



31 August 2023

Andrew McAlister  
[amac.nz1@gmail.com](mailto:amac.nz1@gmail.com)

Dear Andrew,

## DESKTOP REVIEW BLOCK B – 1275 TRAM ROAD, SWANNANOA (PT RURAL SEC 8183 BLK XIII RANGIORA SD)

### 1.0 Introduction

Pattle Delamore Partners (PDP) was commissioned by Andrew McAllister to undertake a desktop review of available data to assess any potential geotechnical risks associated with the proposed rezoning of approximately 21.2 ha of land comprising 1275 Tram Road, Swannanoa (PT RURAL SEC 8183 BLK XIII RANGIORA SD) rural zoned to residential zoned. For the purposes of this review the foregoing Lots will be collectively referred to as “Block B”.

The Waimakariri district plan indicates Block B is currently zoned for rural land use. It is understood that it is proposed rezone Block B to residential land use. The property details of the properties which comprise Block B are summarised in Table 1.

**Table 1: Summary Block B Property Details**

Physical Address	Legal Description	Approximate Land Area (ha)	Existing Landuse
1275 Tram Road, Swannanoa	PT RURAL SEC 8183 BLK XIII RANGIORA SD	21.2 ha	Rural (farmland)

### 2.0 Desktop Review

The following sections outline findings of the desktop review.

#### 2.1 Groundwater

A review of Environment Canterbury (Ecan) Well Search Database well M35/2601 located within Block B indicates a groundwater level beneath Block B of approximately 8.0 metres below ground level (m bgl). Wells BW23/0425, M35/7329 and BW23/0230 located in adjacent properties to the south, west and east of Block A respectively, indicate groundwater depths ranging between approximately 4.9 and 7.5 m bgl.

The locations of the wells are indicated on Figure 1. A summary of the well details is presented in Table 2 and the full Ecan data sheets presented in Appendix A.



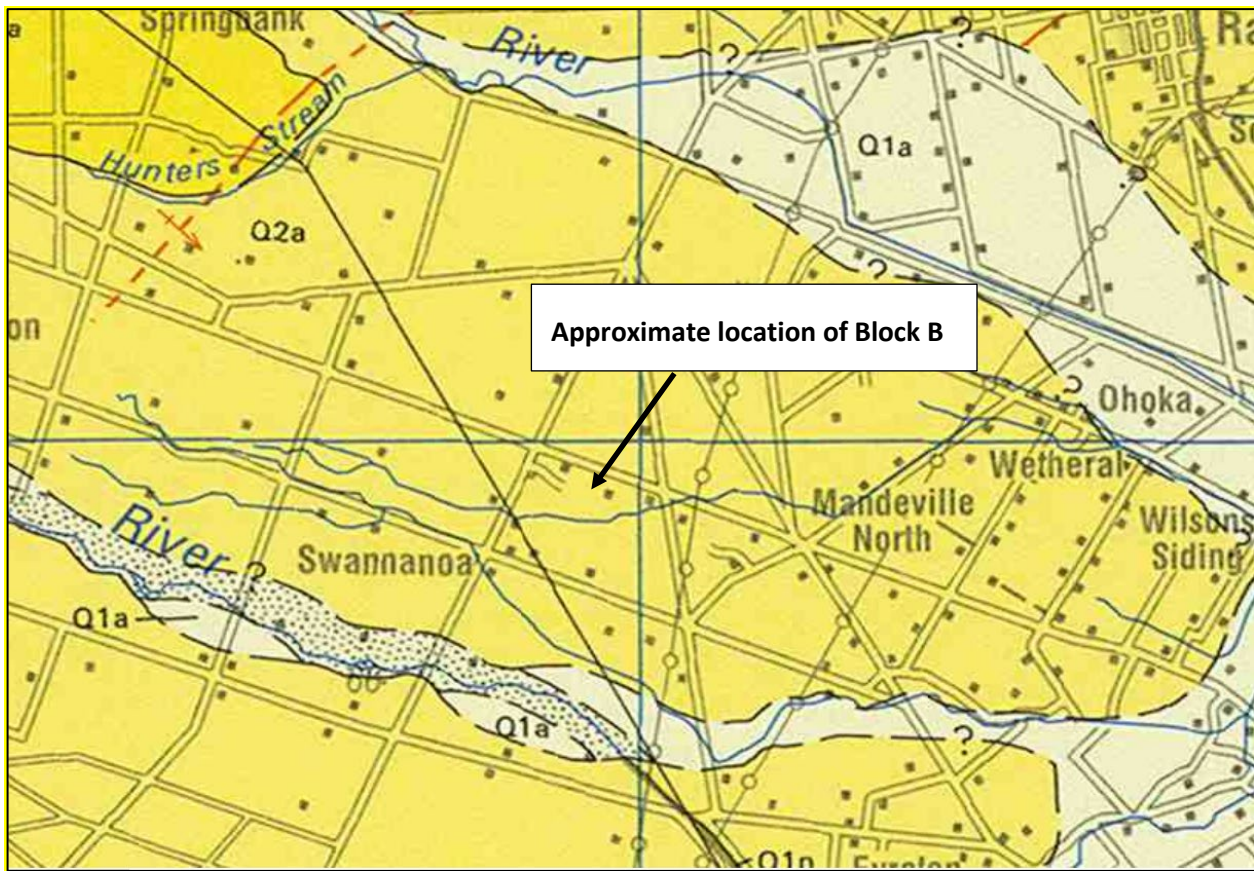


Figure 2: Geological Map of the Swannanoa area indicating the approximate location of Block B.

### 2.3 New Zealand Geological Database (NZGD)

A review of data available on the New Zealand Geotechnical Database (NZGD) indicates that three test pits numbered TP\_169561, TP\_169162 and TP\_169653 were undertaken at the location of the Mandeville Water Reservoir, 937 Two Chain Road, Mandeville (approximately 900 m west of Block B) to an approximate depth of 4.0 m bgl in May 2021. The test pit logs indicate the site is generally underlain by silty SAND and silty, sandy GRAVEL with minor cobbles inferred to be Late Pleistocene River deposits. Groundwater was not encountered in any of the test pits.

A Shallow hand auger investigation undertaken with the Swannanoa School site numbered 62996 directly west of Block B encountered soils described as gravelly SILT inferred to be Springston Formation. The NZGD logs are presented in Appendix B.

### 2.4 Liquefaction Susceptibility

A review of Canterbury Maps 2009 Waimakariri liquefaction susceptibility assessment indicates that Block B is underlain by “river sediments <10,000 years old (active river beds & flood plains)” and has a small possibility liquefaction in isolated areas during strong shaking. The Waimakariri District Council natural hazards viewer maps the area containing Block B as “liquefaction damage is unlikely”.

Due to the depth of the groundwater at the Block B site as described in Section 2.0 the risk of liquefaction is considered low.

## 2.5 Active Faults Database

A review of GNS active faults database (accessed 11/08/2023), indicates that several active faults are located within the general proximity of Block B, based on the distance from the site to any of the nearby mapped active faults there is no direct risk from fault rupture. A summary of the closest active faults to Block B are summarised in Table 3.

**Table 3: Summary of the closest mapped active faults in proximity of Block B**

Fault Name	Approximate Distance (km) to fault from Block B	Direction of fault location relative to Block B	Recurrence Interval (RI) years
Greendale	25 km	South	>10,000 to <=20,000
Hororata	35 km	Southwest	Unknown
Ashley	12 km	North	Unknown
Cust	15 km	Northwest	Unknown
Ashley Gorge	26 km	Northwest	Unknown

*Notes:*

1. Data sourced from GNS Science active fault database (<https://data.gns.cri.nz/af>), accessed on 11/08/2023.

## 2.6 Review of Historical Aerial Photography

The following outlines a review for the available historical aerial photographs:

### 2.6.1 Retrolens:

**1945** – Block B comprises arable / pastoral farmland, small to medium size creek / stream crosses the southern part of the site.

**1955** – Shed built on northwestern side of the site adjacent to boundary with church and graveyard

**1975 – 1979** - Buildings inferred to be dwelling built in northeastern part of site opposite previously identified shed.

**1984 – 1999** - No change as above

### 2.6.2 Canterbury Maps:

**2000 - 2010** – Land directly west of Block B has been developed into residential lots, No change to Block B site.

**2010 -2015** - Area south of dwelling developed into handstand with new shed construction.

### 2.6.3 Google Earth:

**2022 – Present day** - Creek that naturally ran through the southern part of the site has had its sides shallowed to form a swale through the paddock. A new open drain has been constructed along the southern site boundary.

### 3.0 Conclusion

Based on the foregoing desktop review, the following geotechnical hazards may be present at the Block B location:

- ∴ The natural soils underlying Block B generally comprise silty SAND and silty, sandy GRAVEL with minor cobbles inferred to be Late Pleistocene River deposits. No compressible organic materials have been identified during the desktop review.
- ∴ Due to the proximity of Block B to mapped active faults the risk of significant land damage due to seismic shaking is considered low.
- ∴ The Waimakariri District Council natural hazards viewer maps the area containing Block B as “*liquefaction damage is unlikely*”. Due to the depth of the groundwater (4.6 m bgl) beneath Block B the risk of liquefaction is considered low.
- ∴ This geotechnical desktop hazard assessment is based only on publicly available information and no site-specific investigations within Block B have been undertaken.

