2024

TECHNICAL REPORT ON THE REEFTON PROJECT, NEW ZEALAND

NI 43-101 Technical Report on Reefton Project, New Zealand

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Date & Signature

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Acronyms

°C	degrees Celsius
1VD	first vertical derivative
2D	two dimension
2VD	second vertical derivative
3D	three dimension
AA	access agreement
AAS	atomic absorption spectrometry
AAS	atomic absorption spectrometry
AAT	automatic aerial triangulation
Ag	silver
AGC	automatic gain control
AIG	Australian Institute of Geoscientists
As	arsenic
AS	analytic signal
ASig	analytic signal
aspy	arsenopyrite
ASTER	advanced spaceborne thermal emission and reflection radiometer
ASX	Australian Securities Exchange Ltd
ASX:SNG	Siren Gold Ltd
Au	gold
Au_TL43	ALS Code: Au by aqua regia extraction with ICP-MS finish.
Au-AA1	BLEG with extraction AA finish
Au-AA26	25-g charge fire assay, AAS finish
Au-AROR43	aqua regia digest
AusIMM	Australasian Institute of Mining and Metallurgy
Bi	bismuth
BLEG	bulk leach extractable gold
CAD	Canadian dollars
CLR	centre log ratio
cm	centimetre
CMA	Crown Minerals Act 1991
CP(Geo)	Chartered Professional Geologist
CRAE	CRA Exploration Limited
CSV	comma-separated values
Cu	copper
DGPS	Differential Global Positioning System
DOC	Department of Conservation
DQO	data quality objectives
DSIR	Department of Scientific and Industrial Research
E	east
EBSD	electron backscatter diffraction
EP	exploration permit
ERI	electrical resistivity imaging
FAA505	fire assay, AAS finish
FAS30K	3-g charge, screen fire assay at 75 μm
Fe	iron
FEG-SEM	field emission gun scanning electron microscopy
Fe-ox	iron oxide
ft	foot
g	gram
g/t	grams per tonne
GIS	Geographic Information System
GMNZ	Gold Mines New Zealand Ltd
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
GRDM	GRD Macraes Limited
HGM	horizontal gradient magnitude
HQ	core diameter: 63.5 mm
Hz	hertz
ICP-MS	inductively coupled plasma mass spectrometry
ICP-OES	inductively coupled plasma optical emission spectroscopy
IMU	inertial measurement unit
IP	induced polarisation
IRG	intrusive related gold
K	potassium
KCSZ	Krantz Creek Shear Zone
kg	kilogram
km	kilometre
Landpro	Landpro Ltd
LiDAR	Light Detection and Ranging
low-P	low pressure

m	metres
Ma	million years
MBIE	Ministry of Business, Innovation and Employment
ME-MS61	four-acid digest with MS/OES finish
Mg	magnesium
MIA	minimum impact activities
min	minute
ml	millilitre
mm	millimetres
MMCL	Macraes Mining Co Ltd
Mo	molybdenum
MOU	memorandum of understanding
Moz	million ounces
MP	Member of Parliament
MPG	MPG Partnership
MRE	mineral resource estimate
MS	magnetic susceptibility
MSc	Master of Science
Mt	million tonnes
mV/V	millivolts per volt
N	north
NA	not available
NI 43-101	National Instrument 43-101
NNE	north-northeast
No.	number
NQ	core diameter: 47.6 mm
NS	not sufficient data
nT	nanotesla
NZ	New Zealand
NZD	New Zealand dollars
NZP&M	New Zealand Petroleum and Minerals
NZST	New Zealand Standard Time
NZTM	New Zealand Transverse Mercator
oz	ounce
Pb	lead
PGM	platinum group metals
PP	prospecting permit
ppb	parts per billion
ppm	parts per million
PPS	pulse per second
PQ	core diameter: 85 mm
pXRF	portable x-ray fluorescence
py	pyrite
QA	quality assurance
QAT	quality acceptance testing
QC	quality control
QMAP	quarter million mapping
QP	qualified person
QQ	quantile-quantile plot
Res/IP	resistivity/induced polarisation
RGI	Reefton Goldfields Inc.
RGL	Reefton Gold Limited
RMA	Resource Management Act
RSC	RSC Consulting Ltd
RTP	reduced to pole
RUA	Rua Gold Inc
Sb	antimony
SEM	scanning electron microscope
Sn	Tin
SOP	standard operating procedure
SQL	Structured Query Language
t	tonne
TEM	transient electrodemagnetic method
Th	thorium
tilt	tilt angle filter
TIR	thermal infrared
TL	tie Line
TMI	total magnetic intensity
UAV	unmanned aerial vehicle
U	uranium
UTC	Universal Time Coordinated
VHF	very high frequency
W	tungsten
X	latitude
Y	longitude
Z	elevation
Zn	zinc

1. Summary

Rua Gold Inc (RUA) commissioned RSC Consulting Ltd (RSC) to update an independent technical report (the Report) for RUA in compliance with National Instrument 43-101: *Standards of Disclosure for Mineral Projects* (NI 43-101) and Form 43-101F1: *Technical Reports,* in respect of the Reefton Project (the Project) in the Buller District of New Zealand. The Project comprises three exploration permits (EP 60491, EP 60624, and EP 61062), all of which are held by Reefton Gold Limited (RGL), a wholly owned NZ subsidiary of RUA. All work for these exploration permits has been completed by RGL. This Report documents all data and data collection procedures for the Reefton Project, up to and including the effective date of 8 July 2024.

1.1 Property Description & Ownership

The Reefton Project properties are located in the Buller Region of the South Island, New Zealand, and consist of three contiguous exploration permits, for a total area of 342.06 km^2. EP 60491 and EP 61062 are classified as tier 1 exploration permits, whereas EP 60624 is classified as a tier 2 exploration permit. Exploration permits are granted for a maximum of five years.

RGL has 100% ownership of EP 60491, EP 60624, and EP 61062.

1.2 Geology & Mineralisation

The basement rocks of the South Island of New Zealand are divided into two main geological provinces: the Western Province and Eastern Province. The Western Province is composed of Early-to-Mid Palaeozoic metasedimentary and volcanic terranes, that formed on the margin of the Gondwana supercontinent, and the Eastern Province is composed of exotic terranes that were accreted onto the Western Province, in the Late Palaeozoic to Early Cretaceous (Mortimer, 2004). The two provinces are intruded and separated by the Median Batholith, which comprises a complex series of typically gabbroic-granitic plutons, that were generated during subduction, along the southeastern margin of Gondwana, in the Mid-Palaeozoic to Cretaceous (Mortimer et al., 1999). Oblique-compression and initiation of the Alpine Fault in the Miocene resulted in displacement of the basement units and the eventual formation and uplift of the Southern Alps in the Pliocene. The currently active Alpine Fault has ~470 km of dextral offset and marks the major plate boundary between the Australian and Pacific plates.

Situated west of the Alpine Fault, the Western Province is made up of two north trending terranes: the westernmost Buller Terrane, composed of variably metamorphosed continentally derived Ordovician sandstones and mudstones with no intercalated volcanic rocks; and the eastern, more heterogeneous Takaka Terrane, composed of Cambrian to Early Devonian, siliclastics, carbonates and volcanic rocks. Basement rocks were variably deformed and metamorphosed in the Devonian-Cretaceous, with the highest metamorphic grades, amphibolite-granulite facies, reached in gneisses of the Pecksniff Metasedimentary Gneiss and the Victoria Paragneiss, in the Paparoa and Victoria ranges (Nathan et al. 2002). Several fault-bounded sedimentary outliers are preserved in the Buller Terrane, including well indurated and stratified sequences of Devonian marine sandstone, limestone and mudstone of the Reefton Group, and Cretaceous non-marine, sedimentary rocks of the Pororari Group, that are best represented by the coarse-grained, poorly sorted Hawks Craig Breccia (Nathan et al. 2002).

The Reefton Goldfield is hosted entirely within Ordovician-age rocks of the Greenland Group, which form part of the Buller Terrane. In the Reefton area, the Greenland Group forms a ~35-km-long by 15-km-wide north-northeast trending belt of rocks, that is bounded to the north and east by granitic plutons of the Late-Devonian to Carboniferous Karamea, and Cretaceous Rahu and Separation Point batholiths. In the south and west, the block is in fault contact with higher-metamorphic grade paragneisses of the Paparoa metamorphic core complex.

The Greenland Group is a turbiditic sequence of alternating greywackes and argillites that were deformed and metamorphosed to lower greenschist facies in the Silurian to Devonian (~450–387 Ma; Adams 2004, Turnbull et al. 2016). The sequence is dominated by greywacke-sandstone and beds are typically 0.2–2 m thick, separated by layers of argillite typically 10–30 cm thick. The greywackes typically contain >50% quartz with lesser albite, partially recrystallised rock fragments and muscovite (Milham & Craw, 2009). Argillites are less quartz-rich and more micaceous.

Gold (Au) mineralisation in the Reefton Goldfield is orogenic-style and the deposits occur in and around steeply dipping, north to north-northeast trending shear zones that cut across the hinges of earlier folds in weakly altered metasedimentary rocks. The deposits are similar, in many respects, to those found at Bendigo and Ballarat in Victoria, Nova Scotia in Canada (Christie et al., 1999 and 2000), Beaconsfield in Tasmania, Gympie in Queensland, and the ‘Mother Lode’ deposits of California.

Most of the Au-bearing mineralisation, including all of the larger deposits, is arranged along a linear belt, which runs approximately north–south through a sequence of deformed metasedimentary rocks of the Greenland Group. This suggests the presence of a deep-seated structure, that has permitted mineralising fluids to migrate from their source to sites in the upper crust, where the gold was deposited.

The two dominant styles of Au mineralisation in the Reefton Goldfield are:

- coarse native gold associated with minor sulphides in quartz veins; and
- microscopic refractory gold, within sulphides, in sheared sediments and clay alteration (pug) zones adjacent to the quartz veins.

The coarse native gold style of mineralisation comprises the majority of historical gold production. Both styles, however, provide important exploration targets.

1.3 Exploration

RGL conducted an extensive exploration programme, including geological mapping, soil, stream and rock-chip sampling and geochemical analysis, petrological analysis, and geophysical and remote sensing surveys.

Extensive geological and structural mapping was conducted by RGL and third-party contractors to understand the mineralisation and plan surface sampling and drilling. RGL collected 17,259 soil samples, nearly 814 rock-chip samples, 169 stream-sediment samples, and dug eight trenches to collect 36 channel samples. A total of 41 diamond drillholes were drilled for a total of 6,668.6 m. Gold mineralisation was intercepted at depth at Pactolus; some of the best intercepts include DD_PAC_002 with 5 m at 6.28 ppm Au, DD_PAC_004 with 12 m at 9.41 ppm Au, and DD_PAC_022 with 19 m at 1.69 ppm Au, inclusive of 2 m at 8.2 ppm Au.

All samples (drill, soil, rock-chip, stream-sediment), including historical samples, were analysed by portable x-ray fluorescence (pXRF). RGL used the data to identify anomalies and performed principal component analysis to build a lithological classification scheme, effective at discriminating mafic dykes within the Greenland Group.

RGL conducted a comprehensive geophysical programme, including reprocessing the existing Crown airborne magnetic and radiometric data over the Reefton Project. Additionally, RGL conducted or engaged third-party contractors to conduct resistivity, induced polarisation, chargeability, and resistivity surveys over parts of the Crushington prospect. Using an unmanned aerial vehicle (UAV), RGL collected photogrammetry, including orthophotographs, magnetic and LiDAR datasets over areas of interest within EP 60491.

RGL completed a comprehensive process of data compilation, data processing, 3D geological modelling, and the creation of new interpretations and exploration targets for the Reefton Project, leading to the identification and ranking of 21 exploration targets. RGL has focussed much of its exploration programme around the five areas within the Reefton Project (Capleston, Crushington, Murray Creek, Stony Creek, and Orlando) that contain the majority of the exploration targets. This culminated in a significant greenfield discovery (Pactolus) and the identification of several additional greenfield prospects.

1.4 Conclusions & Recommendations

Overall, the Qualified Person (QP) considers that the exploration work conducted at the Reefton Project is of a reasonable standard and fit for purpose. Following on from the previous work programme, the QP identified several recommendations to help progress the exploration at each property.

Recommendations for the Phase 2 exploration work programme include:

- infilling soil grids;
- creating a 3D reconstruction of historical veins and ore shoots, and
- targeting of potential replication of Victoria, Inglewood, and Phoenix (VIP) shoots.

The QP also recommends conducting additional drilling at VIP, NorthStar, and Atalanta, and conducting further exploration by a mix of mapping, surface sampling, drilling, 3D modelling and drilling of several targets at Capleston, including Specimen Hill and Fiery Cross-Reform East.

The proposed exploration budget for Phase 2 is presented in Table 1-1. Estimated costs are in Canadian dollars (CAD).

Table 1-1: Proposed exploration budget (CAD) for Phase 2.

Category	Phase	Exploration Task	Estimated Cost (CAD)
Prospecting and Exploration Expenditures	2	Data Compilation	25,000
	2	Mapping	62,000

	2	Geochemistry	170,000
	2	Geophysics	25,000
	2	Drilling	725,000
Other Expenditures	2	Consenting	50,000
	2	Administration	172,000
	2	Corporate	63,000
Total Phase 2			1,292,000

2. Introduction

2.1 Purpose of the Report

Rua Gold Inc (RUA) commissioned RSC Consulting Ltd (RSC) to update an independent technical report (the Report) for RUA in compliance with National Instrument 43-101: *Standards of Disclosure for Mineral Projects* (NI 43-101) and Form 43-101F1: *Technical Reports,* in respect of the Reefton Project (the Project) in the Buller District of New Zealand. The Project comprises three exploration permits (EP 60491, EP 60624, and EP 61062), all of which are held by Reefton Gold Limited (RGL), a wholly owned NZ subsidiary of RUA. All work for these exploration permits reported here has been completed by RGL. This Report documents all data and data collection procedures for the Reefton Project, up to and including the effective date of 8 July 2024.

2.2 Sources of Information

The scientific and technical information disclosed in this Report is based on data supplied by RGL, in addition to data collected by the Qualified Person (QP) or data that were collected under the supervision of the QP. RGL provided csv files exported from the database of all drilling and sample data available for the Project. Copies of previous reports (geochemical, petrological, geophysical), core and chip photographs, standard operating procedures (SOPs) and GIS data were also provided.

Scanned copies of the original raw logging sheets for a selection of drillholes were made available to RSC. Original certificates and data files from ALS and SGS chemical analyses and corrected (i.e. calibrated based on standards analysed in the sample stream) portable XRF (pXRF) data were also made available to RSC. RSC used the scans of original and historically recorded data to verify the data in the database.

Information relating to property ownership, property titles, legal and environmental matters was sourced from existing documentation and from the New Zealand Petroleum and Minerals (NZP&M) website.

A list of the sources of information, data and reports reviewed as part of this technical report can be found in section 27. The QP takes responsibility for the content of this Report and considers the data review to be accurate and complete.

2.3 Qualified Persons

The work completed by RSC Consulting Ltd, and the subject of this NI 43-101 technical report, was carried out by the following Qualified Person and report authors.

Sean Aldrich (QP) is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM) and a Member of the Australian Institute of Geoscientists (AIG). Mr Aldrich is a full-time employee and principal geologist with RSC. Mr Aldrich holds an MSc in Earth Sciences from the University of Waikato (1996). He has more than 25 years of mining and exploration experience in New Zealand, Papua New Guinea, the Middle East, Central Asia, and Africa. Mr Aldrich's wider experience covers project generation, resource definition, and underground and open-pit mine geology. Mr Aldrich conducted the site visits and takes responsibility for all sections of this Report.

The QP was supported by Stephie Tay, who reviewed data and assisted in preparation of this Report.

Stephie Tay is an Associate of the Australasian Institute of Mining and Metallurgy (AusIMM) and holds an MSc in Geology from the University of Otago, Dunedin, New Zealand. Ms Tay is a full-time employee and Project Geologist at RSC. She has practiced continuously as a tenement advisor and consulting for mining and exploration firms in a range of commodities since 2019. Ms Tay, under the guidance of the Qualified Person, helped prepare this Report.

The Report and the data and evaluations supporting it were peer reviewed by Mr Rene Sterk.

René Sterk is a Fellow of the Australasian Institute of Mining and Metallurgy (AusIMM), and a Chartered Professional Geologist (CP(Geo)) with the AusIMM. Mr Sterk is a full-time employee and principal geologist with RSC. Mr Sterk holds an MSc in structural geology and tectonics from the Vrije Universiteit Amsterdam (2002), and is the managing director of RSC, an independent consulting group based in Dunedin, New Zealand. He has practiced continuously as a mining geologist, exploration geologist, manager and consultant for mining and exploration firms in a range of commodities since 2003.

2.4 Personal Inspection (Site Visit)

Site Visits

Mr Aldrich (QP) conducted three site visits to the Reefton Project.

On 20 April 2021, Mr Aldrich (QP) conducted a site visit of the Project. During the visit, the QP travelled to the drill site. The QP checked drill core, reviewed the logging procedures and visited surface outcrops. No check samples were collected during the site visit.

On 20 and 21 March 2023, Mr Aldrich (QP) conducted a second site visit to the Reefton Project. During this site visit, the QP checked drillhole collar locations, reviewed SOPs, checked logging and collected 30 half-core check samples and 30 pulp check samples.

On 18 and 19 June 2024, Mr Aldrich (QP) conducted a site visit of the Project. During the visit, the QP travelled to the drill site. The QP checked drillhole collar locations, reviewed SOPs, and checked logging. No check samples were collected during the site visit.

3. Reliance on Other Experts

The QP has not independently verified the legal status of RGL's mineral permits, and has not investigated the legality of any of the underlying agreements(s) that exist concerning the Reefton Project.

The QP has reviewed the RGL permit status information on the New Zealand Petroleum and Mineral (NZP&M) website. The QP relied on the NZP&M website and the permit certificates issued under the Crown Minerals Act 1991 (certificates dated 12 April 2019, 27 September 2019, 5 February 2021), which states RGL's legal status and title of prospecting and exploration. However, the QP is not qualified to give a legal opinion with respect to the property titles contained within this Report and discussed in sections 4.2 and 4.3 of the Report.

4. Property Description & Location

4.1 Location

The Reefton Project is located in the Reefton Goldfield, in the Buller Province of South Island, New Zealand. The Project is ~one km east of the township of Reefton, and 48 km east-southeast of the town of Westport. RGL's current operation comprises three exploration permits (EP 60491, EP 60624, and EP 61062) issued under the Crown Minerals Act 1991 (CMA). The combined area of the permits is 34,206 ha. Figure 4-1 illustrates the location of the Project within the country of New Zealand and indicates the Project's proximity to surrounding communities. The Project's centroid is situated at about 1521157 E and 5347474 N (NZTM).

