2,275,000m³ available for extraction. In reality, however, due to buffer setbacks, angled / benched working faces along the site perimeter, and potential pockets or layers of non-useable materials (mainly in Area B), the best case scenario for the applicant is likely to be more in the order of 2,200,000m³.
- This is all a bit speculative, but in that event, the activity could be done and dusted within 11 years (assuming the maximum extraction rate was reached every year).
- In hindsight, the AEE probably doesn't make the above all that clear, but 900,000m³ was always intended to represent the minimum volume of sand extracted, while the applicant would obviously hope for as much sand as possible from the site. Hence, there was never any intention to specify a maximum total extraction volume – just a maximum annual extracted volume.

Should you have any queries or wish discuss the notification and submission process, feel free to contact the undersigned. Reminder any submissions on the application must be received by Council no later than 5pm on Monday 14 September 2020.

Kind regards

Hayley

Hayley Thomas Project Planner **WAIPA DISTRICT COUNCIL**
hayley.thomas@waipadc.govt.nz | www.waipadc.govt.nz
PH: 0800 WAIPADC (0800 924 723)

Hayley Thomas

From: Hayley Thomas
Sent: Tuesday, 15 September 2020 2:26 PM
To: Hayley Thomas
Subject: LU/0108/20 - Query and Agent Response
Attachments: LU010820 - Agent Response to 11 Sept 2020 Query.pdf

Afternoon Notified Parties,

With regard to the resource consent application from Shaw's Property Holdings Limited seeking for the establishment and operation of a mineral extraction activity (sand quarry) at 928 Kaipaki Road, Leamington, Cambridge (Council reference LU/0108/20), a notified party had the following query for the applicant and their agents:

"We would like to draw to your attention the following items that now need to be clarified by the applicant and their agents:

- 1 With reference to your email of 9 September with Mitchell Daysh comments, bullet point 4 states 'This is all a bit speculative, but in that event, the activity could be done and dusted within 11 years (assuming the maximum extraction rate was reached every year).' This needs a clarification and correction as clearly only the sand extraction could be completed in this time frame. A minimum of a further 11 years will required to import the necessary clean fill in with HCVs in and out of the site (based on the applications maximum import allowance of 100,000m3 per year). This gives a minimum total time scale of in excess of 22 years.*
- 2 Could you please clarify with the applicant's agent and possibly directly with the applicant's contributing experts particular Cogswell Services Limited, Grey Matter Limited and Marshall Day Acoustics that their reports are based on a sand take of 2,200,000m3 at an annual rate of 200,000m3 per year over a minimum 11 year period as is now stated by Mitchell Daysh (plus clean fill period of 11 years minimum giving a total minimum operating span of 22 years).*
- 3 Should the affected parties who have already given written consent to the application be notified of the changed sand take and project duration (3 number) as their acceptance was based on the now incorrect information presented to them."*

I have now received the agents response and attach this for your information.

Kind regards

Hayley

Hayley Thomas Project Planner **WAIPA DISTRICT COUNCIL**
hayley.thomas@waipadc.govt.nz | www.waipadc.govt.nz
PH: 0800 WAIPADC (0800 924 723)

Hayley Thomas

From: Mason Jackson
Sent: Monday, 14 September 2020 5:36 PM
To: Hayley Thomas
Subject: External Sender: RE: LU/0108/20 - Query

Follow Up Flag: Follow up
Flag Status: Flagged

Kia ora Hayley

My response to these queries is set out below. Please note that, in the interests of timeliness, I haven't sought responses from the specific experts listed. Instead, I have based the response on individual effects assessment reports which confirm the effects envelope and assumptions used (and those not used) by each expert.

Background

As we discussed previously, the AEE and individual effects assessments talk about the site having the potential to supply over 900,000 m³ of sand over a 7-10 year period. These figures came from the geotechnical assessment undertaken in the very early stages to "prove" there was an economic level of resource on the site prior to embarking on a full consent application process. The results of that assessment showed there was good resource focussed within a 13.4 hectare area of the site while other areas were likely to contain less economical product. To this extent, the total estimate of 900,000 m³ of sand was considered the minimum volume of sand expected from the site and was the basis for the applicant's investment decision.

To maximise potential yield from the site, the scope of the consent application extended beyond the 13.4 hectare "proven" area. Assuming some proportion of sand outside this area was also saleable, this would obviously yield more sand than 900,000 m³ and result in a more efficient use of this natural resource. Crude calculations show that around 2,200,000 m³ of material exists beneath the site (i.e. to a depth of 7m and assuming 0.5m of topsoil is retained). In reality, however, it is unlikely that all material present across the whole application area, and to the full depth, will be able to be excavated for sale. The key point here is that the total exact amount of sand to be excavated is unknown.

To help address these uncertainties, the effects assessments prepared by technical experts in support the consent application were based on a set of known maxims designed to represent the worst case "effects envelope" while the activity is occurring (e.g. maximum effects for any day, week or year that the site was operating etc). This included the following key parameters:

- Maximum rate of sand extraction = 200,000 m³/yr, and
- Maximum rate of cleanfill discharged to the site of approximately 100,000 m³/yr
- Maximum allowable operational noise
- Hours of operation

In terms of activity duration, I highlight the following;

- In terms of any District Council land use consent granted, the applicant specifically sought an unlimited consent duration; and
- In terms of any Regional Council consents granted (groundwater take and cleanfill discharge to land), the applicant sought a 20 year duration.

Response to Question 1.

- The arithmetic set out in the notified parties' email regarding theoretical sand extraction duration is correct, namely that, if it is assumed (although considered unlikely) that the full potential sand yield of the site is saleable (roughly estimated at 2,200,000 m³), and it is extracted at the maximum allowable rate of 200,000 m³/yr, then it will take 11 years. Obviously, this timeframe changes if there is less sand that can be economically extracted, and/or if market drivers result in it being extracted at lower annual rates.
- In respect of clean filling, which is more likely to determine overall activity duration, a worst case scenario of only 50% of trucks arriving to site with cleanfill was adopted as part of the effects envelope. It was also assumed that 10% of trucks arriving on site were there solely to dispose cleanfill. Overall, cleanfill disposal of up to approximately 100,000 m³/yr was assumed as a worst case. Importantly, the figure of 100,000 m³/yr is not a maximum limit as implied. There are benefits in having higher annual rates of cleanfill disposal (e.g. rehabilitation occurs quicker). For this reason, an annual limit on cleanfill disposal was not proposed by the applicant. Nevertheless, using the same arithmetic to that used for sand extraction, if it is assumed (although considered unlikely) that the full potential sand yield of the site is saleable (roughly estimated at 2,200,000 m³), and it is replaced at a rate of 100,000 m³/yr, then it would take 22 years to complete the site rehabilitation. It is noted, however, that the applicant does not expect it to take this long, as evidenced by the requested 20 year duration on the cleanfill discharge consent.
- Further on this point, and as a result of discussions the applicant has had with local construction contractors, it is becoming clearer that it will be more likely that nearly every truck arriving to site to collect sand will have cleanfill to dispose. Having a sand : cleanfill ratio closer to 1:1 will reduce the time lag between exhausting sand supply from the site and final rehabilitation. But again, this is hard to predict with certainty.

Response to Question 2

- As identified above, it was important to set a maximum proposed rate of sand extraction when framing up this application, mainly so that daily, weekly and annual traffic effects could be assessed. To this extent, a limit of 200,000 m³/yr of sand extraction was suggested as a condition within any consent granted, and this is what the applicant's technical experts used to determine the maximum effects of the activity while it was occurring.
- The applicant's experts did not consider or assess effects with any specified long-term timeframes in mind. This is because it is hard to predict exactly what these will be. Instead, their assessments are based on a worst case effects envelope, enabling these effects to be "capped" while the activity is occurring (i.e. for any given day or for any year etc).
- There has not been a change in the proposal as implied. Landuse consent from the Waipa District Council is still being sought with an unlimited duration, and resource consent from Waikato Regional Council for cleanfill disposal is still being sought for 20 years.

I hope this is helpful. Happy to discuss further.

Nga mihi

Mason

 **Mason Jackson**
Senior Consultant

Hayley Thomas

From: Mason Jackson
Sent: Tuesday, 15 September 2020 3:15 PM
To: Emma Cowan; Hayley Thomas
Cc: Charlotte Fransen
Subject: External Sender: Shaws Proposed Sand Quarry and Cleanfill Operation - 928 Kaipaki Road
Attachments: Update Shaws Proposed Sand Quarry Kaipaki Road.pdf; WRC Sand Quarry and Cleanfill-Suggested Conditions_10.09.20.docx

Kia ora korua

Please find attached for your information and consideration a letter setting out various updates relating to the above application, namely:

- A copy of the Tangata Whenua Statement and Engagement Report Recently received;
- A proposed increase to the volume of groundwater take and supporting technical effects assessment information; and
- An updated set of Waikato Regional Council consent conditions being proffered by the applicant to include on any regional council consent granted for cleanfill discharge to land, including associated explanatory comments (Note: an editable word version of these conditions is also attached for your convenience).

In terms of the applications made to the Waikato Regional Council, I trust there is now sufficient information to enable and support a non-notified decision under s95 of the Act.

Also, to the extent they may be relevant to both Councils (e.g. the revised Site Management Plan condition etc), any revised consent conditions being proffered to the Waikato Regional Council are also proffered to the Waipa District Council.

Nga mihi

Mason

 **Mason Jackson**
Senior Consultant

15 September 2020

Emma Cowan – Waikato Regional Council
e-mail: Emma.Cowan@waikatoregion.govt.nz

Hayley Thomas – Waipa District Council
e-mail: Hayley.Thomas@waipadc.govt.nz

Dear Emma and Hayley

RE: Update on Shaws Property Holdings Ltd Proposed Sand Quarry and Cleanfill Operation – 928
Kaipaki Road

The letter sets out for your information and further consideration (as relevant) various updates to the consent applications for the above proposal.

Tangata Whenua Report

Please find enclosed at Attachment 1 of this letter, a copy of the Tangata Whenua Statement and Engagement Report prepared in relation to this proposal. In summary, relevant tangata whenua either endorse or support the proposal.

WRC Application AUTH141798.01.01 - Groundwater Take

In response to WRC's request to provide additional technical and environmental effects assessment information associated with the ancillary activity of taking groundwater for dust suppression and truck wheel wash use, and to respond WRC's advice to consider increasing the proposed daily rate of groundwater take to meet potential dust suppression demands on site, the Applicant has now constructed and tested a new groundwater well on the site. The Applicant has also procured a technical report from Wallbridge Gilbert Aztec (WGA) including assessment of potential groundwater related effects associated with an increased level of take. A copy of this report is provided at Attachment 2 of this letter.

In line with WRC advice, and following analysis of pump test and effects data, the applicant has decided to increase the proposed maximum daily take to 205 m³. This is based on;

- an active site area of up to 3 ha;

- a rule of thumb dust suppression use demand of approximately 50m³ per hectare (as advised by WRC on 11 September 2020);
- a 33% contingency factor; and
- a maximum of 5 m³ per day to top the wheel wash system.

A maximum instantaneous rate of take of 4.5 L/s is also proposed along with a maximum annual abstraction volume of 45,100 m³ (based on 220 days per year of usage). Also included in the WGA report is further justification for the proposed annual take utilising local rainfall records.

The WGA report has assessed the effects of the groundwater take on this basis, concluding that any associated adverse environmental effects will be less than minor. It follows that, the Applicant would like to amend their groundwater take proposal to reflect these new water take maxima.

Suggested WRC Conditions

Further to previous discussions and correspondence (with Emma) the applicant also wishes to proffer a revised set of suggested conditions for any cleanfill discharge consent WRC might grant. A copy of these revised conditions is provided at Attachment 3 of this letter.

Please note the following in relation to these conditions;

- Clean fill acceptance criteria is now aligned with advice from Jonathan Caldwell (Condition 8).
- Regarding the Site Management Plan (SMP) (Condition 12):
 - This is to be prepared in consultation with Ngaati Koroki Kahukura and Ngaati Hauaa;
 - The applicant has agreed with mana whenua to implement plantings along 800m of site perimeter (at an average width of 3m) adjacent to Mangawhero Stream gully (Refer Figure 1 below). In this regard, noting that the planting is relatively small scaled, the Applicant requests this requirement be incorporated in the SMP as opposed to having a separate Planting Plan. As outlined in tangata whenua report, Ngati Haua Mahi Trust will be engaged to undertake this work. To this end Ngati Haua Mahi Trust have already provided the following broad planting plan information to the applicant:
 - An indicative plant list:
 - Totara 200.
 - Rimu 100.
 - Tikouka 400
 - Karamu 600
 - Tarata 300
 - Kohuhu 300

- Harekeke 200
 - Manatu 200
 - Makamako 200.
 - Kanuka, manuka 400.
- Indicative maintenance: Recommend 2 releases a year for the first 3 years.



Figure 1: Scope of Site perimeter planting agreed with mana whenua (denoted by the yellow line)

- A specific Dust Management Plan is now agreed (Condition 17) including a requirement to include a TSP monitor adjacent to the property boundary at 914 Kaipaki Road and the incorporation of alert and trigger levels and associated actions. The Applicant considers that, with their agreement to include TSP monitoring, any need to restrict operations on the basis of wind speed / direction and increased setbacks is not needed.
- To allay concerns about potential land stability issues near the gully edge, the Applicant now proposes to engage a suitably qualified and experienced civil engineer to design the

sand quarry working face running adjacent to the Mangawhero steam gully (Condition 23). This will appropriately address any potential land stability risk. Working within 20m of the gully will not occur until a design is certified. In this regard, the following preliminary advice has already been provided to the Applicant by Sam Linder (BE Civil (hons));

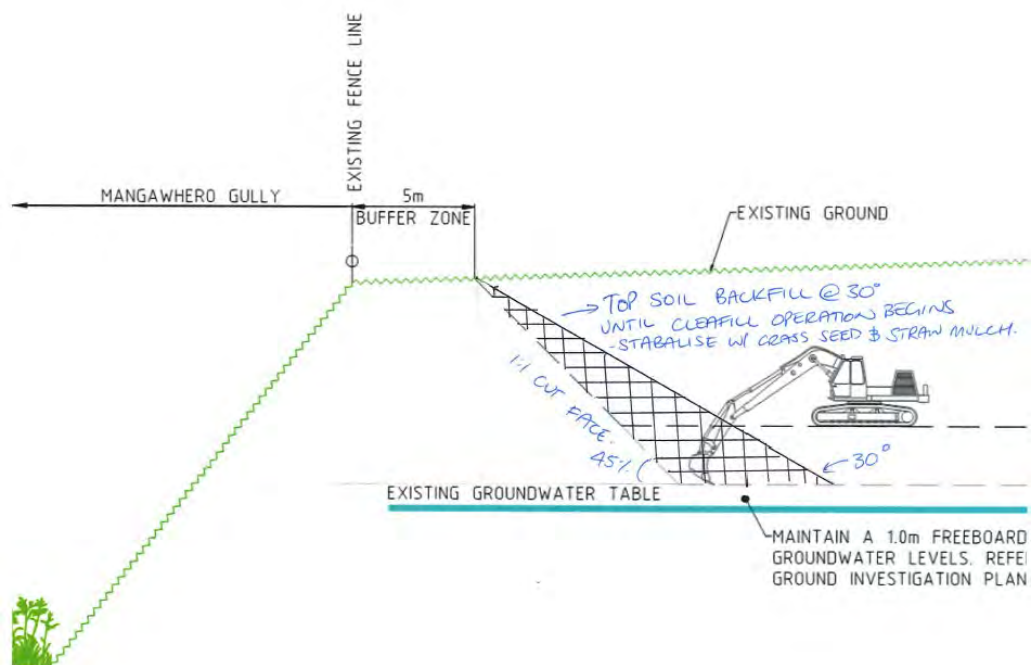
Angle of Repose for a material is the steepest angle a loose material will be stable at. For dry sand, this sits between 30 degrees and 45 degrees, depending on grain size, silt content etc. We could do a simple test to determine exact angle of your site if required.

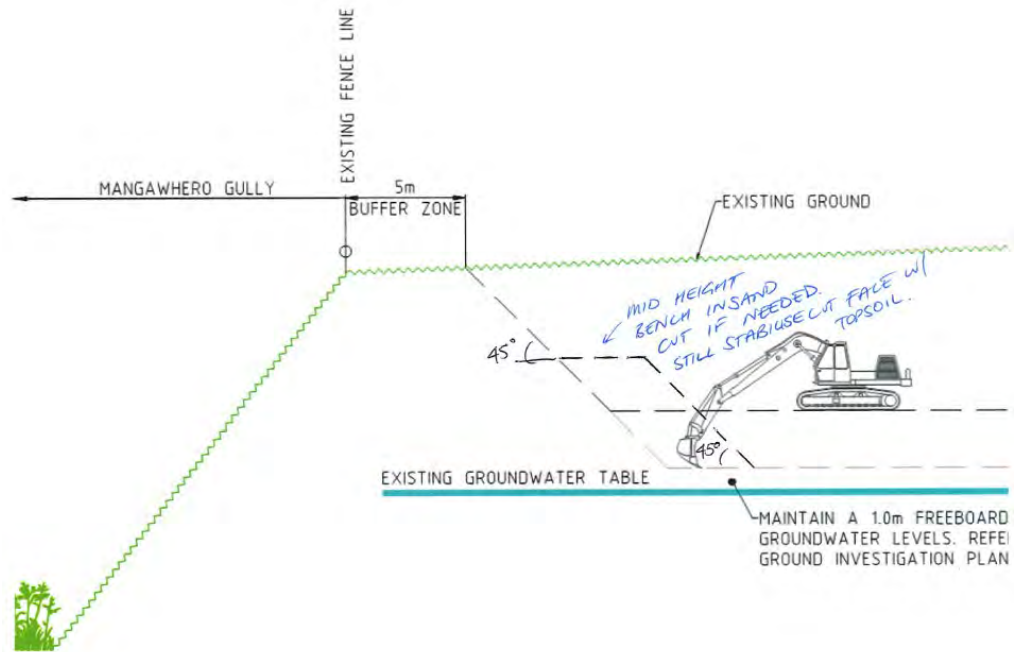
Therefore the excavated embankment will be stable at angle of 45 degrees. Suggestion is to then backfill straight away with stripped topsoil to a angle of 30 degrees, and stabilise with grass seed and straw mulch to avoid any erosion/wash out due to rain until complete clean fill operation is underway. This will be able to be done progressively as the cut operation is underway.

If needed, worse case situation for cut volumes, but to increase stability, would be to add a mid-height bench in the cut. Suggestion is 5mtr wide.

The 20mtr set back would do little to increase any slop stability, as it is all to do with the actual angle. Their concern may be if the embankment falls away/slips then the 20mtr buffer will give it room to do this without affect the Gully side, but if the cut is managed properly, it shouldn't be an issue. If the sand is cut while high moisture content, and left open to dry for too long, you may get some instability then, hence the comment of progressively filling against it with top soil as you open.

See attached plans for how you could manage.





- Additional conditions have been added in line with tangata whenua report regarding gifting of any artefacts uncovered and having representative present to monitor excavation of borrow pits (Conditions 31 and 32) (Note: these all likely to be conditions of separate Heritage Authorisation in any event).

Suggested WDC Conditions

To the extent they are relevant to the WDC consent application, any revised conditions contained in Attachment 3 of this letter are also proffered as part of the District Council land use consent application (e.g. the revised SMP condition).

If you would like to discuss any of the matters set out above, please feel free to contact me.