Based on the foregoing there are no geotechnical risks at the Block B site that would preclude residential development of the site.

### 4.0 References

Canterbury Maps: <https://canterburymaps.govt.nz/>, accessed 10/08/2023.

Environment Canterbury Well Search: <https://www.ecan.govt.nz/data/well-search>, accessed on 10/08/2023.

Forsyth, P.J.; Barrell, D.J.A.; Jongens, R. (compiler) 2008. Geology of the Christchurch area. Institute of Geological and Nuclear Sciences 1:250,000 geological map 16. 1 sheet + 67 p. Lower Hutt, New Zealand: Institute of Geological and Nuclear Sciences Limited.

GNS Active Fault Database: <https://data.gns.cri.nz/af/>, accessed 11/08/2023.

New Zealand Geotechnical Database ([www.nzgd.co.nz](http://www.nzgd.co.nz)), accessed 10/08/2023.

Retrolens Historical Image Resource: <https://retrolens.co.nz/> - Accessed 10/08/2023.

Waimakariri District Natural Hazards interactive Viewer:

<https://waimakariri.maps.arcgis.com/apps/MapSeries/index.html> - Accessed 10/08/2023.

## 5.0 Limitations

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Andrew McAllister and others (not directly contracted by PDP for the work), including the New Zealand Geotechnical Database and Retrolens. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

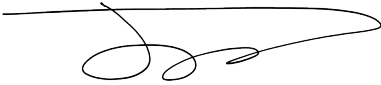
This report has been prepared by PDP on the specific instructions of Andrew McAllister for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

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Yours faithfully

### PATTLE DELAMORE PARTNERS LIMITED

Prepared by



**Jason Grieve**

Senior Engineering Geologist

Reviewed and Approved by



**Andrew Smith**

Technical Director (Geotechnics)



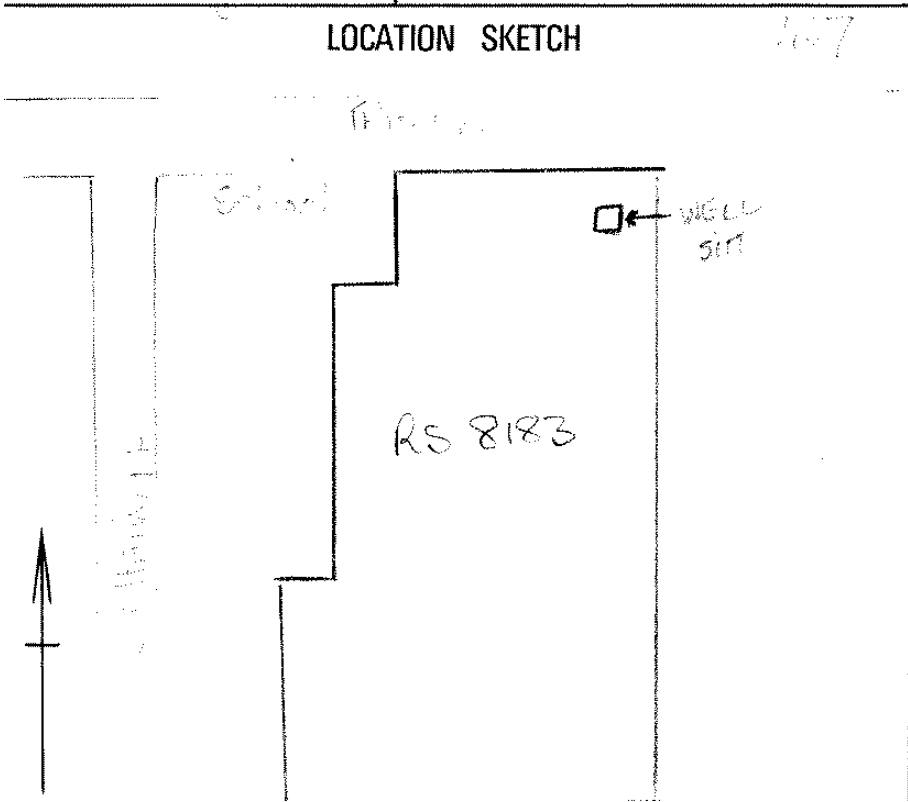
## Appendix A: Ecan - Well Search

# M35/2601 details

## Details

<b>Well Number</b>	M35/2601	<b>File Number</b>	CO6C/00432
<b>Owner</b>	COSTER, D.G.R.& M.J.C.	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	TRAM RD	<b>NZTM Grid Reference</b>	BW23:59403-97781
<b>Locality</b>	Swannanoa	<b>NZTM X and Y</b>	1559403 - 5197781
<b>Location Description</b>		<b>Location Accuracy</b>	50 - 300m
<b>CWMS Zone</b>	Waimakariri	<b>Use</b>	Irrigation,
<b>Groundwater Allocation Zone</b>	Eyre River	<b>Water Level Monitoring</b>	
<b>Depth</b>	30.00m	<b>Water Level Count</b>	5
<b>Diameter</b>	200mm	<b>Initial Water Level</b>	10.60m below MP
<b>Measuring Point Description</b>		<b>Highest Water Level</b>	8.05m below MP
<b>Measuring Point Elevation</b>	54.29m above MSL (Lyttelton 1937)	<b>Lowest Water Level</b>	10.60m below MP
<b>Elevation Accuracy</b>	< 2.5 m	<b>First reading</b>	29 Jul 1983
<b>Ground Level</b>	0.00m above MP	<b>Last reading</b>	14 Oct 1983
<b>Strata Layers</b>	0	<b>Calc Min 80%</b>	10.60m below MP (Estimated)
<b>Aquifer Name</b>		<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>	Unknown	<b>Yield Drawdown Tests</b>	1
<b>Drill Date</b>	29 Jul 1983	<b>Max Tested Yield</b>	8 l/s
<b>Driller</b>	McMillan Drilling Ltd	<b>Drawdown at Max Tested Yield</b>	12 m
<b>Drilling Method</b>	Rotary/Percussion	<b>Specific Capacity</b>	0.65 l/s/m
<b>Casing Material</b>		<b>Last Updated</b>	29 Jun 2023
<b>Pump Type</b>	Unknown	<b>Last Field Check</b>	14 Oct 1983
<b>Water Use Data</b>	No		





### Screens

SCREEN NO.	SCREEN TYPE	TOP (M)	BOTTOM (M)	SLOT SIZE (MM)	SLOT LENGTH (MM)	DIAMETER (MM)	LEADER LENGTH (MM)
1	Stainless steel	28	30				

### Step Tests

STEP TEST DATE	STEP	YIELD (L/S)	YIELD (GPM)	DRAWDOWN (M)	STEP DURATION (HOURS)
29 Jul 1983	1	7.6	100.3062	11.7	2

### Comments

COMMENT DATE	COMMENT
	NO LOG EXISTS
10 Jan 2023	Reference Level updated using LiDAR imagery in Dec 2022. The existing RL was 53.31 and the QAR RL was 4. The method of calculating the original RL was: Interpolated DTM. If GL from MP is updated in future please assess if RL

COMMENT DATE	COMMENT
	also needs to be updated.

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Retrieved: 4:11pm, Wed 09 Aug 2023  
<https://www.ecan.govt.nz/data/well-search/>

# BW23/0230 details

## Details

<b>Well Number</b>	BW23/0230	<b>File Number</b>	
<b>Owner</b>	Vicky Leigh and Robert Karl Jenkins	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	1253C Tram Road	<b>NZTM Grid Reference</b>	BW23:59573-97339
<b>Locality</b>	Swannanoa	<b>NZTM X and Y</b>	1559573 - 5197339
<b>Location Description</b>	Behind the shed/South East Corner	<b>Location Accuracy</b>	50 - 300m
<b>CWMS Zone</b>	Waimakariri	<b>Use</b>	Domestic Supply,
<b>Groundwater Allocation Zone</b>	Eyre River	<b>Water Level Monitoring</b>	
<b>Depth</b>	23.75m	<b>Water Level Count</b>	1
<b>Diameter</b>	150mm	<b>Initial Water Level</b>	4.96m below MP
<b>Measuring Point Description</b>	TOC	<b>Highest Water Level</b>	4.96m below MP
<b>Measuring Point Elevation</b>		<b>Lowest Water Level</b>	4.96m below MP
<b>Elevation Accuracy</b>		<b>First reading</b>	10 Nov 2014
<b>Ground Level</b>	0.30m below MP	<b>Last reading</b>	10 Nov 2014
<b>Strata Layers</b>	8	<b>Calc Min 80%</b>	
<b>Aquifer Name</b>		<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>		<b>Yield Drawdown Tests</b>	1
<b>Drill Date</b>	10 Nov 2014	<b>Max Tested Yield</b>	
<b>Driller</b>	McMillan Drilling Ltd	<b>Drawdown at Max Tested Yield</b>	
<b>Drilling Method</b>	Rotary/Percussion	<b>Specific Capacity</b>	0.98 l/s/m
<b>Casing Material</b>	Steel	<b>Last Updated</b>	29 Jun 2023
<b>Pump Type</b>		<b>Last Field Check</b>	10 Nov 2014
<b>Water Use Data</b>	No		