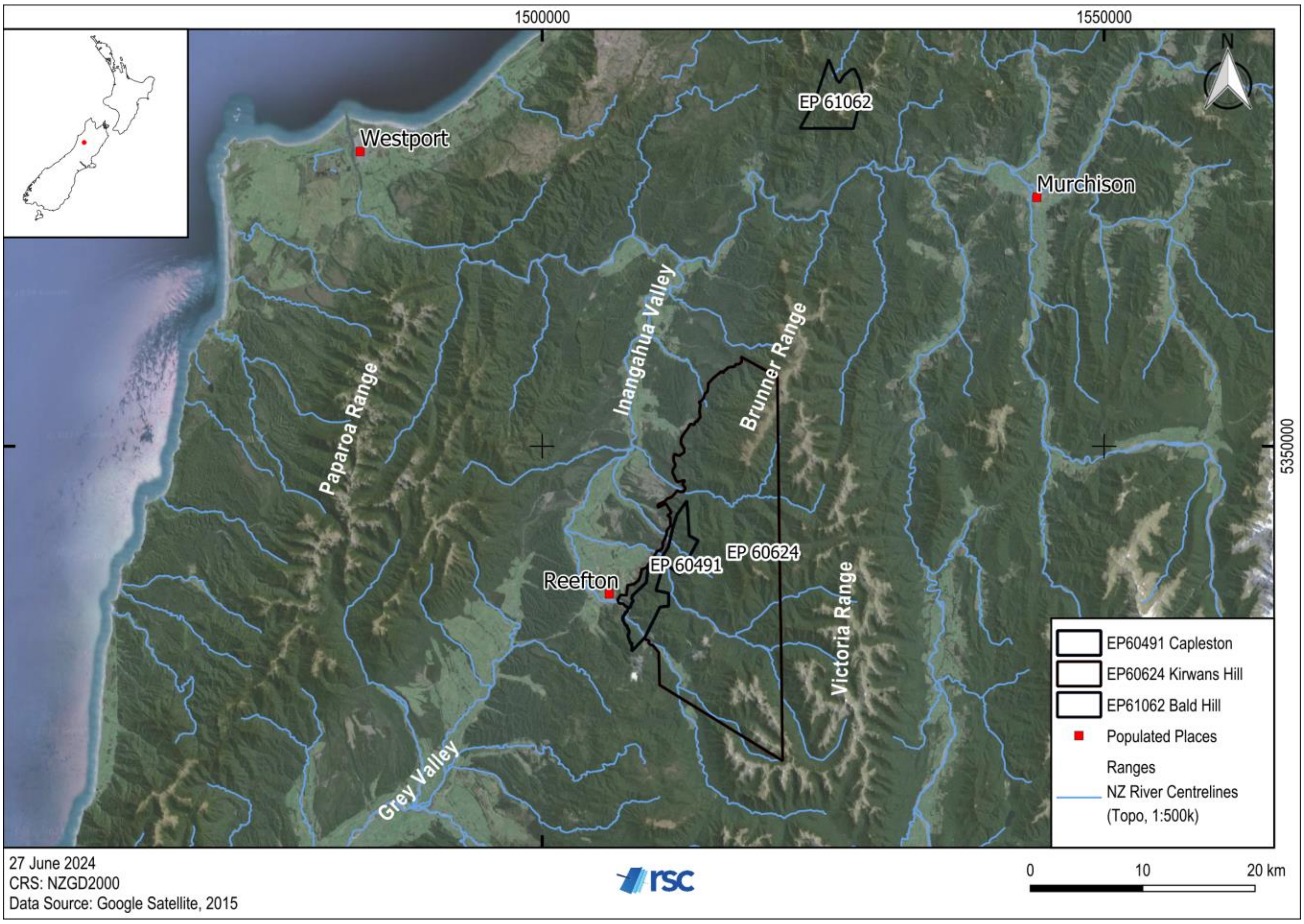

Figure 4-1: Location of the Reefton Project.

4.2 Mineral Tenure

4.2.1 Mineral Rights

Within New Zealand, the allocation of rights to prospect, explore and mine for minerals, owned by the Crown, is carried out by the issuing of prospecting, exploration and mining permits under the CMA. The administration of Crown-owned minerals is conducted on behalf of the New Zealand Government by the Minister of Energy and Resources, through the Ministry of Business, Innovation and Employment (MBIE). The department which oversees the issuing of Mineral Permits is known as New Zealand Petroleum and Minerals (NZP&M).

Under the CMA, all petroleum, gold (Au), silver (Ag), and uranium (U) existing in its natural state is deemed to be owned by the Crown, and pounamu (greenstone) is owned by Te Rūnanga o Ngāi Tahu. The granting of a prospecting, exploration or mining permit provides the permit holder the right to prospect, explore or mine the minerals specified in the permit.

Permits under the CMA are classified as either Tier 1 or Tier 2 depending on the minerals they relate to, expected work programme expenditure, estimated production or royalty and where the activities take place. All prospecting permits are classified as Tier 2. Exploration permits for Au are classified as Tier 1 unless the expected total work programme expenditure, for the final five years of its life, is less than NZD 1,250,000. Mining permits for Au, Ag and platinum group metals (PGMs) are classified as Tier 1 if, in any one permit year in the next five years of its life, the annual royalty will be equal to or more than NZD 50,000. All underground operations are Tier 1.

4.2.2 Mineral Permits

4.2.2.1 Prospecting Permits

Prospecting is any activity undertaken for the purpose of identifying land likely to contain mineral deposits or occurrences.

An exclusive prospecting permit gives the permit holder the exclusive right (although non-exclusive permits are also available) to prospect for the minerals referred to in the permit, in the land covered by the permit and in accordance with the permit's conditions.

The permit conditions are subject to the following.

- The rights under a prospecting permit apply to the relevant minerals whether they are Crown or privately owned. However, any extraction of privately owned minerals, beyond that incidental to prospecting, requires negotiation and agreement with the mineral owners.
- The holder of a prospecting permit has *prima facie* right to be granted a subsequent exploration permit, in respect of the land and Crown-owned minerals, to which the prospecting permit relates, if the prospecting is successful.

A prospecting permit is granted for a period of two years, with the possibility to be extended for a further two years. There are no rights of renewal beyond four years. When a prospecting permit for minerals is renewed, the Minister will typically require relinquishment of half of the permit area.

Ordinarily, the maximum size of a prospecting permit (PP) granted by New Zealand Petroleum & Minerals (NZP&M) is 500 km^2, with the expectation that the size of any subsequent exploration permit will be smaller than the original PP.

There is a minimum annual fee for prospecting permits that are payable to the Crown. For onshore prospecting, the fee is NZD 63.02 per square kilometre or part of a square kilometre or NZD 1,610.00, whichever is greater.

RGL does not currently hold any prospecting permits; however, it formerly held PP 60554 prior to EP 61062.

4.2.2.2 Exploration Permits

Exploration is any activity undertaken for the purpose of identifying mineral deposits or occurrences and evaluating the feasibility of mining.

An exploration permit gives the permit holder the same rights as a prospecting permit, plus the exclusive right to explore for the Crown-owned minerals referred to in the permit, in the land covered by the permit and in accordance with the permit's conditions. An exploration permit cannot authorise exploration for privately owned minerals (noting, however, that all petroleum, Au, Ag, and U existing in its natural state is deemed to be owned by the Crown under the CMA).

Subject to the permit conditions, the holder of an exploration permit has a *prima facie* right to be granted a subsequent mining permit, in respect of the land and Crown-owned minerals to which the exploration permit relates, if the exploration is successful.

An exploration permit for minerals other than petroleum is typically granted for a period of five years, with the possibility to be extended for a further five years. There are no rights of renewal beyond ten years except for appraisal purposes. Appraisal extensions may extend the duration of an exploration permit by up to eight years. When an exploration permit for minerals is renewed, the Minister typically requires relinquishment of half of the permit area.

NZP&M does not specify a maximum size for an exploration permit but does dictate that an exploration permit must not be smaller than 150 hectares.

There is a minimum annual fee for exploration permits that are payable to the Crown. For onshore exploration, the fee is NZD 358.00 per square kilometre or part of a square kilometre or NZD 1,610.00, whichever is greater.

RGL holds three exploration permits (EP 60491, EP 60624, and EP 61062) issued under the CMA, within the Reefton Goldfield.

4.2.2.3 Mining Permits

Mining is taking, winning or extracting, by any means, a mineral existing in its natural state.

A mining permit gives the permit holder the same rights as an exploration permit plus the exclusive right to mine for the specified Crown-owned minerals referred to in the permit, in the land covered by the permit and in accordance with the permit's conditions. A mining permit cannot authorise exploration or mining for privately owned minerals (noting, however, that all petroleum, Au, Ag, and U existing in its natural state is deemed to be owned by the Crown under the CMA).

A mining permit remains in force for a period of up to 40 years. The duration of a mining permit may be extended if the discovery to which the permit relates cannot be economically depleted before the date of expiration.

There is a minimum annual fee for mining permits that are payable to the Crown. For onshore mining, for Tier 1 mining, the fee is NZD 2,058.50 per square kilometre or part of a square kilometre or NZD 1,610.00, whichever is greater. For Tier 2 mining, the fee is NZD 2,058.50 per square kilometre or part of a square kilometre or NZD 1,150.00, whichever is greater.

RGL does not currently hold any mining permits.

4.2.2.4 Revocation of Permits

The Minister may revoke a permit if:

- the permit holder contravenes a condition of the permit, the CMA or regulations made under the CMA;

- the permit is a Tier 1 permit, the permit holder is the permit operator, and the permit holder undergoes a change of control without the Minister's consent; or
- the permit holder undergoes a change of control without notifying the Minister or the Minister is not satisfied the permit holder, following the change of control, has the financial capability to meet its obligations under the permit.

The conditions for each of RGL's permits are in Schedule 1 of the permit certificate.

On 31 May 2019, RGL underwent a change of control within the meaning of the CMA, for which the Minister's consent was not sought or obtained. This constituted a breach of the CMA because RGL was, and is, the permit operator for a Tier 1 exploration permit (EP 60491). On 26 February 2020, RGL received a warning letter from NZP&M in relation to the breach. The warning letter confirmed the Minister does not intend to revoke RGL's exploration permit or prosecute RGL for the breach. To the best of RGL's knowledge, it has not otherwise contravened the CMA or any regulations made under it.

4.2.2.5 Current Permits

RGL is 100% owner and operator of three exploration permits issued under the CMA (see Table 4-1 and Figure 4-2 for details). Unless otherwise stated in this Report, the multiple semi-contiguous permits are referred to as a single entity, named the Reefton Project. The total size of the Reefton Project is 342.06 km^2. The Reefton Project is managed 100% by the local operating company, RGL. Details of the individual permits are outlined in Table 4-1.

Table 4-1: Status of the mineral permits that comprise the Reefton Project.

Permit No.	Owner	Operation Name	Tier	Commodity	Date Granted	Term	Expiry Date	Area (ha)	Comment
EP 61062	RGL (100%)	Bald Hill	2	metallic minerals, excluding uranium	17 May 2024	5 years	16 May 2029	1,997	
EP 60491	RGL (100%)	Capleston	1	Au, Ag	12 April 2019	10 years	11 April 2029	2,424	Extension of duration for a further 5-year term (to 11 April 2029) granted on 5 July 2024
EP 60624	RGL (100%)	Kirwans Hill	2	metallic minerals, excluding uranium	22 September 2020	5 years	21 September 2025	29,785	

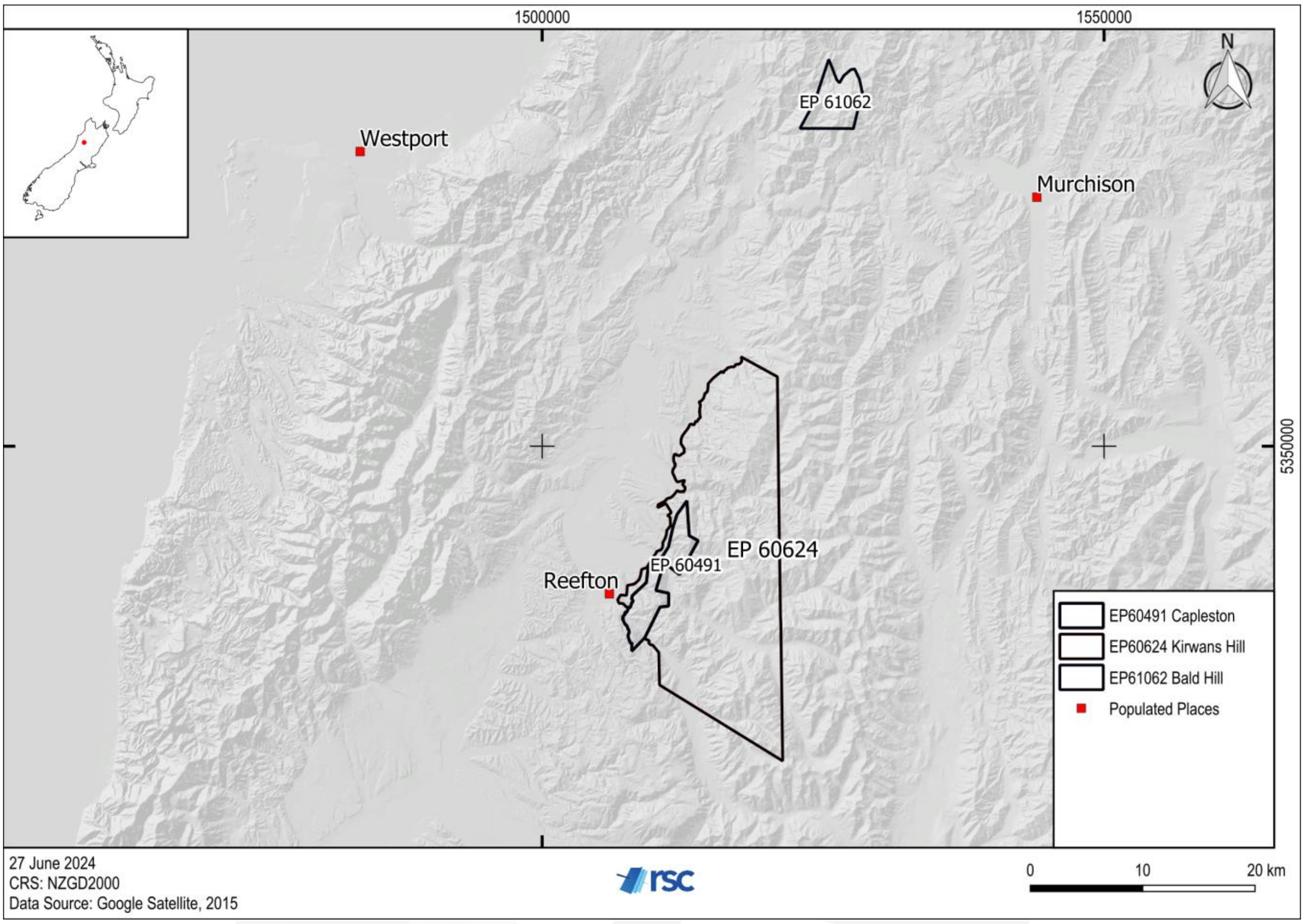

Figure 4-2: Boundaries of EP 60491, EP 60624, and EP 61062.

4.2.2.6 Work Programmes

An applicant for a permit under the CMA must propose a minimum work programme for the proposed permit. The Minister will not grant the permit unless the Minister is satisfied the work programme is consistent with the CMA, the purpose of the permit and good industry practice, and that the applicant is likely to comply with and give proper effect to the work programme. In addition, the work programme for a subsequent permit or permit extension of duration must be approved by the Minister. A permit holder may apply to the Minister to change the work programme for the permit.

EP 60491 has ongoing permit obligations to be completed by April 2027 and April 2029 (Table 4-2). EP 60624 (Table 4-3) and EP 61062 (Table 4-4) have ongoing permit obligations to be completed by September 2025 and May 2029, respectively.

Table 4-2: Minimum work programme for EP 60491.