Yours sincerely,

Mason Jackson
Mitchell Daysh Ltd

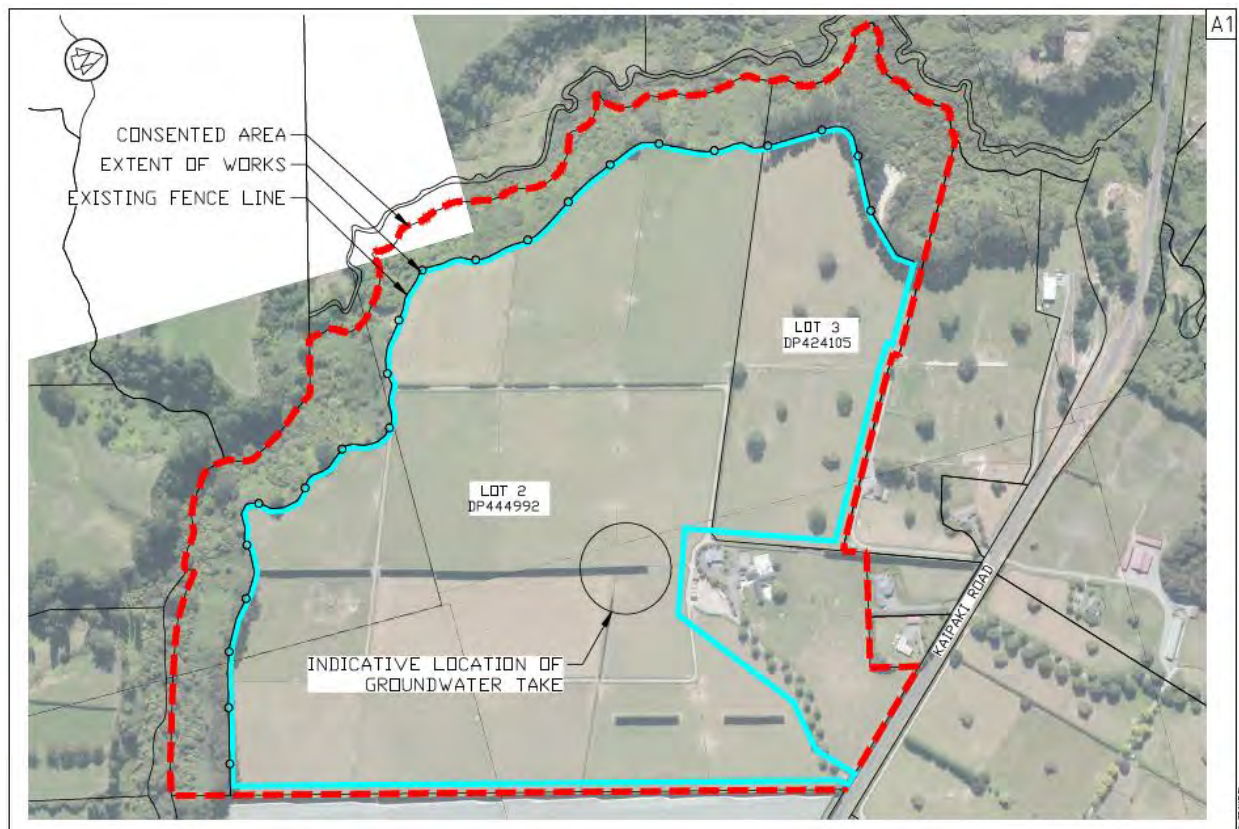
Email address: mason.jackson@mitchelldaysh.co.nz

Attachment 1: Copy of Tangata Whenua Statement and Engagement Report

TAANGATA WHENUA STATEMENT AND ENGAGEMENT REPORT

KAIPAKI ROAD SAND QUARRY AND CLEANFILL OPERATION

for Mitchell Daysh Limited



1 September 2020

Te Huia Natural Resources Limited
15 Blomfield Street
Hamilton

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Disclaimer: This information was created for the specific purpose of providing a Taangata Whenua Statement and Engagement Report for the Kaipaki Sand Quarry and Cleanfill proposal. This information cannot be used for any other purpose without the express permission of Ngaati Korokii-Kahukura and Ngaati Hauaa, and in no way substitutes the need for future engagement with taangata whenua.

EXECUTIVE SUMMARY

Shaw's Property Holdings Limited has an application with the Waipa District Council and Waikato Regional Council for resource consents to establish and operate a mineral extraction activity (sand quarry and clean filling operation) on their property at 928 Kaipaki Road, Cambridge.

The applicant proposes to extract approximately 900,000 cubic metres of sand over the next 7-10 years, with a proposed maximum extraction of 200,000 cubic metres per year. The applicant proposes to infill the extracted area with cleanfill and ultimately rehabilitated to restore its landscape.

Te Huia Natural Resources Limited, on behalf of Mitchell Daysh Ltd (Lead Contractor), has engaged with taangata whenua to develop this Taangata Whenua Statement and Engagement Report. There are three iwi who have confirmed rights and interests within the application area. Following the 1995 Waikato Raupatu Claims Settlement Act, a tribal authority on behalf of Waikato-Tainui was established, now recognised as Te Whakakitenga o Waikato-Tainui. However, the mana (occupational and historical authority) is implicitly held by Ngaati Korokii-Kahukura Trust and Ngaati Hauaa Iwi Settlement Trust.

This Taangata Whenua Statement and Engagement Report (Taangata Whenua Report) was developed to inform the applicant and decision makers under the Resource Management Act 1991 and the Heritage New Zealand Pouhere Taonga Act 2014, capturing the following:

- The interests of Taangata whenua in the consent application area;
- Significant cultural, economic, social and environmental matters that support iwi considerations for the resource consent application;
- Engagement report with Taangata whenua;
- Recommendations and conditions to restore and protect the impacts of the consented activities and associated water bodies;
- Overall decision to support or decline the application from Taangata whenua.

Te Whakakitenga o Waikato-Tainui **endorses** the recommendations and position of Ngaati Korokii-Kahukura and Ngaati Hauaa Iwi Trust, as taangata whenua of the area where the proposed activities are situated.

Ngaati Korokii-Kahukura **supports** the application for resource consents based on the acceptance of conditions and recommendations by the applicant.

Ngaati Hauaa Iwi Trust **supports** the application for resource consents based on the acceptance of conditions and recommendations by the applicant.

PROJECT BACKGROUND

Kaipaki Road Sand Quarry and Cleanfill Operation

Shaw's Property Holdings Limited (the Applicant) is applying to the Waipa District Council and Waikato Regional Council for resource consents to establish and operate a mineral extraction activity (sand quarry and clean fill operation) on their property at 928 Kaipaki Road, Cambridge.

The applicant proposes to extract approximately 900,000m³ of sand over the next 7-10 years. The volume extracted may vary dependent on further detailed analysis. The rate at which the sand will be extracted may also vary, and will be dependent on a number of factors, including weather conditions and market demand. However, a maximum extraction of 200,000m³ per year is proposed.

Cleanfill will be imported to the site and utilised as part of the rehabilitation works following sand extraction.

The boundaries of the proposed sand quarry and clean fill operation (i.e. the 'consented area') generally align with the external site boundaries of the two titles. However, the actual operational area (i.e. the 'extent of works') will be slightly smaller, so that the activities proposed are appropriately set back from the external site boundaries and the adjacent SNA areas to afford adequate separation from the adjacent gully area and stream in the SNA and the nearest dwellings.

The application proposes to undertake the mineral extraction activities as a series of stages, and to concurrently rehabilitate the site back to rural pasture.

TAANGATA WHENUA STATEMENT AND ENGAGEMENT REPORT

Te Huia Ltd has developed this Taangata Whenua Statement and Engagement Report (Taangata Whenua Report) to support documentation to the Waipa District Council, Waikato Regional Council and Heritage New Zealand Pouhere Taonga. The Taangata Whenua Report does not cover a wide scope of matters that decision making authorities would expect in a Cultural Values Assessment (CVA). The decision to do a Taangata Whenua Report, rather than a CVA, reflects the nature of the activity, limited extent of impacts beyond the site and range of parties involved. The Taangata Whenua Report will capture and reflect the following:

- Demonstration of engagement with taangata whenua;
- Reflect issues and opportunities presented by taangata whenua; and
- Present the position of taangata whenua in relation to the activity.

When determining a decision, in consideration of activities associated with the Kaipaki Sand Quarry and Cleanfill Application, the decision makers should 'recognise and provide for' the Taangata Whenua Report. The Taangata Whenua Report should also satisfy the engagement requirements for authorisations to Heritage New Zealand Pouhere Taonga.

TAANGATA WHENUA

Within the Kaipaki area there are three Iwi who have confirmed their rights and interests. Their rights and interests do not need to be proven to the decision making authorities.

Te Whakakitenga o Waikato-Tainui (Waikato-Tainui) is the Iwi Authority on behalf of the 68 Marae and its beneficiaries. Ngaati Korokii-Kahukura and Ngaati Hauaa, on behalf of their beneficiaries are taangata whenua and hold mana (power and authority derived from whakapapa, continued occupation and use) for this area.

Taangata whenua, in simple terms, are naturally the people of the lands. Taangata whenua have a historic and spiritual affiliation to the lands, waters and all the taonga that they embrace. Ngaati Korokii-Kahukura and Ngaati Hauaa iwi continue to occupy and acknowledge their affiliation and interests to the Kaipaki and Pukerimu area. Ngaati Korokii-Kahukura and Ngaati Hauaa are also established Iwi authorities, who are representative of their hapuu and whaanau in matters related to local and central Government, fisheries, aquaculture, farming, education, environmental, social and other affairs. Both Iwi hold political and occupational authority over this space that was determined by whakapapa (genealogical ties) and secured by ahi kaa (continued occupation).

Each of the iwi have a responsibility to protect the natural resources, mahinga kai, and other values of the rohe for the benefit and use of those tribal members of Ngaati Korokii-Kahukura and Ngaati Hauaa descent. Consensus support of this Statement is required by all three Iwi. The following statements reflect the rights and interests of Ngaati Korokii-Kahukura and Ngaati Hauaa.

Ngaati Korokii-Kahukura

Ko Maungatautari too maatou maunga	Our mountain is Maungatautari
Ko Waikato too maatou awa tuupuna	Our ancestral river is Waikato
Ko Ngaati Korokii-Kahukura maatou	We are Ngaati Korokii Kahukura
Ko Maungatautari, ko Poohara oou maatou marae	Our marae are Maungatautari and Poohara

Ngaati Korokii descends from the high chief Korokii, a descendant, 16 generations removed from Hoturoa, captain of the Tainui canoe. Ngaati Kahukura descends from the high chieftainess Kahukura, also a descendant 16 generations removed from Hoturoa. Joined together through common ancestry and lineage their descendants are Ngaati Korokii-Kahukura (Ngaati Korokii-Kahukura, 2017).

The ancestral tribal rohe of Ngaati Korokii-Kahukura spans from Southern Hamilton City, following the Waikato River to the northern end of Lake Arapuni, inland to western Te Awamutu and through again to southern Hamilton City encompassing Mount Maungatautari and many kaainga settlements. Korokii along with his allies conquered the Ngaati Kauwhata and Raukawa under Taowhakairo taking control of the Maungatautari region and the stretch of the Waikato River from Arapuni northward to Te Parapara.

Maungatautari is the tuupuna maunga and living taonga to the people of Ngaati Korokii-Kahukura. His forests offered shelter to the people in hard times and provided foods such as birdlife and native flora and fauna. Maungatautari is a symbol of mana for Ngaati Korokii-Kahukura. The Waikato River is the

tuupuna awa and also a living taonga to Ngaati Korokii-Kahukura. The waters of Waikato had traditional healing powers; yielded aquatic foods such as fish and tuna and the Arapuni region was coined 'te rohe o te tuna – the region of the plentiful eels'. The Waikato River was the principle highway of trade and transport taking Ngaati Korokii-Kahukura wheat, flax and potatoes as far as Auckland to be exported to Sydney and the Americas (Ngaati Korokii-Kahukura, 2017).

Ngaati Korokii-Kahukura has several hapuu: Ngaati Waihoru, Ngaati Ueroa, Ngaati Huakatoa, Ngaati Houruamua, Ngaati Werewere and Ngaati Poorangi. All of these hapuu lived around the base of Maungatautari and alongside various areas around the Waikato River. Ngaati Korokii-Kahukura exercised tikanga to manage, defend and develop their tribal area for the benefit of all its members.

Ngaati Hauaa

Hauaa is the eponymous ancestor of Ngaati Hauaa. His father Koroki married Tumataura and had two sons, Hape through whom Ngaati Koroki descend; and Hauaa from whom Ngaati Hauaa descends. Whilst Ngaati Koroki remained in the Maungatautari area, Ngaati Hauaa encompassed the lands and waters within the east and north of Maungatautari, in particular Tamahere, Tauwhare, parts of Hamilton City, Morrinsville up to Te Aroha across the kaimai ranges into Matamata and Hinuera.

The historical description of the Ngaati Hauaa area of interest can generally be associated with the location of maunga. These maunga are Taupiri, Maungatautari and Te Aroha. The following tauparapara acknowledges their maunga and other Iwi and Hapuu who straddle the boundaries of Ngaati Hauaa. Namely Ngaati Hinerangi, Ngaati Paoa, Ngaati Mahuta, Ngaati Wairere, Ngaati Raukawa, Tamatera and Ngaati Koroki. It is generally accepted that Ngaati Hauaa occupies the space in between the maunga.

Ngaati Hauaa Kaumatua Eru Kaukau describes the historical geography of Ngaati Hauaa in the following tauparapara:

Titiro mai nga kohatu o Ngaati Hauaa

Mai Te Aroha Maunga mai i te raki, tera Tamatera nga kaitiaki

Titiro ki te rawhiti, Ngaati Maru tera

Tona korero mai Te Aroha ki Katikati ki Ngaa Kuri a Whareki tikirau

Te hauauru mai Te Aroha ki Taupiri, tena a Ngaati Paoa me Wairere

Titiro mai ki te tonga Te Aroha ki Wairere, tena a Ngaati Hauaa e mihi mai nei

Titiro ki Wairere ki Maungatautari

Ka huri ahau ki te patetere ki Raukawa ki te Ihingarangi ki Ngaati Koroki nga kaitiaki tena o tena maunga

Engari, titiro ki Maungatautari ki te raki ki Taupiri e ngunguru e mihi mai nei

Ngaati Hauaa i waenganui ko tona korero he piko, he taniwha te maunga o nga Kiingi

Ka hoki mai i nga korero o Tawhiao

"Waihotia te kaumarua moku te kaua mohi ko hau ki roto

Ko te Atua toku piringa ka puta ka ora

Nga korero o Rawiri noku roimata hei kai moku i te ao i te po it te ao i te po.

Ko wai tou Atua"

Look to the mountain rocks from te Aroha to the north.
 I see the hapu of Tamatera taangata whenua, taangata kaitiaki.
 Look to the beginning of the sun to the east, Ngaati Maru, Ngaati Pukenga from Te Aroha to Katikati as taangata whenua and kaitiaki, from the howling dogs of Te Arawa.
 Te Arawa to the outskirts of Mataatua we humbly beseech thee.
 Look from the west, from Te Aroha to Taupiri, Ngaati Paoa, Ngaati Wairere.
 Look to the south Te Aroha ki Wairere. Ngaati Hauaa we greet you within.
 Look to the western side from Wairere to Maungatautari amongst our neighbours Te Arawa., Mataatua, Ngaati Raukawa Te Ihingarangi o Ngaati Koroki.

"We come back to the passing thoughts of Tawhiao.
 Leave me the twelve prophecies. The Ten Commandments, eleven with me in it, there will be only one God for me and my people.
 I turn to Psalm 42.3 *My tears are my food day and night, while all day long they ask me, where now is your God.*"

ENGAGEMENT RECORD

Te Huia Ltd engaged with the taangata whenua and Iwi Authority through email, hui and site visits. Phone contact occurred at multiple times during the development of the Taangata Whenua Report.

- 20 March 2020: Te Huia Ltd is engaged to undertake cultural engagement with taangata whenua.
- 21 April 2020: Initial contact made with taangata whenua via email.
- 18 May 2020: Te Huia Ltd site visit.
- 27 May 2020: Zoom meeting regarding multiple works led by Mitchell Daysh, including the Kaipaki Sand Quarry project.
- 4 July 2020: Contact (via email) was made with Ngaati Hauaa Mahi Trust to develop a restoration programme, as requested by the applicant.
- 22 July 2020: A site visit was held with representatives from Ngaati Korokii-Kahukura.
- 3 August 2020: Draft Taangata Whenua Report sent to taangata whenua representatives for amendment and approval.
- Site Visit undertaken by Ngaati Hauaa Iwi Trust representative, Norman Hill.

MATTERS OF SIGNIFICANCE

The following matters were noted in considering the application and undertaking a site visit:

1. There are five recorded archaeological sites (food pits) S15/ 285, S15/546, S15/547, S15/631 and S15/715 within the project area. The Archaeological Assessment undertaken by Clough and Associates Ltd states that these sites cannot be avoided and will therefore require an authorisation to destroy or modify the site. There is no doubt that the area was historically used by Maaori in pre-european times, however these sites are not regarded as significant sites. Taangata whenua are supportive of the sites being extinguished, however protocols must be in place to ensure tikanga practices are provided for, and to preserve any newly discovered taonga or artefacts. Upon discovery, traditional ownership of the taonga/artefact will be gifted to Ngaati Korokii-Kahukura and Ngaati Hauaa (see Appendix 1: Letter from Te Manatuu Taonga);
2. The extraction activities are adjacent to the Mangawhero Stream. The Mangawhero Stream flows to the Waikato River. It is imperative that there are no impacts on the Mangawhero Stream. And that the applicant determine improvements to the Mangawhero Stream, or edges adjacent to the property, as a koha (gift) to the stream and Waikato River;
3. Much of the activities and its impacts look to be managed on site. There are no areas of culturally ecological significance on site as the land has been highly modified for a long period of time. However, there is an opportunity for taangata whenua to be involved in the rehabilitation of the site in the future;
4. Water will be taken from an underground spring and will have minimal impact on the Mangawhero Stream;
5. Cleanfill is still to be determined but will be managed under policies and rules in the Waikato Regional Plan, which must not be inconsistent with the Vision and Strategy for the Waikato River.

ASSESSMENT OF THE APPLICATION AND RECOMMENDATIONS

To support an assessment of the proposed activities to excavate sand and replace the excavated space with cleanfill, Te Huia Ltd assessed the activities against the matters outlined above, and against the following documents:

- **Te Ture Whaimana o te Awa o Waikato – the Vision and Strategy for the Waikato River**
Te Ture Whaimana o te Awa o Waikato is the primary direction setting document for the Waikato River and all it embraces. Section 9(2) of the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 (the Settlement Act) states that:
*“The vision and strategy applies to the Waikato River and **activities** within its catchment affecting the Waikato River.” [emphasis added]*
- **Tai Tumu, Tai Pari, Tai Ao – the Waikato-Tainui Environmental Plan**
Section 40(2) of the Settlement Act also notes the following with regard to the Waikato-Tainui Environmental Plan:

“A consent authority considering an application for a resource consent under section 104 of the Resource Management Act 1991 must have regard to the Waikato-Tainui environmental plan, if it considers that section 104(1)(c) applies to the plan.”

Given the proximity of the proposed activities, an assessment against these two unique documents is appropriate.

Te Ture Whaimana o te Awa o Waikato – Vision and Strategy

Te Huia Ltd provides the following comments and proposed recommendations (bullet pointed) in relation to the activities, to achieve the objectives of the Vision and Strategy:

Objectives of Te Ture Whaimana	Comments/Recommendations
(a) The restoration and protection of the health and well being of the Waikato River.	<p>Te Ture Whaimana must be given effect to. The applicant has considered opportunities to further the Vision and Strategy for the Waikato River.</p> <ul style="list-style-type: none"> Te Ture Whaimana is paramount when considering the overall impact of the proposed sand quarry and cleanfill operation.
(b) The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural, and spiritual relationships.	<p>Both Ngaati Korokii-Kahukura and Ngaati Hauaa continue to practice their relationships with the Waikato River and its resources.</p> <ul style="list-style-type: none"> Taangata whenua should be engaged in all conditions noted in this table to provide for the restoration and protection of their relationship with the Waikato River.
(c) The restoration and protection of the relationship of Waikato River iwi according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural, and spiritual relationships.	As above.
(d) The restoration and protection of the relationship of the Waikato region's communities with the Waikato River including their economic, social, cultural and spiritual relationships.	
(e) The integrated, holistic and coordinated approach to management of the natural, physical, cultural and historic resources of the Waikato River.	<p>Understanding the history and significance of the area can better improve work practices and care onsite.</p> <ul style="list-style-type: none"> Taangata whenua to lead cultural induction and cultural safety training to onsite staff. This will improve awareness of the area and its cultural importance to the Iwi.
(f) The adoption of a precautionary approach towards decision that may result in significant adverse effects on the Waikato river, and in particular those effects that threaten serious or irreversible damage to the Waikato River.	<p>Although the proposed activities are unlikely to result in significant adverse effects, the applicant has demonstrated a desire to minimise any future impacts of the activities. Taangata whenua are supportive of the following actions:</p> <ul style="list-style-type: none"> That excavation of sand occurs atleast 5-metres back from the fenceline; That groundwater is only taken for purposes related to the activity;

	<ul style="list-style-type: none"> • That restorative planting around the boundary edges of the property occur as soon as resource consents are granted, to improve stability in surrounding soils and minimise impacts in the Mangawhero gully.
(g) The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments on the health and wellbeing of the Waikato River.	As above.
(h) The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.	<ul style="list-style-type: none"> • All works and their impacts should be managed onsite to not contribute to further degradation to the Mangawhero Stream leading to the Waikato River.
(i) The protection and enhancement of significant sites, fisheries, flora and fauna.	<p>This objective provides an opportunities for resource users to contribute to the improvement of significant sites, fisheries, flora and fauna.</p> <p>The applicant has sought the advice of Ngaati Hauaa Mahi Trust to develop a restoration programme for the gully area adjacent to the property.</p> <p>Also, protocols shall be in place to ensure tikanga is upheld when excavating around the recorded archaeological sites.</p> <p>At the completion of excavation, the site will be returned to a designed state, reflective of its surrounding environment.</p> <ul style="list-style-type: none"> • Ngaati Hauaa Mahi Trust are confirmed to undertake restorative works (planting) around the property boundaries and adjacent to the Mangawhero Stream; • Kaitiaki shall be onsite during excavation of topsoil for around the recorded archaeological sites; • Ngaati Korokii-Kahukura and Ngaati Hauaa are traditional custodians of any newly discovered taonga or artefacts; • Ngaati Korokii-Kahukura and Ngaati Hauaa will be notified immediately if any koiwi (bones) are discovered onsite; • Ngaati Korokii-Kahukura and Ngaati Hauaa should be included in redesigning the site, once excavation is completed, to reflect the surrounding environment.
(j) The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental and economic wellbeing is subject to the restoration and protection of the health and wellbeing of the Waikato River.	
(k) The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.	
(l) The promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities.	The area is adjacent to the Mangawhero Stream but the stream, at this point, is unlikely to provide for sporting or recreational purposes. However, a relationship has formed with the land owner if taangata whenua may require access to a part of the Mangawhero for cultural reasons.