## Screens

SCREEN NO.	SCREEN TYPE	TOP (M)	BOTTOM (M)	SLOT SIZE (MM)	SLOT LENGTH (MM)	DIAMETER (MM)	LEADER LENGTH (MM)
1	Stainless steel	22.25	23.75	2.5			

## Step Tests

STEP TEST DATE	STEP	YIELD (L/S)	YIELD (GPM)	DRAWDOWN (M)	STEP DURATION (HOURS)
10 Nov 2014	1	1.51	19.9292564	1.54	2

## Comments

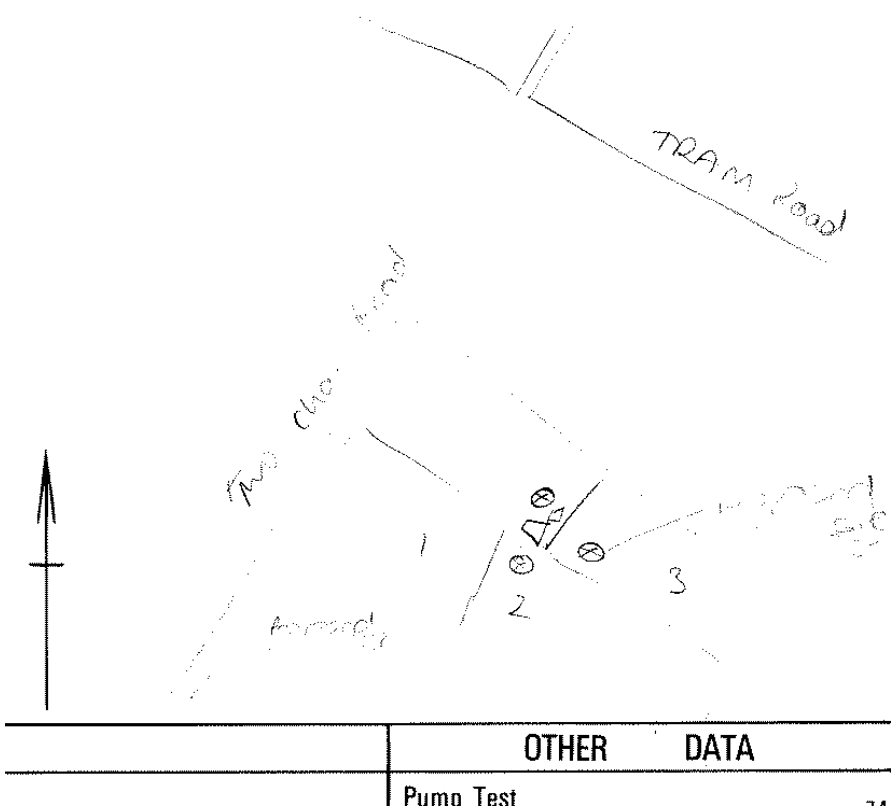
COMMENT DATE	COMMENT
24 May 2023	NZTM Easting/Northing updated from:1559469-5197359 shifted 105m

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<https://www.ecan.govt.nz/data/well-search/>

# M35/7329 details

## Details

<b>Well Number</b>	M35/7329	<b>File Number</b>	CO6C/10253
<b>Owner</b>	FASTIER, K.W	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	TWO CHAIN ROAD	<b>NZTM Grid Reference</b>	BW23:58853-97451
<b>Locality</b>	Swannanoa	<b>NZTM X and Y</b>	1558853 - 5197451
<b>Location Description</b>	LOT 3 BACK LEFT	<b>Location Accuracy</b>	50 - 300m
<b>CWMS Zone</b>	Waimakariri	<b>Use</b>	Domestic Supply,
<b>Groundwater Allocation Zone</b>	Eyre River	<b>Water Level Monitoring</b>	
<b>Depth</b>	18.00m	<b>Water Level Count</b>	0
<b>Diameter</b>	125mm	<b>Initial Water Level</b>	5.70m below MP
<b>Measuring Point Description</b>		<b>Highest Water Level</b>	
<b>Measuring Point Elevation</b>	57.57m above MSL (Lyttelton 1937)	<b>Lowest Water Level</b>	
<b>Elevation Accuracy</b>	< 2.5 m	<b>First reading</b>	
<b>Ground Level</b>	0.00m above MP	<b>Last reading</b>	
<b>Strata Layers</b>	4	<b>Calc Min 80%</b>	7.70m below MP (Estimated)
<b>Aquifer Name</b>		<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>	Unknown	<b>Yield Drawdown Tests</b>	1
<b>Drill Date</b>	23 Jan 1996	<b>Max Tested Yield</b>	5 l/s
<b>Driller</b>	McMillan Drilling Ltd	<b>Drawdown at Max Tested Yield</b>	6 m
<b>Drilling Method</b>	Rotary/Percussion	<b>Specific Capacity</b>	0.75 l/s/m
<b>Casing Material</b>	STEEL	<b>Last Updated</b>	29 Jun 2023
<b>Pump Type</b>	Unknown	<b>Last Field Check</b>	
<b>Water Use Data</b>	No		



## Screens

SCREEN NO.	SCREEN TYPE	TOP (M)	BOTTOM (M)	SLOT SIZE (MM)	SLOT LENGTH (MM)	DIAMETER (MM)	LEADER LENGTH (MM)
1	Stainless steel	16.5	18				

## Step Tests

STEP TEST DATE	STEP	YIELD (L/S)	YIELD (GPM)	DRAWDOWN (M)	STEP DURATION (HOURS)
23 Jan 1996	1	4.5	59.3918266	6	24

## Comments

COMMENT DATE	COMMENT
10 Jan 2023	Reference Level updated using LiDAR imagery in Dec 2022. The existing RL was 54.77 and the QAR RL was 4. The method of calculating the original RL was: Interpolated DTM. If GL from MP is updated in future please assess if RL also needs to be updated.

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<https://www.ecan.govt.nz/data/well-search/>

# BW23/0425 details

## Details

<b>Well Number</b>	BW23/0425	<b>File Number</b>	
<b>Owner</b>	Alejandro Pfurr and Sarah Gray	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	17 Long View Lane	<b>NZTM Grid Reference</b>	BW23:59059-97188
<b>Locality</b>	Swannanoa	<b>NZTM X and Y</b>	1559059 - 5197188
<b>Location Description</b>		<b>Location Accuracy</b>	50 - 300m
<b>CWMS Zone</b>	Waimakariri	<b>Use</b>	Domestic and Stockwater,
<b>Groundwater Allocation Zone</b>	Eyre River	<b>Water Level Monitoring</b>	
<b>Depth</b>	23.51m	<b>Water Level Count</b>	1
<b>Diameter</b>	150mm	<b>Initial Water Level</b>	7.55m below MP
<b>Measuring Point Description</b>		<b>Highest Water Level</b>	7.55m below MP
<b>Measuring Point Elevation</b>	56.12m above MSL (Lyttelton 1937)	<b>Lowest Water Level</b>	7.55m below MP
<b>Elevation Accuracy</b>	< 2.5 m	<b>First reading</b>	18 Jan 2017
<b>Ground Level</b>		<b>Last reading</b>	18 Jan 2017
<b>Strata Layers</b>	6	<b>Calc Min 80%</b>	
<b>Aquifer Name</b>		<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>		<b>Yield Drawdown Tests</b>	1
<b>Drill Date</b>	18 Jan 2017	<b>Max Tested Yield</b>	
<b>Driller</b>	Hydrill	<b>Drawdown at Max Tested Yield</b>	
<b>Drilling Method</b>	Rotary Rig	<b>Specific Capacity</b>	1.00 l/s/m
<b>Casing Material</b>	Steel	<b>Last Updated</b>	29 Jun 2023
<b>Pump Type</b>		<b>Last Field Check</b>	18 Jan 2017
<b>Water Use Data</b>	No		

## Screens



SCREEN NO.	SCREEN TYPE	TOP (M)	BOTTOM (M)	SLOT SIZE (MM)	SLOT LENGTH (MM)	DIAMETER (MM)	LEADER LENGTH (MM)
1	Stainless steel	19.01	22.45				

## Step Tests

STEP TEST DATE	STEP	YIELD (L/S)	YIELD (GPM)	DRAWDOWN (M)	STEP DURATION (HOURS)
18 Jan 2017	1	3	39.59455	3	2

## Comments

COMMENT DATE	COMMENT
07 Feb 2017	address updated from Winters Rd to 17 Long View Lane on direction by Hydrill; lot is in new subdivision not included on existing maps
10 Jan 2023	Reference Level updated using LiDAR imagery in Dec 2022. The existing RL was null and the QAR RL was 5. The method of calculating the original RL was: no height assigned. If GL from MP is updated in future please assess if RL also needs to be updated.

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Retrieved: 4:13pm, Wed 09 Aug 2023

<https://www.ecan.govt.nz/data/well-search/>



## Appendix B: New Zealand Geotechnical Database (NZGD)



Swannanoa School

Information in this map has been derived from various sources including the Kaitiaki District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimata District, Mackenzie District, Timaru District and Waitaki District's databases.  
 Boundary information is derived under licence from LINZ Digital Cadastral Database (Crown Copyright Reserved). The aforementioned Councils do not give and expressly disclaim any warranty as to the accuracy or completeness of the information or its fitness for any purpose.  
 Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.