Item	Type of Activity	Due Date	Comment	Status
1a	Data compilation	11/04/2022	Create a GIS database with all relevant geological and geophysical exploration data	Complete
1b	Other activity	11/04/2022	Complete a programme of airborne ortho-photo and digital terrain acquisition	Complete
1c	Geophysics	11/04/2022	Complete a geophysical passive seismic survey	Complete

1d	Mapping	11/04/2022	Complete geological and structural mapping to produce a new detailed geological map of the permit area	Complete
1e	Geochemical	11/04/2022	Complete a programme of soil and rock sampling for a minimum of 400 samples	Complete
1f	Geochemical	11/04/2022	Complete a programme of geochemical surveying that consists of orientation soil and wacker sampling	Complete
1g	Geochemical	11/04/2022	Complete a programme of portable XRF data collection on available sample pulps and data analytics	Complete
1h	Geophysics	11/04/2022	Complete a programme of geophysical aeromagnetic data analysis on all available survey data	Complete
1i	Geophysics	11/04/2022	Complete a geophysical magnetic survey over known gold anomalies	Complete
1j	Geophysics	11/04/2022	Complete a programme of geophysical magnetic susceptibility on existing drill core over known mineralisation zones	Complete
1k	Drilling	11/04/2022	Complete a programme of diamond core drilling for a minimum of 1,500 m	Complete
1l	Data compilation	11/04/2022	Update the geological and GIS database	Complete
1m	Other activity	11/04/2022	Complete a detailed structural and geological 3D model	Complete
1n	Other activity	11/04/2022	Identify targets for further exploration	Complete
1o	Reporting	11/04/2022	Prepare a technical report detailing all work completed during this stage of the work programme, in conjunction with QAQC information and data, sufficient to demonstrate levels of accuracy and precision to be submitted to the chief executive, in accordance with the regulations	Complete
2a	Drilling	11/04/2024	Complete a further drilling programme for a minimum of 2,500 m	Complete
2b	Data compilation	11/04/2024	Update the GIS database	Complete
2c	Other activity	11/04/2024	If results warrant, complete a mineral resource estimate to at least an inferred status in accordance with a recognised reporting code	Complete
2d	Other activity	11/04/2024	If results warrant, complete a mine scoping study in accordance with a recognised reporting code	Complete
2e	Reporting	11/04/2024	Prepare a technical report detailing all work completed during this stage of the work programme, in conjunction with QAQC information and data, sufficient to demonstrate levels of accuracy and precision to be submitted, to the chief executive, in accordance with the regulations	Complete
03a	Test pitting	12/04/2027	complete a programme of pitting and trenching;	Not yet started
03b	Geophysical	12/04/2027	complete additional high resolution magnetic surveying to extend the current Pactolus surveying south beyond the extent of current gold anomalism;	Not yet started
03c	Drilling	12/04/2027	complete a programme of diamond core drilling for a minimum of 6,000 m;	Not yet started
03d	Other activity	12/04/2027	complete a programme of geotechnical studies for specific gravity, and rock quality determinations;	Not yet started

03e	Other activity	12/04/2027	complete preliminary petrological and metallurgical testing;	Not yet started
03f	Other activity	12/04/2027	complete a program of DGPS surveying of old mine workings to accurately locate the historical workings;	Not yet started
03g	Geophysical	12/04/2027	complete a programme of ultra-detailed magnetics over the Capleston and Crushington areas;	Not yet started
03h	Geochemical	12/04/2027	complete a program of 1,500 infill soil sampling over historical areas;	Not yet started
03i	Data compilation	12/04/2027	update the GIS database with relevant geological, geochemical, and geophysical data;	Not yet started
03j	Data compilation	12/04/2027	update the 3D geological and structural model, integrate the model with the improved surface geochemistry, 3D modelling of the high-resolution geophysical data, and accurately modelled historical workings;	Not yet started
03k	Other activity	12/04/2027	carry out a targeting and ranking process on the model using a systems-driven approach to interpretation to define drill targets; and	Not yet started
03l	Other activity	12/04/2027	prepare a technical report detailing all work completed during this stage of the work programme in conjunction with QAQC information and data sufficient to demonstrate levels of accuracy and precision to be submitted to the chief executive in accordance with the regulations.	Not yet started
04a	Drilling	12/04/2029	complete a further programme of drilling, with a minimum of 4,000 m;	Not yet started
04b	Drilling	12/04/2029	if results warrant, complete a resource definition drilling programme on exploration targets;	Not yet started
04c	Other activity	12/04/2029	if results warrant, complete a resource estimate;	Not yet started
04d	Other activity	12/04/2029	if results warrant, complete a scoping study;	Not yet started
04e	Data compilation	12/04/2029	update the GIS database with all new data obtained;	Not yet started
04f	Other activity	12/04/2029	prepare a technical report detailing all work completed during this stage of the work programme in conjunction with QAQC information and data sufficient to demonstrate levels of accuracy and precision to be submitted to the chief executive in accordance with the regulations.	Not yet started

Table 4-3: Minimum work programme for EP 60624.

Item	Type of Activity	Due Date	Comment	Status
1a	Data compilation	21/09/2023	Compile all available geological data into a GIS database and undertake a data intervention to identify targets for further exploration	Complete
1b	Mapping/ Geochemical	21/09/2023	Undertake a programme of mapping and geochemical sampling comprising a minimum of 1,600 soil samples and 50 stream-sediment samples	Complete

1c	Geophysics	21/09/2023	Complete a programme of geophysical aeromagnetic data analysis on all available survey data	Complete
1d	Geophysics	21/09/2023	Carry out ground-based geophysical surveying over targets identified from analysis of aeromagnetic and surface geochemical sampling	Complete
1e	Other activity	21/09/2023	Identify potential drill sites for hard-rock targets	Complete
1f	Drilling	21/09/2023	Complete a programme of drilling of the high-grade ore shoots, with a minimum of 500 m	Complete
1g	Reporting	21/09/2023	Prepare a technical report detailing all work completed during this stage of the work to be submitted to the chief executive, in accordance with the regulations	Complete
2a	Geochemical	21/09/2025	Complete a further programme of geochemical sampling with a minimum of 800 soil samples	Complete
2b	Drilling	21/09/2025	Complete a further programme of drilling either surface or underground, with a minimum of 1,250 m	Not yet started
2c	Data compilation	21/09/2025	Update the GIS database with all new data obtained	Not yet started
2d	Other activity	21/09/2025	Define an inferred resource, if warranted	Not yet started
2e	Reporting	21/09/2025	Prepare a technical report detailing all work completed during this stage of the work to be submitted to the chief executive, in accordance with the regulations	Not yet started

Table 4-4: Minimum work programme for EP 61062.

Item	Type of Activity	Due Date	Comment	Status
1a	Data compilation	17/05/2027	Update all available geological data into the existing GIS database and undertake a data intervention to identify targets for further exploration.	Not yet started
1b	Geophysics	17/05/2027	Complete improved geophysical aeromagnetic data analysis on all available survey data.	Not yet started
1c	Geophysics	17/05/2027	Complete a programme of ultra-detailed UAV MagArrow magnetic surveying, including LiDAR surveying where existing data are insufficient for the UAV flight systems.	Not yet started
1d	Geochemical	17/05/2027	Complete a programme of geochemical sampling on identified targets for a minimum of 500 samples.	Not yet started
1e	Geochemical	17/05/2027	Complete a further programme of geochemical sampling on identified targets for a minimum of 500 samples.	Not yet started
1f	Geochemical	17/05/2027	Complete a programme of stream-sediment sampling for a minimum of 50 samples.	Not yet started
1g	Mapping	17/05/2027	Complete a programme of detailed geological mapping with structural mapping and a minimum of 50 rock chip samples.	Not yet started

1h	Other activity	17/05/2027	Identify potential drill targets.	Not yet started
1i	Drilling	17/05/2027	Complete a programme of drilling for a minimum of 250 m.	Not yet started
1j	Reporting	17/05/2027	Prepare a technical report detailing all work completed during this stage of the work programme — in conjunction with QA/QC information and data sufficient to demonstrate levels of accuracy and precision — to be submitted to the chief executive in accordance with the regulations.	Not yet started
2a	Geochemical	17/05/2029	Complete a further programme of geochemical sampling.	Not yet started
2b	Drilling	17/05/2029	Complete a further programme of drilling for a minimum of 500 m.	Not yet started
2c	Data compilation	17/05/2029	Update the GIS database with all new data obtained.	Not yet started
2d	Other activity	17/05/2029	If results warrant, complete an inferred resource estimate.	Not yet started
2e	Reporting	17/05/2029	Prepare a technical report detailing all work completed during this stage of the work programme — in conjunction with QA/QC information and data sufficient to demonstrate levels of accuracy and precision — to be submitted to the chief executive in accordance with the regulations.	Not yet started

4.3 Surface Rights & Permits

The granting of a permit under the CMA does not confer a right of access to the land covered by the permit, except for certain minimum impact activities.

Subject to some limited exceptions, the permit holder must have an access arrangement with each owner and occupier of the land to carry out more than minimum impact activities on or under the land, but the permit holders is required to give 10 working days' notice to the landowner and occupier. The access agreement may be either agreed by the parties or determined by an arbitrator under the CMA. An access arrangement is binding on the owner's or occupier's successors in title.

An activity carried out below the surface of the land does not require an access arrangement if the activity will not, or is not likely to:

- cause any damage to the surface of the land or any loss or damage to the owner or occupier of the land;
- have any prejudicial effect regarding the use and enjoyment of the land by the owner or occupier; or
- have any prejudicial effect regarding any possible future use of the surface of the land.

Access to Crown land requires permission from the relevant Minister of the Crown with responsibility for the land. To sample Crown land, held or managed under the Conservation Act (1987) or in other Acts specified in Schedule 1 of the Conservation Act, the permit holder must gain consent or an access arrangement from the Department of Conservation (DOC). Permit holders require consent (this differs from an access arrangement, which is stricter) from DOC to conduct minimum impact activities on conservation land. For all other exploration and mining activities on conservation land, the permit holder will require an access arrangement from DOC. If an access arrangement is sought for conservation land, the Minister of Conservation must determine whether the proposed mining activities are ‘significant’. If the activities are ‘significant mining activities’, the application for land access must be publicly notified with a submission period.

Prospecting permits give the permit holder the right to prospect for specified minerals by very low-impact methods, such as literature searches, geological mapping, hand sampling or aerial surveys. Exploration permits give the permit holder the exclusive right to explore for the specified minerals in the permit area using higher impact exploration methods, such as drilling and earthworks. However, any exploration activity must be allowed under the Resource Management Act (1991) or permitted by a granted resource consent.

The Resource Management Act classifies activities into six primary categories: permitted, controlled, restricted discretionary, discretionary, non-complying, and prohibited. These different categories determine whether resource consent is required before carrying out an activity, and what will be considered when resource consent application is assessed. National Environmental Standards and Regional and District Plans regulate which category an activity falls in, and therefore whether resource consent is required.

The majority of land within the Reefton area was State Forest Land, gazetted in 1981 as the Victoria State Forest Park. The land was subsequently renamed as the Victoria Conservation Park and came under the administration of the DOC under the Conservation Act 1987. The DOC, therefore, has primary responsibility for the conservation of New Zealand’s natural and historic heritage. The Department also has responsibilities under other related legislation including the National Parks Act 1980 and the Reserves Act 1977. Parts of the land within the permit area have further conservation protection with the additional gazettal of Wildlife Management Areas, Amenity Areas and Ecological Areas. Timberlands West Coast administers exotic and some indigenous forest stands. Freehold land forms a minority of the tenement distribution.

RGL has one active agreement with DOC to undertake minimum impact activities (MIA) on the land administered by DOC, within its permit area. An MIA gives access to the land to conduct non-mechanical exploration, such as surface geochemical sampling and mapping. Details of these MIA agreements are presented in Table 4-5.

RGL previously held an MIA agreement with DOC covering the Capleston EP 60491, which expired on 11 April 2024, the original permit expiry prior to the EP 60491 extension term. RGL applied to DOC for a new MIA on 2 May 2024. If the MIA is granted, the MIA is expected to expire on 11 April 2029.

The Kirwans East PP 60554 was superseded by EP 61062 on 17 May 2024. The previous MIA for PP 60554 expired on 26 September 2023. RGL has not applied for any further MIAs.

The MIA agreement for the Kirwans Hill EP 60624 is currently the only active MIA agreement RGL holds with DOC. It is due to expire on the expiry date of the permit.

Table 4-5: DOC MIA agreements previously held and applied for by RGL.

Permit No.	Operation Name	MIA Consent No.	MIA Grant Date	Status	MIA Expiry Date

EP 60491	Capleston	78144-MIA	12 April 2019	Inactive	11 April 2024
EP 60491	Capleston	-	(Lodged on 2 May 2024)	Pending	11 April 2029 (proposed)
PP 60554	Kirwans East	98142-MIA	1 June 2022	Inactive	26 September 2023
EP 60624	Kirwans Hill	DOC-6483252	1 November 2020	Active	21 September 2025

In addition to the current MIA agreement, RGL held an access agreement (AA) (AA; and variations thereof) with DOC that recently expired, and RGL has applied for two new AAs (Table 4-6). An AA allows for more intrusive work, including exploration drilling.

The AA previously held by RGL covered EP 60491 (78806_AA_v2). It was granted to RGL for a term of 5 years, from 12 April 2019 to 11 April 2024. The AA gave RGL consent for access to 0.66 hectares of land (Victoria Forest Park, Boatman Creek Conservation Area and overlays of Murray Creek Amenity Area and Larrys Wildlife Management area) contained within EP 60491 — specifically 3 campsites/helicopter landing pads, 8 pump sites, and 21 drilling sites. The AA expired on 11 April 2024, the original permit expiry.

On 1 May 2024, RGL applied to DOC for a new AA to cover EP 60491. The AA application details sites previously approved under 78806_AA_v2 and four new drill sites in Murray Creek. If granted, the AA is expected to expire on 11 April 2029.

On 6 June 2023, RGL applied to NZP&M for an AA to cover EP 60624. The application details nine drill sites.

Table 4-6: DOC AA agreements previously held and applied for by RGL.

Permit No.	Operation Name	AA Consent No.	AA Grant Date	Status	AA Expiry Date
EP 60491	Capleston	78806_AA_v2	18 November 2019	Inactive	11 April 2024
EP 60491	Capleston	-	(Lodged 1 May 2024)	Pending	11 April 2029 (proposed)
EP 60624	Kirwans Hill	-	(Lodged 6 June 2023)	Pending	-

Based on its review of RGL's agreements with DOC concerning exploration in the Reefton area, and other available material, RSC has identified nothing to suggest RGL does not hold sufficient surface rights to allow it to effectively explore the permit area.

4.4 Royalties & Encumbrances

4.4.1 Crown Royalties

One of the purposes of the CMA is to provide “a fair financial return to the Crown for its minerals”, which is achieved through a system of mandatory Crown royalties.

The Crown Minerals (Royalties for Minerals Other than Petroleum) Regulations 2013 (Royalty Regulations) set out rates and provisions for the payment of Crown royalties on non-petroleum mineral production. The Royalty Regulations provide for the payment of royalties on exploration and mining permits, to the extent minerals are produced from the permits.

Subject to certain thresholds (notably, a net sales revenue threshold of NZD 200,000 per annum), the royalty regime under the Royalty Regulations for Tier 1 permits, for metallic minerals, is:

- for gold and net sales revenue from Au, of not more than NZD 2M per annum, an ad valorem royalty of 2% of net sales revenue; and otherwise
- the higher of an ad valorem royalty of 2% of net sales revenue or an accounting profits royalty of 10% of accounting profits.

4.4.2 MPG Rights

The MPG Partnership is a collective of six men who undertook exploration under PP 60377. This permit was acquired by RGL with a memorandum of understanding (MOU). Under the MPG MOU, RGL has agreed to grant MPG:

- a 1% net smelter royalty on all "hard rock production from RGL's hard rock operations on PP 60377…Including but not limited to gold, silver, tungsten and all other hard rock gold-associated minerals"; and
- "an indefinite right to mine any alluvial material contained within PP 60377…Subject to standard non-interference clauses in relation to [RGL's] hard rock exploration and mining operations."

PP 60377 is the predecessor prospecting permit to MPG's subsequent exploration permit, which RGL acquired from MPG when it was issued; this transfer has occurred, and the subsequent Exploration Permit (EP 60624) is held 100% by RGL.

4.5 Environmental Liabilities & Permits

New Zealand's principal environmental legislation is the Resource Management Act 1991 (RMA).

The RMA regulates the impacts of all activities on the natural and physical environment, including land, water and air. An activity must be permitted under either:

- the relevant district or regional plan (which is administered by the relevant district or regional council);
- a resource consent granted by the relevant district or regional council; or
- the RMA itself, or a regulation made under the RMA.

Activities are typically permitted subject to conditions, such as to mitigate environmental effects in various ways, to monitor and report, or to pay an environmental bond.

The RMA contains a general duty to avoid, remedy or mitigate any adverse effect on the environment arising from an activity, whether the activity is permitted or not.

If a resource consent is required for an activity, an application must be made to the relevant district or regional council. Resource consents may be granted or declined, and are subject to appeal procedures. Unless the environmental effects of the activity are minor and written approvals have been obtained from any affected parties, resource consent applications will be notified and third parties, or the general public, will be able to submit on whether the activity should be consented and on what conditions.

A variety of injunctive and compensatory enforcement orders are available under the RMA to prevent, remedy and provide compensation for environmental non-compliance. In serious cases, resource consents can be cancelled. It is an offence to contravene the principal sections of the RMA. Offences attract significant fines; up to NZD 600,000 for a company with the possibility of an additional penalty in the case of commercial gain.

To the best of RGL's knowledge, it has not committed any breaches of the RMA or any other environmental laws. RGL has not been the subject of any enforcement proceedings for breaches of its environmental obligations.

Based on its review of RGL's agreement with The Ministry of Energy and Mines concerning exploration in the Reefton area, dated 10 January 2018, and other available material, RSC has identified nothing to suggest RGL will be prohibited for environmental reasons from effectively exploring the permit areas.

RGL holds the necessary permits under the CMA for its current prospecting and exploration activities (see section 4.3).

RGL has, or is expected to have, the necessary access arrangements in place for its current prospecting and exploration activities (see section 4.3).

Based on its review of RGL's permits, issued by New Zealand Petroleum and Minerals concerning exploration in the Reefton area, dated 8 July 2024 and other available material, RSC has identified nothing to suggest RGL does not hold sufficient permits to allow it to explore the permit area effectively.

4.6 Other Significant Factors & Risks

Mining in New Zealand is a sensitive subject and like many other Western Countries, there are active anti-mining groups.

Exploration and mining projects within New Zealand can also be subject of negative social media campaigns by embolden local and online anti-mining groups. In 2019, Plaman Resources lost its social licence to operate at Foulden Hills, Diatomite Mine, Otago[1]. A negative Facebook social media campaign resulted in the project losing funding and therefore being unable to proceed. The QP notes that while there is some risk of social licence issues, the West Coast region has stronger support for mining than the rest of New Zealand.

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[1] https://www.newsroom.co.nz/southern-discomfort-at-fossil-mining-plans

5. Accessibility, Climate, Local Resources, Infrastructure & Physiography

5.1 Accessibility

The Reefton Project is located to the east of the Reefton township and can be accessed via State Highway 6 and 7 (Figure 5-1). Local roads that lead off from the highways provide vehicle access to various parts of the Project, and old mining access roads locally provide 4-wheel-drive access to the major historical mines. The DOC maintains recreational walking tracks within the prospects.

Heavy machinery access requires helicopter transport to some permit areas. Local firms operate helicopter charter services, and fixed-wing charter services are available through the Greymouth Aero Club.

27 June 2024
CRS: NZGD2000
Data Source: Google Satellite, 2015

Figure 5-1: Cadastral map illustrating accessibility to the Reefton Project.