(m) The application to the above of both maatauranga Maaori and latest scientific methods.	
Analysis: The application is not inconsistent with the Vision and Strategy.	

Tai Tumu, Tai Pari, Tai Ao – Waikato-Tainui Environmental Plan

The following section focusses on the issues and objectives related to this application, in particular section 28 – Mining and Quarrying Oil, Gas and Minerals. Issues noted in the Environmental Plan include:

- 28.2.1 Mining and the effects of mining have contributed to the pollution and deterioration of the health of the environment including the Waikato River, its surrounding environment, and has impacted on the fisheries and plant life of the river.
- 28.2.2 Landscapes may be forever altered, particularly in the case of open cast mining. There is concern that arguably ‘low-impact’ mining may result in unintended or unanticipated long-term effects. For example, if the removal of iron sand or limestone from an area altered the ecosystem characteristics so the ecosystem’s capacity or capability to support certain flora and fauna changed. This could be a positive or negative effect on an ecosystem’s life supporting capacity and capability.
- 28.2.3 Waahi tapu and sites of significance may be intentionally or accidentally altered or destroyed.
- 28.2.4 Mining activity is often relatively long life and mine operators have an ongoing part to play in mitigating the effects of their operations. It is not sufficient to wait until consents expire; there needs to be an ongoing effort to investigate ways to minimise the adverse affects of mining.

Te Huia Ltd provides the following comments and proposed recommendations (bullet pointed) in relation to the activities, to ensure they have regard to the policies of the Waikato-Tainui Environmental Plan.

Tai Tumu, Tai Pari, Tai Ao	Comments/Recommendations
<p>28.3.1 – In partnership with Waikato-Tainui existing and new mining activities effectively manage adverse social, cultural, spiritual, environmental and economic effects.</p> <p>Methods:</p> <p>(a) Generally, there is a precautionary approach to mining, particularly when the mining activity or methodology is new to the Waikato-Tainui rohe.</p> <p>(b) Mining activities are developed or operated in a manner consistent with this Plan, particularly the sections that are relevant to the proposed or existing mining activity.</p> <p>(c) Mining activities occur using the best practicable option to manage adverse effects.</p>	<p>This objective is covered in the Vision and Strategy assessment, in particular Objectives (a) and (b).</p> <p>The precautionary approach is considered in the Vision and Strategy assessment under Objective (f).</p> <p>This assessment, and recommendations included in the Vision and Strategy Assessment will ensure consistency.</p> <p>The Waikato Regional Plan will cover best practicable options.</p>

(d) Where any environmental effects occur, they are confined to the site of the mining activity. (e) Transported minerals or mining waste are covered or sealed to prevent transported material escaping into the surrounding environment. (f) Research and innovation that promotes lowered reliance upon mined materials is supported. (g) Reuse and recycling of mined materials (e.g. copper, gold etc) is supported.	It is my assessment that the activities will be confined to the site. <ul style="list-style-type: none"> • A condition to the resource consent should include sealed or covered material when being transferred from the site. • Where possible, materials should be recycled.
Analysis: The application seems to give regard to the Waikato-Tainui Environmental Plan.	

DECISION

Te Whakakitenga o Waikato-Tainui **endorses** the recommendations and position of Ngaati Korokii-Kahukura and Ngaati Hauaa Iwi Trust, as taangata whenua of the area where the proposed activities are situated.

Ngaati Korokii-Kahukura **supports** the application for resource consents based on the acceptance of conditions and recommendations by the applicant.

Ngaati Hauaa Iwi Trust **supports** the application for resource consents based on the acceptance of conditions and recommendations by the applicant.

If you have questions on this Taangata Whenua Statement and Engagement Report, please contact Julian Williams.

Hei konaa, me ngaa mihi



Julian Williams & Terina Rakena
Executive Directors, Te Huia Natural Resources Limited
julian@te-huia.co.nz
021 379 310

CONFIRMATION FROM IWI

Endorsement from Waikato-Tainui – Project Advisor

RE: Draft Report - Kaipaki Sand Quarry



Wikitoria Tane <wikitoria.tane@tainui.co.nz>
To: julian@te-huia.co.nz



3/08/2020

You replied to this message on 3/08/2020 11:12 AM.

Kia ora Julian,

Are you happy to accept endorsement of the Statement and Engagement Report via this email?

If so, based on the contents of the Statement of Engagement W-T are happy to endorse the positions of Ngāti Korokii Kahukura and Ngāti Hauā.

Ngā mihi

Wikitoria

WAIKATO TAINUI
Wikitoria Tane | Project Advisor / Taiao
Mobile: +64 27 712 1322 | Tel:
Email: wikitoria.tane@tainui.co.nz | Web: www.waikatotainui.com
Address: PO Box 648, 2 Bryce Street, Hamilton 3204



Support from Ngaati Korokii-Kahukura – Poto Davies

RE: Draft Report - Kaipaki Sand Quarry



Poto Davies <poto@puawai.com>
To: julian@te-huia.co.nz; 'Norm Hill - Strategic Relationships Manager'



14/08/2020

Ki ora Jules

Thank you for this and reflecting accurately our interest in this area.

I support as is so only need to delete the 2x 'opposes' statements

Tiaki pai koorua me te whanau whaanui ...

Sent from [Mail](#) for Windows 10

Support from Ngaati Hauaa Iwi Trust – Norm Hill

8 September - Verbally provided support of the report via phone call, after a site visit. Noting that Ngaati Hauaa would like to maintain communications and updates about the project development.

19 September 2011

Tukoroirangi Morgan
Chairman, Te Arataura
Waikato-Tainui Te Kauhanganui Incorporated
Private Bag 542
HOPUHOPU, 3742

Tēnā koe e te Rangatira, Tukoroirangi Morgan,

**WAIKATO-TAINUI INTERIM CUSTODIANSHIP OF NEWLY-FOUND
TAONGA TŪTURU**

Waikato-Tainui Te Kauhanganui Incorporated ("Waikato-Tainui") has asked that I formally record the arrangements agreed with my Ministry. I understand you may show this letter to relevant third parties.

By way of background, the Minister for Arts, Culture and Heritage and myself signed an Accord with Waikato-Tainui, relating to taonga tūturu under the Protected Objects Act 1975 ("the Act"), and other matters, on 20 February 2009 ("the Accord").

Pursuant to the Accord, I, as the Chief Executive of Manatū Taonga/Ministry for Culture and Heritage, have now agreed that where appropriate, Waikato-Tainui will have interim custodianship of newly-found taonga tūturu under the Act. This interim custody applies to newly-found taonga tūturu found in the Accord Area (defined in section 4 of the Taonga Tuku Iho Accord) found on or after the date of this letter. If you would like a further copy of the map showing the Accord Area, please contact Liz Cotton (Senior Adviser, Heritage Operations) at the contact details provided below.

Waikato-Tainui will be required to notify me where newly found taonga tūturu are provided to Waikato-Tainui. The normal processes for notifying newly found taonga tūturu through a Notification of Finding of Taonga Tūturu form still apply to taonga tūturu provided to Waikato Tainui for interim custody.

My staff are working through processes with Waikato-Tainui to ensure all taonga tūturu received by Waikato-Tainui will be cared for and registered appropriately. In accordance with the Act I retain the discretion to transfer taonga tūturu to alternative custody if I consider it appropriate (for example, where conservation treatment is required). Waikato-Tainui will have custody of the taonga tūturu until ownership is determined in accordance with sections 11 and 12 of the Act. Waikato-Tainui is a registered collector of taonga tūturu in terms of section 14 of the Act.

Attachment 2: Copy of Wallbridge Gilbert Aztec (WGA) Groundwater Effects Assessment Report

WGA

WALLBRIDGE GILBERT
AZTEC

Shaw's Sand Quarry

**928 Kaipaki Road,
Cambridge**

**ASSESSMENT OF EFFECTS –
GROUNDWATER ABSTRACTION**

Project No. 201103

Doc No: WGA201103-RP-HY-0001

Rev. B

14 September 2020



Revision History

Rev	Date	Issue	Originator	Checker	Approver
A	2/9/2020	DRAFT to Mitchell Daysch	C. Houlbrooke	B.Sinclair	C. Houlbrooke
B	14/9/2020	Final	C. Houlbrooke	M.Jackson	C. Houlbrooke

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Appendices

Appendix A Pumping Test Analysis Outputs

Appendix B Water quality Results

1 INTRODUCTION

1.1 BACKGROUND

Wallbridge Gilbert Aztec (WGA) has been retained by Shaw's Sand Quarry to evaluate the effects of abstracting groundwater from a newly drilled bore (consent number AUTH141611.03.01, bore number 72_104215) located at 928 Kaipaki Road, Cambridge (Figure 1). The water is proposed to be used for truck wheel wash and dust suppression purposes in a proposed sand quarry and clean fill operation. The purpose of this report is to support the application for a resource consent to take water from the bore.

1.2 WATER REQUIREMENTS AND USE

Abstracted water is to be used for dust suppression and truck wheel wash purposes in the proposed sand quarry. Shaw's Quarry is seeking to abstract groundwater at the following rates:

- Instantaneous maximum flow of 4.5 L/s.
- Maximum daily abstraction of up to 205 m³/day.
- Maximum annual abstraction of up to 45,100 m³ (based on 220 days per year usage).

Shaw's Quarry is planning to install approximately 30 m³ of on-site storage. The bore is expected to be pumping as required during a full year with more demand over the summer months for dust suppression.

In order to assess a suitable number of days for dust suppression WGA carried out an assessment on the number of rainfall days with more than 3 mm rainfall.

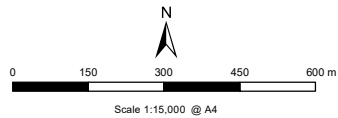
This is based on an assumption that a day with more than 3 mm rainfall would not require dust suppression. WGA acknowledges that, on any day, other factors such as wind strength and temperature will also control the requirement for dust suppression. In addition to our simplified modelling, the cumulative rainfall will also affect the dust suppression requirements (i.e. soil moisture levels will be high following periods of sustained rainfall). Rainfall data from Hamilton Airport¹ were used in the assessment. Based on this assessment 220 days appears to be a reasonable number of days to cover between 80% to 90% of days in a year. This recognises that the quarry will generally operate up to six days per week (86% of days in a year) and cumulative rainfall will reduce the need for dust suppression requirements in the wetter winter months.

¹ Cliflo data from NIWA for Hamilton AWS, agent number 2112, <https://cliflo.niwa.co.nz/>.



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Document Path: V:\2020\201103 - Shaws Sand Quarry GWD\Design\Sketchel GIS\WG201103_A_GIS_Production Bore.mxd



Coordinate System: NZGD 2000 New Zealand Transverse Mercator

Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Any relevance placed on such information shall be at the risk of the user.

Note: The information shown on this map is a copyright of WGA 2020

LEGEND

- Production Bore - Schick Bore
- Observation Bore -70_663
- Unknown
- 0 - 25
- Production Bore Buffer (1km)
- Roads
- River/Stream

Nearby Bore (Depth (m))



Figure 1

Schick Bore Pumping Test Analysis
Bore Locations Surrounding Production Bore

Table 1: Number of days with more than 3mm rainfall (Hamilton Airport).

Month/Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	7	3	6	5	4	2	4	6	10	6	6	6	6	5	6	6	1	4	6	6	7	1	5	3	4	6	9	2
February	2	4	4	7	6	5	5	1	2	7	2	4	15	4	3	2	4	8	4	2	7	2	1	5	6	6	10	1
March	6	7	5	5	6	10	7	4	4	3	4	7	2	6	8	6	2	3	1	8	6	3	0	7	3	11	4	3
April	4	6	9	9	11	4	7	6	8	2	8	3	4	3	11	2	7	6	3	7	2	11	13	9	4	8	10	6
May	9	7	13	5	10	5	7	6	8	12	7	5	9	12	9	5	5	12	9	10	7	10	8	8	15	9	11	4
June	9	13	10	13	11	7	9	9	10	3	11	4	10	7	10	11	13	7	17	12	9	9	9	6	9	6	10	8
July	10	1	12	21	10	5	13	12	7	7	11	7	11	9	6	11	16	10	6	13	8	4	6	8	15	7	12	8
August	16	9	8	9	13	9	9	10	8	10	6	6	13	8	10	11	16	9	17	5	10	7	8	10	7	12	13	16
September	14	6	11	10	10	8	4	7	10	4	9	14	6	8	2	7	7	8	15	6	8	10	14	12	12	15	6	10
October	7	3	11	8	8	6	11	3	8	7	6	7	13	15	9	9	8	13	6	12	9	7	6	4	12	9	8	8
November	4	8	9	9	8	8	5	14	7	11	10	9	4	6	6	2	5	5	2	4	3	5	9	7	11	5	10	5
December	12	6	2	6	9	6	3	6	8	16	8	12	14	10	7	6	7	6	8	12	10	6	5	2	5	3	12	4
Grand Total	100	73	100	107	106	75	84	84	90	88	88	84	107	93	87	78	91	91	94	97	86	75	84	81	103	97	115	75
Days per year with irrigation or rain	320	293	320	327	326	295	304	304	310	308	308	304	327	313	307	298	311	311	314	317	306	295	304	301	323	317	335	295
% of days during the year with irrigation or rain	88	80	88	90	89	81	83	83	85	84	84	83	90	86	84	82	85	85	86	87	84	81	83	82	88	87	92	81

1.3 WELL CONSTRUCTION

The well construction details for both the production bore and an observation bore monitored during the pumping test documented in this report are summarised in Table 2. The production bore is 75 m deep with a 10 m screen from 65 m below ground level (bgl) to 75 m bgl.

Table 2: Well construction details from bore log.

Parameter	Production Bore Shaws Sand Quarry	Observation Bore Taylor
Bore number	72_104215	70_663
Owner	Shaw's Quarry	Taylor
Address	928 Kaipaki Road	Kaipaki Road
Easting NZTM ⁽¹⁾	1811735	1811678
Northing NZTM ⁽¹⁾	5803008	5803256
Depth (m)	75	42.70
Casing depth (m btoc)	65	41.40
Screened interval length (m)	10	1.3
Static water level (m btoc) ⁽²⁾	35.3	
Diameter of casing (mm)	100	100

Notes: 1) Locations derived by WGA and Profarms from aerial photographs.

2) Data from pumping test recorded by WGA.

1.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

The proposed groundwater take is situated within the Hamilton Basin, a large tectonic basin centred on Hamilton City with an area of approximately 2,000 km² and traversed by the Waikato River. The basin is surrounded by ranges of Mesozoic (Manaia Hill Group) and Tertiary age (Te Kuiti and Waitemata Groups) rocks. The basin is infilled with Tauranga Group alluvial sediments dating from the Pliocene to the middle Holocene, overlain by late Holocene unconsolidated alluvial and colluvial sediments. The Tauranga Group sediments are up to 300 m thick and include gravels, sands, silt, muds and peats of fluvial, lacustrine and distal ignimbritic origin. Basement greywacke underlies the sedimentary deposits at depth (GNS 2005).

The Hinuera Formation of the Tauranga Group underlies much of the Hamilton basin and was deposited by braided river systems of the Waikato River initiated by volcanism in the Taupo Volcanic zone (Petch 1987). The Hinuera Formation contains the aquifers used most extensively across the Hamilton Basin. Within this formations, the most productive aquifers consist of well sorted coarse sands and gravels. These discontinuous sequences of rhyolitic and pumiceous gravelly sands and gravels are interspersed with pumiceous silt, clay and peat. Lithological variability generally results in a number of zones of higher permeability within each of the formations rather than a single, continuous aquifer (Schofield 1972).

Literature values for hydraulic conductivity in the Hamilton Basin range from 0.5 m/day in the silts and peat layers to 13.5 m/day in the coarse gravelly sands. Aquifer transmissivity values derived from pumping tests range from 10 m²/day to 1,000 m²/day but are usually less than 100 m²/day. Storativity values vary from 0.001 for deep, confined or semi-confined aquifers to 0.1 for shallow, unconfined aquifers in the Hamilton Basin (Petch and Marshall 1988). In some areas these discontinuous aquifers may yield up to 30 L/s (Petch 1987).

The piezometric surface in the Hamilton Basin is closely related to surface topography. Piezometric gradients beneath un-dissected areas of the Hinuera Formation surface are low, however they steepen near incised stream channels. Groundwater is recharged from rainfall, predominantly during the winter when soil moisture deficits are satisfied. The shallow groundwater subsequently discharges to the incised streams. Isotropic analyses suggest that the groundwater flux is mainly through shallow aquifers. Groundwater in deeper aquifers within the basin is significantly older, having been dated at up to 6,500 years old (Marshall and Petch 1985).

1.5 LOCAL AQUIFER DEFINITION

The geological description of Shaw's Sand Quarry bore is summarised from the driller's log in Table 3. The lithology shows a highly stratified sequence of aquifer and aquitard materials. The source aquifer is confined or semi-confined beneath low permeability units consisting of mainly silts and peats.

The site is situated in the Waikato River Catchment, as defined by the Waikato Regional Plan. A search of the WRC borehole database indicates bores within one kilometre of the Shaw's Sand Quarry bore (Figure 1) were drilled to depths of less than 30 m and target the upper sandy layer for domestic water use. The closest neighbouring bore (70_663) is 42.7 m deep and 247 m from Shaw's production bore. WGA considers that this bore (70_663) is tapping the aquifer above the aquifer targeted by Shaw's production bore.

Table 3: Geological log for Shaw's Quarry bore.

Depth (m bgl)		Description	Hydrogeological Characteristics
From	To		
0	1	Ash	Soil
1	3	Sand	Aquifer
3	4	Gravel	
4	5	Clay brown	Aquitard
5	7	Sand pumice	Aquifer
7	13	Clay Silts	Aquitard
13	16	Grey Clay	
16	17	White Pumice	
17	18	Golden Pumice	
18	22	Green Clay	
22	29	Green Silts	
29	31	Clay	
31	33	White Clay	
33	35	Golden Clay	
35	36	Golden Sands	Aquifer
36	37	Grey Clay	Aquitard
37	44	White Pumice	
44	46	Peat	
46	63	Green Sand Silt	
63	65	Green Clay	Aquifer (tapped by production bore)
65	74	Dark Gravel	
74	76	Grey Clay	

Note: 1) Geological description from driller's log.

2

PUMPING TEST ANALYSIS

2.1 OBSERVATIONS

The Shaw's Sand Quarry bore was drilled by Ken Garnet in June 2020. Pumping tests were performed on this bore by WGA with pump installations and support from Professional Farm Services Limited (Profarms). A four-hour stepped rate test was conducted 6 August 2020. The bore was pumped at rates of 1.33 L/s, 2.44 L/s, 3.56 L/s and 4.56 L/s for an hour per step with both automated (1 min interval) and manual water level monitoring undertaken. All pressure transducer data has been corrected for barometric changes using an on-site barometer. The water level recovery was monitored manually for 60 minutes following the end of pumping.

A constant rate pumping test was undertaken commencing on 10 August 2020. The bore was pumped at a rate of approximately 15.5 m³/hour (or 4.3 L/s) for 24 hours (1,440 minutes) and monitored using a pressure transducer recording at one-minute intervals in conjunction with frequent manual measurements. Following the cessation of pumping, the water level recovery in the production bore was monitored for a further 1,411 minutes. Water levels in the observation bore (70_663) were intended to be monitored automatically during the pumping test, however no data was obtained. The observation bore is owned by Mr Taylor and located approximately 247 m to the north of the pumping bore. This bore was considered the most appropriate bore for use as an observation bore during the test as it is the closest bore to Shaw's Sand Quarry bore and there are no nearby bores of a similar depth (Figure 1).

2.2 DRAWDOWN AND RECOVERY

2.2.1 Pumping Bore

The static water level was recorded in the production bore at 35.3 m below ground level (bgl) prior to the commencement of the stepped rate pumping test. The results of the step test are summarised in Table 4 and Figure 2.