0 0.01 0.02 0.03 0.04 km

Scale: 1:614 @A3

Map Created by Canterbury Maps on 12:43:22 p.m.



Environment Canterbury Regional Council; Hurunui District Council; Waimakariri District Council; Timaru District Council; Waimate District Council; Mackenzie

SOURCE: Canterbury Maps via Environment Canterbury GIS viewer, obtained from <http://canterburymaps.govt.nz/Viewer/>, on 16 June 2015



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**Project:** Swannanoa School New Classrooms  
 Geotechnical Assessment  
**Project No.:** 4-11427.01 / 00GEO  
**Client:** Ministry of Education

**Site Investigation Plan**

**Drawn:** Geotechnical Engineer

**Date:** 17 June 2015



# Auger Scala No. HA/SC 1

Project: Swannanoa School New Classrooms  
 Client: Ministry of Education  
 Project No.: 4-11427.01  
 Location: 1305 Tram Road, Rangiora  
 North-east corner of proposed building footprint

Coordinates: 1559184 E 5198011 N  
 Ref. Grid: NZTM2000  
 R.L.: Not established  
 Depth: 0.3 m

GEOLOGY/UNIT	DESCRIPTION	GRAPHIC LOG	WATER LEVEL	SOIL TESTS						
				R.L. (m)	DEPTH (m)	SCALA PENETROMETER (Blows per 100mm)	SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES	
TS	Sandy SILT with some gravel; dark brown. "Soft"; dry; no plasticity; sand, fine; gravel, fine to coarse, subangular to rounded, greywacke. Rootlets present (TOPSOIL).				0	0				C.S
SPRINGSTON FORMATION	Gravelly SILT; brown. "Soft"; dry; no plasticity; gravel, fine to coarse, subangular to rounded, greywacke.			0.1	10					
	End of hole at 0.30 m. Unable to auger further due to gravel.			0.2	15					
				0.3	20					
				0.4	21					
				0.5	21					
				0.6						
				0.7						
				0.8						
				0.9						

AUGER SCALA LOG A4 - SWANNANOA SCHOOL NEW CLASSROOMS V2.GPJ\_OPUS\_TEM\_2015.GDT\_12/8/15

- Notes:
1. TS = TOPSOIL
  2. C.S = Soil sample collected for contamination laboratory testing
  3. Soil consistency from field description shown in quotation marks (" ")
  4. Coordinates estimated from Google Earth

Date Tested: 2/06/2015  
 Date Reported: 2/06/2015  
 Logged by: B Menefy

Test Methods:  
 Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001



# Auger Scala No. HA/SC 2

Project: Swannanoa School New Classrooms  
 Client: Ministry of Education  
 Project No.: 4-11427.01  
 Location: 1305 Tram Road, Rangiora  
 North-west corner of proposed building footprint

Coordinates: 1559165 E 5198017 N  
 Ref. Grid: NZTM2000  
 R.L.: Not established  
 Depth: 0.2 m

GEOLOGY/UNIT	DESCRIPTION	GRAPHIC LOG	WATER LEVEL	SOIL TESTS					
				R.L. (m)	DEPTH (m)	SCALA PENETROMETER (Blows per 100mm)	SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES
TS	Sandy SILT with some gravel; dark brown. "Soft"; dry; no plasticity; sand, fine; gravel, fine to coarse, subangular to rounded, greywacke. Rootlets present (TOPSOIL).				0	0			
SPRINGSTON FORMATION	Gravelly SILT; brown. "Soft"; dry; no plasticity; gravel, fine to coarse, subangular to rounded, greywacke.			0.1	10				
	End of hole at 0.20 m. Unable to auger further due to gravel.			0.2	12				
				0.3	10				
				0.4	14				
				0.5	18				
				0.6					
				0.7					
				0.8					
				0.9					

- Notes:
1. TS = TOPSOIL
  2. Soil consistency from field description shown in quotation marks (" ")
  3. Coordinates estimated from Google Earth

Date Tested: 2/06/2015  
 Date Reported: 2/06/2015  
 Logged by: B Menefy

Test Methods:  
 Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001  
 Image Log and Log Symbols, NZ Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.



# Auger Scala No. HA/SC 3

Project: Swannanoa School New Classrooms  
 Client: Ministry of Education  
 Project No.: 4-11427.01  
 Location: 1305 Tram Road, Rangiora  
 South-west corner of proposed building footprint

Coordinates: 1559175 E 5197986 N  
 Ref. Grid: NZTM2000  
 R.L.: Not established  
 Depth: 0.3 m

GEOLOGY/UNIT	DESCRIPTION	GRAPHIC LOG	WATER LEVEL	R.L. (m)	DEPTH (m)	SOIL TESTS				
						SCALA PENETROMETER (Blows per 100mm)		SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES
TS	Sandy SILT with some gravel; dark brown. "Soft"; dry; no plasticity; sand, fine; gravel, fine to coarse, subangular to rounded, greywacke. Rootlets present (TOPSOIL).				0	0				C.S
SPRINGSTON FORMATION	Gravelly SILT; brown. "Soft"; dry; no plasticity; gravel, fine to coarse, subangular to rounded, greywacke.				0.1	10				
	End of hole at 0.30 m. Unable to auger further due to gravel.				0.2	15				
					0.3	18				
					0.4	14				
					0.5	12				
					0.6	10				
					0.7	8				
					0.8	6				
					0.9	4				

AUGER SCALA LOG A4 - SWANNANOA SCHOOL NEW CLASSROOMS V2.GPJ\_OPUS\_TEM\_2015.GDT\_12/8/15

- Notes:
1. TS = TOPSOIL
  2. C.S = Soil sample collected for contamination laboratory testing
  3. Soil consistency from field description shown in quotation marks (" ")
  4. Coordinates estimated from Google Earth

Date Tested: 2/06/2015  
 Date Reported: 2/06/2015  
 Logged by: B Menefy

Test Methods:  
 Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001

Image Log accordance with NZS Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.



# Auger Scala No. HA/SC 4

Project: Swannanoa School New Classrooms  
 Client: Ministry of Education  
 Project No.: 4-11427.01  
 Location: 1305 Tram Road, Rangiora  
 South-east corner of proposed building footprint

Coordinates: 1559157 E 5197992 N  
 Ref. Grid: NZTM2000  
 R.L.: Not established  
 Depth: 0.25 m

GEOLOGY/UNIT	DESCRIPTION	GRAPHIC LOG	WATER LEVEL	SOIL TESTS																
				R.L. (m)	DEPTH (m)	SCALA PENETROMETER (Blows per 100mm)		SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES										
						0	2				4	6	8	10	12	14	16	18	20	
TS	Sandy SILT with some gravel; dark brown. "Soft"; dry; no plasticity; sand, fine; gravel, fine to coarse, subangular to rounded, greywacke. Rootlets present (TOPSOIL).																			
SPRINGSTON FORMATION	Gravelly SILT; brown. "Soft"; dry; no plasticity; gravel, fine to coarse, subangular to rounded, greywacke.				0.1															
	End of hole at 0.25 m. Unable to auger further due to gravel.				0.2															
					0.3															
					0.4															
					0.5															
					0.6															
					0.7															
					0.8															
					0.9															

- Notes:
1. TS = TOPSOIL
  2. Soil consistency from field description shown in quotation marks (" ")
  3. Coordinates estimated from Google Earth

Date Tested: 2/06/2015  
 Date Reported: 2/06/2015  
 Logged by: B Menefy

Test Methods:  
 Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988  
 Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001  
 Image Log and Log Symbols, NZ Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.



## Log Key Sheet

### CLASSIFICATION

Based on USBR Unified Soil Classification System

### WATER



Water level on date shown

### METHOD

OB	open barrel
W	wash boring
TT	triple tube
UT	thin walled undisturbed tube
ISPT	standard penetration test
MA	machine auger
HA	Hand Auger
PS	piston sample
SNC	Sonic drilling
VE	Vacuum Extraction
CP	Cable Percussion

### SAMPLES

D	Small disturbed sample
B	Bulk disturbed sample
U	Undisturbed sample
UT	Thin wall open drive tube sample (push tube)
W	Water sample

### MOISTURE

D	Dry, looks and feels dry
M	Moist, no free water on hand when remoulding
W	Wet, free water on hand when Remoulding

### CONSISTENCY

Cohesive Soils		Undrained Shear Strength (kPa)	Non-cohesive Soils		SPT – Uncorrected
VS	Very soft	<12	VL	Very loose	0 to 4
S	Soft	12 to 25	L	Loose	4 to 10
F	Firm	25 to 50	MD	Medium dense	10 to 30
St	Stiff	50 to 100	D	Dense	30 to 50
VSt	Very stiff	100 to 200	VD	Very dense	>50
H	Hard	>200			

### GRAPHIC LOG (1 or a combination of the following)

Organic Material		Cobbles		Siltstone	
Mudstone		Sandstone		Asphalt	
Gravel		Limestone		Sand	
Silt		Clay		No Core	

### ORGANIC SOILS

#### Von Post Classification

H1	Completely unconverted and mud-free peat, when pressed gives clear water and plant structure is visible.
H2	Practically unconverted and mud-free peat, when pressed gives almost clear water and plant structure is visible.
H3	Very slightly decomposed or very slightly muddy peat, when pressed gives marked muddy water, no peat substance passes through the fingers and plant structure is less visible.
H4	Slightly decomposed or slightly muddy peat, when pressed gives marked muddy water and plant structure is less visible.
H5	Moderately decomposed or very muddy peat with growth structure evident but slightly obliterated.
H6	Moderately decomposed or very muddy peat with indistinct growth structure.
H7	Fairly well decomposed or very muddy peat but the growth structure can just be seen.
H8	Well decomposed or very muddy peat with very indistinct growth structure.
H9	Practically decomposed or mud-like peat in which almost no growth structure is evident.
H10	Completely decomposed or mud peat where no growth structure can be seen, entire substance passes through the fingers when pressed.