5.2 Climate

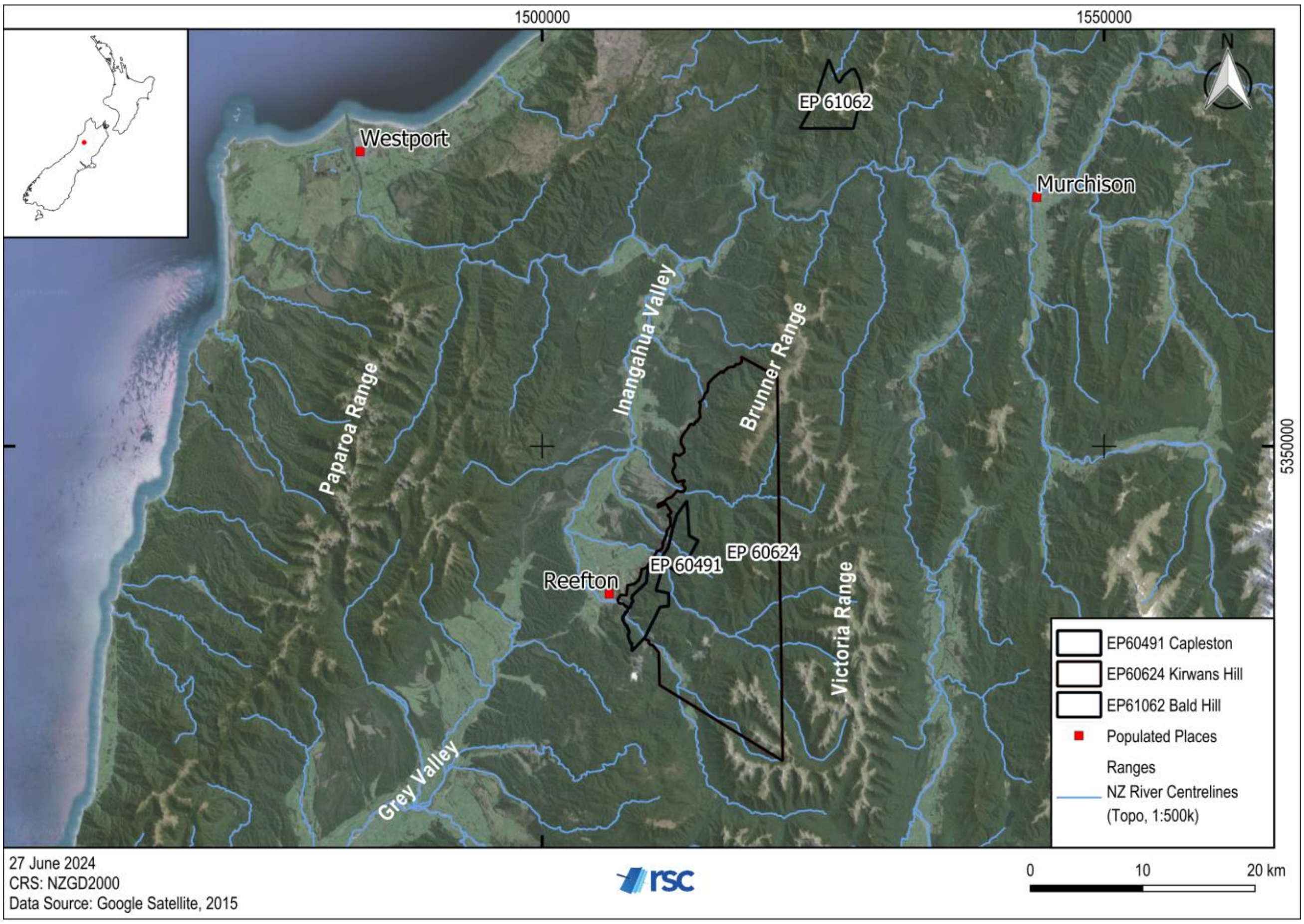
The Project Area is in the rain shadow of the Paparoa Range. The climate is wet and temperate, with average annual rainfall in Reefton of 1,920 mm per year. Seasonally, spring receives the most precipitation, while late summer and early autumn are the driest. Summer weather is often hot and relatively dry, while frosts and fogs are common in winter — average mean temperatures range from 5°C in the winter months to 17°C in summer. The region receives, on average, two days of snow and 68 days of ground frost each year. Field work can be conducted year-round.

5.3 Physiography

The Reefton Goldfield is situated in hilly country of moderate to steep relief, in the foothills of the Victoria Range. The topography is locally very steep and varies in elevation from 240 m to >1,000 m above sea level. Creeks and rivers strongly dissect the area (Figure 5-2).

5.4 Vegetation

Apart from the Inangahua and Grey valleys, which have been largely cleared for agriculture, the dominant vegetation of mountain slopes below 1,000 m is mixed, regenerating, indigenous beech (Nothofagus spp.) and podocarp, principally rimu, forest growing on poor and immature soils. Alpine scrublands and grasslands are present at higher altitudes. There are also areas of exotic pine plantations near the township of Reefton. Vegetation in the Project Area is predominantly thick and can impede exploration (Figure 5-3).



27 June 2024
CRS: NZGD2000
Data Source: Google Satellite, 2015

Figure 5-2: Significant ranges and valleys around the RGL permit area.

Figure 5-3: Typical topography at the Reefton Project. Looking southeast towards the Capleston area.

5.5 Local Resources & Infrastructure

All the properties are located within the Buller region and are typically well connected by state highways and public roads to nearby towns. The nearest hospital is located in Greymouth and there is a community health centre located in Westport. The closest regional airport is located in Hokitika which connects to Christchurch International Airport. Reefton is connected to New Zealand's rail network. There are small ports located at Westport and Greymouth, which typically service fishing vessels and recreational vessels.

To facilitate its exploration, RGL has established an exploration office in the township of Reefton, immediately to the southeast of the permit area. The exploration office includes a small laboratory for processing soil samples, a core cutting and logging facility, and additional containers to store samples and supplies.

Cell phone coverage for much of the Project Area is poor. VHF radios are used for communication between the RGL base and drill site, and GSP units, with satellite communication functions (Garmin InReach), are used for communication between RGL base and surface sampling teams.

A helipad has been built within the Project at Pactolus Campsite (E1513002, N5340972) to service the drilling (Figure 5-4). Ten drill pads have also been built, eight of which have been decommissioned and the land rehabilitated (Figure 5-5).

Water at the drill sites was sourced from the nearest creek. Depending on how far away the nearest water source was from the drill site, a series of pumps were used to transport water. At the Pactolus campsite, water was pumped from Topffer Creek to halfway up the spur. Then a second pump would pump the water to the camp. A diversion was in place in the water line, sending water to the drill site. Power at the camp and drill site was from diesel-fuelled generators.

The West Coast region of the South Island has an active mining industry; therefore, there are numerous skilled contractors and organisations in the area that can support exploration and mining activity.

Figure 5-4: A. Helipad at Pactolus; B. Helicopter landing at Pactolus.

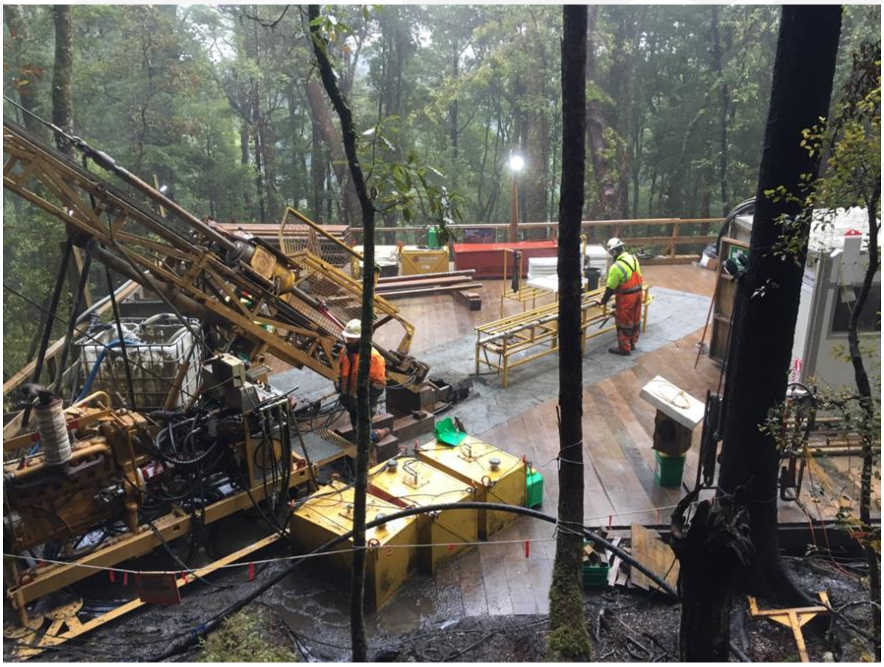


Figure 5-5: Drill pad 1 at Pactolus.

6. History

6.1 Tenure & Operating History

The Reefton Project is located in the Reefton Goldfield, which contains several historical alluvial and hard-rock Au mines including Capleston Group, Crushington Group, Murray Creek Group, Ajax Group, Italian Gully Group, Larry Creek Group and Kirwan's Hill mines.

The central section of the Reefton Project was previously held by Lime and Marble Limited (L&M) between 1970 and 1971 (Riley and Ball, 1971), and subsequently by CRA Exploration Limited (CRAE) between 1981 and 1990.

In December 1990, CRA Exploration Pty. Ltd. withdrew from New Zealand, and tenders were called for the company's West Coast licence areas. The successful tenderer was Macraes Mining Co. Ltd., which changed its name to Gold and Resource Developments (NZ) Limited on 14 May 1999, and again to GRD Macraes Limited (GRDM) on 30 June 2000. The permits subsequently formed part of the asset portfolio of OceanaGold (New Zealand) Limited, listed in May 2004. The area of the Capleston Exploration Permit (EP 60491) was relinquished by OceanaGold in 2018 (Edwards, 2018).

The eastern section of the Reefton Project, over Kirwans Hill, was held by Gold Mines New Zealand Ltd (GMNZ) between 1978 and 1987 (Bunting, 1985). Between 1988 and 2013, the area has been held by several exploration companies including Kirwans Reward Mining Ltd (Hohback, 1988), Kamedon Management Ltd, Zephyr Minerals NL (Sylvester, 1998), Auzex Resources (Hill, 2009) and Siburan Resources Ltd (Way, 2013). In 2018, the area was pegged by the MPG Partnership who entered into a Joint Venture with RGL in 2019.

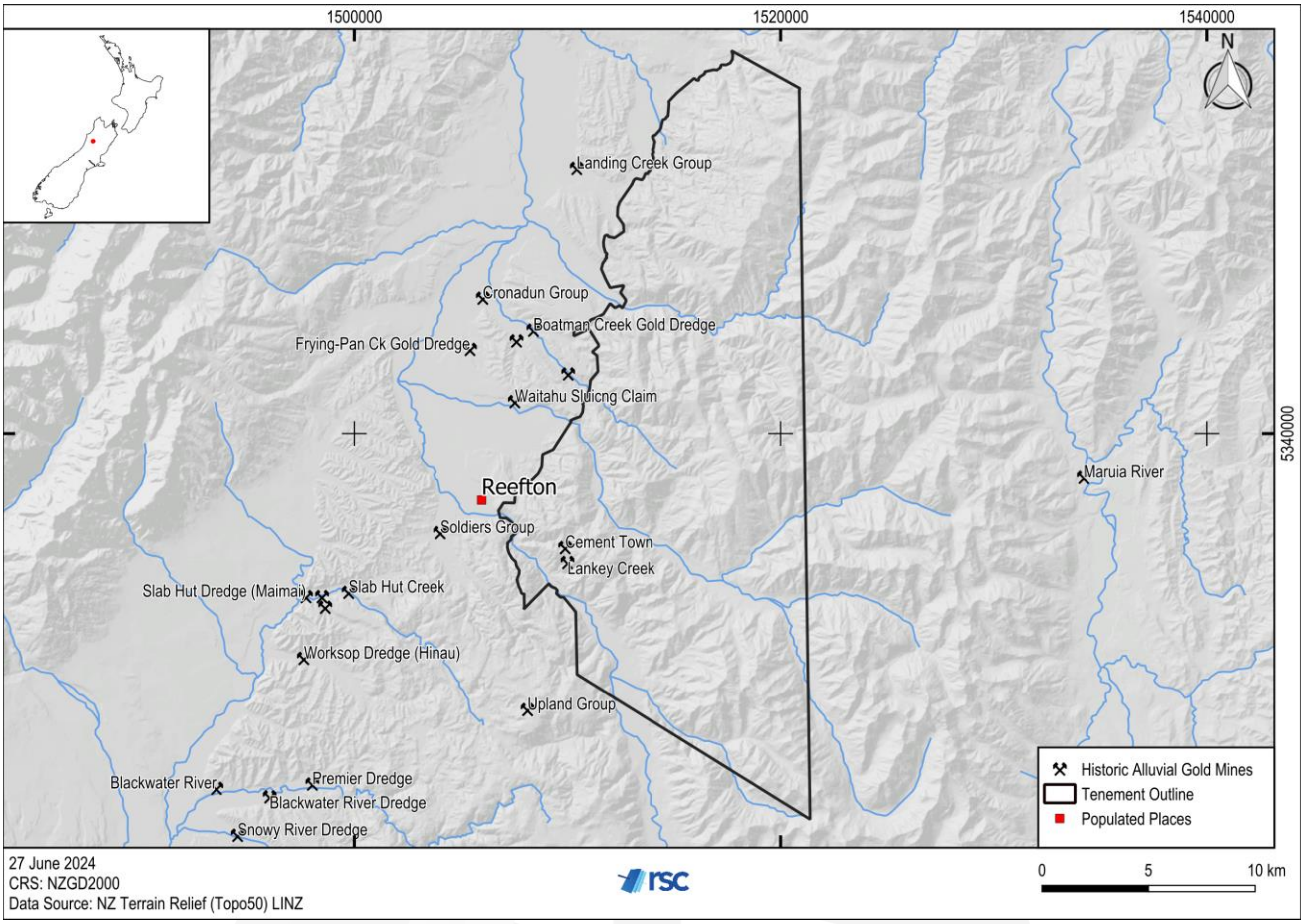
6.2 Exploration History

6.2.1 Alluvial Gold

The first discovery of Au within the Reefton area was made by John Redman in 1866, during the peak of the first West Coast Au rush. Alluvial Au was found in Redman's Creek and was followed by discoveries in Boatmans, Murray, Rainy and Soldier Creeks (Barry, 1993; Figure 6-1).

Easily accessible alluvial Au deposits in Holocene gravels were first exploited by individuals or small parties of miners using dishes, cradles, and sluice boxes. Gold-bearing fluvioglacial gravels of Pleistocene age were worked by co-operative parties who constructed dams, water races, tunnels, flumes, and tail races to enable ground and hydraulic sluicing (Barry 1993).

Dredging operations were effectively employed on many of the local rivers and tributaries from 1900–1919 and 1934–1957. The cessation of the Snowy River Dredge in 1957 led to a 23-year lull in alluvial mining in the area. Increases in the Au price in 1980 led to a revival of the alluvial Au industry, which was aided by the introduction of hydraulic excavators and floating rotary screens. Mining by these methods continues in the Reefton area to this day (Barry, 1993).



27 June 2024
CRS: NZGD2000
Data Source: NZ Terrain Relief (Topo50) LINZ

Figure 6-1: Locations of historical alluvial Au mining around Reefton.

6.2.2 Hard-Rock Gold

The first discovery of auriferous quartz in the Reefton area was in June 1870, with the discovery of a reef in the head of Murray Creek. The first prospecting claim application was lodged, on what was later the Golden Treasure claim. Further discoveries followed in November 1870, the most important being the Andersons lode in Andersons Creek, and a reef in German Jacks Gully, subsequently called the Ajax shoot, followed by the adjacent Golden Fleece shoot (Barry, 1993).

Between December 1871 and January 1872, payable quartz was found north of Reefton in Larry, Boatmans and Caples Creeks, on which the Capleston Group of mines were situated (Barry, 1993).

For the year ending March 1877, 952.6 kg (30,627 oz) of Au was mined from 33,963 t of quartz, but by 1878 Au output from the Reefton mines had declined to 809.4 kg (26,022 oz). A second mining boom, incited by the discovery of the Rand Goldfield in South Africa, commenced in 1880. Speculation was encouraged by handsome returns, particularly from the Capleston Group of mines. The Welcome ore shoot, a down-plunge extension of the Hopeful ore shoot, recovered 415.7 kg (13,365 oz) from 4,024 t of quartz. For the next ten years, this mine was consistently profitable (Barry, 1993).

From the first crushing of ore from the Ajax Mine in March 1872, a total of 3,983,351 t of quartz was extracted from 59 productive mines for a return of 64,678 kg (2.08 Moz) of Au. Only 11 of these mines produced more than 500 kg (16,075 oz) of Au (Barry, 1993).

Discoveries of new deposits dropped off in the late 1890s and early 1900s. Other than the discovery of the Alexander reefs to the south of Reefton in 1920, there were no further significant discoveries, and Au production steadily declined as Globe-Progress, Wealth of Nations, and Keep-it-Dark mines closed in the 1920s and 1930s (Barry, 1993).

At the outbreak of the Second World War, the Big River and Blackwater mines were the only producers. Wartime labour shortages were responsible for the closure of the Big River Mine in September 1942. When the Blackwater shaft collapsed on 9 July 1951, the ventilation and drainage systems of the Blackwater Mine were disabled and 81 years of continuous quartz mining activity in the Reefton Goldfield came to an end.

Hard-Rock Au mining would not recommence in Reefton until 2007 when OceanaGold (NZ) Ltd reopened the Globe-Progress mine. Construction on the project started in 2005, consisting of a surface mine and process plant to grind and concentrate the mined ore. The mine yielded 606,000 oz Au over the life of the open pit operation which ceased production in 2015. In total, 12.89 Mt of ore was processed, with an average grade of 1.8 g/t Au. Globe-Progress transitioned to closure and rehabilitation in 2016. It is now known as the Reefton Restoration Project (Edwards, 2020).

Table 6-1 summaries the historical Au produced within the Reefton Project.

Table 6-1: Historical production from mines within Reefton Project (Barry, 1993; Figure 6-2).