Table 4: Results of Shaw's Sand Quarry bore stepped rate test.

Step	Pumping rate (L/s)	Water level ⁽¹⁾ (m bgl)	Drawdown ⁽¹⁾ (m)
1	1.33	35.596	0.296
2	2.44	36.083	0.783
3	3.56	36.672	1.372
4	4.56	37.243	1.943
Recovery ⁽²⁾	0	35.412	0.112

Note: 1) Water level and drawdown recorded at end of each 60 minute step.

2) Water level and drawdown recorded at the end of each monitored step (60 minutes).

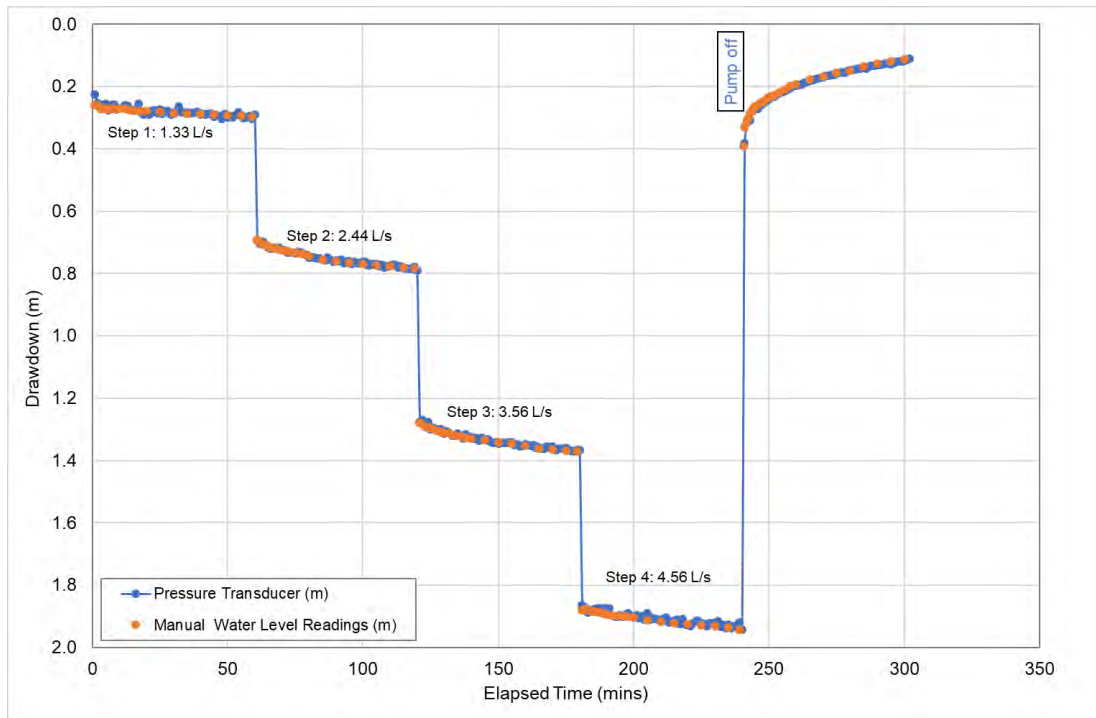


Figure 2: Stepped rate test drawdown and recovery in production bore.

Prior to the commencement of the constant rate pumping test, the static water level was recorded in the production bore at 35.28 m bgl. A water level of 37.22 m bgl was recorded at 1,440 minutes equating to a maximum drawdown of 1.92 m (Figure 3). During the last couple of hours of the test the pump was cutting out periodically for very short periods of time due to power surges. After 523 minutes (less than 9 hours) following the end of pumping the water level in the production bore had fully recovered.

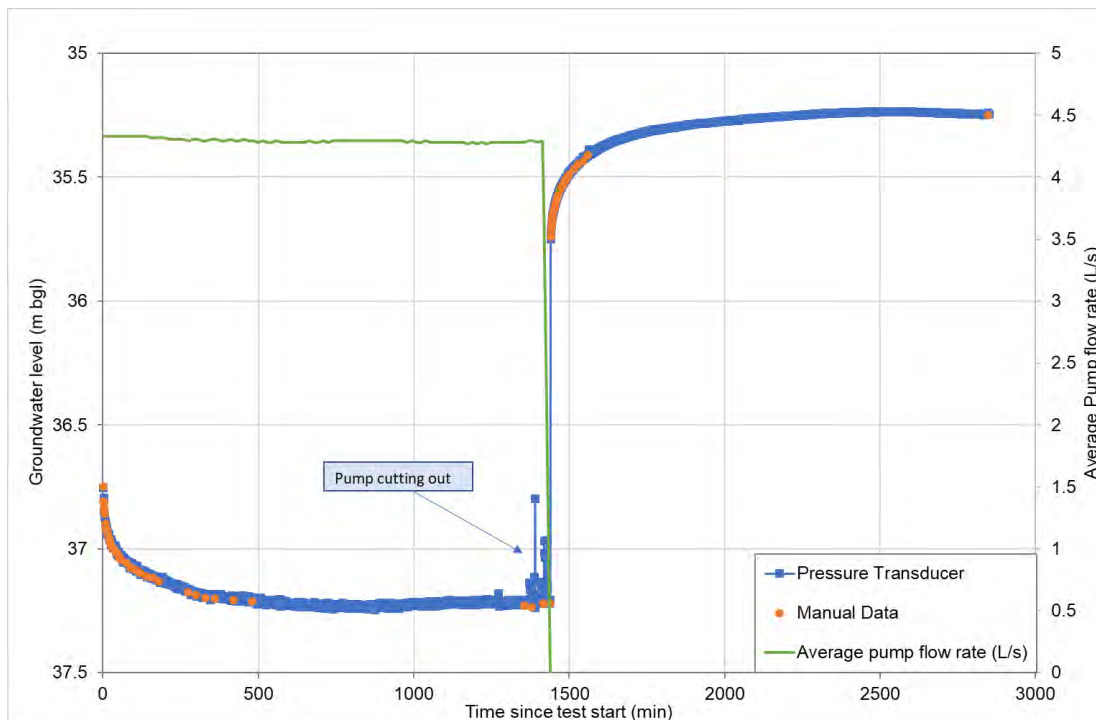


Figure 3: Constant rate pumping test drawdown and recovery in production bore.

2.2.2 Observation Bore

The static water level was recorded by Profarms to be 14.6 m below ground in the observation bore. A pressure transducer was installed in the Observation Bore during the pumping test. However, the record reflects air pressure in the bore rather than a water level trend in the bore (Figure 4). Given the results of the pumping test the expected drawdown in the pumped aquifer at this location following 24 hours pumping was less than 0.08 m and may not have been detected in water level monitoring.

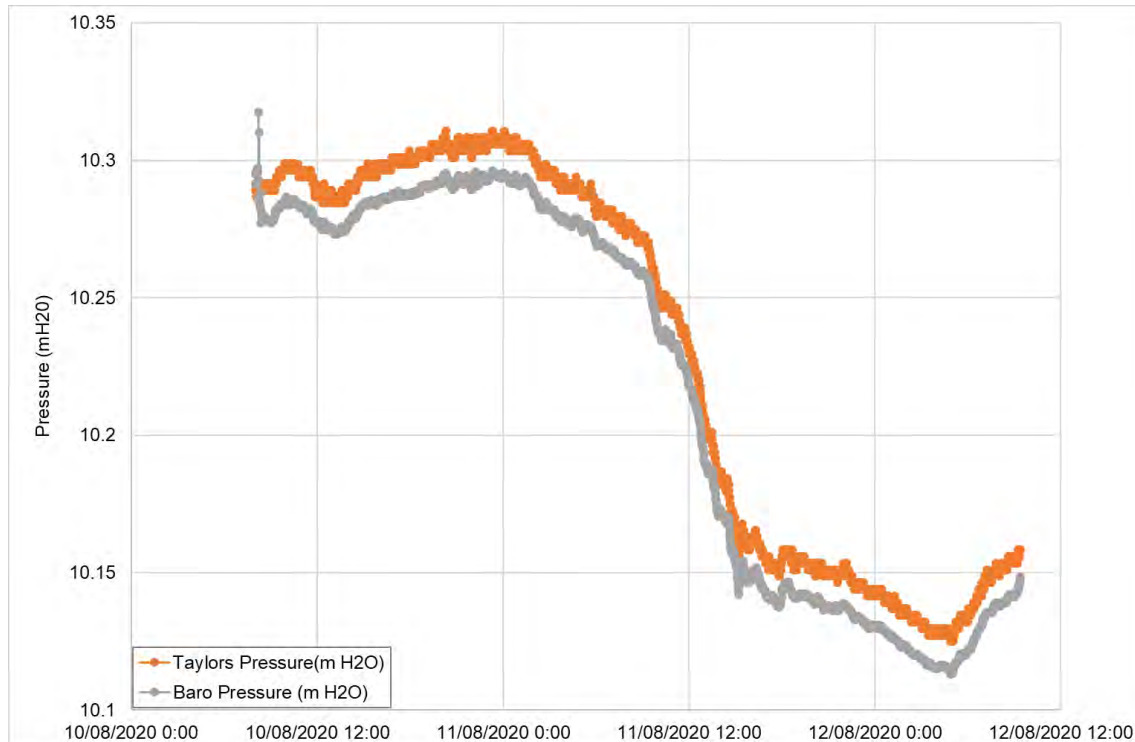


Figure 4: Observed pressure in Observation Bore.

2.3 PUMPING TEST ANALYSIS

2.3.1 Stepped Rate Test

The stepped rate test results were analysed to assess the well efficiency of the Production Bore (Figure 5 and Figure 6). The results showed that at a flow rate of 4.56 L/s the well efficiency is approximately 35%. This is a low efficiency for a new bore and is considered to be due to the small diameter of the bore (100 mm). The small diameter of the well screen means water flow rates through the openings in the screen are relatively high and therefore subject to high frictional losses. These losses increase as the pumping rate increases, leading to corresponding decreases in well efficiency. This low well efficiency does not reflect negatively on the drillers installation and will not limit the capacity of the bore to produce water at the flow rates tested.

The diameter of the bore is restricting the available pumping rate (restricting pump capacity) rather than the aquifer properties and available water column in the bore; i.e. the pumping test resulted in a relatively small drawdown of less than 2 m compared to the available water column in the bore (approximately 30 m).

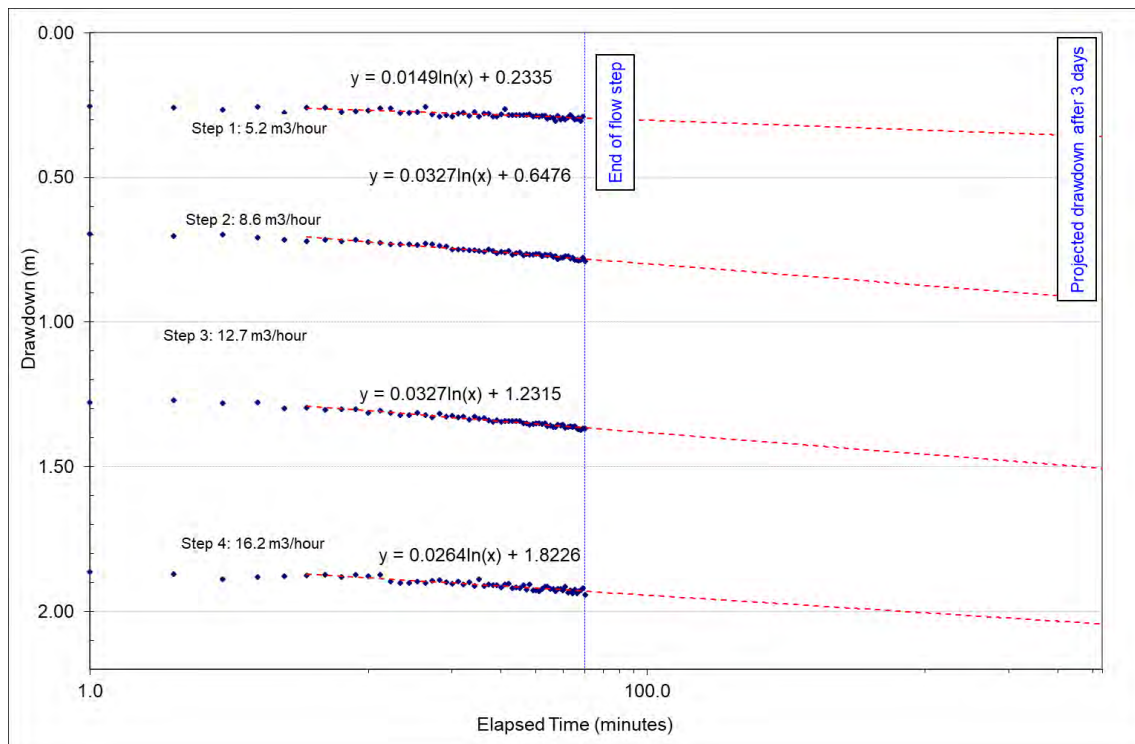


Figure 5: Step test analysis to determine well efficiency

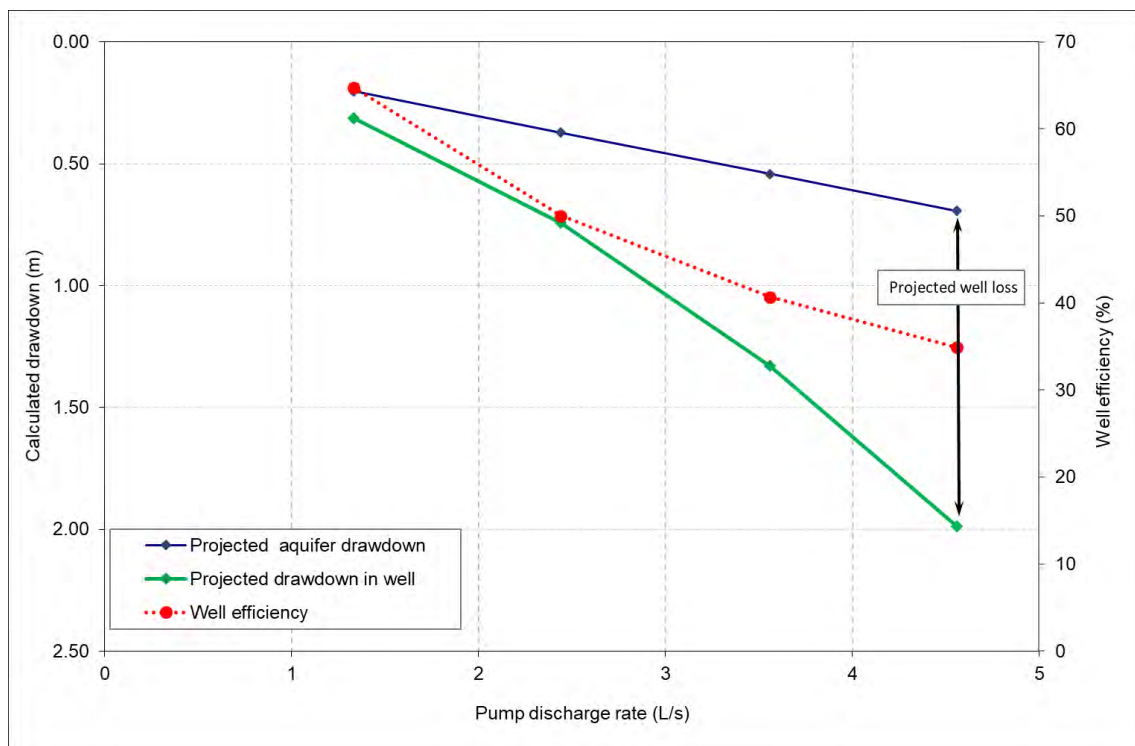


Figure 6: Calculated well loss and well efficiency.

2.3.2 Constant Rate Test

The Cooper-Jacob, Hantush-Jacob and Theis methods were used to assess the stepped rate test and the constant rate pumping test using AQTESOLV version 4.50 software. The following standard set of assumptions is incorporated in the Theis solutions:

1. The aquifer has an apparent infinite extent.
2. The aquifer and confining layer are homogenous, isotropic and of uniform thickness over the area influenced by pumping.
3. The piezometric surface was horizontal prior to pumping.
4. The well is pumped at a constant discharge rate.
5. The water removed from storage is discharged instantaneously with decline of head.
6. The diameter of the well is small, i.e., the storage in the well can be neglected.
7. The head in any un-pumped aquifer(s) remains constant.
8. Storage in the confining layer is negligible
9. Flow to the well is unsteady.

Transmissivity values derived from the pumping test analysis range from 260 m²/day (Hantush-Jacob method) to 367 m²/day (Cooper-Jacob method). The results are summarised in Table 5 and provided in Appendix A. These values are consistent with expected transmissivity values for the area. It was not possible to derive storativity values from the pumping test analysis as an observation bore of the same depth was not available.

Table 5: Results derived from pumping test analysis.

Analysis method	Transmissivity (m ² /day)	Leakage (r/B)
Theis (Stepped rate test)	287	-
Hantush-Jacob	259	4.4 x 10 ⁻⁴
Hantush-Jacob (adjusted swl) ⁽¹⁾	282	7.6 x 10 ⁻⁵
Cooper Jacob	367	-
Theis Recovery	284	-

Note: ⁽¹⁾ Static water level (swl) was adjusted slightly by 0.043 m following pumping test analysis to allow for fitting of recovery data past 523 minutes when the recovering water levels passed the recorded swl from the test start.

3

ASSESSMENT OF EFFECTS

3.1 EFFECTS ON NEIGHBOURING BORES

The effects of the proposed abstraction have been assessed using the transmissivity results from the pumping test analyses presented in Table 5. Storativity values used were based on a typical range of values for a confined/semi confined system.

The following ranges of aquifer properties were used in the assessment:

- Transmissivity between 280 m²/day and 367 m²/day
- Storativity between 0.0001 and 0.001

The Theis (1935) method was applied to evaluate potential drawdown, assuming the aquifer is fully confined and Shaw's Sand Quarry bore is pumped continuously at 205 m³/day for 220 days (Table 6; Figure 7). The aquifer is likely to be semi-confined rather than fully confined and some degree of leakage would be expected. Incorporating leakage into the drawdown calculations would result in the calculated drawdowns presented in Table 6 being reduced.

Table 6: Projected drawdown in source aquifer after 220 days continuous pumping from Shaw's Sand Quarry Bore at 205 m³/day.

Distance from abstraction bore (m)	Projected drawdown range (m)
100	0.45 to 0.65
500	0.30 to 0.46
1,000	0.24 to 0.37
2,000	0.18 to 0.30

There are only three bores recorded in the WRC bore database as being located within one kilometre of Shaw's Sand Quarry bore. There are no bores within 1 km that are drilled to a similar depth as the Shaw's Sand Quarry bore. The deepest bore within one kilometre is 70_663, which is 42.7 m deep and 247 m to the north of Shaw's Sand Quarry bore. There is no resource consent associated with bore 70_663 to take groundwater so it is assumed that it is used for domestic and stock water supply only. This bore is tapping a layer that is approximately 22.3 m shallower than Shaw's Sand Quarry bore. The aquitard separating the two productive aquifers, which consists of numerous silt and clay layers, will reduce any potential interference effects on nearby bores.

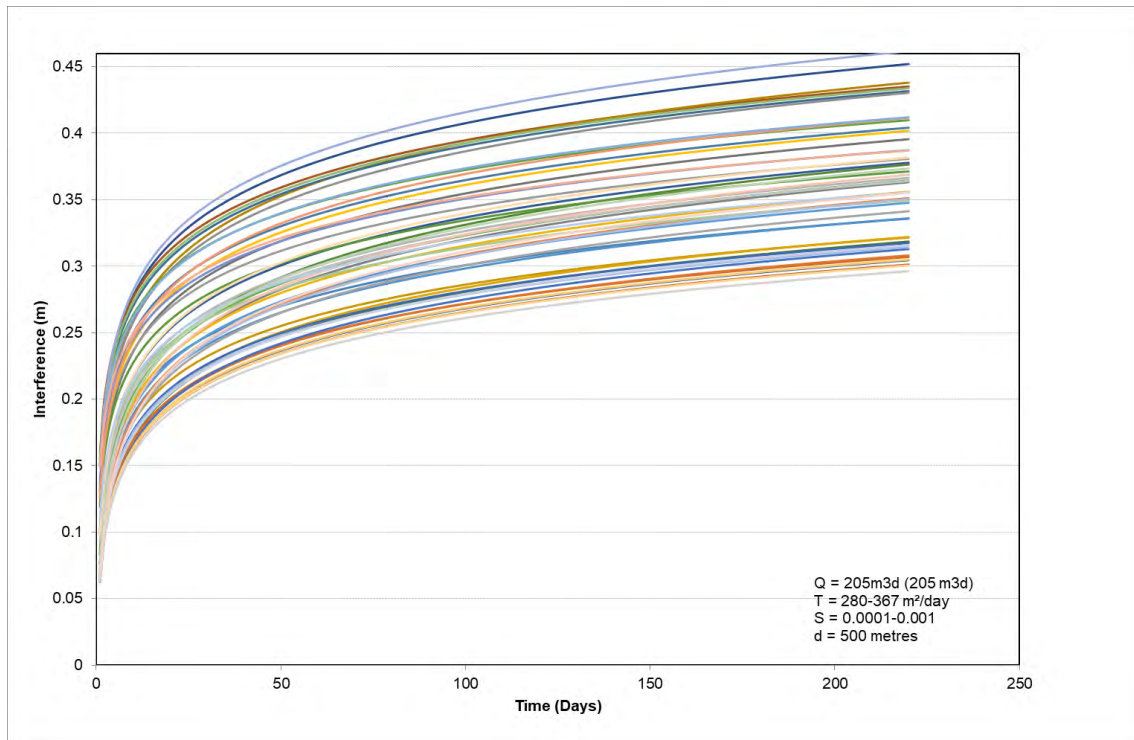


Figure 7: Projected drawdown after 220 days of continuous pumping at 500 m from Shaw's Sand Quarry Production bore.