S Saturated, soil below water table

### SOIL AND ROCK DESCRIPTIONS

Soil and Rock Descriptions are generally as described in the NZ Geotechnical Society "Field Description of Soil and Rock – Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", dated December 2005.

Vane Shear Strength measurements in accordance with the NZ Geotechnical Society "Guideline for hand held shear vane test" dated August 2001.

### INSITU TESTS

SV = 40/10	Insitu shear strength and remoulded shear strength respectively, as measured by Pilcon Shear Vane
$\tau = 50/12$	Vane shear strength and remoulded vane shear strength respectively, corrected to BS1377
UTP =	Unable To Penetrate with Shear Vane
N = 15	SPT uncorrected blow count for 300mm penetration

### ★ Laboratory Test(s) carried out:

AL	Atterberg limits
UU	Unconsolidated undrained triaxial
PSD	Particle size
CU	Consolidated undrained triaxial
CONS	Consolidation
COMP	Compaction
UCS	Unconfined compression

### WEATHERING

CW	Completely weathered
HW	Highly weathered
MW	Moderately weathered
SW	Slightly weathered
UW	Unweathered





# Test Pit Log

Test Pit ID: **TP01**  
Sheet 1 of 1

<b>Project:</b> Mandeville Water Reservoir	<b>Project number:</b> 3366120
<b>Site location:</b> 937 Two Chain Road, Mandeville	<b>Client:</b> Waimakariri District Council
<b>Location:</b> Refer to Site Plan	<b>Coordinate system:</b> NZTM
	<b>Vertical datum:</b> NZVD 2016
	<b>Northing:</b> 5198111.0
	<b>Ground level (mRL):</b> 74.00
	<b>Easting:</b> 1558443.0
	<b>Location method:</b> hhGPS

Groundwater (m)	In Situ Tests		Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
	Su (kPa)	Scala blows/50mm						
		2 2 10					Silty fine to coarse SAND, some gravel, minor rootlets, trace clay; dark brown; dry; low plasticity (matrix). Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke). [TOPSOIL]	
				0.5	73.5		Silty fine to coarse SAND, some fine to coarse gravel, trace clay; light yellowish brown; dry; low plasticity. Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				1.0	73.0		Fine to coarse GRAVEL, some fine to coarse sand, minor cobbles, trace clay, trace rootlets; light yellowish brown; dry; non plastic (matrix). Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
		1 4 12+ 10+		1.5	72.5		Fine to coarse GRAVEL, some fine to coarse sand, trace cobbles; grey; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				2.0	72.0		Fine to coarse GRAVEL, some fine to coarse sand, trace cobbles; brownish grey; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				2.5	71.5		Fine to coarse sandy fine to coarse GRAVEL, trace silt, trace cobbles; light brown; dry; non plastic (matrix). Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				3.0	71.0		Fine to coarse SAND, some gravel, trace silt; light brown; dry; non plastic (matrix). Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				3.5	70.5		Fine to coarse sandy GRAVEL, trace silt, minor cobbles; light brown; dry; non plastic (matrix). Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke). 3.50m: Moist.	
				4.0	70.0		4.00m - End of test pit, terminated at target depth.	
				4.5	69.5			

Late Pleistocene River Deposits

<b>Date started:</b> 11/05/2021	<b>Logged by:</b> DA	<b>Comments:</b> Test Pit terminated at target depth of 4m bgl. Coordinates by hhGPS to an accuracy of +/-5 m. Elevations to an accuracy of +/-5 m. Groundwater not observed.
<b>Vane ID:</b> N/A	<b>Contractor:</b> On Grade Drainage & Excavation Ltd	
<b>Vane type:</b> N/A	<b>Equipment:</b> Komatsu PC130-8 13T Excavator	
<b>Vane width:</b> N/A	<b>Method:</b> TP	
<b>Face orientation:</b> N/A		

For Explanation of Symbols and Abbreviations See Key Sheet



## Log Key Sheet

### CLASSIFICATION

Based on USBR Unified Soil Classification System

### WATER



Water level on date shown

### METHOD

OB	open barrel
W	wash boring
TT	triple tube
UT	thin walled undisturbed tube
ISPT	standard penetration test
MA	machine auger
HA	Hand Auger
PS	piston sample
SNC	Sonic drilling
VE	Vacuum Extraction
CP	Cable Percussion

### SAMPLES

D	Small disturbed sample
B	Bulk disturbed sample
U	Undisturbed sample
UT	Thin wall open drive tube sample (push tube)
W	Water sample

### MOISTURE

D	Dry, looks and feels dry
M	Moist, no free water on hand when remoulding
W	Wet, free water on hand when Remoulding

### CONSISTENCY

Cohesive Soils	Undrained Shear Strength (kPa)	Non-cohesive Soils	SPT – Uncorrected
VS Very soft	<12	VL Very loose	0 to 4
S Soft	12 to 25	L Loose	4 to 10
F Firm	25 to 50	MD Medium dense	10 to 30
St Stiff	50 to 100	D Dense	30 to 50
VSt Very stiff	100 to 200	VD Very dense	>50
H Hard	>200		

### GRAPHIC LOG (1 or a combination of the following)

Organic Material		Cobbles		Siltstone	
Mudstone		Sandstone		Asphalt	
Gravel		Limestone		Sand	
Silt		Clay		No Core	

### ORGANIC SOILS

#### Von Post Classification

H1	Completely unconverted and mud-free peat, when pressed gives clear water and plant structure is visible.
H2	Practically unconverted and mud-free peat, when pressed gives almost clear water and plant structure is visible.
H3	Very slightly decomposed or very slightly muddy peat, when pressed gives marked muddy water, no peat substance passes through the fingers and plant structure is less visible.
H4	Slightly decomposed or slightly muddy peat, when pressed gives marked muddy water and plant structure is less visible.
H5	Moderately decomposed or very muddy peat with growth structure evident but slightly obliterated.
H6	Moderately decomposed or very muddy peat with indistinct growth structure.
H7	Fairly well decomposed or very muddy peat but the growth structure can just be seen.
H8	Well decomposed or very muddy peat with very indistinct growth structure.
H9	Practically decomposed or mud-like peat in which almost no growth structure is evident.
H10	Completely decomposed or mud peat where no growth structure can be seen, entire substance passes through the fingers when pressed.

S Saturated, soil below water table

### SOIL AND ROCK DESCRIPTIONS

Soil and Rock Descriptions are generally as described in the NZ Geotechnical Society "Field Description of Soil and Rock – Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", dated December 2005.

Vane Shear Strength measurements in accordance with the NZ Geotechnical Society "Guideline for hand held shear vane test" dated August 2001.

### INSITU TESTS

SV = 40/10	Insitu shear strength and remoulded shear strength respectively, as measured by Pilcon Shear Vane
$\tau$ = 50/12	Vane shear strength and remoulded vane shear strength respectively, corrected to BS1377
UTP =	Unable To Penetrate with Shear Vane
N = 15	SPT uncorrected blow count for 300mm penetration

### ★ Laboratory Test(s) carried out:

AL	Atterberg limits
UU	Unconsolidated undrained triaxial
PSD	Particle size
CU	Consolidated undrained triaxial
CONS	Consolidation
COMP	Compaction
UCS	Unconfined compression

### WEATHERING

CW	Completely weathered
HW	Highly weathered
MW	Moderately weathered
SW	Slightly weathered
UW	Unweathered



# Test Pit Log

Test Pit ID: **TP02**  
Sheet 1 of 1

<b>Project:</b> Mandeville Water Reservoir	<b>Project number:</b> 3366120
<b>Site location:</b> 937 Two Chain Road, Mandeville	<b>Client:</b> Waimakariri District Council
<b>Location:</b> Refer to Site Plan	<b>Coordinate system:</b> NZTM
	<b>Vertical datum:</b> NZVD 2016
	<b>Northing:</b> 5198095.0
	<b>Ground level (mRL):</b> 75.00
	<b>Easting:</b> 1558434.0
	<b>Location method:</b> hhGPS