Mine Group	Quartz (tonnes)	Gold (oz)
Larry Creek Group	9,064	5,289
Italian Gully Group	1,071	1,093
Capleston Group	85,523	134,927
Murray Creek Group	63,056	39,680
Ajax Group	147,688	96,671
Crushington Group	818,247	406,212
Kirwans Hill	22,554	11,012
Total	1,147,203	646,884

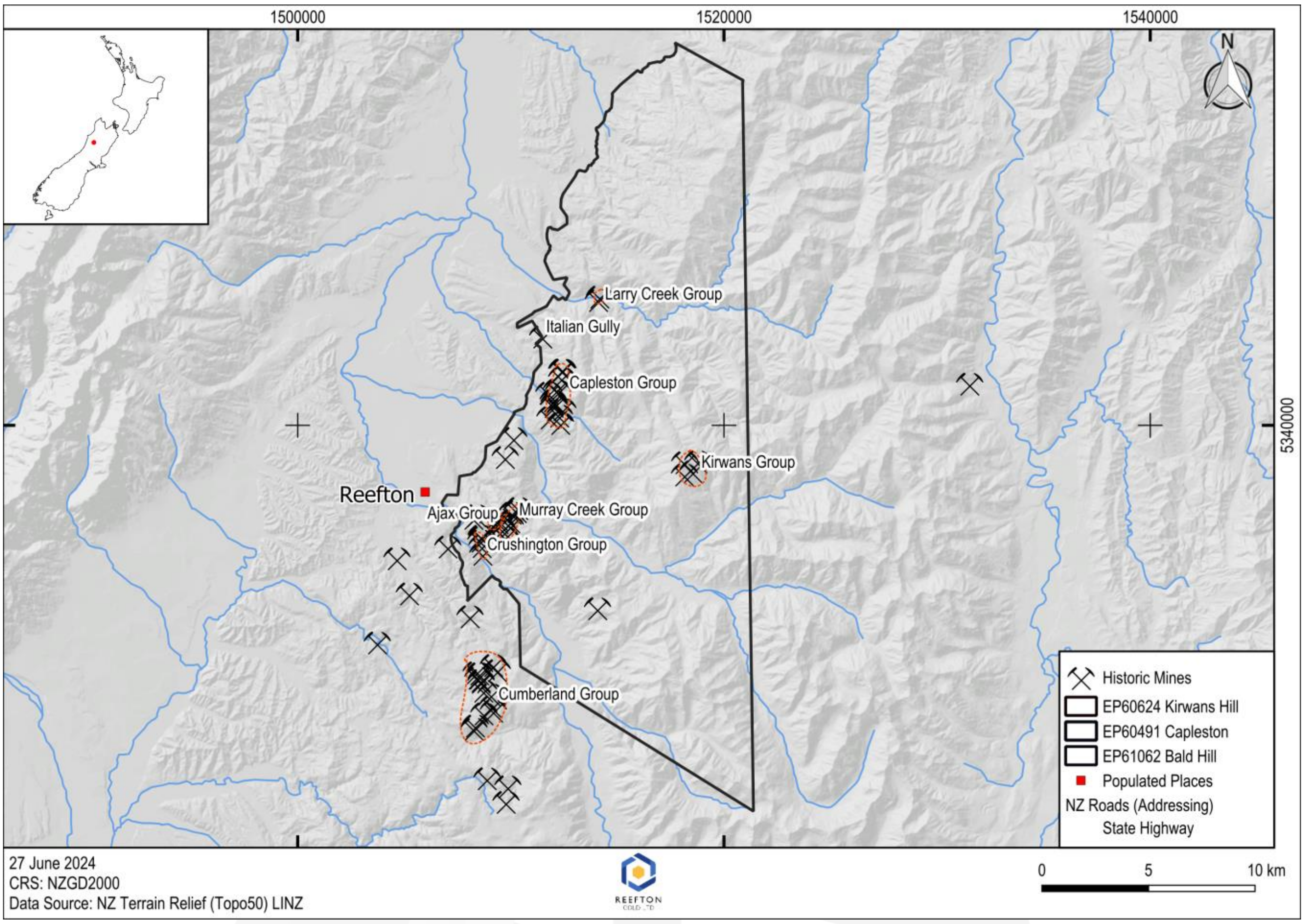


Figure 6-2: Location of historical mining centres within the Reefton Goldfield.

6.2.2.1 Capleston Group

The Capleston Group consists of five mines: Imperial-Reform, Just-In-Time, Fiery Cross, Welcome-Hopeful and Specimen Hill mines, which define the strike of a lode system, with individual workings targeting ore shoots (Barry, 1993; Figure 6-3).

The Imperial-Reform is the southernmost mine of the group and produced a total of 33.3 kg (1,071 oz) Au from a shallow, north-plunging ore shoot, with an average grade of 19.6 g/t. A 61-m-deep shaft was sunk on the northern claim boundary, which was deepened to 122 m and driven northwards, but any downdip extension of the Imperial-Reform shoot was not discovered (Downey 1928).

Just-in-Time was mined from adits, winzes and via the Fiery Cross shaft. The Just-in-Time ore shoot was up to 30 m long and up to 3 m wide, with an average width of 1.2 m (Gage, 1948). From 1874–1889, the mine was a regular producer, with a total of 534 kg (17,169 oz) of Au produced from 13,755 t of ore (38.8 g/t) (Barry, 1993).

The Fiery Cross ore shoot was worked from a shaft and five levels, with an incline shaft driven from No.3 level, which allowed the two lower levels to be developed. Below the bottom level, a subhorizontal fault cut off the ore shoot. The No. 3 level was driven south to the Just-in-Time shoot which was followed down by an internal shaft to 232 m. The orebody at this depth was again terminated by a gentle, north-dipping fault (Henderson, 1917). Production from the mine up to 1896 amounted to 870 kg (27,971 oz) of Au from 24,956 tonnes of quartz (34.8 g/tonne), including Au recovered from the southern portion of the Just-in-Time shoot. The Fiery Cross shaft was extended to 305 m depth and included an easterly 244-m crosscut which encountered three reef tracks (the sheared country rock in which the quartz lodes are found), but no ore (Downey, 1928; Riley & Ball, 1971).

The initial crushing from the Fiery Cross in December 1873 produced 24.6 kg (791 oz) of Au from 447 t of quartz; compared to 50.7 kg (1,630 oz) from 313 t of quartz from Just-In-Time.

The Welcome-Hopeful mine was the most profitable of the Capleston Group. The upper section of the ore shoot yielded 651.75 kg (20,954 oz) of Au from 13,004 t of ore (50.1 g/t). The average width of the Welcome shoot was 0.45 m, but widths of up to 2.1 m were reported. The down-plunge extension of the shoot was followed for ~300 m below outcrop. Workings comprised five adits and an underground shaft from which three levels were opened. At No. 9 level, the orebody was faulted out, and despite an internal shaft sunk, levels driven from this shaft did not re-encounter the orebody (Barry, 1993). Attempts to locate a down-plunge extension of the Welcome shoot, with a branch drive from the Boatmans low-level tunnel, were unsuccessful. Extensions to the North Welcome shoot were also sought by a 366-metre adit driven from the valley of Little Boatmans Stream (Gage, 1948).

From 1876–1906, 44,868 t of quartz were treated from the Welcome-Hopeful mine, for a yield of 2,756 kg (88,608 oz) Au (61.4 g/t; Gage, 1948).

The area to the north of the Welcome-Hopeful mine was prospected, with a 700-m-long adit from Little Boatmans Creek driven eastwards towards the Specimen Hill claim. A 91.5-m-deep shaft was then sunk at the end of the adit but did not intersect the shoot (Downey, 1928).

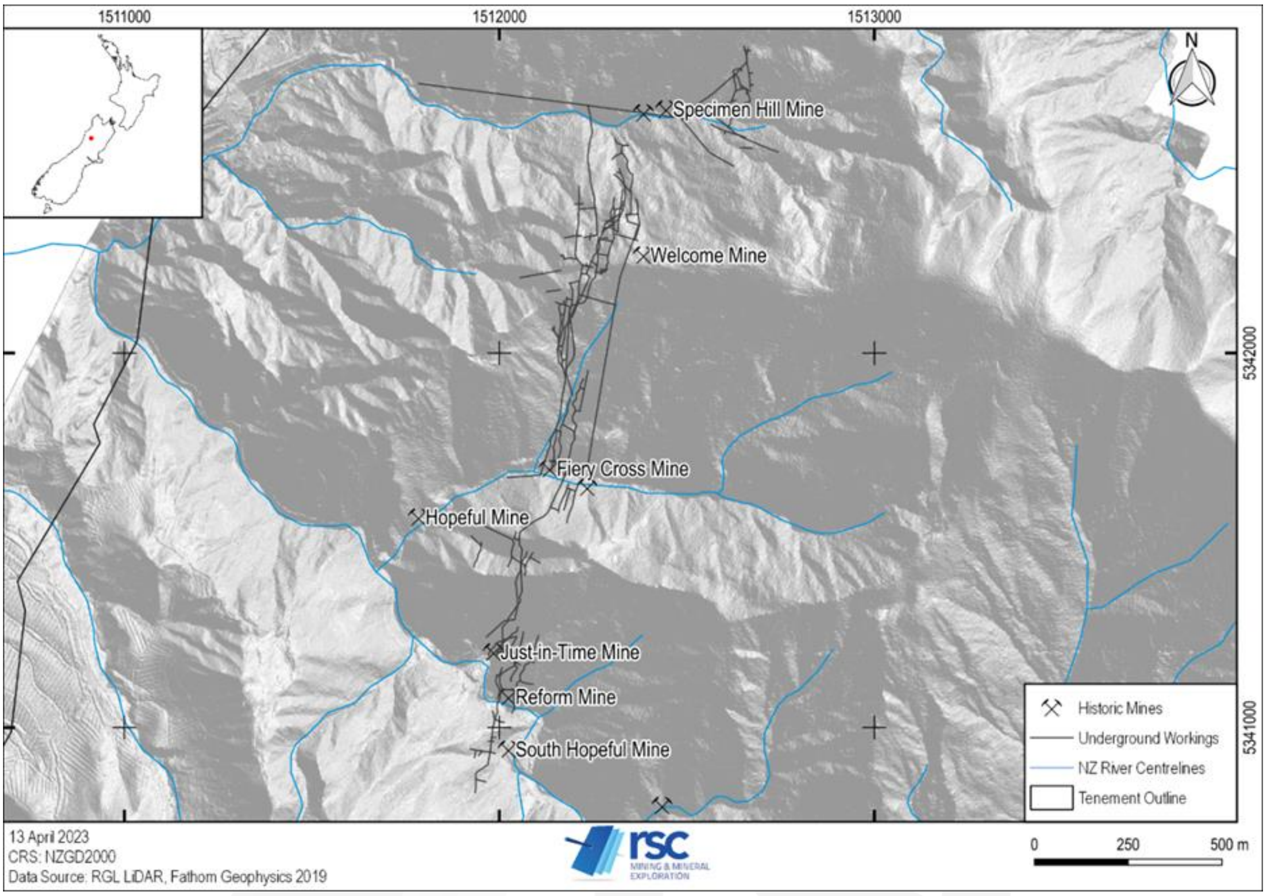


Figure 6-3: Capleston Group and underground workings.

6.2.2.2 Crushington Group

The principal mines within the Crushington Group include Keep-it-Dark, Wealth-of-Nations and Energetic, with minor workings at Pandora, Nil Desperandum-Hercules and Golden Ledge (Figure 6-4).

The Keep-it-Dark lease was taken up in 1872, and the first crushing took place in 1875. Up until the mine closure in 1928, 333,797 t of quartz were mined for 5,680 kg (182,616 oz) of Au.

Two lode systems were mined in the Keep-it-Dark property: the Eastern and the Western. A quartz lode was also mined from the 'Old Dark' shoot located ~100 m east of the Eastern lode system. This shoot died out 37 m below outcrop. Adits and levels from a 150-m-deep 'monkey' shaft were used to mine the Eastern lode system. The ore body comprised two shoots: the northern and the southern. Payable quartz at a grade of 17–18 g/t was found in No. 6 level and stoped up to No. 5 level (Downey, 1928). On No. 7 level, the northern shoot again proved to be uneconomic. Around 1897, the Western lode system was located west of the main shaft. The Western lode system, consisting of the eastern and western shoots, was worked from the main shaft and nine levels. The eastern shoot was worked as far as No. 5 level.

The discovery of auriferous quartz on the Wealth of Nations claim was made in 1871, with payable quartz found in the adjacent Energetic claim shortly afterwards. Both the Wealth of Nations and Energetic reefs were worked for ten years until the reef was faulted off 90 m below the outcrop. Gold produced from the near-surface workings on the Energetic and Wealth of Nations lodes amounted to 958 kg (30,800 oz) and 871 kg (28,003 oz), respectively. The downward continuation of the

Wealth of Nations ore shoot was not discovered for another 12 years. The search for the faulted ore shoot commenced from a 61-m vertical shaft, sunk 244 m from the portal of No. 4 (battery) level. A drive, directed to the north, from the bottom of this shaft intersected a 1.5-metre-wide reef carrying grades of 7–9 g/t. An inclined shaft was sunk on the reef; however, payable quartz was not found until the 152-metre level. The inclined shaft was extended to 211 m below No. 4 (battery) level, and several levels were put out, encountering three subvertical ore shoots. Development below the 213-metre level was carried out from the Energetic shaft, which was progressively deepened to 692 m below the surface (No. 13 level) and extracted large quantities of quartz from above No. 11 level. The mine ceased operations in 1927 with the collapse of the main shaft for a second time (Barry, 1993)

During the operation of the Energetic and Wealth of Nations claims, 4,229 kg (135,966 oz) of Au was recovered from 323,660 t of quartz (13.5 g/t) (Barry, 1993).

Small quantities of Au were recovered from workings at No. 2, South Keep-it-Dark, Pandora and Nil Desperandum-Hercules (Barry, 1993).

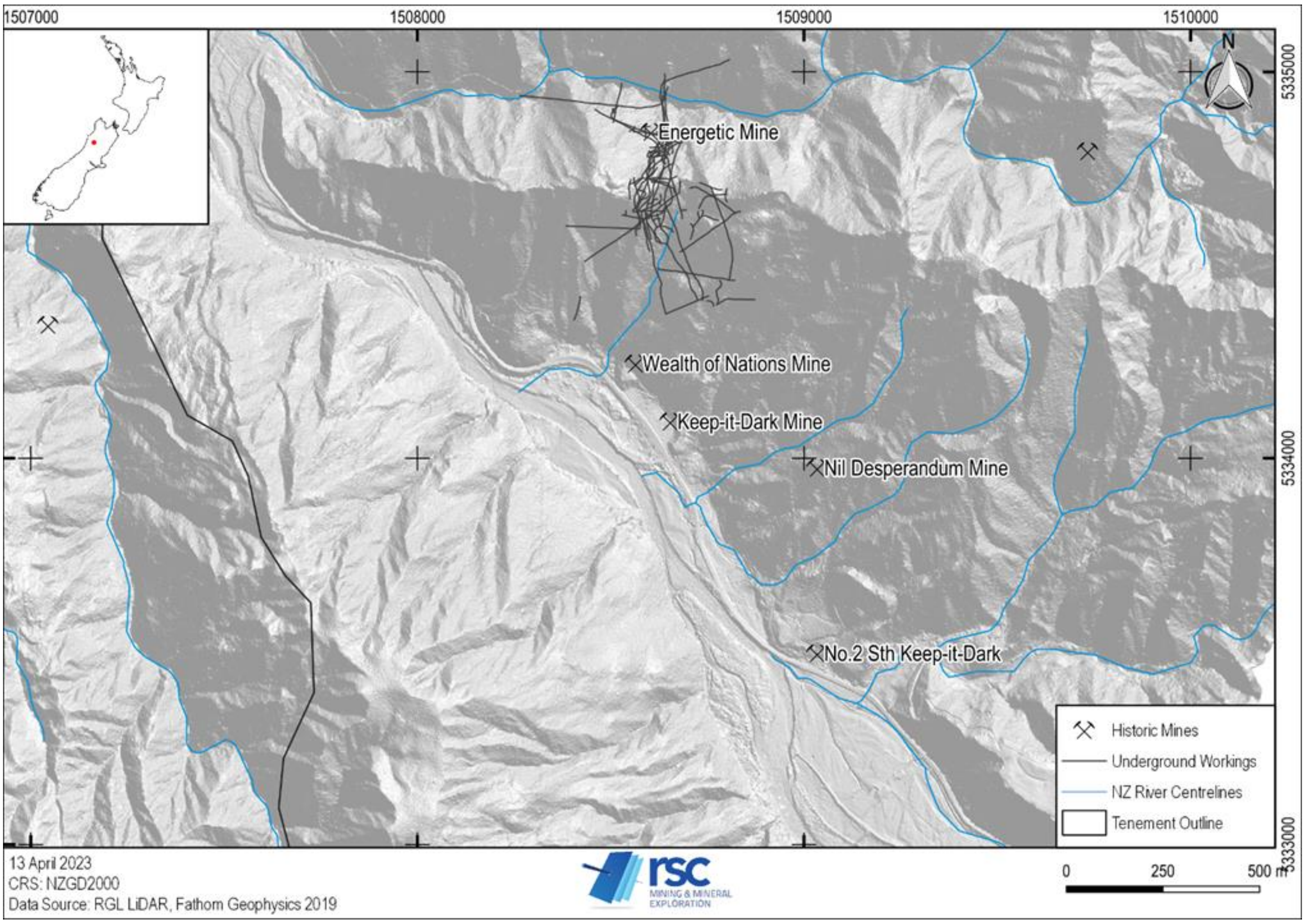


Figure 6-4: Crushington Group mines with underground workings.

6.2.2.3 Murray Creek Group

The Murray Creek Group which includes the Inglewood, Phoenix, Victoria, Golden Treasure, Westland, Comstock, Band of Hope and Perseverance leases are situated in the headwaters of Murray and Burkes Creeks (Figure 6-5). According to Gage (1948), 1,234 kg (39,674 oz) of Au was recovered by the Murray Creek mines from 63,056 t of quartz (19.6 g/t).

The Victoria shoot, discovered in 1870, was one of the first quartz reefs to be pegged out in the area. Payable quartz was located on the adjacent Phoenix and Inglewood claims shortly after the Victoria discovery. Up to 1908, 16,557 t of quartz had been extracted from the Inglewood and Phoenix shoots to yield 376 kg (12,089 oz) of Au (22.7 g/t). Production from the Victoria shoot, in the same period, amounted to 3,000 t of quartz from which 65 kg (2,090 oz) of Au was recovered (21.7 g/t). In 1909, the three claims were purchased by the New Murray Creek Gold Mining Co and in 1914, the crushing of ore from a down-plunge continuation of the Victoria shoot commenced. Production continued until the end of 1919, during which time 31,124 t of quartz were processed for 592 kg (19,033 oz) of Au (19.0 g/t). In 1920, high operating costs contributed to the failure of the company. Crushing recommenced on the Victoria shoot in early 1929, but work was suspended in July of the same year because of Au recovery problems caused by the presence of arsenic (As) and antimony (Sb) in the ore (Gage, 1948). Later efforts to bring the mine into production were also unsuccessful, and all work ceased in 1938 (Barry, 1993; Gage, 1948).

The Perseverance Mine is situated in a tributary of Murray Creek, between the Royal and Golden Treasure mines. The prospect was abandoned in 1880 because of the low (10.2 g/t) ore grade (Downey, 1928). After reopening the mine in 1910, the No. 1 adit level was extended and commenced work on a lower No. 2 adit. Work ceased with the outbreak of World War I, and it was not until 1937 that the Mines Department undertook prospecting work. The mine was abandoned in 1942 without any further production (Barry, 1993).