An assessment of the potential effect of the proposed abstraction on the overlying aquifer has been carried out using the Hunt and Scott (2007) solution for a two aquifer system using the following parameters which represent a conservative approach based on the ranges derived from pumping test analysis.

- Transmissivity of $282 \text{ m}^2/\text{day}$ in the pumped aquifer.
- Storativity of 0.0006 in the pumped aquifer.
- Transmissivity of $50 \text{ m}^2/\text{day}$ in the shallower aquifer (assumed for the 40 m deep layer)
- Storativity of 0.0001 in the shallower aquifer (assumed for the 40 m deep layer)
- An aquitard thickness of 22.3 m (total depth between top of pumped aquifer and bottom of the observation bore).
- Vertical hydraulic conductivity for the aquitard of 0.01959 m/day (from aquifer test results Appendix A).

The results of this analysis indicated there could be a pumping induced drawdown of approximately 0.37 m in the 40 m deep aquifer at 247 m after 220 days pumping (

Table 7; Figure 8). A static groundwater level for bore 70_663 was recorded as 14.6 m bgl, therefore there is approximately 28.1 m water in the bore above the top of casing and 0.37 m drawdown would represent a 1.3% reduction in available water. Therefore, it is concluded that any effects on the 40 m deep aquifer from pumping would be less than minor.

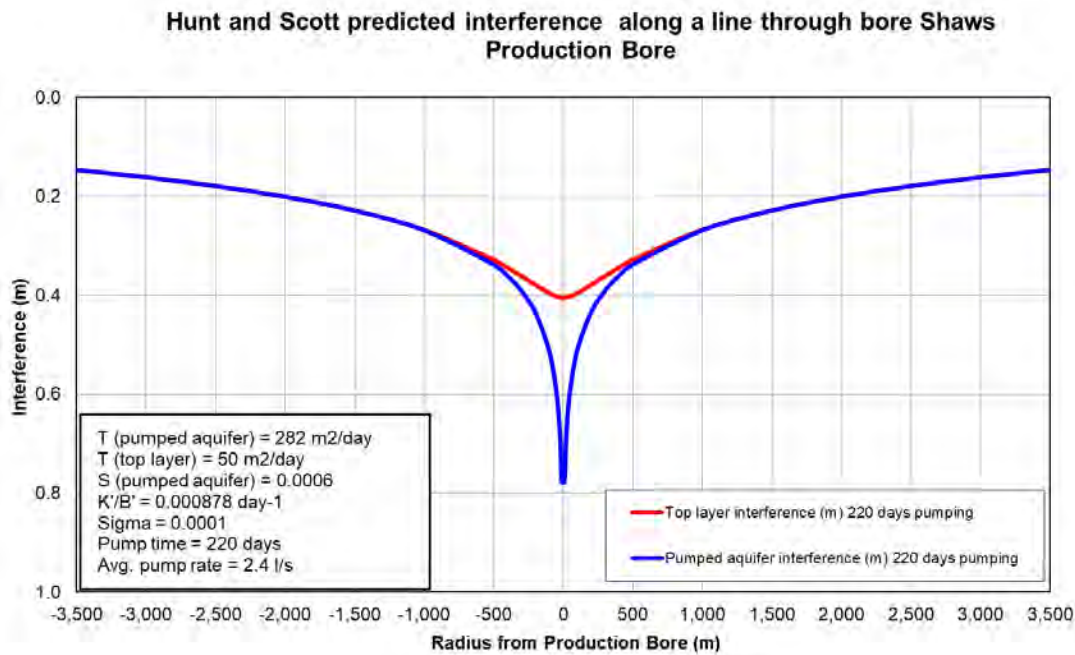


Figure 8: Projected drawdown after 220 days of continuous pumping in a leaky aquifer.

Table 7: Projected drawdown in nearby bores based on Hunt-Scott method and continuous pumping for 220 days.

Bore	Distance to Production Bore (m)	Bore depth (m)	Projected drawdown (m)
Obs Bore - 70_663	247	42.70	0.37
70_942	594	unknown	0.31
70_943	447	24.0	<0.34 ⁽¹⁾

Note: 1) Bore 70_943 is appears to be tapping the uppermost layer as shown in Table 3.

3.2 STREAM DEPLETION

The proposed abstraction is from an aquifer overlain by multiple aquitard layers. The closest surface water body is Mangawhero Stream, which is approximately 500 m to the west, north-west and south-west of Shaw's Sand Quarry bore. At this location the stream is within an incised gully approximately 35 m deep (Mitchel Daysch 2020). Below the incised gully invert is approximately 29 m of silts, clays and peat aquitard above the target aquifer, as described in the bore log (Table 3).

A conservative stream depletion analysis has been undertaken using the Hunt (2003) method. This method takes into account an aquitard separating the pumped aquifer from the overlying surface water body. The following parameters were applied in the analysis:

- Distance of 500 m from the abstraction bore.
- An aquitard thickness of 29 m (depth to top of aquifer from incised gully).
- Vertical hydraulic conductivity for the aquitard of 0.01959 m/day.
- Stream bed width of 3 m.

The results of this analysis indicated the potential stream depletion from the proposed take would be less than 0.006 L/s (0.5 m³/day). It is therefore considered that the proposed take would not significantly affect flows in the Mangawhero Stream.

3.3 LONG TERM SUSTAINABILITY

There are no consented groundwater/spring takes within one kilometre of the proposed abstraction.

The WRC regional plan defines the aquifer in the area of the proposed groundwater abstraction to be the Hamilton Basin – West Aquifer. This aquifer is not currently fully allocated and no consented groundwater takes are located within one kilometre of Shaw's Sand Quarry bore. The permitted abstractions nearby are from the shallow aquifer. Therefore, it is considered that the proposed take will not cause any long-term aquifer sustainability issues.

3.4 OTHER MATTERS

As part of the consideration of the effects, Policy 12 of the Waikato Regional plan outlines several aspects to consider in addition to the effects detailed and evaluated above. These include the following:

- Saline water intrusion – not an issue for this proposed abstraction given the bore is located inland and not associated with a coastal aquifer.
- Water quality – the proposed abstraction is from a deep aquifer and is not expected to cause any change in water quality within the local aquifer. The results from recent water quality testing are included in Appendix B.
- Aquifer compression – the small size of the proposed take, small drawdown and the stability of the aquifer sediments are such that aquifer compression from this proposed take is expected to be less than minor.

4 CONCLUSIONS

Shaw's Sand Quarry proposes to take water for dust suppression and truck wash from a bore (72_104215) located at 928 Kaipaki Road.

The proposed maximum abstraction rates are 205 m³/day and 45,100 m³/year with an instantaneous maximum flow of 4.5 L/s.

Two pumping tests; a four hour stepped rate test and a 24 hour constant rate test were undertaken in August 2020. Following 1,440 minutes of pumping at a rate of 15.5 m³/hour (4.3 L/s) during the constant rate test, a drawdown of 1.92 m was observed in the pumping bore.

Transmissivity values derived from the stepped rate test and the constant rate pumping test range from 280 m²/day to 367 m²/day.

There are three bores listed in the WRC database within one kilometre of the proposed take. None of these bores are screened in the same aquifer as the Shaw's Sand Quarry bore. The deepest nearby bore is 43 m deep and is at a distance of about 250 m from Shaw's Sand Quarry bore. The proposed abstraction from Shaw's Sand Quarry bore is expected to cause less than 0.37 m drawdown effect in the nearest bore. This is less than 2% of the available water in the nearby bore. Therefore, interference effects are considered to be less than minor.

Results from stream depletion analysis indicated the potential stream depletion from Mangawhero Stream due to the proposed take would be less than 0.01 L/s (0.5 m³/day). It is therefore considered that the proposed take will have less than minor effects on flows in the Mangawhero Stream.

There is sufficient allocation available within the WRC regional plan defined aquifer; Hamilton Basin – West to accommodate the proposed abstraction from the Production Bore of up to 45,100 m³/year.

5 REFERENCES

GNS 2005. Geology of the Waikato Area, Edbrooke SW (Ed). Institute of Geological and Nuclear Sciences.

Hantush M. S., Jacob C.E. 1955. Non-steady radial flow in an infinite leaky aquifer. Am. Geophys. Union Trans. 36, 95-100.

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Hunt and Scott 2007. Flow to a well in a two-aquifer system. Journal of Hydrologic Engineering 12(2), 146-155.

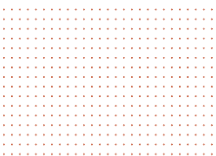
Marshall TW, Petch RA 1985. A Study of ground water and surface water resources in the Hamilton Basin. Waikato Valley Authority Technical Publication No. 30.

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Petch RA, Marshall TW 1988. Ground water resources of the Tauranga Group sediments in the Hamilton Basin, North Island, New Zealand. Journal of Hydrology 27:81-98.

Schofield JC 1972. Ground water of the Hamilton Lowland. New Zealand Geological Survey Bulletin No. 89.

Theis C.V. 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage. Am. Geophys. Union Trans. 16, 519-524.



APPENDIX A

PUMPING TEST ANALYSIS OUTPUTS



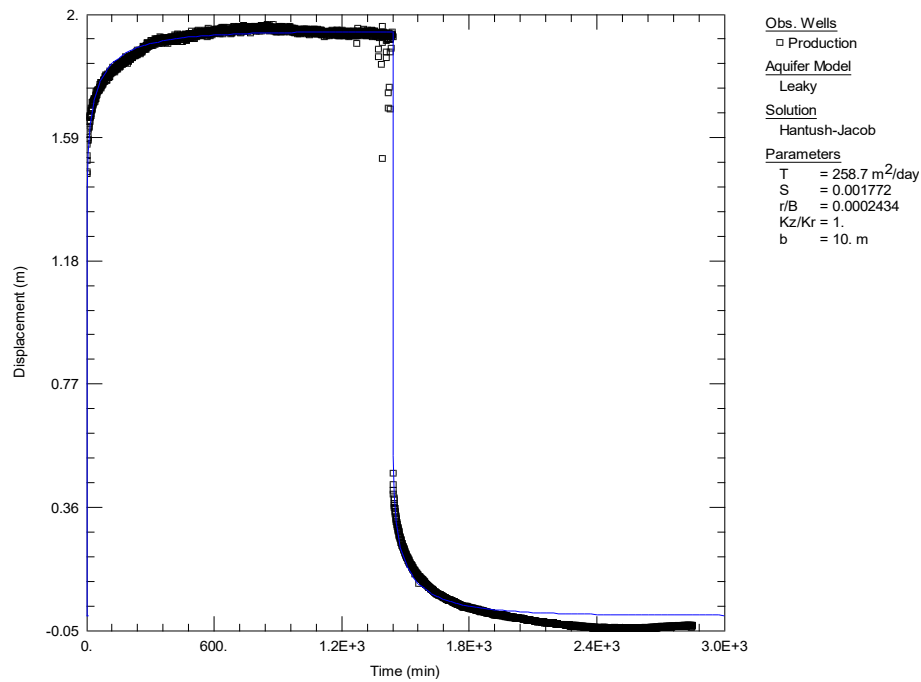
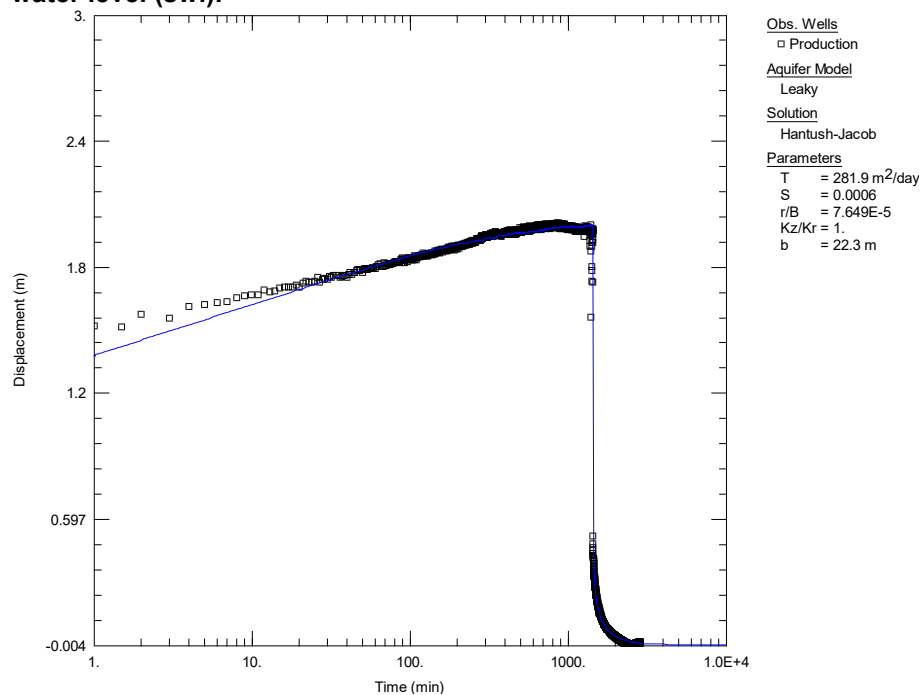


Figure A1: Results from Hantush-Jacob solution constant rate test with no correction to static water level (swl).



AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	281.9	2.319	+/- 4.549	121.5	m ² /day
S	0.0006	8.163E-5	+/- 0.0001601	7.35	
r/B	7.649E-5	6.092E-6	+/- 1.195E-5	12.56	
Kz/Kr	1.	not estimated			
b	22.3	not estimated			m

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

$K = T/b = 12.64 \text{ m/day}$ (0.01463 cm/sec)
 $S_s = S/b = 2.69E-5 \text{ 1/m}$
 $K'/b' = 7.159E-7 \text{ min}^{-1}$
 $K' = 0.01959 \text{ m/day}$

Figure A2: Results from Hantush-Jacob solution constant rate test with a correction to swl.

Note: Static water level (swl) was adjusted slightly by 0.043 m following pumping test analysis to allow for fitting of recovery data past 523 minutes when the recovering water levels passed the recorded swl from the test start.

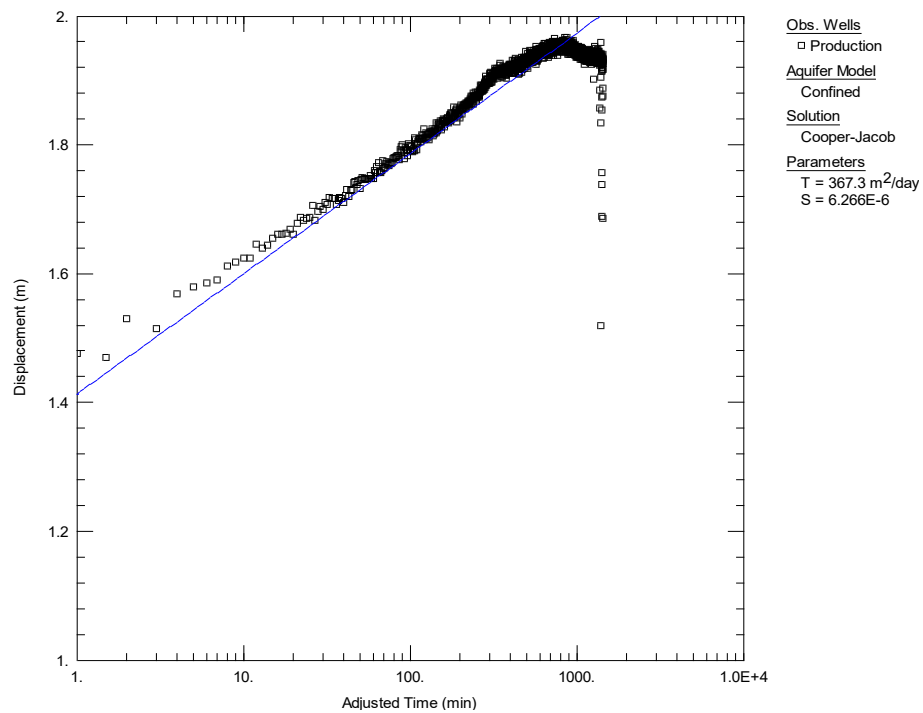


Figure A3: Results from Cooper-Jacob solution constant rate test.

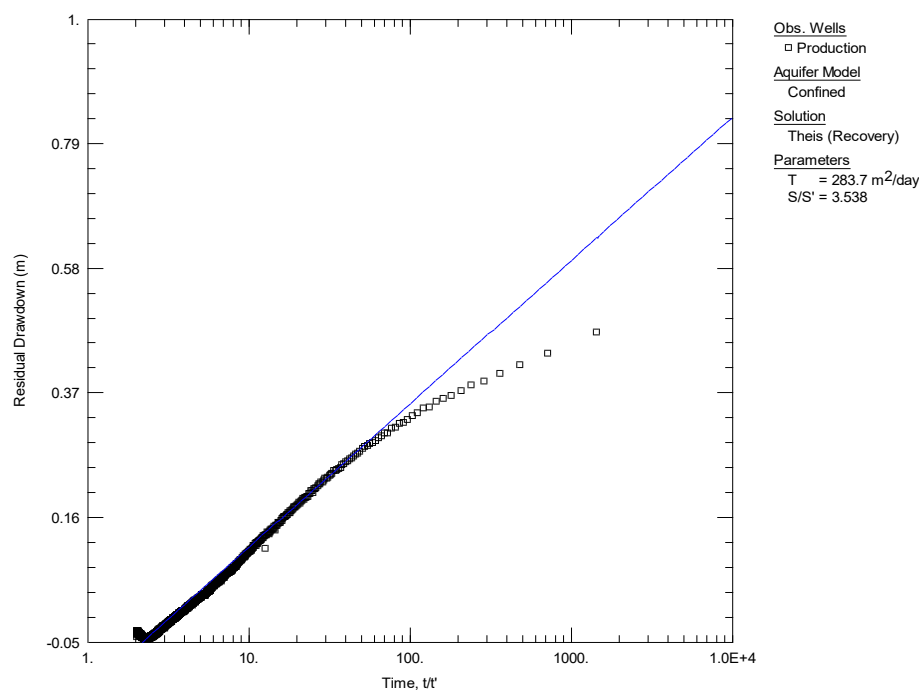


Figure A4: Results from Theis (Recovery) solution constant rate test.

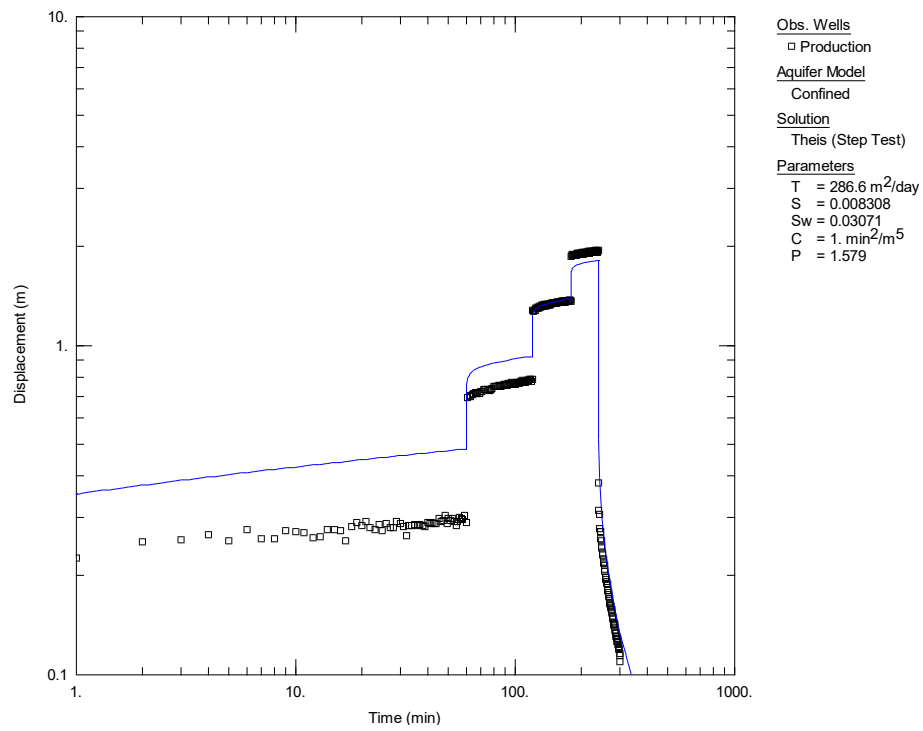


Figure A5: Results from Theis (Step Test) solution from stepped rate test.