Groundwater (m)	In Situ Tests		Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
	S <sub>u</sub> (kPa)	Scala blows/50mm						
		2 2 16+					Silty fine to coarse SAND, minor gravel, minor rootlets, trace clay; light greyish brown; dry; low plasticity (matrix). Sand/Gravel: Subrounded to subangular, slightly weathered, sandstone (greywacke). [TOPSOIL]	
				0.5	74.5		Fine to coarse sandy SILT, some fine to coarse gravel, trace clay; light yellowish brown; dry; low plasticity; quick. Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke).	Late Pleistocene River Deposits
				1.0	74.0		Fine to coarse GRAVEL, some fine to coarse sand; light yellowish grey; dry; non plastic (matrix). Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				1.5	73.5		Fine to coarse sandy fine to coarse GRAVEL, some cobbles, trace silt; light yellowish brown; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				2.0	73.0		Fine to coarse GRAVEL, some fine to coarse sand; light grey; dry; non plastic (matrix). Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				2.5	72.5		Fine to coarse sandy fine to coarse GRAVEL, trace cobbles, trace silt; light brown; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				3.0	72.0		Fine to coarse gravelly SAND, some cobbles, trace silt; brown; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				3.5	71.5		Fine to coarse sandy fine to coarse GRAVEL, some cobbles, trace silt; brown; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke). 3.50m: <i>Moist.</i>	
				4.0	71.0		4.10m - End of test pit, terminated at target depth.	
				4.5	70.5			

<b>Date started:</b> 11/05/2021	<b>Logged by:</b> DA	<b>Comments:</b> Test Pit terminated at target depth of 4.1m bgl. Coordinates by hhGPS to an accuracy of +/-5 m. Elevations to an accuracy of +/-5 m. Groundwater not observed.
<b>Vane ID:</b> N/A	<b>Contractor:</b> On Grade Drainage & Excavation Ltd	
<b>Vane type:</b> N/A	<b>Equipment:</b> Komatsu PC130-8 13T Excavator	
<b>Vane width:</b> N/A	<b>Method:</b> TP	
<b>Face orientation:</b> N/A		

For Explanation of Symbols and Abbreviations See Key Sheet



**Log Key Sheet**

**CLASSIFICATION**

Based on USBR Unified Soil Classification System

**WATER**



Water level on date shown

**METHOD**

- OB open barrel
- W wash boring
- TT triple tube
- UT thin walled undisturbed tube
- ISPT standard penetration test
- MA machine auger
- HA Hand Auger
- PS piston sample
- SNC Sonic drilling
- VE Vacuum Extraction
- CP Cable Percussion

**SAMPLES**

- D Small disturbed sample
- B Bulk disturbed sample
- U Undisturbed sample
- UT Thin wall open drive tube sample (push tube)
- W Water sample

**MOISTURE**

- D Dry, looks and feels dry
- M Moist, no free water on hand when remoulding
- W Wet, free water on hand when Remoulding

**CONSISTENCY**

**Cohesive Soils**

- VS Very soft <12
- S Soft 12 to 25
- F Firm 25 to 50
- St Stiff 50 to 100
- VSt Very stiff 100 to 200
- H Hard >200

**Undrained Shear Strength (kPa)**

**Non-cohesive Soils**

- VL Very loose
- L Loose
- MD Medium dense
- D Dense
- VD Very dense

**SPT – Uncorrected**

- 0 to 4
- 4 to 10
- 10 to 30
- 30 to 50
- >50

**GRAPHIC LOG** (1 or a combination of the following)

Organic Material		Cobbles		Siltstone	
Mudstone		Sandstone		Asphalt	
Gravel		Limestone		Sand	
Silt		Clay		No Core	

**ORGANIC SOILS**

*Von Post Classification*

- H1 Completely unconverted and mud-free peat, when pressed gives clear water and plant structure is visible.
- H2 Practically unconverted and mud-free peat, when pressed gives almost clear water and plant structure is visible.
- H3 Very slightly decomposed or very slightly muddy peat, when pressed gives marked muddy water, no peat substance passes through the fingers and plant structure is less visible.
- H4 Slightly decomposed or slightly muddy peat, when pressed gives marked muddy water and plant structure is less visible.
- H5 Moderately decomposed or very muddy peat with growth structure evident but slightly obliterated.
- H6 Moderately decomposed or very muddy peat with indistinct growth structure.
- H7 Fairly well decomposed or very muddy peat but the growth structure can just be seen.
- H8 Well decomposed or very muddy peat with very indistinct growth structure.
- H9 Practically decomposed or mud-like peat in which almost no growth structure is evident.
- H10 Completely decomposed or mud peat where no growth structure can be seen, entire substance passes through the fingers when pressed.

S Saturated, soil below water table

**SOIL AND ROCK DESCRIPTIONS**

Soil and Rock Descriptions are generally as described in the NZ Geotechnical Society "Field Description of Soil and Rock – Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes", dated December 2005.

Vane Shear Strength measurements in accordance with the NZ Geotechnical Society "Guideline for hand held shear vane test" dated August 2001.

**INSITU TESTS**

- SV = 40/10 Insitu shear strength and remoulded shear strength respectively, as measured by Pilcon Shear Vane
- $\tau$  = 50/12 Vane shear strength and remoulded vane shear strength respectively, corrected to BS1377
- UTP = Unable To Penetrate with Shear Vane
- N = 15 SPT uncorrected blow count for 300mm penetration

★ **Laboratory Test(s) carried out:**

- AL Atterberg limits
- UU Unconsolidated undrained triaxial
- PSD Particle size
- CU Consolidated undrained triaxial
- CONS Consolidation
- COMP Compaction
- UCS Unconfined compression

**WEATHERING**

- CW Completely weathered
- HW Highly weathered
- MW Moderately weathered
- SW Slightly weathered
- UW Unweathered



# Test Pit Log

Test Pit ID: **TP03**

Sheet 1 of 1

<b>Project:</b> Mandeville Water Reservoir	<b>Project number:</b> 3366120
<b>Site location:</b> 937 Two Chain Road, Mandeville	<b>Client:</b> Waimakariri District Council
<b>Location:</b> Refer to Site Plan	<b>Coordinate system:</b> NZTM
	<b>Vertical datum:</b> NZVD 2016
	<b>Northing:</b> 5198082.0
	<b>Ground level (mRL):</b> 72.00
	<b>Easting:</b> 1558437.0
	<b>Location method:</b> hhGPS

Groundwater (m)	In Situ Tests		Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
	Su (kPa)	Scala blows/50mm						
		2 4 7 8 11+ 8 9 12+ 12+		0.5	71.5		Silty fine to coarse SAND, some gravel, minor rootlets, trace clay; brown; dry; low plasticity (matrix). Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke). [TOPSOIL] Fine to coarse gravelly fine to coarse SAND, minor silt, trace clay, trace rootlets; light yellowish brown; dry; low plasticity (matrix). Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke).	Late Pleistocene River Deposits
		3 7 14+ 33+		1.0	71.0		Fine to coarse sandy fine to coarse GRAVEL, minor cobbles, trace silt; brown; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				1.5	70.5		Fine to coarse GRAVEL, some sand, trace silt; grey; dry; non plastic. Sand/Gravel: Subrounded to rounded, slightly weathered, sandstone (greywacke). Fine to coarse sandy fine to coarse GRAVEL, trace silt; brown; dry; non plastic. Sand/Gravel/Cobbles: Subrounded to rounded, slightly weathered, sandstone (greywacke).	
				2.0	70.0			
				2.5	69.5			
				3.0	69.0			
				3.5	68.5			
				4.0	68.0		3.70m: Moist. 4.00m - End of test pit, terminated at target depth.	
				4.5	67.5			

<b>Date started:</b> 11/05/2021	<b>Logged by:</b> DA	<b>Comments:</b> Test Pit terminated at target depth of 4m bgl. Coordinates by hhGPS to an accuracy of +/-5 m. Elevations to an accuracy of +/-5 m. Groundwater not observed.
<b>Vane ID:</b> N/A	<b>Contractor:</b> On Grade Drainage & Excavation Ltd	
<b>Vane type:</b> N/A	<b>Equipment:</b> Komatsu PC130-8 13T Excavator	
<b>Vane width:</b> N/A	<b>Method:</b> TP	
<b>Face orientation:</b> N/A		