Four ore shoots were mined in the Golden Treasure claim. From north to south they are the Westland, Golden Treasure-North Block, 'Antimony' Block and the Band of Hope Block. Of these shoots, the Golden Treasure-North Block was the most productive, yielding 7,795 t of quartz for 150 kg (4,823 oz) of Au (19.2 g/t). The Westland shoot, in the northern part of the lease, was 1.2 m wide of unknown length and reportedly returned poor Au grades. The Golden Treasure North Block was 0.6–1.5 m wide over 30 m long and reported excellent Au grades (Henderson, 1917). To the east, parallel to the Golden Treasure North Block, the 'Antimony Block' was at least 55 m long and averaged 1.5 m wide. At the southern end of the lease, the Band of Hope Block was 61 m long with an average width of 1.8 m. Although this shoot was rich in places, most of the quartz proved to be unpayable (~6 g/t; Henderson, 1917). As the ore contained stibnite, some difficulty was experienced in Au recovery, and production ceased from the Golden Treasure mine in 1897.

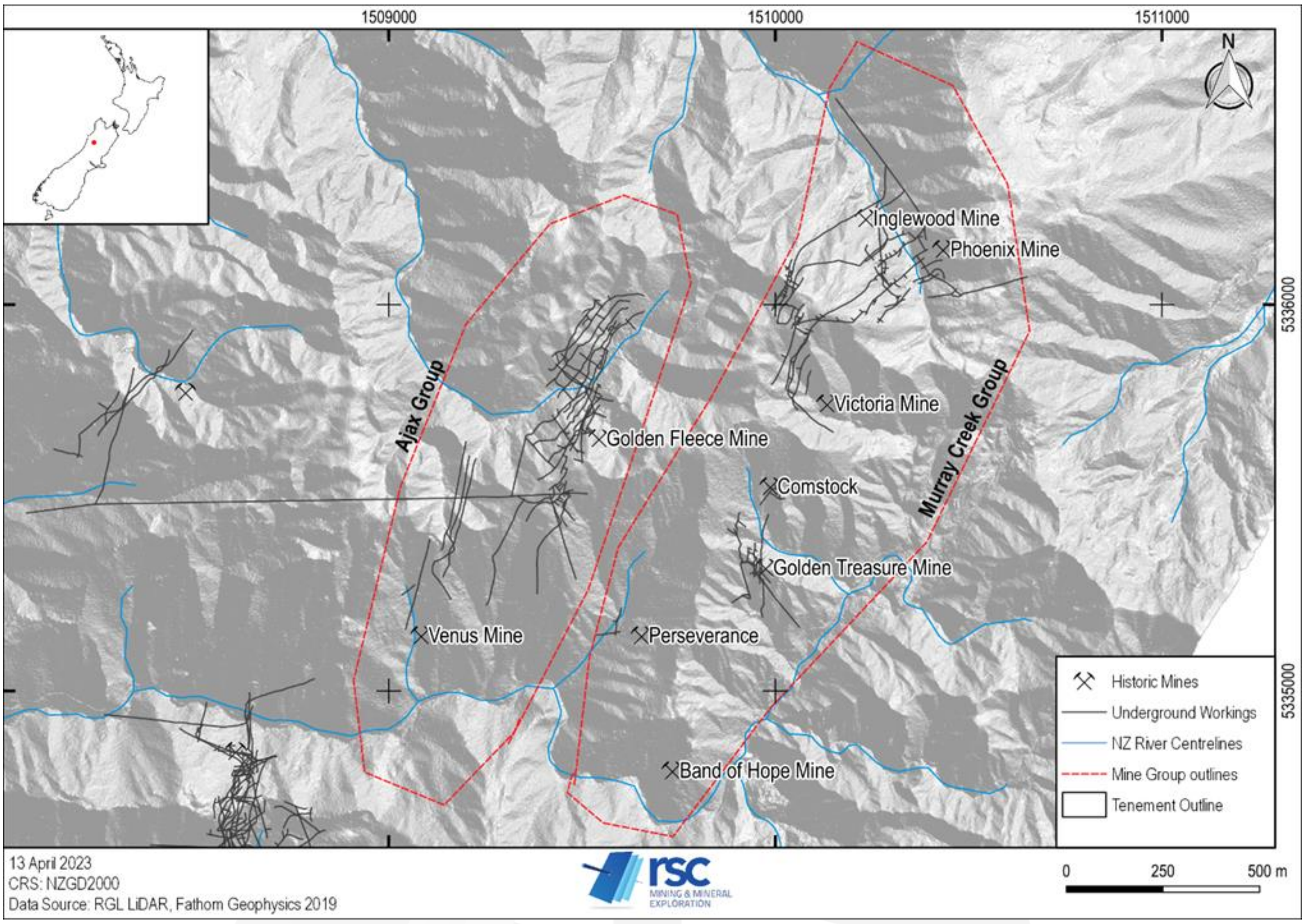


Figure 6-5: Ajax Group and Murray Creek Group mines, with underground workings.

6.2.2.4 *Ajax Group*

The principal mines of this group are the Golden Fleece, Ajax and Royal, which are located in the head of Burkes Creek, with the Ajax and Golden Fleece mines working parallel shoots on adjacent claims (Figure 6-5). A total of 3,007 kg (96,677 oz) of Au from 147,688 t of quartz was produced by the mines of the Ajax Group, at an average grade of 20.4 g/t.

The Ajax shoot was discovered in 1870, and the first parcel of quartz from the Ajax shoot (610 t) was crushed in March 1872 for a yield of 29.8 kg (958 oz) Au. During the first four years of production, 200 kg (6,430 oz) of Au was extracted from 7,000 tonnes of quartz (28.6 g/t). In late 1872, the first crushing from the Golden Fleece returned 29.5 kg (948 oz) Au from 305 t of rock. Again, in January 1873, the Golden Fleece recovered 34.9 kg (1,112 oz) of Au from 694 t of quartz. By 1884, the Ajax shaft had been sunk to 217 m and six levels opened up, with the Ajax shoot persisting to the bottom level, but the richer Golden Fleece shoot disappeared between Nos. 4 and 5 levels.

Compared to the adjacent Ajax and Golden Fleece shoots, the Royal shoot was narrow, broken and of low grade (Downey, 1928). It was mined from 1878 by three companies via four adits (Barry, 1993).

The Venus shoot, to the southwest of the Royal shoot, was found in 1875. The shoot was narrow (0.5 m), decreased in width with depth and was faulted out between Nos. 3 and 4 adit levels.

During 20 years of intermittent operations, 11,046 t of quartz was crushed from which 92 kg (2,958 oz) of Au were obtained (8.3 g/t). In 1895, when the mines were connected, a low-level tunnel was extended from Blacks Point to No. 6 level. Stoping resumed in 1900, and large quantities of quartz were mined over the next seven years. The mine was let out on tribute in 1908, and all work ceased in 1912 (Barry, 1993).

6.2.2.5 Italian Gully Group

Quartz lodes were first discovered in the Italian Gully in 1872, with two mines mentioned in the literature; Italian Gully and Garibaldi (Downey, 1928; Gage, 1948; Figure 6-6). Four adits were driven on the Italian Gully claim, proving a 150-m-long, but narrow reef. The shoot averaged between 15–20 cm, only attaining a width of 1 m in one area (Downey, 1928). In 1876, the Italian Gully Gold-mining Company erected a battery that operated intermittently. In 1878, a new company called the Golden Arch purchased the claim, prospecting and crushing intermittently until 1883, when the mine was let on tribute for a further year before being abandoned. Except for minor prospecting, no more was done until 1905, when a syndicate erected a new battery and reopened the No. 4 crosscut. Multiple cross-faults displaced the reef repeatedly to the west, and the resulting dead-work in development, together with the narrowness of the reef and the hardness of the walls, led to unpayable working. In 1908, a new Golden Arch Company built yet another battery and cyanide plant and carried out more prospecting, but could not make the mine pay, so it was let out to tributers who operated with some success for several years. The Company went into liquidation in 1911. However, Downey (1928) states that quartz of fair value was left underfoot in both mines. Over its lifetime, the mine produced 30,957 g Au from 1,644 tons crushed rock, giving an average grade of ore of 18 g/t (Downey, 1928).

The Garibaldi Mine was situated immediately south of the Italian Gully claim, which reported an ore shoot of similar length and width as the adjoining claim. However, little development work took place on the Garibaldi claim due to the narrow nature of the lode (Downey, 1928).

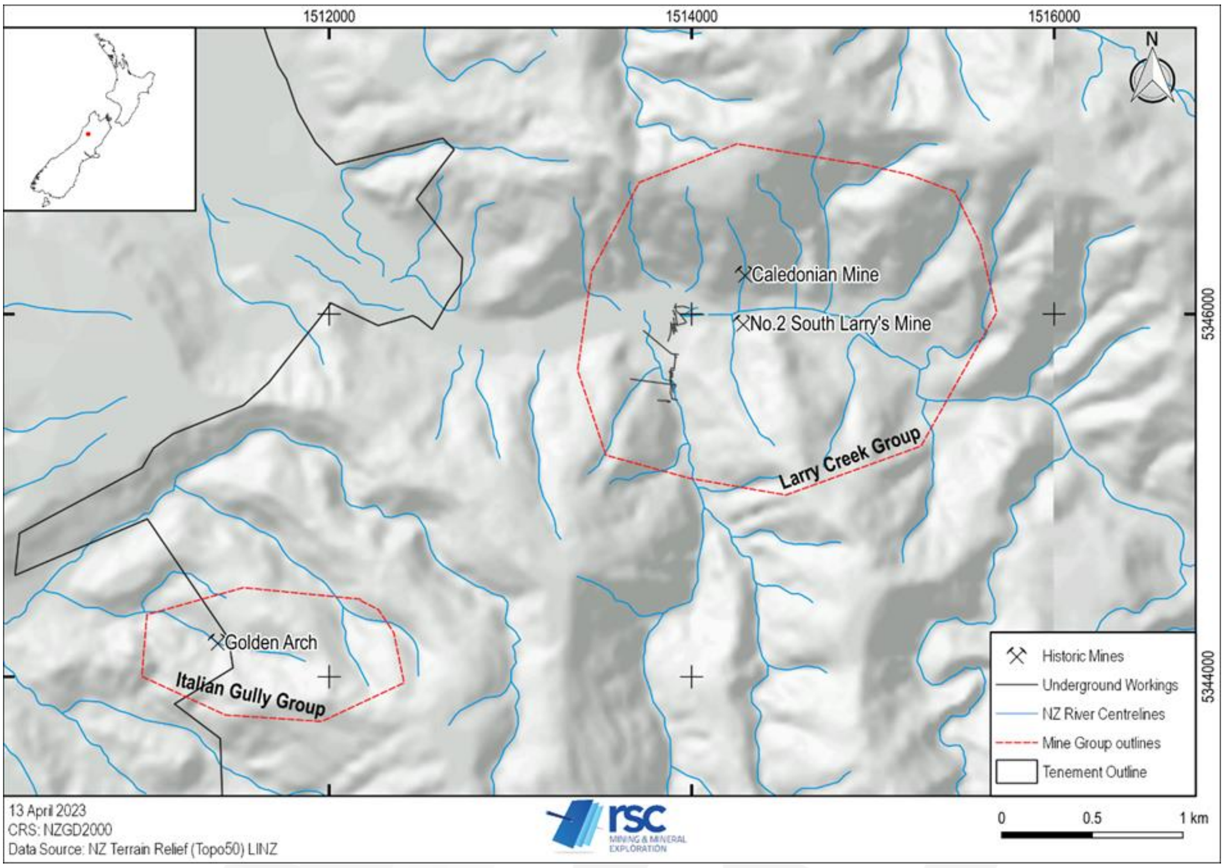


Figure 6-6: Italian Gully Group and Larry's Creek Group mines, with underground workings.

6.2.2.6 Larry Creek Group

The Larry Creek Group consists of the Caledonian and No. 2 South Larry's claims (Figure 6-6). The ore body at the Caledonian claim in Larry's Creek (7.2 km above its confluence with the Inangahua River) was discovered in 1872 and mined from a shaft and four levels (Barry, 1993; Gage, 1948). The shaft was constructed on the south bank of Larry's Creek and sunk to a depth of 55 m, with the first level being 21 m below the shaft collar and others at intervals of 12 m (Downey, 1928). In Nos. 1 and 2 levels, the 55-m-long and 0.9-m-wide ore shoot dipped steeply east and pitched 30° north. No reef structure was intercepted below No. 2 level. The reef track was intersected below No. 4 level, from a shaft sunk by the New Caledonian Company, in 1906, and was also devoid of quartz (Barry, 1993). Gold production from the Caledonian Mine amounted to 67.25 kg (2,162 oz) from 1,429 t of ore (Henderson, 1917).

In the nearby Larry's No. 2 Mine, an adit 182 m long was driven, with mineralisation found ~30 m below outcrop. The reef consisted of 3.7 m of stockwork quartz veins, interspersed with wall rock. The quartz stringer veins carried visible Au. By 1877, all of the reefs above the adit were mined out and crushed for a return of 128 kg (4,129 oz) Au. A further tunnel was driven 42 m below outcrop from 1883–1884. The quartz in this tunnel is reported to have been more compact than in the upper workings, but of poorer grade (Downey, 1928).

6.2.2.7 Kirwans Hill

Gold was discovered at Kirwans Hill in December 1896, in the form of loose Au-bearing quartz (Downey, 1928). Numerous reefs were found outcropping on adjacent claims, from 1–2 m wide, but none were found to carry payable Au. The loose auriferous quartz on the surface was scattered over an area approximately 300 m x 400 m, with some boulders weighing 2–3 t. The area was intensely prospected, with tunnels and shafts being sunk under the loose material. Two tunnels were each driven a distance of 76 m, one at a depth of 40 m, the other at 62 m below the surface (Figure 6-7). None of the test workings encountered a solid reef (Downey, 1928). Mining of the loose surface quartz continued until 1906, by which time 21,967 tons of quartz was crushed yielding 311.4 kg (10,012 oz) Au. The open pit mine extended to a depth of 36 m, where at depth, the quartz boulders were found to be mixed with crushed country rock (Barry, 1993).

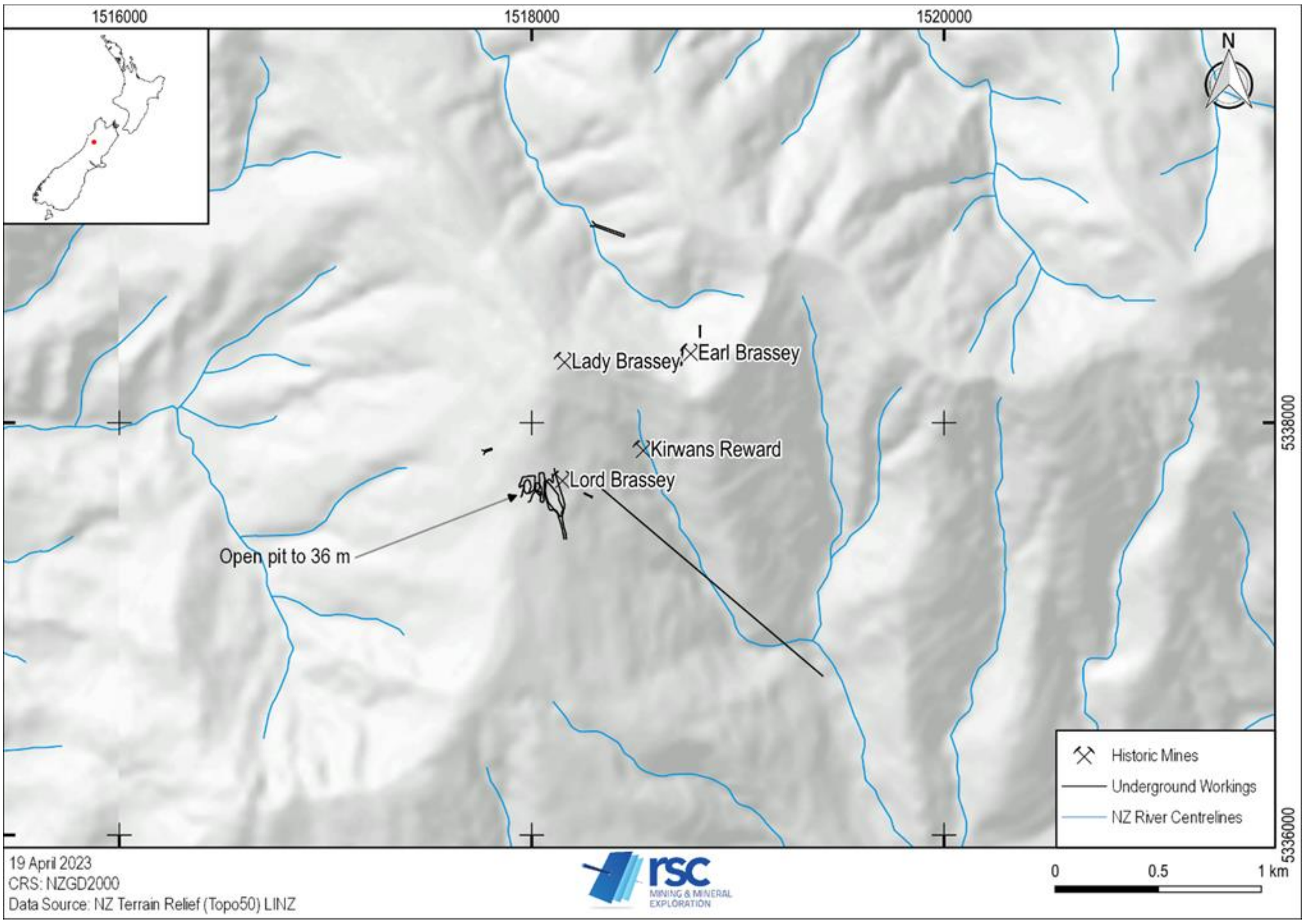


Figure 6-7: Kirwan's Hill Group mines, with open pit (Lord Brassey) and underground workings.

6.2.3 Previous Exploration & Development Work

6.2.3.1 Government Assisted Surveys (1935–1948)

During the late 1930s to 1940s, Government-assisted surveys in the form of work schemes, or as part of scientific studies, surveyed the goldfield to identify the controls on Au mineralisation (Gage, 1948). The Department of Scientific and Industrial Research (DSIR) based its work on a comprehensive geological and physiographic study of the Reefton Goldfield that was conducted in 1917 (Henderson, 1917; Gage, 1948). Additional mapping and reinterpretation of the structural geology of the area were presented in Gage (1948).