APPENDIX B

WATER QUALITY RESULTS





Certificate of Analysis

Page 1 of 4

Client:	WGA	Lab No:	2417503	DWAPv1
Contact:	Clare Houlbrooke	Date Received:	12-Aug-2020	
	C/- WGA	Date Reported:	14-Aug-2020	
	4 Ash Street	Quote No:		
	Central	Order No:		
	Christchurch 8011	Client Reference:	201103	
		Submitted By:	Clare Houlbrooke	

Sample Type: Aqueous

Sample Name:		Shaws Bore 201103 12-Aug-2020 9:25 am	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:		2417503.1		
Routine Water + E.coli profile Kit*				
Escherichia coli*	MPN / 100mL	< 1 #1	-	< 1
Routine Water Profile				
Turbidity	NTU	29	< 2.5	-
pH	pH Units	6.7	7.0 - 8.5	-
Total Alkalinity	g/m ³ as CaCO ₃	151	-	-
Free Carbon Dioxide	g/m ³ at 25°C	62	-	-
Total Hardness	g/m ³ as CaCO ₃	88	< 200	-
Electrical Conductivity (EC)	mS/m	29.1	-	-
Electrical Conductivity (EC)	µS/cm	291	-	-
Approx Total Dissolved Salts	g/m ³	195	< 1000	-
Total Arsenic	g/m ³	0.0051	-	0.01
Total Boron	g/m ³	0.0136	-	1.4
Total Calcium	g/m ³	15.9	-	-
Total Copper	g/m ³	< 0.00053	< 1	2
Total Iron	g/m ³	12.0	< 0.2	-
Total Lead	g/m ³	0.0033	-	0.01
Total Magnesium	g/m ³	11.8	-	-
Total Manganese	g/m ³	1.22	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m ³	2.0	-	-
Total Sodium	g/m ³	26	< 200	-
Total Zinc	g/m ³	0.60	< 1.5	-
Chloride	g/m ³	6.7	< 250	-
Nitrate-N	g/m ³	0.06	-	11.3
Sulphate	g/m ³	< 0.5	< 250	-

Note: The Guideline Values and Maximum Acceptable Values (MAV) are taken from the publication 'Drinking-water Standards for New Zealand 2005 (Revised 2018)', Ministry of Health. Copies of this publication are available from <https://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2018>

The Maximum Acceptable Values (MAVs) have been defined by the Ministry of Health for parameters of health significance and should not be exceeded. The Guideline Values are the limits for aesthetic determinands that, if exceeded, may render the water unattractive to consumers.

Note that the units g/m³ are the same as mg/L and ppm.

Analyst's Comments

#1 The samples do not meet the requirements of the NZDWS - samples were greater than 10 °C on receipt in the lab (12.7 °C). As such, please interpret these microbiological results with caution. Samples must be kept at less than 10 °C (but not frozen).



pH/Alkalinity and Corrosiveness Assessment

The pH of a water sample is a measure of its acidity or basicity. Waters with a low pH can be corrosive and those with a high pH can promote scale formation in pipes and hot water cylinders.

The guideline level for pH in drinking water is 7.0-8.5. Below this range the water will be corrosive and may cause problems with disinfection if such treatment is used.

The alkalinity of a water is a measure of its acid neutralising capacity and is usually related to the concentration of carbonate, bicarbonate and hydroxide. Low alkalinities (25 g/m³) promote corrosion and high alkalinities can cause problems with scale formation in metal pipes and tanks.

With the pH and alkalinity levels found, this water could be corrosive towards metal piping and fixtures.

The high alkalinity of this water may cause an increase in the pH in the root zones of plants which are irrigated using this water.

Hardness/Total Dissolved Salts Assessment

The water contains a low amount of dissolved solids and would be regarded as being slightly hard.

Nitrate Assessment

Nitrate-nitrogen at elevated levels is considered undesirable in natural waters as this element can cause a health disorder called methaemaglobinaemia. Very young infants (less than six months old) are especially vulnerable. The Drinking-water Standards for New Zealand 2005 (Revised 2018) suggests a maximum permissible level of 11.3 g/m³ as Nitrate-nitrogen (50 g/m³ as Nitrate).

Nitrate-nitrogen was detected in this water but at such a low level to not be of concern.

Boron Assessment

Boron may be present in natural waters and if present at high concentrations can be toxic to plants.

Boron was found at a low level in this water but would not give any cause for concern.

Metals Assessment

Iron and manganese are two problem elements that commonly occur in natural waters. These elements may cause unsightly stains and produce a brown/black precipitate. Iron is not toxic but manganese, at concentrations above 0.5 g/m³, may adversely affect health. At concentrations below this it may cause stains on clothing and sanitary ware.

Iron was found in this water at a very high level.

Manganese was found in this water at a high level.

Treatment to remove iron and/or manganese will be required.

Bacteriological Tests

The NZ Drinking Water Standards state that there should be no *Escherichia coli* (E coli) in water used for human consumption. The presence of these organisms would indicate that other pathogens of faecal origin may be present. Results obtained for Total Coliforms are only significant if the sample has not also been tested for E coli.

Escherichia coli was not detected in this sample.

Final Assessment

The parameters Turbidity, pH, Total Iron and Total Manganese did NOT meet the guidelines laid down in the publication 'Drinking-water Standards for New Zealand 2005 (Revised 2018)' published by the Ministry of Health for water which is suitable for drinking purposes.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Routine Water Profile		-	1
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23 rd ed. 2017.	-	1
Turbidity	Analysis using a Hach 2100N, Turbidity meter. APHA 2130 B 23 rd ed. 2017 (modified).	0.05 NTU	1
pH	pH meter. APHA 4500-H ⁺ B 23 rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (modified for Alkalinity <20) 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃	1
Free Carbon Dioxide	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 23 rd ed. 2017.	1.0 g/m ³ at 25°C	1
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃	1
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 rd ed. 2017.	0.1 mS/m	1
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 rd ed. 2017.	1 µS/cm	1
Approx Total Dissolved Salts	Calculation: from Electrical Conductivity.	2 g/m ³	1
Total Arsenic	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.0011 g/m ³	1
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.0053 g/m ³	1
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.053 g/m ³	1
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00053 g/m ³	1
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³	1
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00011 g/m ³	1
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³	1
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00053 g/m ³	1
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.053 g/m ³	1
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³	1
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.0011 g/m ³	1
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³	1
Nitrate-N	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.05 g/m ³	1
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³	1
Escherichia coli*	MPN count using Colilert (Incubated at 35°C for 24 hours), or Colilert 18 (Incubated at 35°C for 18 hours). APHA 9223 B 23 rd ed. 2017.	1 MPN / 100mL	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 12-Aug-2020 and 14-Aug-2020. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

A handwritten signature in blue ink, appearing to be 'Ara Heron', written over a light blue circular stamp.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Facsimile: 08 8232 0967

WALLBRIDGE GILBERT AZTEC

www.wga.com.au

Attachment 3: Revised Suggested WRC Consent Conditions

RESOURCE CONSENT CERTIFICATE

Resource Consent: AUTH141798.02.01

File Number: 61 75 28A

*Pursuant to the Resource Management Act 1991, the
Regional Council hereby grants consent to:*

Shaw's Property Holdings Limited
1130 Kaipaki Road
Cambridge 3495

(hereinafter referred to as the Consent Holder)

Consent Type: Land Use Consent

Consent Subtype: Land – Solid Waste

Activity authorised: To discharge cleanfill to land in association with a sand quarry

Location: 928 Kaipaki Road, RD 3, Cambridge 3495

Map reference: NZTM 1811605.0000 E 5802878.0000 N

Consent duration: This consent will commence on the date of decision notification
and will expire on ~~XX XXX~~ 20XX.

Subject to the conditions overleaf:

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General

1. Except as specifically provided for by other conditions of the applicable consents, all activities to which the consents relate shall be undertaken in general accordance with the resource consent conditions below and the information contained in the resource consent application.
2. The consent holder shall be responsible for all contracted operations related to the exercise of this resource consent, and must ensure that all relevant staff and contractors are made aware of the conditions of this resource consent and ensure compliance with those conditions.

Pre-Start

3. The consent holder shall appoint a representative(s) prior to commencement of any works authorised by this resource consent, who shall be the Waikato Regional Council's principal contact person in regard to matters relating to this consent. The consent holder shall inform the Waikato Regional Council of the representative's name and how they can be contacted prior to this consent being exercised. Should that person(s) change during the term of this resource consent, the consent holder shall immediately inform the Waikato Regional Council and shall also give written notice to the Waikato Regional Council of the new representatives name and how they can be contacted.
4. The consent holder shall inform the Waikato Regional Council in writing at least 10 working days prior to the commencement of activities of the start date of the works authorised by this resource consent.

Groundwater

5. Activities authorised by this resource consent shall not intercept groundwater and excavations shall be at least one metre above groundwater levels.

Cleanfill Management

6. The consent holder shall record the source, measure the quantity, and identify and log incoming cleanfill. The consent holder shall provide this information to the Council annually, by 31 March, for each year that this consent is exercised.
7. All fill material deposited shall be limited to cleanfill as defined as material that when discharged to the environment will have no adverse effect on people and the environment. This includes natural materials such as clay, soil and rock, and other inert materials such as concrete and brick, or mixtures of any of the above. There shall be no organic material mixed with the fill and/or placed in a position where it may lead to land instability. Cleanfill, deposition authorised by this consent shall exclude;
 - i). material that has combustible, putrescible or degradable components
 - ii). materials likely to create leachate by means of biological or chemical breakdown
 - iii). any products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices
 - iv). materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health
 - v). soils or other materials contaminated with hazardous substances or pathogens
 - vi). hazardous substances.

8. For each 500 cubic metres of material received on site, a composite sample shall be analysed for the following contaminants. Each sample will consist of six sub-samples of equal volume. Results will be compared with the cleanfill acceptance thresholds in the table below.

Table 1: Acceptance Criteria

Trace elements	Acceptance criteria (mg/kg)
Arsenic	17
Boron	15
Cadmium	0.8
Chromium	56
Copper	120
Lead	78
Mercury	1
Nickel	33
Zinc	175
Organic compounds	Acceptance criteria (mg/kg)
TPH C7-C9	110
TPH C10-C14	58
Benzene	0.11
Ethylbenzene	10
Toluene	19
Total Xylene	25
Benzo[a]pyrene (equivalent)	2.8
Total DDT	1.9
Dieldrin	0.1

Unless otherwise agreed with the Waikato Regional Council in writing, the fill material shall be deemed to meet the cleanfill acceptance thresholds when the concentration of each individual constituent is less than the threshold concentration in the table above. In the event that a sample fails to meet the cleanfill acceptance thresholds for one or more analysed constituents, the consent holder shall remove the fill material from the disposal site and dispose to an authorised site.

9. Analysis of the testing shall be undertaken by an appropriately registered laboratory.
10. The consent holder shall measure the quantity, and identify the source of the material and log incoming cleanfill and provide this information to the Waikato Regional Council by 31 March (for the period 31 March to end of February), for each year that this consent is exercised.
11. Fill samples shall be collected from the imported cleanfill deposited across the site. Random composite sampling of the deposited fill material shall be undertaken at each stage of the filling operation prior to rehabilitation of the respective stage. The sampling shall be undertaken by an independent and suitably qualified person. The samples shall be tested at an appropriately registered laboratory for the analytes listed in Condition 3 and the sampling results shall be provided to the Waikato Regional Council within 7 days of becoming available.

Site Management Plan

12. The consent holder shall provide the Waikato Regional Council with a revised "Site Management Plan" (SMP), at least 20 working days prior to the commencement of activities authorised by this consent. The SMP shall be prepared in consultation with Ngaati Koroki Kahukura and Ngaati Hauaa and shall be approved in writing by the Waikato Regional Council acting in a technical certification capacity prior to any works authorised by this consent commencing.

The revised SMP shall include, but may not be limited to the following:

- i). The specific location of the cleanfill placement area;
- ii). Acceptance criteria for cleanfill to be disposed on site;
- iii). Contaminant levels shall be specified in accordance with condition 3; or as varied by written agreement between the consent holder and the Waikato Regional Council.
- iv). A description of operational procedures and monitoring that will be implemented to minimise unauthorised or contaminated material entering the site;
- v). Specific design details, construction and certification procedures to ensure long term stability of cleanfill areas;
- vi). Construction timetable for the erosion and sediment control works and the bulk earthworks proposed;
- vii). A site staging plan;
- viii). Timetable and nature of progressive site rehabilitation and re-vegetation proposed incorporating those sections of the site perimeter identified in the conceptual planting scope provided as Figure 1 of letter from Mitchell Daysh dated <insert date>. In this respect, the SMP shall include the following related information;
 - a. Site plantings including species to be planted, where they are to be planted, density of planting, sourcing of plants and fertilising;
 - b. Site preparation for planting;
 - c. Timeline for planting; and
 - d. Ongoing maintenance procedures;
- ix). Contingency and mitigation measures;
- x). Maintenance, monitoring, and inspection procedures;
- xi). Specific dust control measures to ensure that dust emissions are kept to a practicable minimum inclusive of recommendations for access road maintenance;
- xii). Procedures to review the management plan in order to ensure compliance with the resource consent conditions;
- xiii). Random load fill sampling and deposited fill verification sampling methods and procedures. Details of the suitably qualified and experienced person who will undertake the sampling.
- xiv). An Erosion and Sediment Control Plan in accordance with the document titled "Erosion and Sediment Control – Guidelines for Soil Disturbing Activities" (Technical Report No. 2009/02 – dated January 2009).

13. The Consent Holder shall operate the site in accordance with the approved SMP which details the procedures that will implemented to operate in accordance with the conditions of this resource consent. The SMP shall be reviewed and updated at least once every five years from the exercise of this consent. Any changes to the SMP shall be approved in writing by the Waikato Regional Council acting in a technical certification capacity.

Discharges

14. The consent holder shall ensure that the suspended solids concentrations of any natural water body shall not exceed a maximum of 100 grams per cubic metre after reasonable mixing as a result of the activities authorised by this consent.

Commented [MJ1]: Applicant has recently agreed with mana whenua to implement plantings along 800m of site perimeter adjacent to Mangawhero Stream gully. Due to the relatively small scale of planting, it is requested this be incorporated in the SMP as opposed to having a separate Plan. As outlined in tangata whenua report, Ngati Haua Mahi Trust will be engaged to undertake this work and have provided planting plan info already.

Commented [EC2R1]: Sounds great, thanks for offering this ecological enhancement. I would like this to be a separate condition if poss, easier to monitor.

Commented [MJ3R1]: The SMP and incorporation of perimeter planting are two aspects mana whenua are keen to review. Having them presented as a single document would be easier for them and the consent holder.

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Procedures to minimise land stability risk adjacent to the Mangawhero Stream gully, including but not necessarily limited to;¶

Prioritising the deposition of cleanfill to locations adjacent to the quarry edge working face beside the Mangawhero Stream gully; and ¶

Use of protective ground surface coverings to protect against scour and erosion.

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Moved down [1]: <#>The consent holder shall be responsible for ensuring the structural integrity and maintenance of all construction earthworks, and for the provision of additional erosion and sediment controls that become necessary to control erosion as a result of the exercise of this consent.¶

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15. If requested in writing by the Waikato Regional Council the consent holder shall;

- i). take samples of the discharges from all sediment retention structures on the site a minimum of once per month and after all rainfall events greater than 20 millimetres in the preceding 24 hours, except for times when there are no discharges; and
- ii). take the samples within four hours of becoming aware of a rainfall event greater than 20 millimetres in the preceding 24 hours.

Advice Note: The discharge of water from the sand quarry and cleanfill disposal operation shall be in accordance with the Waikato Regional Plan Permitted Activity Standards unless a discharge permit is obtained.

Dust

16. The consent holder shall ensure that the concentrations of total suspended particulates (TSP) in ambient air arising from authorised activities at or beyond the boundary of the site does not exceed 80 µg/m³ as a 24 hour average.

17. At least 20 working days prior to the commencement of activities under this resource consent, the consent holder shall submit to Waikato Regional Council, for approval in a technical certification capacity, a draft Dust Management Plan (DMP). The DMP shall be approved in writing by the Waikato Regional Council acting in a technical certification capacity prior to the commencement of activities under this resource consent. Any changes to the DMP shall be reviewed and certified by the Waikato Regional Council prior to the changes being made. The DMP shall include but not be limited to the following:

- i. Specific locations and specifications for fixed and mobile sprinklers for the control of dust from stockpiles, if it is demonstrated that these are a source of off site particulate nuisance;
- ii. Specific management procedures for the use of the water cart for control of dust from internal access roads and working areas;
- iii. Specific management procedures for the control of dust from the clean fill and overburden disposal operations;
- iv. Other actions necessary to comply with the requirements of this resource consent;
- v. Provision and maintenance of 20 kph speed limit signs on all unsealed access roads; and
- vi. Unless otherwise approved in writing by the Waikato Regional Council acting in a technical certification capacity following any review of the DMP in accordance with Condition 20 of this Consent:
 - a) Total Suspended Particulates ("TSP") monitoring locations, alert levels and trigger levels and actions, including a requirement to install a TSP monitor adjacent to the property boundary at 914 Kaipaki Road;
 - b) Details of how the nett TSP concentrations will be calculated; and
 - c) Maintenance procedures for the TSP monitoring equipment and weather station.

18. The Consent Holder shall operate the site in accordance with the approved DMP. The DMP shall be reviewed and updated at least once every five years from the exercise of this consent. Any changes to

Commented [MJ5]: The applicant is happy to incorporate dust monitoring / alerts etc as part of the DMP. This as the key tool to check success of DMP procedures and negates any need to restrict operations on the basis of wind speed / direction and increased setbacks.

Commented [MJ6]: Specific condition requiring TSP monitor at Comes boundary as requested.

the DMP shall be approved in writing by the Waikato Regional Council acting in a technical certification capacity.

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Complaints Register

19. The consent holder shall maintain and keep a register of complaints regarding all aspects of operations at the site related to the exercise of this consent, received by the consent holder. The register shall record:

- a) the date, time and duration of the event/incident that has resulted in a complaint;
- b) the location of the complainant when the event/incident (if possible, specify nature of incident e.g. dust nuisance) was detected;
- c) the possible cause of the event/incident;
- d) the weather conditions and wind direction at the site when the event/incident allegedly occurred;
- e) any corrective action undertaken by the consent holder in response to the complaint;
- f) any other relevant information.

The register shall be available to the Waikato Regional Council at all reasonable times. Complaints received by the consent holder that may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.

Objectionable or Offensive Dust Effects

20. All activities authorised by this consent shall ensure that dust emissions are kept to a practicable minimum so that there shall be no particulate matter as a result of the activities authorised by this resource consent that causes an objectionable or offensive effect beyond the boundary of the site. At least the following measures shall be implemented:

- (a) The use of water sprays to suppress dust from fill areas from access roads and from other disturbed land, on an as required basis;
- (b) The use of dust stabilisation systems (water, water plus additives or mulch);
- (c) The stabilisation of disturbed land which is currently not being worked;
- (d) The regrassing of completed surfaces;
- (e) The maintenance of all access routes;
- (f) The use of a truck wheel wash; and
- (g) Keeping the total area of exposed soil to a practicable minimum at all times.

21. On the happening of a dust emission event which in the view of the Council is or may be in breach of Condition 24, the Consent Holder shall provide a written report to the Council within five days of being notified of this requirement by the Council. The report shall specify:

- (a) The cause(s) or likely cause(s) of the event and any factors that influenced its severity;
- (b) The nature and timing of any measures implemented by the consent holder to avoid, remedy or mitigate any adverse effects; and the steps to be taken in future to prevent recurrence of similar events; and
- (c) The steps planned to be taken to prevent reoccurrence of similar events.

Advice Note: For the purpose of this resource consent, the Waikato Regional Council will consider an effect that is objectionable or offensive to have occurred if any appropriately experienced officer of the Waikato Regional Council deems it so after having regard to:

- i) *The frequency, intensity, duration, amount, effect and location of the suspended or particulate matter; and/or*
- ii) *receipt of complaints from neighbours or the public: or*
- iii) *relevant written advice or a report from an Environmental Health Officer of a territorial authority or health authority.*

Activity Setbacks

22. Activities authorised by this resource consent shall be setback a minimum of 130 metres from the residential dwelling at 914 Kaipaki Road; a minimum 20 metre setback from the northern and eastern property boundaries, including the to the existing kiwifruit orchard to the south east; a minimum 5 metre setback from the western gully edge; a minimum of 10 metre setback from any other property boundary.