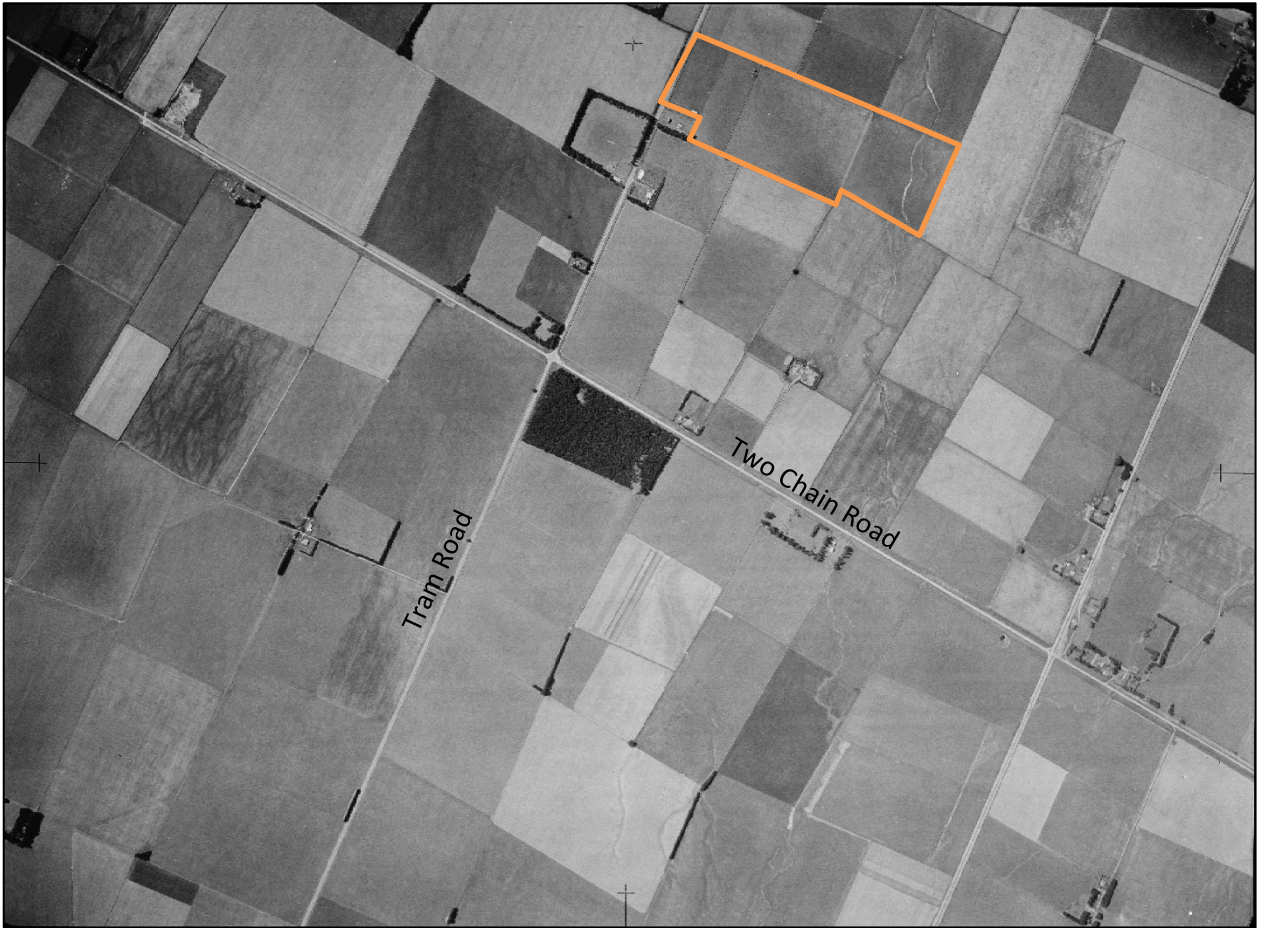
For Explanation of Symbols and Abbreviations See Key Sheet



## Appendix C: Historical Imagery - Block B

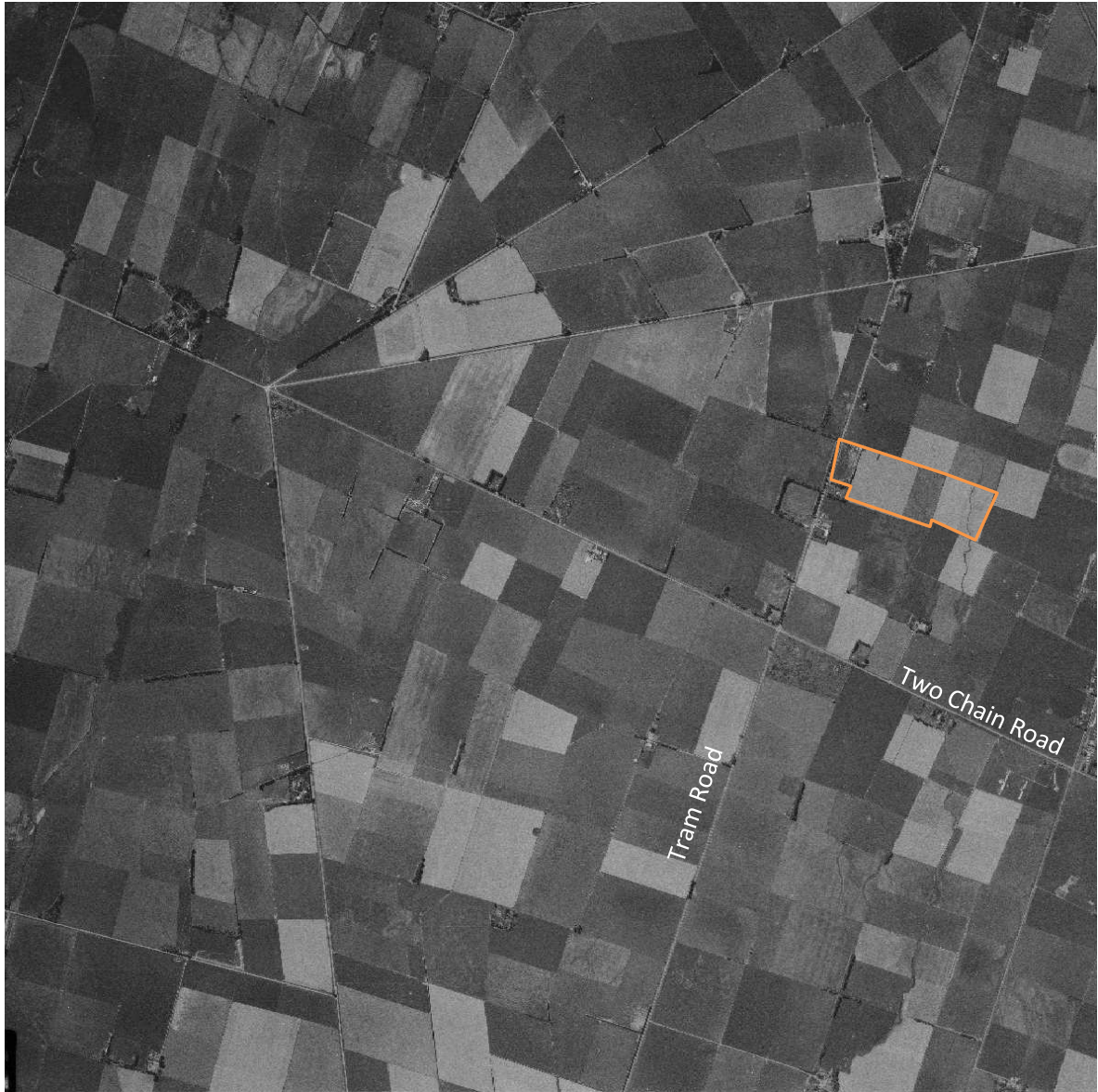


**Photograph 1: 1941: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).**

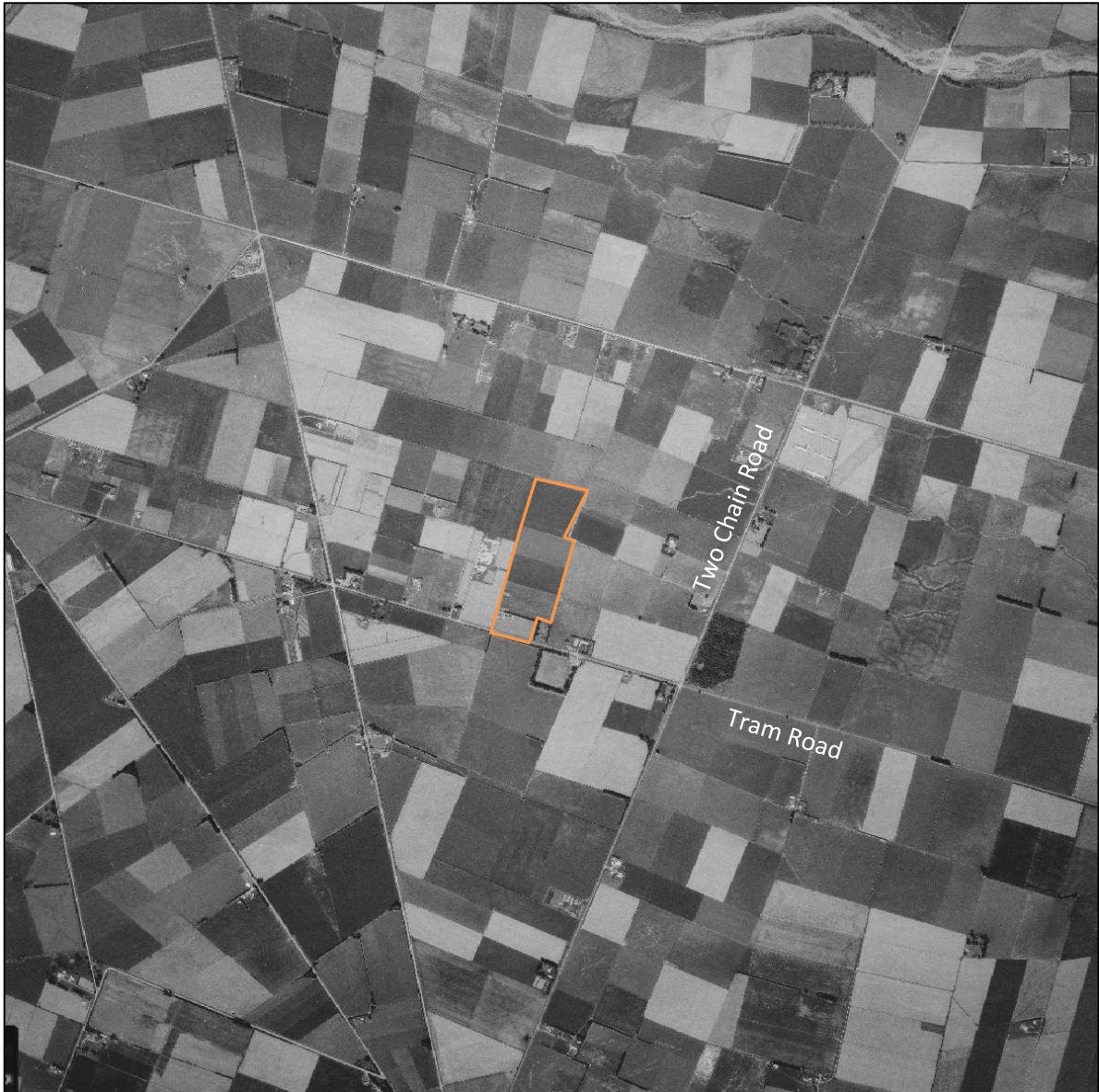


Photograph 2: 1955: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).