During 1938, the DSIR geophysically surveyed two areas of the Reefton Goldfield from Crushington to the Cumberland/Exchange workings and around the Blackwater Mine area. A potential drop ratio (resistivity) method was utilised to identify mineralised structures by their low resistivity zones relative to the country rocks (Modriniak and Marsden, 1938).

6.2.3.2 1951–1980

From 1951, when the Blackwater mine closed, up to the early 1980s, little exploration work was conducted in Reefton, mostly due to the low Au price.

Carpentaria Exploration Co Pty Ltd conducted the first significant prospecting work in the Reefton area in the early 1970s. In total, 444 stream-sediment samples were collected from across 14 prospecting licence areas (Zuckerman, 1972).

Small-scale exploration for Sb over Murray Creek was completed by L&M Ltd in the 1970s. This survey work consisted of a stream-sediment sampling programme, which collected samples from ~230 locations. Hand-drawn contour maps are the only record of this programme and no sampling or analytical methodology was reported (Riely & Ball, 1971).

6.2.3.3 Gold Mines NZ (1978–1990)

Summary

Gold Mines of New Zealand Limited (GMNZ) held ground over the Kirwans Hill Prospect, as well as much of the Victoria Range, during the 1980s. The company was focussed on the intrusion-related Au potential of the area, seeking multi-element mineralisation, in addition to Au. As a result, GMNZ conducted some of the most extensive regional exploration surveys of the goldfield.

Geological Mapping and Petrology

GMNZ carried out regional-scale mapping of the various igneous intrusions, adjacent to the Reefton Goldfield, and carried out petrological studies on ~300 thin sections (polished and unpolished) across a range of regional lithologies (Pirajno, 1981; Bentley, 1982).

The Greenland Group rocks were defined as metagreywacke and metapelites based on both field observations and petrographic studies. Metagreywackes are typified by abundant detrital quartz (35–50%) and only minor amounts of (<6% sodic) plagioclase, and fine-grained sedimentary and volcanic rock fragments. Detrital K-feldspar was not identified. The remainder of the rock consists of fine-grained chlorite and sericite formed by recrystallisation of the original clay matrix. Metapelites are finer-grained, and of similar mineral composition, but contain a significantly higher proportion of recrystallised clay matrix, and are therefore more aluminous (Bentley, 1982).

Greisenisation and hydrothermal alteration of the Greenland Group metasediments is fracture controlled at Kirwan's Hill. The resultant mineral assemblage is a complex superimposition of different phases due to the confinement of the reaction fluids to major fractures. Two resultant alteration assemblages were reported:

- biotite-tourmaline-muscovite-pyrrhotite, in quartz fissure vein haloes; and
- phlogopite-clinozoisite-scheelite-(chlorite-pyrite), in greisenised sections.

Stream-Sediment and Rock-Chip Sampling

During the initial years of operation, GMNZ conducted an extensive stream-sediment sampling programme, which collected 1,795 samples (Pirajno, 1981). Samples were collected at 100–200 m intervals in active stream channels. Analabs, in Perth, assayed the stream-sediment samples for Cu, Pb, Zn, Mo and W. In addition to the stream sediments, the survey collected 89 rock samples, either as float or from outcrop, which were analysed for trace elements. Follow-up stream-sediment surveys were conducted in Station Creek (14 samples) and in Bateman Creek (74 samples) (Pirajno, 1982; Bunting, 1985).

GMNZ collected a large number of rock samples from the area of the Kirwans 'open pit', predominantly tailings/mullock from the historical mining operation. The company reported collecting 40 in-situ samples from the 'open-pit' area (Pirajno, 1982; Bentley, 1983; Bunting, 1985).

In 1987, GMNZ entered a joint venture with Kirwans Reward Mining Ltd, commencing a programme of rock-chip sampling in the 'open pit' and relocating and resampling geochemical Au-soil anomalies along surrounding ridgelines (Hohbach, 1988).

Soil Sampling

During the first soil sampling programme GMNZ conducted, they collected 1,708 samples from the McConnochie-Tobin (1,167 samples) and Kirwans Hill (541 samples) areas. Sampling lines were established along creeks, spurs, and ridges, with stations at 50-m intervals in all cases. Along creeks or streams, soils were taken from both sides, at the stream bank, or at the break of slope (Pirajno, 1981).

Soil samples were, in most cases, collected from the B zone ~25–50 cm deep depending on the thickness of overlying humus and forest litter. Samples were dried and sieved to <180 µm (80 mesh) and the resulting fractions analysed for Cu, Pb, Zn, Mo, Au, Sn and W.

GMNZ followed up the regional-scale soil sampling programme with a gridded programme surrounding Kirwans Hill from 1982–1983, and a ridge-spur soil programme in the vicinity of Mt Haast. The soil sampling grid was spaced at 50-m intervals, with material taken from the B horizon, at depths between 0.1–0.3 m. In total, the Kirwans programme collected 656 samples and the Mt Haast programme collected 830 samples (Pirajno, 1982; Bentley, 1983).

Another detailed grid survey was completed by GMNZ, over the Kirwans open pit, to further delineate the Au anomaly (Bunting, 1985). Grid lines were surveyed in at a bearing of 104° (true north) at 120-m intervals for a distance of 1,560 m. Soil samples were collected at 40-m intervals along the surveyed lines, after slope corrections had been applied, with a total of 374 soil samples collected during this survey. Further infill sampling was completed at a closer spacing to better understand the anomaly prior to trenching. A total of 265 soil samples were collected during this infill sampling, on existing lines and on intermediate lines surveyed, using a grid with a 60-m line spacing and 20-m sample interval.

Further regional work was also carried out in the eastern watershed of Station Creek, to the south of Kirwans Hill and in the headwaters of Batemans Creek. A total of 167 soil samples were collected on eight east to north-east trending ridges on the eastern side of Station Creek, stopping at the base of the younger overlying Tertiary sediments. 462 soil samples were collected along the main ridges and subsidiary spurs at intervals of 50 metres in the Bateman Creek area (Bunting, 1985).

6.2.3.4 CRA Exploration (1983–1990)

Summary

From 1983 to the acquisition of the tenements by Macraes Mining Company Limited in 1990, CRA Exploration Limited (CRAE) was a major explorer in the Reefton Goldfield, holding ground spanning from Waiuta in the south to the Brunner Range in the north. They conducted regional-scale stream-sediment geochemical sampling and flew the goldfield with airborne magnetics/radiometrics. This airborne work also included a photo-based interpretation of the mineralised corridor.

CRAE drilled 52 drillholes throughout the goldfield, the majority of which (39 holes) were completed at the Globe Progress deposit, with only three holes drilled at Capleston and three at Crushington.

The exploration work completed is recorded in a number of CRAE company reports (i.e. Begg & Foster, 1983; Green & Rosengren, 1984; Rosengren, 1984; Lew, 1986, 1987a,b; Corner, 1987; Patterson, 1987; Lew & Agnew, 1989; Lawrence, 1998, 1989; Corner, 1990).

Stream-Sediment and Rock-Chip Sampling

CRAE conducted a detailed reconnaissance survey over the Brunner Range in 1988 (Lawrence, 1988). This survey collected 138 stream sediment, 259 pan concentrate and 166 lithological samples, with a sample density of one sample per 2.3 km^2. CRAE implemented a further systematic regional stream-sediment/pan concentrate/float rock-chip sampling programme over most of the Greenland Group stratigraphy the following year (Lew & Agnew, 1989). The second survey involved the collection of 121 stream-sediment, 121 pan concentrate and 191 rock-chip samples which tested an area of 745 km^2. A theoretical sampling density of one sample per 2.4 km^2 was achieved.

Stream-sediment samples were collected from the active portions of the creeks and were wet sieved to <180 µm (-80 mesh) in the field. Samples were dried and ring milled to -200 µm in the laboratory. A 30-g split was fire assayed for Au, while a 1-g split was analysed for As, Sb, Ag, Bi, Cu, Pb and Zn using atomic absorption spectrometry (AAS) (Lew & Agnew, 1989).

Ten-to-twenty-gram pan-concentrate samples were from two 20 L pans of <10-mm sieved gravel, taken from the best trap sites available from the active flood portion of the creeks. The entire sample was dried, weighed and analysed for Au, As, Sb and W by Neutron Activation Analysis (Lew & Agnew, 1989).

Analabs analysed both the stream-sediment and pan concentrate samples in their Auckland, New Zealand, laboratory.

CRAE revealed that the stream-sediment technique was not an effective method in the goldfield due to contamination from old workings, interference from fluvio-glacial derived Au and the poor chemical weathering of the area. Anomalous As and Sb were revealed the best indicators of primary mineralisation. The pan concentrates were demonstrated to be a better technique. Nevertheless, some anomalies were identified. These included: Snowy River Tributary; South Capleston; Snowy Creek; Montgomery Tributary; Shaw Stream and Bateman's Creek.

Soil Sampling

During the period from August 1984 to January 1986, CRAE conducted a regional-scale soil sampling programme on east-trending ridge traverses, spaced ~2 km apart, over the majority of the goldfield (Lew, 1986). This survey collected 2,693 A-horizon soil samples along 17 traverses.

CRAE concluded that soil sampling was an effective technique for identifying the mineralisation over the Globe-Progress deposit. The company conducted another survey in 1987, completing an east-west orientated grid over the Capleston area. The 1987 survey collected C-horizon samples on lines 50–200 m apart, with a 12.5 m separation between sample points (Lew, 1987a). The grid was extended north during a second survey in 1987 to cover the Welcome-Hopeful workings (Corner, 1987). This second grid collected 359 samples from the B/C soil horizon which were assayed for Au, As and Sb by AAS at the ISL laboratory, Nelson, New Zealand.

In 1989, CRAE established a grid to the north of the Welcome-Hopeful mine, over the Specimen Hill prospect. 496 soil samples were collected and analysed for Au, by fire assay, at Analabs in Auckland. Arsenic and Sb concentrations were determined by AAS, with hot and cold acid digests, respectively (Corner, 1990). This study noted the close association between As and Au in soil samples, with coincident anomalies in both metals.

During the 1987 field season, CRAE installed a 100 m x 25 m grid covering an area of 600 m x 600 m over part of the Murray Creek group of mines. This soil grid comprised of 343 samples (Corner, 1987).

Further to the south, the company conducted a ridge and spur survey over the old Wealth-of-Nations mine near Crushington. This survey delineated two Au-mineralised shear zones, but it was noted that the As anomaly associated with these structures was less pronounced than the anomaly present at the nearby Globe-Progress deposit (Lew, 1987b).

Airborne Geophysical Surveys

In 1988, CRAE completed an airborne, goldfield-wide magnetic/radiometric survey. The survey was conducted by Geo Instruments Pty Ltd, using a Geometrics G-813 proton precession, bird-mounted, magnetometer. The survey was flown with a flight line spacing of 200 m and a mean terrain clearance of 85 m (Craven, 1996a).

Ground Geophysical Surveys

Several techniques were trialled on a prospect-by-prospect basis by CRAE, e.g. ground magnetics, IP-resistivity and downhole logging. The ground magnetics had little application due to the low magnetic contrast of the Greenland Group sediments. The exception was at Murray Creek, where a ground magnetic survey identified a mineralised dolerite dyke (Lawrence, 1989). These methods were never routinely used except for IP-resistivity surveys.

In 1986, CRAE conducted IP-Resistivity surveys over the Capleston prospect (Harvey, 1986, 1987). The survey employed a Scintrex ICP-8 250-watt battery-powered transmitter and a Scintrex IPR-11 receiver. The survey was carried out with a six-level, 25-m dipole array on east-west (105°) grid lines typically spaced 100 m apart. The surveys were reported to be plagued with instrument and ground problems and produced poor data quality (Harvey, 1986). Craven (1996b) attributed this to low transmitter currents, problems with the receiver, the low conductivities of the host rock and the strong effects of the topography on the data.

Air Photo Interpretation

A photogeological study of the Reefton Goldfield was undertaken in by Hunting Australia (1986) for CRAE. The aim of the study was to enhance the understanding of the regional stratigraphic and structural controls of primary Au mineralisation. The study utilised black and white 1:15,000 scale aerial photographs, flown by NZ Aerial Mapping in 1973–1974, and some 1:40,000 scale photography taken in 1982–1984. The photogeological mapping was assisted by reference to detailed traverse data, contained in published geological maps, and was supported by road traversing.

The survey highlighted the influence of northwest- and north-trending fracture corridors in the distribution of Au occurrences. A concentration of Au mines is also evident along the northeast-trending lineament corridor occupied by a basic dyke swarm passing south of Blacks Point.

Drilling

In 1987, CRAE drilled three holes at the Capleston prospect, for a total length of 305.3 m. Two of the holes were drilled by Alton Drilling, with the third drilled by Otago Central Drilling. Despite losing circulation, the first two holes reached mineralisation. The third hole was prematurely terminated at 36 m when the licence expired. Mineralised intervals were sampled at one-metre intervals from half core. Other core was sampled with a grinder over two-metre intervals. Sawn splits, and ground core were assayed for Au by fire assay and for As, Ag, Cu, Pb and Zn by AAS through ISL, Nelson, New Zealand (Corner, 1987).

Three diamond drillholes totalling 351.35 m were drilled at the Crushington Prospect to test the mineralised shears, defined by the geophysical and geochemical surveys, and the workings of the Hercules Keep-it-Dark and Wealth-of-Nations mines (Lew, 1987b).

6.2.3.5 *Macraes Mining Co and OceanaGold NZ Ltd (1990–2018)*

Summary

Macraes Mining Co Ltd (MMCL), GRD Macraes, and then OceanaGold (NZ) Ltd held various permits over parts of the Project Area.

From 1990–1995, Macraes Mining Co did limited work on the Capleston/Crushington prospect areas, with the majority of their efforts going into assessing the work completed by CRAE, along with some high-level reconnaissance mapping and rock-chip sampling (Abraham, 1995).

From the late 1990s to 2012, the company completed various exploration programmes within the area, including mapping and geochemical sampling surrounding the historical workings. However, limited work was carried out post-2013 and with the shut-down of OceanaGold's Globe-Progress Mine in 2015 and later closure in 2016, most exploration activities ceased. The Capleston permit was surrendered in July 2018.

Geological Mapping

Prior to 2009, mapping over the goldfield had been completed on a prospect basis with high-density mapping (i.e. 1:1,000 scale) on several key prospects (Rattenbury 1994; Stewart, 1996; Maw, 2000). Starting from 2009, OceanaGold geologists, with the assistance of external contractors re-mapped the entirety of Oceana's tenement package at a regional scale and completed prospect scale mapping (i.e. 1:1000 scale) around many of the historical mines. From 2009–2012, mapping was carried out in the Capleston, Crushington and Caledonia prospect areas. The majority of the field mapping was completed within the headwaters of the Waitahu River and Larry's Creek. Mapping was carried out to determine structural facing (bedding/cleavage relationships), younging and any new observations of faults or minor quartz veins (Allibone 2010, 2012: Jongens, 2012; Gardener, 2013a).

Stream-Sediment and Rock Chip Sampling

Little advancement on the stream sediment coverage of CRAE has been completed over the Project Area during the tenure of MMCL and OceanaGold. Various field programmes have collected rock samples from outcrop, trenches/channels, mullock dumps and streams, the details of the number of samples taken during these programmes are given in Table 6-2.

Table 6-2: Samples taken during field programmes in the Reefton Goldfield.

Year	Prospect	Total No. Samples	Outcrop	Float	Mullock	Trench/channel	Reference
1995	Capleston	86	64	8	14		Abraham, 1995
1995	Crushington to Murray Creek	81	62	7	12		Rose, 1995
2011	Crushington to Murray Creek	28	16			12	McLelland, 2011
2012	Capleston	45	39	4	2		McLelland, 2012
2012	Crushington to Caledonia	21	14	6	1		Gardener, 2013a
2013	Caledonia	2	2				Gardener, 2013b
2013	Murray Creek	17	14	3			McLelland, 2013
2014	Caledonia	65	34			31	Adamson, 2014
2010–2013	Crushington	116	49	7	2	58	Edwards, 2018

Soil/Wacker Sampling

MMCL/OceanaGold moved away from traditional soil sampling within the Reefton Goldfield, instead relying on wacker sampling, a technique capable of penetrating through the thick glacial cover that exists in some parts of the area. OceanaGold's method of wacker sampling involves a four-person team, including one geologist. A sampler is hammered into the ground using the wacker (jackhammer) drill, then 1-m rods are added until refusal (when the rods will no longer go down any further). The rod string is then jacked out manually with the sample collected from the sampler. Each sample contains ~20 cm of material from the soil-bedrock interface.

From 1995–2001, three wacker programmes were completed by MMCL/GRD Macraes over the Specimen Hill prospect, the Murray Creek area and the Auld Creek area on the southern boundary of the current permit area (GRD Macraes. 2001).

At Specimen Hill, the existing CRAE soil grid that covered the Just-In-Time/Reform and Welcome/Fiery Cross workings was extended to the northeast to fully cover the Specimen Hill prospect. A total of 437 samples were collected during this survey, all of which lie in the Reefton Project.

At Murray Creek, GRD Macraes re-established the CRAE grid and extended it south from the Victoria Lode to cover the Golden Treasure, Comstock, Band of Hope and Perseverance workings. The company used wacker sampling to locate mineralised structures. A total of 374 wacker samples were collected on a 12.5 m x 100 m pattern and all lie within the Reefton Project.

A total of 344 wacker samples over a 25 m x 100 m grid were collected over the Auld Creek prospect, of which 110 samples fall within the Project Area.

From 2008–2011, OceanaGold completed an additional programme of wacker sampling over the Crushington/Murray Creek area (McLelland, 2011; Comeskey, 2011). A total of 710 wacker samples were collected prior to March 2011, with a further 193 wacker samples taken between March 2011 and September 2011 (Comeskey, 2011). The additional Crushington wacker sampling grid was designed on 100-m-spaced lines with 20-m spacing between samples. Infill sampling was also completed in selected areas with samples spaced 10 m apart.

A total of 120 soil samples, from the adjacent Auld Creek North and Globe-Progress wacker grids, crossed into permit area (McLellland, 2011).

Ground Geophysical Survey

An orientation ground magnetic survey was conducted by Groundsearch EES Limited, over a portion of the Murray Creek workings (Wood, 1995). The method was designed to discriminate if magnetic contrasts could be observed between pug shear zones. In essence, raw magnetic data did not differentiate the shear trend, although, by extensive processing of the data, some expression was visible.

Drilling

MMCL drilled a total of four diamond drillholes for 449.45 metres in the Specimen Hill prospect between January and March 1997. Ausdrill New Zealand Limited completed the drilling using a helicopter supported Boart Longyear 38 diamond drill rig. The drillholes were cored using HQ-diameter, triple-tube drilling equipment. The drillholes were geologically and geotechnically logged, and the majority of the core was sampled by sawing the core in half with a diamond saw, and assayed by ALS, Tauranga, New Zealand (GRD Macraes, 2001).