Land Stability

23. The consent holder shall engage a suitably qualified and experienced civil engineer to design the sand quarry working face running adjacent to the Mangawhero steam gully to appropriately address any potential land stability risk in this location. The design shall specify recommended working face profiles, slope angles and setbacks along with any recommended post excavation processes or protection measures. A copy of the design shall be provided to the Waikato Regional Council for approval, acting in a technical certification capacity, prior to any sand quarrying activities occurring within 20 metres of the Mangawhero steam gully edge.

24. The consent holder shall be responsible for ensuring the structural integrity and maintenance of all construction earthworks and for the provision of additional erosion and sediment controls that become necessary to control erosion as a result of the exercise of this consent.

25. Re-vegetation and/or stabilisation of all disturbed areas is to be completed in accordance with the measures detailed in the document titled *"Erosion and Sediment Control – Guidelines for Soil Disturbing Activities"* (Technical Report No. 2009/02 – dated January 2009).

26. The area of open and disturbed land (excluding any access and haul roads and any processing and stockpiling areas) shall not exceed three hectares at any one time as a result of the exercise of this resource consent.

27. The rehabilitation of land to which this land use consent relates shall be undertaken by the consent holder to the satisfaction of the Waikato Regional Council. The objectives of rehabilitation of the land shall be to ensure that:

- a) the area of bare soil/earthen surfaces is kept to a minimum at all times;
- b) it requires no more management than that required in adjacent catchments which are unaffected by this activity;
- c) the land cover is generally consistent with the adjacent areas unaffected by this activity;
- d) the quality of the water discharging from the rehabilitated land is consistent with the discharge from adjacent catchments unaffected by overburden stripping works; and
- e) nuisance and invasive plant species (e.g. pampas, blackberry, broom) are removed on a regular basis.

Record Keeping and Annual Report

28. The consent holder shall record the following in a daily log:

Commented [MJ7]:

Commented [EC8R7]: Does the applicant offer a condition specific to installing a dust monitor on near the Comes boundary and trigger alerts/responses? Please draft a condition for consideration.

The gully edge setback is to ensure stability. Does the Geotech assessment support a 5m setback?

Commented [MJ9R7]: Yes – Condition 17(a) commits to a TSP monitor adjacent to the Comes property, while triggers, alerts and responses will be addressed in the DMP for WRC approval.

Any stability risk of the 5m gully setback is addressed through new proposed condition 23. Draft design options have been provided separately demonstrating this risk can be addressed with the proposed minimum Mangawhero stream gully edge setback of 5m.

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- (a) Records of any TSP monitoring;
- (b) Details on any dust control equipment malfunctions and any remedial actions taken;
- (c) Details on any visible emission of dust and the source;
- (d) Wind direction;
- (e) The frequency of water cart usage and the volume of water applied;
- (f) The volume of water used for dust suppression other than water cart usage;
- (g) The date and signature of the person entering the information;
- (h) Details of dust complaints received; and
- (i) Actions taken in response to dust complaints received.

Records shall also be made available to the Waikato Regional Council within 5 working days upon request.

29. The consent holder shall provide to the Waikato Regional Council an annual report, by 31 March, for each year that this consent is exercised. The annual report shall include but not be limited to;

- a) An assessment of the consent holder's compliance with the conditions of resource consents AUTH141798.01.01 and AUTH141798.01.02 and any recommendations to address any identified non-compliances;
- b) Plans for topsoil and subsoil stripping and sand extraction over the next 12 months;
- c) The location and areas of land to be revegetated over the next 12 months;
- d) The results of all cleanfill testing undertaken as required by the conditions of this consent for the previous 12 month period.
- e) The volume recorded in cubic metres of cleanfill imported to the site for the previous 12 month period.
- f) A detailed description including photographs of perimeter planting works undertaken and ongoing maintenance of the plants.
- g) TSP monitoring results.

Tangata Whenua

30. In the event of any archaeological site or waahi tapu being discovered or disturbed while undertaking earthworks, cleanfilling or any sand quarry related or ancillary activities, the activity shall cease immediately in the area of the discovery, and Tangata Whenua, Heritage New Zealand and the Waikato Regional Council shall be notified within 48 hours. Works may recommence with the written approval of the Waikato Regional Council. Such approval shall be given after the Waikato Regional Council has considered:

- a) Tangata Whenua interests and values;
- b) The consent holders interests;
- c) Any Heritage New Zealand authorisations; and
- d) Any archaeological or scientific evidence.

31. Any artefacts uncovered during any excavation works on the site shall be gifted to Ngaati Kokokii-Kahukura and Ngaati Hauaa.

32. In no less than 15 working days prior to excavating any recorded archaeological sites (borrow pits) Representatives from Ngaati Kokokii-Kahukura and Ngaati Hauaa Iwi Trust shall be invited to attend the site for the purpose of monitoring top soil excavation works at these sites. The invitation shall include details of the purpose of the invitation, the date excavation works are planned to start and consent holder contact details.

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Review

33. The Waikato Regional Council may, between 1 April and 30 June 2018, and between 1 April to 30 June every three years thereafter serve notice on the consent holder under section 128(1) of the Resource Management Act 1991, of its intention to review the conditions of this resource consent for the following purposes:

- a) To review the effectiveness of the conditions of this resource consent in avoiding or mitigating any adverse effects on the environment from the exercise of this resource consent and if necessary to avoid, remedy or mitigate such effects by way of further or amended conditions, or,
- b) If necessary and appropriate, to require the holder of this resource consent to adopt the best practicable option to remove or reduce adverse effects on the surrounding environment due to the placement of cleanfill and any subsequent contaminated stormwater discharges, or,
- c) To review the adequacy of and the necessity for monitoring undertaken by the consent holder, or,
- d) To take account of any changes to the Waikato Regional Plans or Policies.

Administration

34. The consent holder shall pay to the Waikato Regional Council any administrative charge fixed in accordance with section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under section 360 of the Resource Management Act.

From: Mason Jackson
Sent: Mon, 28 Sep 2020 08:30:48 +1300
To: Hayley Thomas
Cc: Jonny Schick (jonny.schick@shaws.co.nz)
Subject: External Sender: PSI for 928 Kaipaki Rd - Site for proposed sand quarry
Attachments: PSI Final 928 Kaipaki Rd.pdf

CYBER SECURITY WARNING: This email is from an external source - be careful of attachments and links. Please follow the Cybersecurity Policy and report suspicious emails to Servicedesk
Morena Hayley

Please find attached a Preliminary Site Investigation report which examined potential soil contamination risks to human health in association with proposed new sand quarry at 928 Kaipaki Rd (ex-asparagus growing landuse). You will be aware that as part of the land use consent application for the sand quarry, specific consent conditions were suggested to address the potential for soil contamination at the site. In the interests of certainty, it was decided more recently to assess this risk prior to any decision on the consents.

The PSI report concludes that it is 'highly unlikely' there will be a risk to human health or the environment if the site is developed into a sand quarry. Accordingly, there will be no need to include related consent conditions in the event land use consent is granted.

Please can you forward this report onto the appropriate person within Council to assess.

Have a great day.

Nga mihi

Mason

 Mason Jackson
Senior Consultant

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PRELIMINARY SITE
INVESTIGATION
928 KAIPAKI ROAD
OHAUPO

PREPARED FOR:
SHAW'S PROPERTY
HOLDINGS LTD

SEPTEMBER 2020

CSI
Contaminated Site Investigation

34 Brookfield Street
Hamilton

Ph: 07 859 1481
Fax: 07 859 1481
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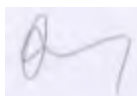
contaminatedsite@xtra.co.nz



PSI REPORT: 928 Kaipaki Road, Ohaupo.

Prepared by: GUY SOWRY

Date:



01.09.2020.

DIRECTOR

CSI

CONTAMINATED SITE INVESTIGATION

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0.0 Executive Summary

Purpose	Undertake a PSI for a site at 928 Kaipaki Road, Ohaupo.
Site Status	The site is currently pastoral land with no structures. Change the landuse from agricultural to industrial.
Site History	Aerial photos from 1939 to 1979 document the site as pastoral land with structures present. Aerial photos from 1983 and 1995 document the site as horticultural with no structures present. Aerial photos from 2008 to 2019 document the site as pastoral with no structures present.
Consultation	Anecdotal information from the current landowner documents no HAIL at the time of purchase. No HAIL has occurred since. Anecdotal information from the adjacent landowner documents that the site was an asparagus farm. Anecdotal information from the Chairman of NZ Asparagus Council and a local asparagus farmer for 40 + years states that the herbicides Diuron and Bromacil would have been used. Insecticides and fungicides are not required for the growing of asparagus in the Cambridge area.
Geology Hydrogeology Hydrology	The soil is considered to be a sand or silt. A groundwater system at approximately 9 m. The nearest surface water is the Mangawhero Stream located immediately adjacent to the southern boundary.
Site Investigation	<p>Walkover Undertaken by Guy Sowry on 4 September 2020. No evidence of any HAIL noted.</p> <p>History Asparagus farm from circa 1983 to 1995 with the herbicides Diuron and Bromacil used. No chemical storage. Pastoral prior and post with no chemical storage, live stocking dipping or landfilling. Superphosphate application has occurred.</p> <p>Potential Ground Contamination Diuron and Bromacil should degrade within 6 years. Cadmium concentrations considered to be below Rural Residential no produce SGV.</p> <p>Potential HAIL None.</p> <p>CSM A low risk to human health and the environment, as there are no identified potential contaminants/hazards. It is highly unlikely that there will be a risk to human health or the environment if the landuse changes from agricultural to commercial/industrial. Therefore, the site is considered suitable for the intended use.</p>
Recommendation	<ol style="list-style-type: none"> 1. No further contaminated land investigations are required for this application. 2. The site shall be listed on WDC and WRC Selected Land Use Registers as 'Entered in Error'.
<i>This sheet is intended to provide a summary only. This sheet does not provide a definitive scientific analysis.</i>	

1.0 INTRODUCTION

- 1.1 Contaminated Site Investigations (CSI) has been appointed by Mr. Jonny Schick (Shaw's Property Holdings Ltd) to undertake a Preliminary Site Investigation (PSI) of a site at 928 Kaipaki Road Ohaupo. A PSI was requested by Waipa District Council (WDC) as they consider that the following Hazardous Activity or Industry (HAIL) has occurred at the site:
 - A.10. Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glasshouses or spray sheds.
- 1.2 The aim of the PSI is to provide Mr. Jonny Schick with an evaluation of ground conditions to determine if the above HAIL and/or any other HAIL has occurred at the site and if yes:
 - the potential risk to human health; and
 - the potential risk to the environment.
- 1.3 The PSI has been completed in general accordance with: the Resource Management Act 1991 (RMA); and the Resource Management Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011(NES).
- 1.4 This report is based on a review of historical photos, consultation and a site walkover undertaken by Guy Sowry of CSI on 4 September 2020. The report has been prepared by Guy Sowry in accordance with the NES and in particular *Contaminated Land Management Guidelines No 1 - Reporting on Contaminated Land*.
- 1.5 As per the NES User Guide Suitably Qualified and Experienced Practitioner requirements Guy Sowry holds a post graduate diploma in 'Environmental Health Science' and over 25 years experience investigating and reporting on contaminated land.
- 1.6 The following limitation should be noted:
 - the investigation is only a preliminary investigation with no soil samples. Should a risk to human health be proven a detailed site investigation may be required.
- 1.7 Attention is drawn to the report conditions shown in Appendix A.

2.0 CURRENT AND PROPOSED SITE STATUS

2.1 Site Identification

- 2.1.1 The site is located at 928 Kaipaki Road, Ohaupo, approximately 5.1 kilometres west of Cambridge town centre, as shown in Figure 1: Site Location.
- 2.1.2 Details of 928 Kaipaki Road, Ohaupo (the wider site) are provided for in Table 1: Wider Site Details.

Table 1: Wider Site Details

OWNERSHIP	SIZE	LEGAL DESCRIPTION	VRN
Jonny Shick Shaw's Property Holdings Ltd	40.7 ha	Lot 2 DP 444992	04525/243/10

- 2.1.3 The site is roughly rectangular in shape approximately 720 metres in length (north to south) and 240 metres wide as shown in Figure 2: Site Plan.
- 2.1.4 The wider site is zoned in the Waipa District Council's Operative District Plan as 'Rural'.

2.2 Site Description

- 2.2.1 The site is currently a horse and dry stock (cattle and sheep) farm with hedges, farm raceways and farm fences as documented in Figure 2 Site Plan.
- 2.2.2 The site comprises seven different sized paddocks. All of the paddocks are fenced with wooden rail fences with a steel gate for access. Concrete stock troughs are present throughout the site. A farm raceway, which is fenced on both sides with wooden rail fences, runs from the wider sites adjacent yard in a reverse c shape, to the east and then down to the south, roughly through the centre until it turns back in the south, to the wider site in the west. A grassed pit is located in the southwestern corner paddock.
- 2.2.3 The northern boundary is open to the wider site with a wooden rail fence and then a driveway beyond. The eastern boundary is fenced with a wooden and wire rail fence and hedged. Beyond is a kiwifruit orchard. The southern boundary is fenced with a wooden and wire rail fence with bush reserve immediately beyond. The western boundary is fenced with wooden rail fences and hedged. Beyond in the south and centre is paddocks associated with the wider farm. Beyond in the north is rural residential property and equine infrastructure.
- 2.2.4 The site is flat.

2.3 Surrounding Environment

- 2.3.1 The site is situated in an area of pastoral land, rural residential, orcharding and bush.
- 2.3.2 The wider site pastoral site is located immediately to the west. Pastoral land is also located to the north beyond Kaipaki Road.

- 2.3.3 The wider sites rural residential property and farms infrastructure are located immediately to the west. Rural residential properties are located beyond the northwestern boundaries.
- 2.3.4 A kiwifruit orchard is located immediately to the east of the site. This orchard runs for approximately 800 metres to the east along Kaipaki Road.
- 2.3.5 Bush is located immediately beyond the southern boundary and to the south and west of the wider site. This bush is associated with the gully containing the Mangawhero Stream.

2.4 Proposed Development

- 2.4.1 The owner would like to establish and operate a sand quarry and clean filling operation at the site and wider site.
- 2.4.2 The site will comprise an entranceway in the northeastern corner, a sealed accessway along the eastern boundary and sand excavation and clean fill working areas. Sand extraction will commence in the south eastern corner and move in a northerly direction. The existing topsoil will be stripped and stockpiled on site for later use in recontouring.
- 2.4.3 The sand will be used for the local industrial and construction sectors as foundations pads.

3.0 HISTORICAL REVIEW

3.1 Aerial Photo Review

- 3.1.1 Reproductions of aerial photos are included in this report as SK01 (1939) to SK12 (2010) and are located in Appendix B.
- 3.1.2 The **1939** reproduction (SK01) shows the site as pastoral land with a small structure in the central north. The immediate surrounding land is predominantly pastoral with a rural property is present in the northwest, bush in the south and Kaipaki Road in the north.
- 3.1.3 The **1943** reproduction (SK02) shows the site as relatively unchanged to the 1939 reproduction. The immediate surrounds also remain relatively unchanged.
- 3.1.4 The **1953** reproduction (SK03) shows the site as pastoral land with at least three structures present and probable farm fences. The structure in the central north is smaller in size. A second structure is located slightly to the south and a third structure is present in the south. The farm fences divide the site into at least six paddocks. The immediate surrounds also remain relatively unchanged.
- 3.1.5 The **1957** reproduction (SK04) shows the site as probable pastoral land. The immediate surrounding land includes the farm dwelling, sheds etc in the central west, bush to the south, Kaipaki Road in the north and probable pastoral land.
- 3.1.6 The **1967** reproduction (SK05) shows similar conditions to the 1957 reproduction. The immediate surrounding land also remains relatively unchanged to the 1957 reproduction with the exception of a probable dwelling located to the north.
- 3.1.7 The **1971** reproduction (SK06) shows the shows the site as pastoral land with a square structure in the central west and probable farm fences. The immediate surrounds also remain relatively unchanged to the 1967 reproduction with the exception of an increase in number of structures within the rural property immediately adjacent in the northwest.
- 3.1.8 The **1974** reproduction (SK07) shows unchanged site conditions to the 1971 reproduction. Immediate surround land conditions also remain relatively unchanged.
- 3.1.9 The **1979** reproduction (SK08) shows similar site conditions to the 1971 and 1974 reproductions. Immediate surround land conditions also remain relatively unchanged to the 1971 and 1974 reproductions.
- 3.1.10 The **1983** reproduction (SK09) shows the sites as horticultural land with no structures present. The crop appears to mature as rows are not visible, except in the south as rows running from north to south are visible. Immediate surround land conditions to the west and south remain relatively unchanged however, the adjacent rural property in the northwest has decreased in size with structures removed and replaced with the same crop. The site appears to be open to the same cropping conditions in the east.
- 3.1.11 The **1995** reproduction (SK10) shows the sites as horticultural land with no structures present. The crops in the central north appear to be larger. Immediate surround land conditions remain relatively unchanged to the 1983 reproduction.

- 3.1.12 The **2008** reproduction (SK11) shows the site as bare soil or planted in maize except for the northeastern corner which, is pastoral. The site is open to the wider site in the north. Hedges are present in the central north and along the eastern, western and northern boundaries. The wider sites in the west is also bare soil or maize. The rural property in the northwest is relatively unchanged. The land to the east is a horticultural crop. The land to the south is bush.
- 3.1.13 The **2010** reproduction (SK12) shows similar conditions on site to those conditions outlined in Section 2.2 with only difference being a pit in the southwestern corner.

4.0 CONSULTATION AND LITERATURE REVIEW

4.1 Waipa District Council

4.1.1 The following information was obtained from WDC via Mr. Jonny Schick:

- HAIL Status.

4.1.2 The wider site is listed on WDC Selected Land Use Register (SLUR) as presented in Table 2: WDC Selected Landuse Status.

Table 2: WDC Selected Landuse Status

NAME	Kaipaki Road Orchard
STATUS	Current
CLASSIFICATION	Unverified HAIL
HAIL	A.10. Persistent pesticide bulk storage or use

4.2 Waikato Regional Council

4.2.1 The following information was requested from or obtained from the Waikato Regional Council (WRC) website:

- HAIL status;
- groundwater takes within 500 metres; and
- pollution incidents.

4.2.2 The site is listed on WRC SLUR as presented in Table 3: WRC Selected Landuse Status.

Table 3: WRC Selected Landuse Status

NUMBER	
NAME	
STATUS	Current
CLASSIFICATION	Unverified HAIL
HAIL	A.10. Persistent pesticide bulk storage or use

4.2.3 Groundwater is addressed in section 5.0.

4.2.5 No pollution incidents have been recorded for the site.

4.3 Mr. Jonny Schick, Current Landowner

4.3.1 Mr. Schick stated that when they took ownership in 2010 none of the following was noted: hazardous substance storage; superphosphate storage; significant soil staining; farm landfills; and historical dipping structures.

- 4.3.2 Mr. Shick stated that during his ownership they have not stored any hazardous substances or used any, other than glyphosate, or landfilled or burnt any waste at the site. Superphosphate has been applied.
- 4.3.3 Mr. Shick stated that the pit in the south west corner was a sand pit with the sand only used on site for construction purposes.
- 4.3.4 Mr. Shick stated that to his knowledge the site was previously an asparagus farm.

4.4 Mr. Peter Wing, Past Landowner

- 4.4.1 Mr. Wing was the past landowner who was occupied the site during at the time the orchard was present. Attempts to contact Mr. Wing and his son Mr. Craig Wing were made on several occasions however, they did not reply.

4.5 Mr. Paul Gardiner, Adjacent Landowner

- 4.5.1 Mr. Gardiner stated that they brought 982 Kaipaki Road, the adjacent land to the east, in 2013. At the time it was planted in apples, plums and asparagus and they converted it to kiwifruit shortly after.
- 4.5.2 Mr. Gardiner stated that to his knowledge 928 Kaipaki Road was historically part of the orchard but was only planted in asparagus.

4.6 Mr. Tony Rickman, Chairman New Zealand Asparagus Council

- 4.6.1 Mr. Rickman has grown asparagus in the Cambridge area for 40 + years and recalls that the was site was part of Mr. Peter Wings asparagus farm. To Mr. Rickman's knowledge the site was only ever planted in asparagus.
- 4.6.2 Mr. Rickman stated that only herbicides are necessary for the growing of asparagus in the Cambridge area. The standard practice in the 1980's was to spray around the seedlings with either of the preemergent herbicides Diuron or Bromacil. Mr. Rickman stated that these chemicals would also have been applied for the life of the plant. Mr. Rickman stated that asparagus do not require excessive feeding (fertilising), once a year is considered sufficient. Mr. Rickman stated that pesticides/insecticides, are not required for asparagus growing in the Waikato. If insects are an issue Mr. Rickman recommends pyrethrin based sprays.