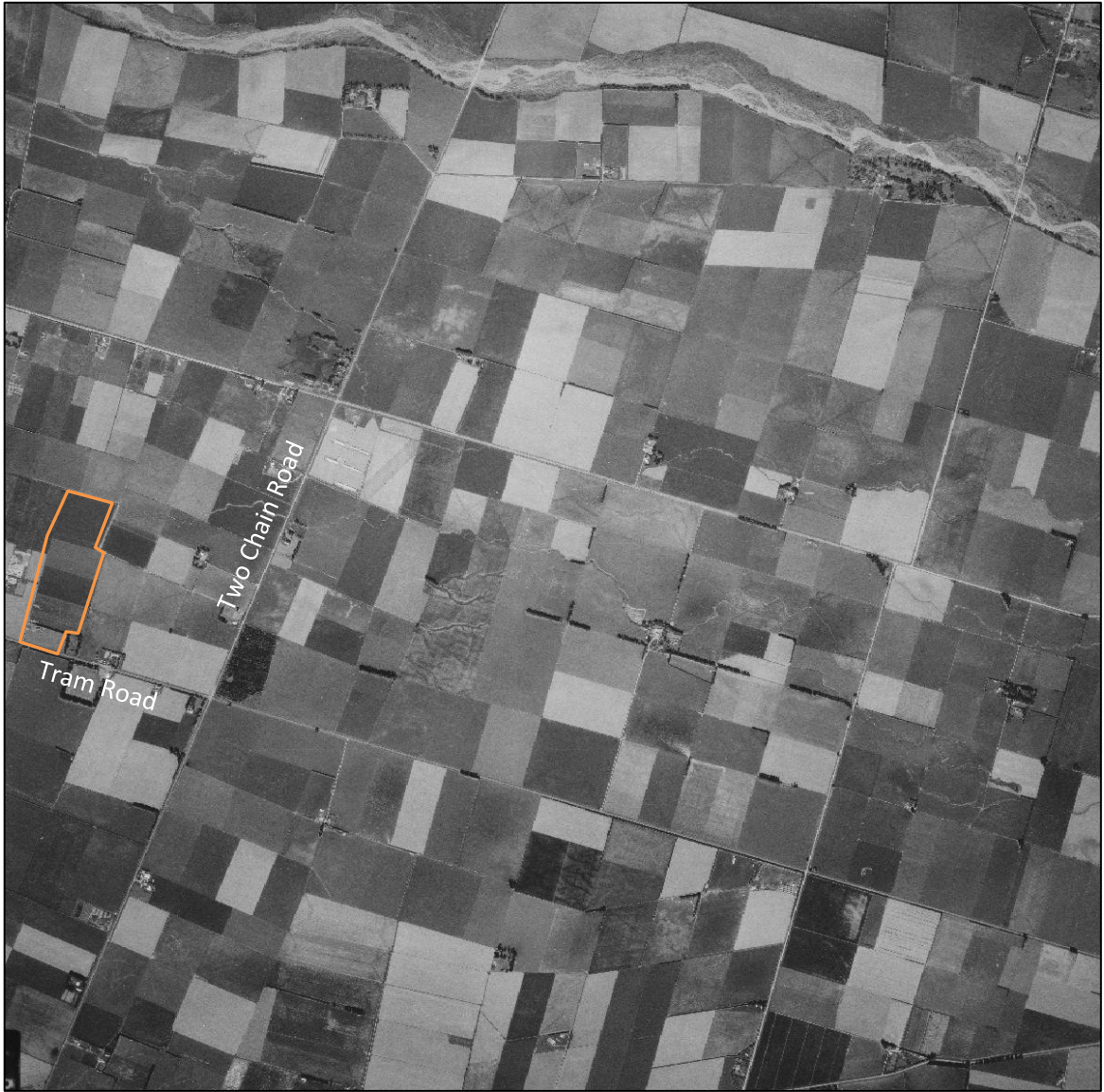




**Photograph 3: 1975: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).**



Photograph 4: 1979: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).



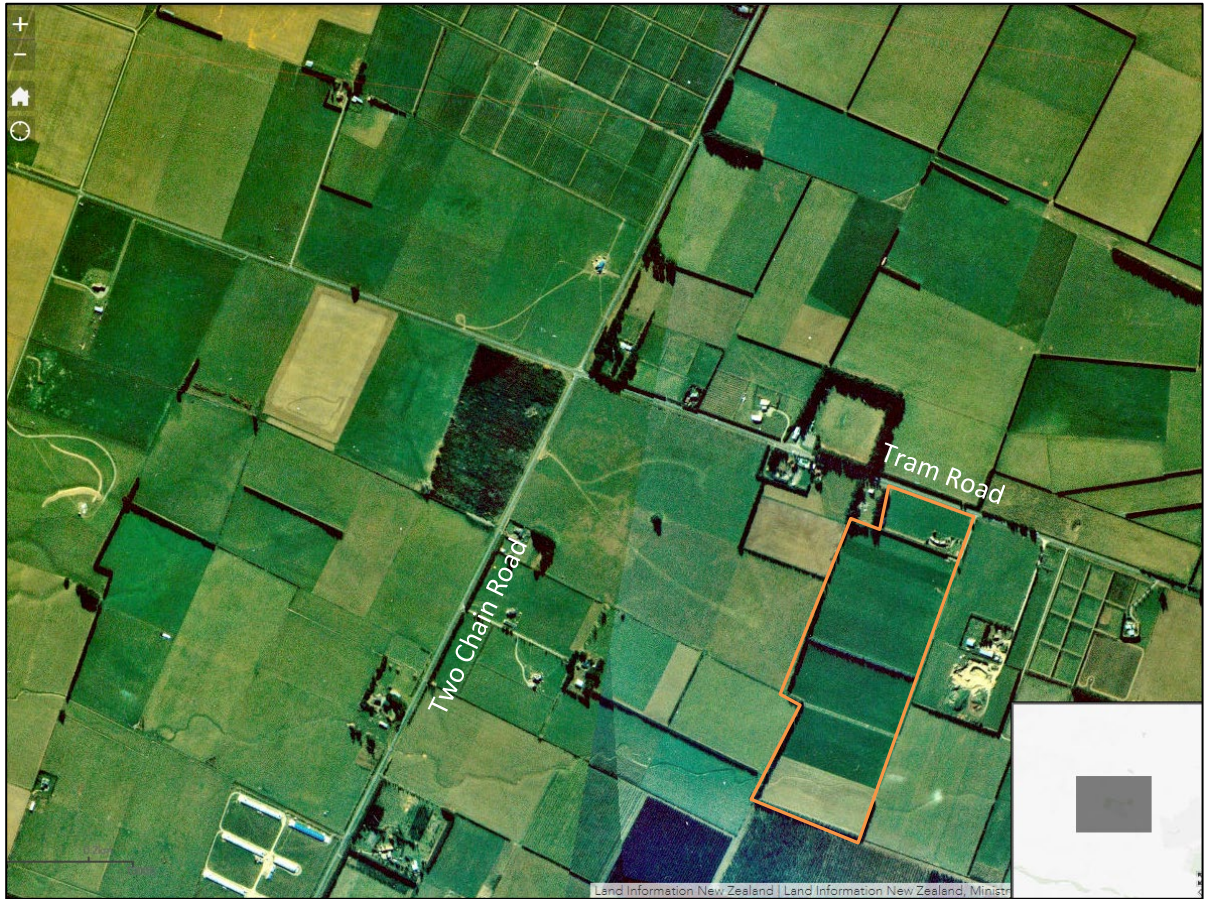
Photograph 5: 1984: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).



**Photograph 6: 1994: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).**



**Photograph 7: 2000: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Retrolens).**



Photograph 8: 1995-1999: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Canterbury Maps).



Photograph 9: 2000-2004: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Canterbury Maps).



Photograph 10: 2004-2010: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Canterbury Maps).





Photograph 11: 2010-2015: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Canterbury Maps).



Photograph 12: 2004-2015: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source Canterbury Maps).



Photograph 13: 2022: Block B - 1275 Tram Road, Swannanoa indicated by orange outline (Source: Goggle Earth).