4.7 Geotechnical Report, Mark T Mitchell Limited

- 4.7.1 A geotechnical investigation of the wider site was completed by Mark T Mitchell Limited in 2019. A total of three bores were excavated at the subject site. No obvious contamination or fill were observed in any of these bores.

5.0 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

5.1 Geology

- 5.1.1 The Mark T Mitchell Limited Geotechnical Investigation identified the soil at the site as alluvial deposits namely silts and sands. Topsoil and the underlying loam were encountered at the site at depths between 0.5 m to 1.2 m.

5.2 Hydrogeology

- 5.2.1 The Mark T Mitchell Limited Geotechnical Investigation did not encounter groundwater at the site however, groundwater was encountered at the wider site at depths between 7.8 to 8.7 m.
- 5.2.2 Based on this information it is anticipated that a shallow groundwater system is likely to be present beneath the site at approximately 9 m.

5.3 Hydrology

- 5.3.1 The nearest surface water is the Mangawhero Stream which, is located in the gully immediately to the south of the site, approximately 45 metres. The WRC does not hold any information on the water quality of this stream at the closest point to the site however, as the water catchment is predominantly pastoral and horticultural it is considered most likely to be moderate.
- 5.3.2 The Mangawhero Stream discharges to the Waikato River immediately adjacent to 899 Kaipaki Road, approximately 1 kilometre to the north of the wider site.

6.0 SITE INVESTIGATION

6.1 Walkover

- 6.1.1 A walkover was undertaken by Guy Sowry, a Director of CSI, on 4 September 2020. At the time of the walkover the day was fine with no rain.
- 6.1.2 The walkover documented the site as pastoral paddocks for horses and dry stock with no structure present other than wooden fences. No soil staining, odour or vegetation stress was noted. No past structures were noted to suggest historical chemical storage or livestock dipping. No hummocky land was noted to suggest landfilling or offal pitting. Site photos are contained in Appendix C.

6.2 Land History

6.2.1 Aerial Photos

- 6.2.1.1 Aerial photos from 1939 to 1979 document the site as pastoral with structures present. The immediate surrounding land is also pastoral.
- 6.2.1.2 Aerial photos from 1983 and 1995 show the site as horticultural land. The wider site is pastoral. The adjacent land to the east is horticultural.
- 6.2.1.3 An aerial photo from 2008 documents the site as either in maize or bare soil.
- 6.2.1.4 Aerial photos from 2010 onwards document the site as pastoral land. The wider site is also pastoral. The adjacent land to the east is horticultural.

6.2.2 Consultation

- 6.2.2.1 Information from WDC document the site as having been HAIL A.10.
- 6.2.2.2 Information from WRC document the site as having been HAIL A.10 with no recorded pollution incidents.
- 6.2.2.3 The current landowner Mr. Jonny Schick stated that when they purchased the site it was paddocks with no structures present other than farm fences and concrete troughs and there was no evidence of farm dumps, offal pits, cattle footbaths, sheep dips or superphosphate storage. Mr. Schick also stated that no chemicals have been used or stored at the site since they have owned it and no waste has been landfilled at the site.
- 6.2.2.4 The landowner of the adjacent kiwifruit orchard Mr. Paul Gardiner stated that to his knowledge the site was historically used to grow asparagus.
- 6.2.2.5 Mr. Tony Rickman Chairman NZ Asparagus Council and Cambridge asparagus farmer for 40 + years stated that the site was an old asparagus farm. Mr. Rickman stated that fertilising only needs to occur once a year, fungicides are not required in the Cambridge and preemergent herbicides such as Diuron or Bromacil would have been used for weed control.

6.2.3 Literature Review

- 6.2.3.1 The Mark Mitchel Geotechnical Investigation documents the soil on site as sands or gravels with a topsoil and loam layer down to at least 1.2 m. No evidence of contamination or landfilling at the site.

6.2.4 Proposal

- 6.2.4.1 Establishment of a sand quarry and subsequent cleanfill site. The sand will be used in the local construction industry for foundations.

6.3 Potential Ground Contamination

Pastoral Land

- 6.3.1 Pastoral land from 1939 to early 1979 and from at least 2008 onwards. Whilst pastoral farming is not considered to be HAIL the farming activities of livestock dipping, landfilling (including offal pits), chemical storage persistent pesticide application (DDT and Dieldrin to control grass grub) and the intentional or accidental release of a hazardous substance, are. A Waikato Regional Council Report titled *Historic Pesticides Residues in Horticultural and Grazing Soils in the Waikato Region*, Sally Gaw, 2003, documents the accidental release of a hazardous substance from farming practices to be: cadmium in superphosphate; and zinc in facial eczema remedies. Each of the above potential HAIL are presented below in comparison to the most sensitive landuse scenario for which the sand could be used for, rural residential with no produce consumption as most likely under hardstand:

6.3.2 Livestock Dipping, Landfilling, Chemical Storage

- 6.3.2.1 Aerial photos clearly document that the site was not occupied by structures associated with livestock dipping. Aerial photos document structures at the site. These structures may have been used to store chemicals. However, as the site was part of a wider farm it is considered that any farm chemicals would have been stored at the main yard as this was common practice.
- 6.3.2.2 Anecdotal information documents that landfilling has not occurred at the site. Anecdotal information documents no evidence of soil contamination. Geotechnical Investigation documents no fill at the site and no evidence of contamination. Site walkover by CSI documented no evidence of landfilling or soil contamination.
- 6.3.2.3 Therefore, potential ground contaminants from livestock dipping, farm landfilling and chemical storage has not occurred at the site.

6.3.3 Persistent Pesticide Application

- 6.3.3.1 It is not known if DDT and any other organochlorines were applied to the site historically. Glyphosate has been used however, it is not considered to be a persistent pesticide as its half-life is approximately 96 days.

- 6.3.3.3 The WRC Report titled *Historic Pesticides Residues in Horticultural and Grazing Soils in the Waikato Region*, Sally Gaw, 2003, documents a DDT high of 0.75 mg/kg for pastoral land. When this value is compared to the NES rural residential landuse no produce soil guideline value (SGV) for DDT of 120 mg/kg, DDT and other organochlorines are not considered to be potential ground contaminants at the site.

6.3.4 Accidental Release of Hazardous Substances - Cadmium

- 6.3.4.1 It is not known if Superphosphate' was applied historically. It has been applied during its current use as a horse farm. Superphosphate contains high concentrations of cadmium.
- 6.3.4.2 The WRC Technical Report 2005/51 *Cadmium Accumulation in Waikato Soils*, Dr. Nick Kim, 2005 documents for pastoral land a Cadmium average of 0.70 mg/kg and a Cadmium high of 1.5 mg/kg. When these concentrations are compared to the NES rural residential landuse scenario no produce (SGV) for cadmium of 110 mg/kg, the accidental release of cadmium from superphosphate application is not considered to be a potential ground contaminant at the site.

6.3.5 Accidental Release of Hazardous Substances - Zinc

- 6.3.5.1 Facial eczema remedies may have been given to stock that grazed the site. Therefore, zinc from facial eczema remedies such as boluses or fortified feed, may have been passively released by stock onto the land.
- 6.3.5.2 The WRC Report titled *Historic Pesticides Residues in Horticultural and Grazing Soils in the Waikato Region*, Sally Gaw, 2003, documents a zinc high of 58 mg/kg for pastoral land. When this value is compared to a NES approved landuse scenario SGV for zinc of 200 mg/kg, the accidental release of zinc is not considered to be a potential contaminant at the site.

Market Garden

- 6.3.6 Asparagus farm from at least 1983 to 1995. Persistent pesticide use and or storage associated with market gardening is a HAIL. Preemergent herbicides such as Diuron or Bromacil will more than likely have been used. Pyrethrin based insecticides may have been used. Glyphosate is not considered a persistent pesticide. Anecdotal information shows that organochlorines were not used in the industry.

Herbicides – Diuron and Bromacil

- 6.3.6.1 The United States of America Pesticides Action Network Pesticide Chemical Database website documents the aerobic soil half-life of Diuron to be 372 days and the aerobic soil half-life of Bromacil to be 347 days.
- 6.3.6.2 Using the soil half-life equation it would take approximately 2,232 days for Diuron the chemical with the highest half life, to no longer be present in soil. That is it would take approximately 6 years for the historical herbicides used in asparagus farming to degrade.

- 6.3.6.3 As these chemicals were more than likely used by a past owner over 25 years ago, they will have degraded and therefore are not considered to be potential ground contaminants at the site.

Pyrethrin Insecticides

- 6.3.6.4 A search of the United States of America Pesticides Action Network Pesticide Chemical Database for all Type I and Type II pyrethroids documents that bifenthrin has the highest soil half-life of 95 days. Using the soil half-life equation in the United States of America National Pesticide Information Centre's website it would take approximately 665 days for bifenthrin to no longer be present in soil. That's is just under two years to totally degrade.
- 6.3.6.5 As these chemicals may have been used by a past owner over 25 years ago, they will have degraded and therefore are not considered to be potential ground contaminants at the site.

Conclusion

- 6.3.7 Based on the above information it is considered that there are no potential contaminants at the site.

6.4 Known HAIL

- 6.4.1 The wider site is listed by both the WDC and the WRC as unverified HAIL A.10.

6.5 Potential HAIL

- 6.5.1 The application of persistent pesticides to land HAIL: A.10 – has not occurred at the site. Therefore, it is considered that HAIL A:10 has not occurred at the site.

6.6 Conceptual Site Model

- 6.6.1 A conceptual site model for the future sand quarry including the use of sand in the construction industry is presented in Table 4: Conceptual Site Model.

Table 4: Conceptual Site Model

ELEMENTS		CONTAMINANTS
HAZARDS		None.
PATHWAY	Air	Soil will be exposed in accordance with a site operating/management plan.
	Stormwater	To land. 45 metres down a vegetated gully to the nearest surface water.
	Groundwater	A shallow unconfined (sand soil) groundwater system at approximately 9 m more than likely beneath the site.
	Contact	Direct contact with the soil during construction. Direct contact with the soil during occupation. The site is considered to be of local importance – sand resource. However, as the sand is only to be used in the construction industry it is considered that there will no significant risk to microbial processes, soil invertebrates, plants and wildlife.
RECEPTOR	Human Health	On site – development workers and future occupiers. Off site – development workers, future occupiers and maintenance workers.
	Ecological	On site – none. Off site – aquatic organisms.
	Built	None.
RISK	Human Health	LOW
	Ecological	
	Built	

6.6.2 The Conceptual Site Model documents a low risk to human health and the environment, as there are no identified potential contaminants/hazards. Without a hazard source a pathway link to potential receptors is unable to be established.

6.7 Risk Assessment

6.7.1 A risk assessment is not required as the risk to human health and the environment at the site is considered to be **LOW** as demonstrated by the conceptual site model.

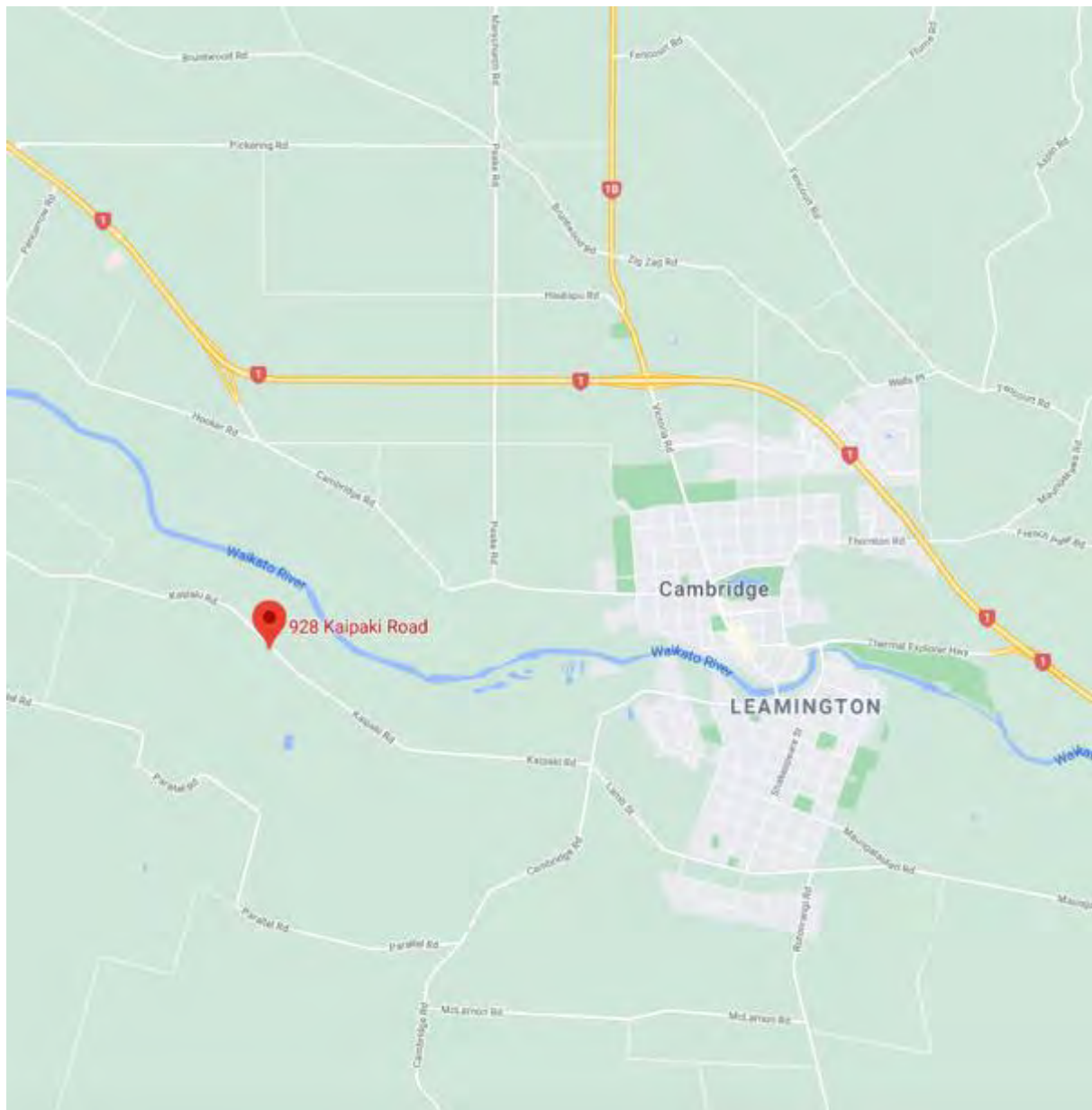
7.0 CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

- 7.1.1 The purpose of this investigation was to determine if a Hazardous Activity or Industry has occurred or is occurring at a site with 928 Kaipaki Road, Ohaupo.
- 7.1.2 A desk top investigation by Guy Sowry of CSI comprising a review of historical photos consultation, and a site walkover, documents that a HAIL has not occurred at the site.
- 7.1.3 The Conceptual Site Model documents a **LOW** risk to human health and the environment as contaminant pathways are considered to be incomplete as there are no identified potential contaminants/hazards.
- 7.1.4 Therefore, it is highly unlikely that there will be a risk to human health or the environment if the site is developed into an industrial site and the sand is used for construction purposes.

7.2 Recommendations

- 7.2.1 No further contaminated land investigations are required for this application.
- 7.2.2 That the site is recorded on the WDC and the WRC Landuse Information Registers as 'Entered in Error'. However, it should also be noted that the cleanfill operation will allow metal concentrations above the NES Rural Residential metal SGV's and therefore, once a cleanfill consent is granted the wider site should be listed as 'Verified HAIL G.3 – no sampling'.



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	FIGURE 1
	SITE LOCATION



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	FIGURE 1
	SITE LOCATION

APPENDIX A

REPORT CONDITIONS

This report is prepared solely for the benefit of Shaw Holdings Ltd and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, with the limitations stated, to the conditions of site at the time of the investigation. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on aerial photos, anecdotal information and a site walkover. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research.

Whilst the findings detailed in this report reflect our best assessment, we are unable to give categorical assurances that they will be accepted by regulatory authorities without questions as such authorities may have unpublished more stringent objectives. This report is prepared and written for the proposed uses stated in the report and should not be used in a different context without reference to CSI. In time approved practices or amended legislation may necessitate a re-assessment.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspects especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report. If migrating pollution or contaminants (past or present) exists further research will be required before the effects can be better determined.

APPENDIX B

AERIAL PHOTOS



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK01
	1939



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK02
	1943



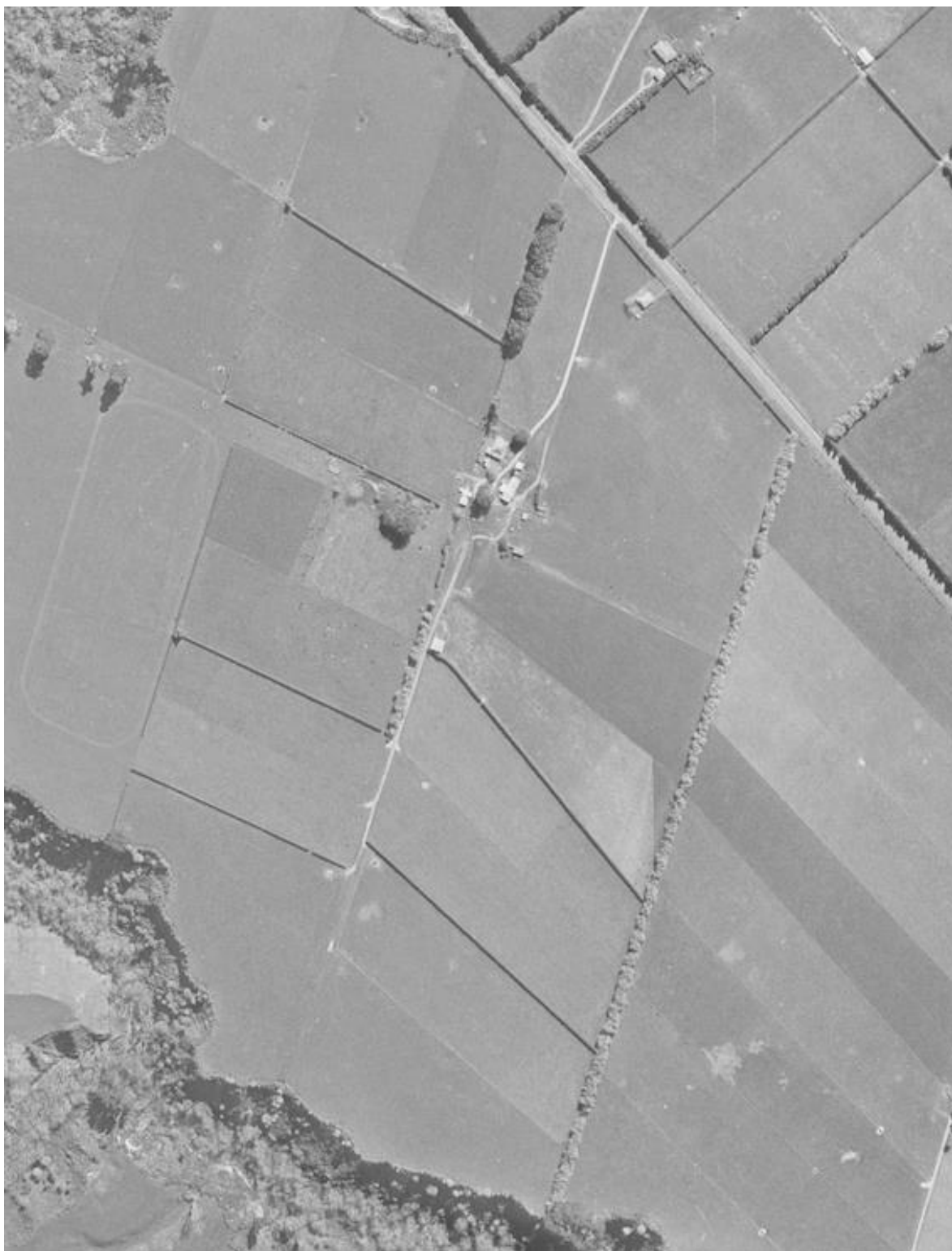
CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK03
	1953



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK04
	1957



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK05
	1967



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK06
	1971



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK07
	1974



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK08
	1979



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK09
	1983



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	1995
	SK10



CSI Contaminated Site Investigations 34 Brookfield Street Hamilton	298 KAIPAKI ROAD
	SK11
	2008



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CSI

Contaminated Site Investigations
34 Brookfield Street
Hamilton

298 KAIPAKI ROAD

SK12

2010

APPENDIX B**SITE PHOTOS**



SOUTH



NORTH



PIT