From March–October 2007, OceanaGold drilled nine diamond drillholes (RDD0047–RDD0055), for a total of 1,366.8 m, in the Crushington prospect. The drilling programme was designed to test mineralised structures highlighted from historical workings. The programme was completed by Boart Longyear's helicopter supported CS1000 diamond drill rig.

Three of these drillholes were abandoned due to ground conditions and old workings. Intercepted mineralisation was narrow and/or low grade in brecciated host rock. Interceptions through the inferred northern strike of Crushinghton mineralisation, within the vicinity of historical workings, suggest there is peripheral mineralisation in the broken/crushed host rock and associated mineralised pug. This mineralised halo does not appear to continue along strike to the south (McCulloch, 2007).

From July–October 2011, OceanaGold drilled a further eight diamond drillholes at Crushington (CR001-CR007 including daughter drillhole CR001-A). A total of 1,046 m of drilling was completed. Drillholes targeted the largest and most significant geochemical anomalies within the field area, known Au mineralisation and areas that appeared to represent surface locations of the offset portions of historically worked lodes (Comeskey, 2011).

6.2.3.6 Auzex Resources Pty Ltd (2006–2009)

Auzex Resources Pty Ltd was granted an exploration permit over Kirwans Hill in November 2006.

Soil and Rock-Chip Sampling

Auzex conducted a programme collecting 172 soil samples on a 40 m x 40 m spaced grid over Kirwans Hill. The area selected, covered a tungsten (W) soil anomaly defined by Goldmines NZ work in 1983 (Bentley, 1983). Three-kilogram bulk, wet soil samples were collected, dried, sieved to <180 µm (80 mesh) and dispatched to ALS for analysis (Auzex, 2007). A brief follow-up programme of soil sampling was undertaken to investigate the potential for extension to previously defined Au in soil and rock-chip anomalies, in the saddle between Drysdale Creek and Kirwans Creek, to cover an area ~700 m x 400 m. This follow-up survey analysed an additional 44 soil samples (Pilcher & Burns, 2008).

A total of 46 rock samples were collected from veins ranging in thickness from 1–120 cm. Scheelite was reported to be visible with the naked eye as light-brown clots, rarely, but easily observed when using a UV lamp (Auzex, 2007). Cursory follow-up rock sampling was undertaken in and around the Kirwans Reward pit. A total of three rock samples were taken and dispatched to ALS Chemex Brisbane in the 2008 field season (Pilcher & Burns, 2008). None of the samples returned significant Au, and W ranged from 0.9–6.5 ppm.

Drilling

Auzex planned two phases of diamond drilling at the Kirwans Hill prospect from April 2007 to January 2008. Difficult ground conditions and delays led to the abandonment of the first hole KHDD07-01 at ~75 m and slowed production overall. Only one hole, KHDD07-02, successfully achieved the target depth. A total of 393 m was drilled in three drillholes (Pilcher & Burns, 2008). The first phase (April–June 2007) comprising drillholes KHDD07-01 and KHDD07-02 was undertaken by Alton Drilling using a heli-portable skid-mounted LS1000 diamond rig, running triple tube PQ and HQ2 gear. The second phase was undertaken by heli-drill with a modified CS1000 rig, also running triple tube PQ and HQ2 gear. Cost overruns in drilling resulted in the abandoning of KHDD08-03 at 54.9 m (Pilcher & Burns, 2008).

Geophysical Surveys

In 2011, New Zealand Petroleum and Minerals (NZP&M), on behalf of the New Zealand government (the Crown) commissioned an airborne magnetic and radiometric survey of the West Coast of the South Island (Vidanovich, 2013). The West Coast Airborne Geophysical Survey, covering the Reefton Goldfield, was acquired from February 2011 to March 2013.

Australian geophysical company Thomson Aviation Ltd conducted the surveys using helicopters flown by Central South Island Helicopters Ltd. The geophysical equipment consisted of a Geometrix G822A Caesium Vapour magnetometer and a Radiation Solutions RS 500 Gamma Ray Spectrometer, coupled to NaI Crystal packs, with a combined volume of 33.6 L (Vidanovich, 2013). The survey was flown on a 110–290° bearing at a 200-m line spacing and a target 50-m ground clearance. Orthogonal tie lines were flown every 2 km. Data collected were processed to create levelled grids in ER Mapper format, and GeoTIFF formats at 40-m cell resolution. The radiometric grids included were for Potassium (K), Thorium (Th), Uranium (U) and Total Count. A digital terrain model was also supplied based on elevation data acquired during the survey (Vidanovich, 2013).

Airborne Magnetic Data

The aeromagnetic grids produced during the NZP&M survey (Figure 6-8) included many different industry-standard variants, including total magnetic intensity (TMI), TMI reduced to pole (RTP), first vertical derivative (1VD), second vertical derivative (2VD), analytic signal (AS) and automatic gain control (AGC).

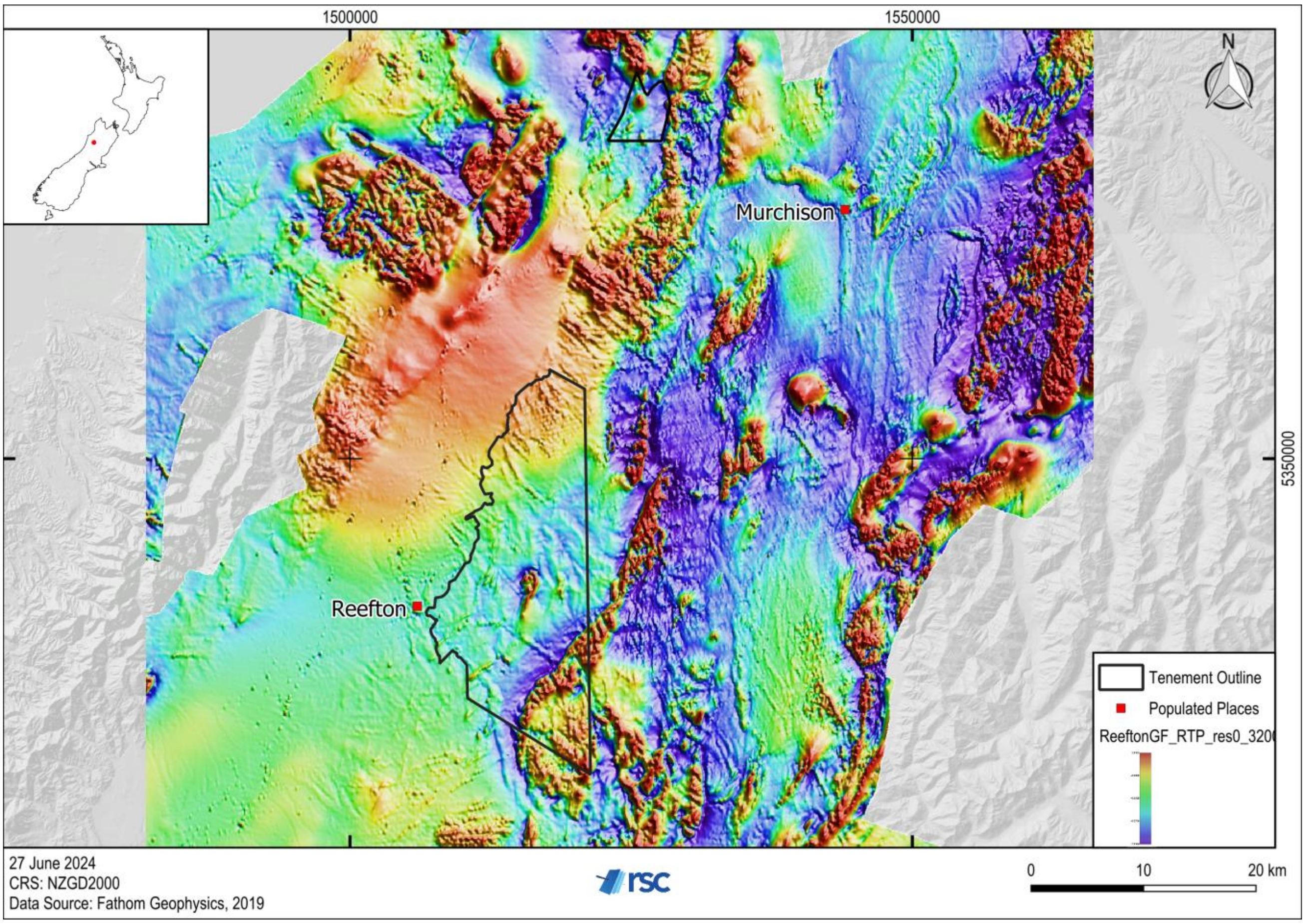


Figure 6-8: Magnetics image, analytical signal over the Reefton Goldfields.

Radiometric

The radiometric grids included were for Potassium (K), Thorium (Th), Uranium (U; Figure 6-9) and Total Count. A digital terrain model was also supplied based on elevation data acquired during the survey (Vidanovich, 2013).

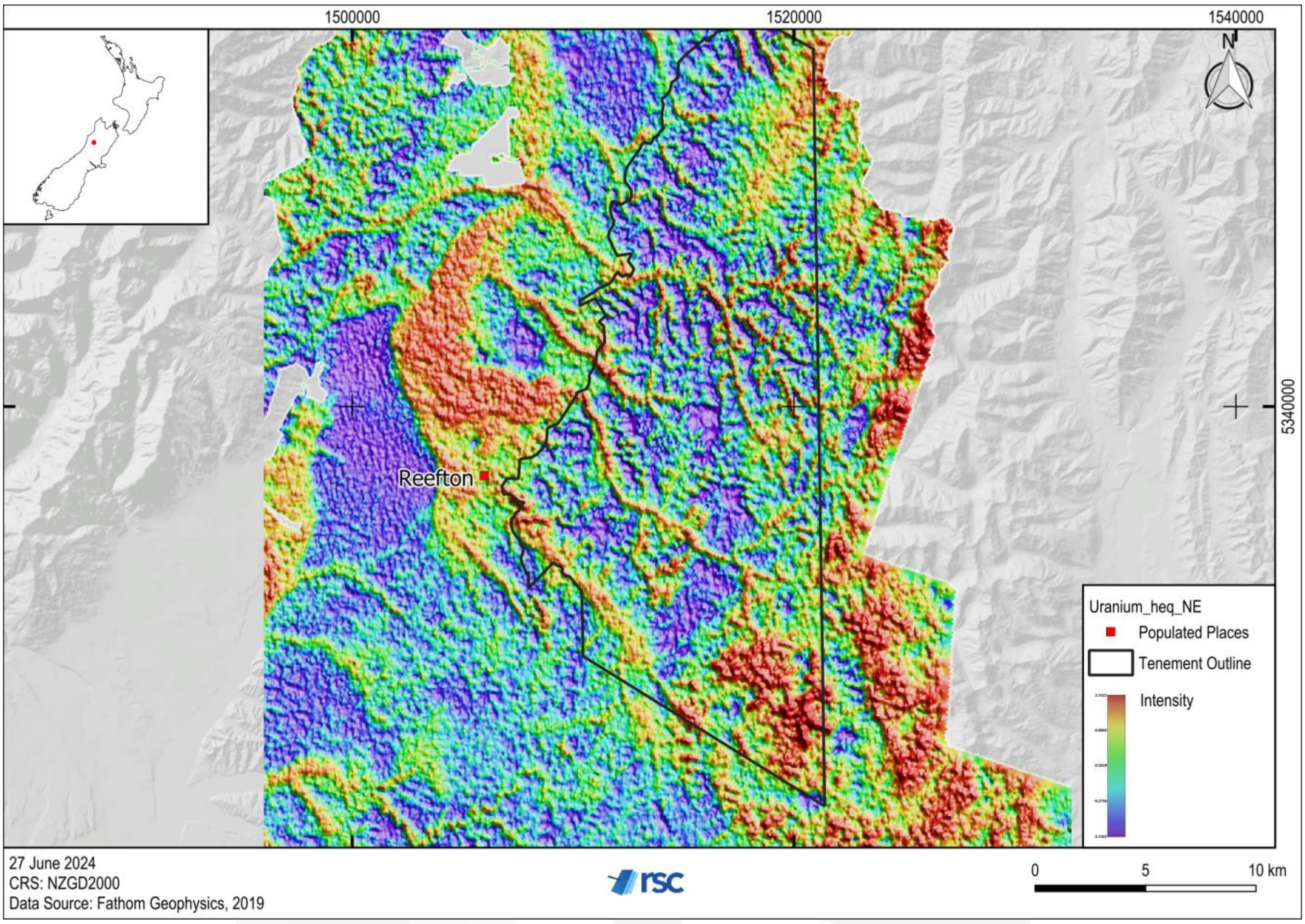
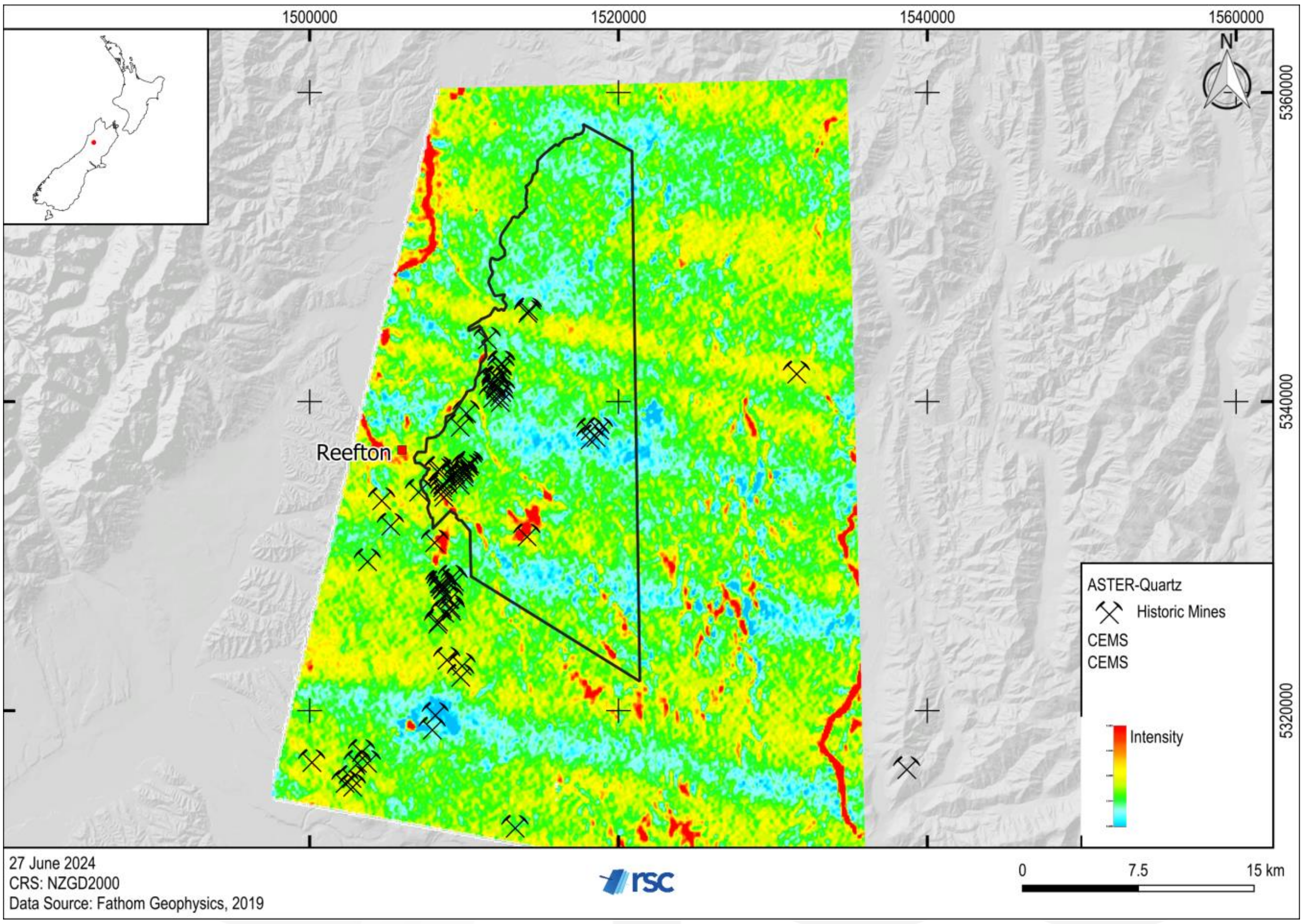


Figure 6-9: Radiometric grid of uranium intensity (Fathom Geophysics, 2019).

Satellite Data

Satellite systems capture wavelengths of light, typically in multiple spectrums, including bandwidths such that we see (red, green and blue) and bandwidths we do not see, such as into infrared bands. Images including multiple bandwidths are known as multispectral images — they are of relevance to mineral exploration as some infrared bands are sensitive to changes in the soil and rock content making up a given area. Two satellite systems, ASTER and Sentinel2, provide multispectral images that are free to download at slightly different bands in the infrared zone. Therefore, exploration companies are able to use these images to try and infer information about the soil content across the tenement. The ASTER satellite system images are short-wave infrared and thermal infrared bands, which are useful for imaging clays and silicas, respectively, while Sentinel2 images are visible and near-infrared bands, which are useful for discerning iron phases. Muscovite, Chlorite and Quartz [ASTER indexes] are the best indices to use in this geological environment. Quartz is an ASTER TIR index, and the resolution is 90 m (coarse for the target style; Figure 6-10). Overall, the remote sensing results for the RGL properties are of limited use. The mineralisation style at the Reefton Project is challenging to detect in the satellite data, as is difficult to identify muscovite, chlorite, and quartz (common minerals in meta-sediments) alteration due to the relatively high background levels for these minerals. Also, the vegetation is severe across the tenements and the likelihood of a valid signal is low (Fathom Geophysics, 2019).

Notwithstanding, there is clear ground around the Globe Progress and Echo mines and the younger Reefton Group geology is outlined by subtle signatures as it is dominated by quartzite (Figure 6-10).



27 June 2024
CRS: NZGD2000
Data Source: Fathom Geophysics, 2019

Figure 6-10: ASTER scenes illustrating the intensity of quartz.

6.3 Production History

There is no modern Au production from within the Project Area. Historical production from the mines within the Project Area is presented in Section 6.2.

6.4 Previous Mineral Resource Studies

There are no pre-existing mineral resource estimates within the Project Area.

7. Geological Setting & Mineralisation

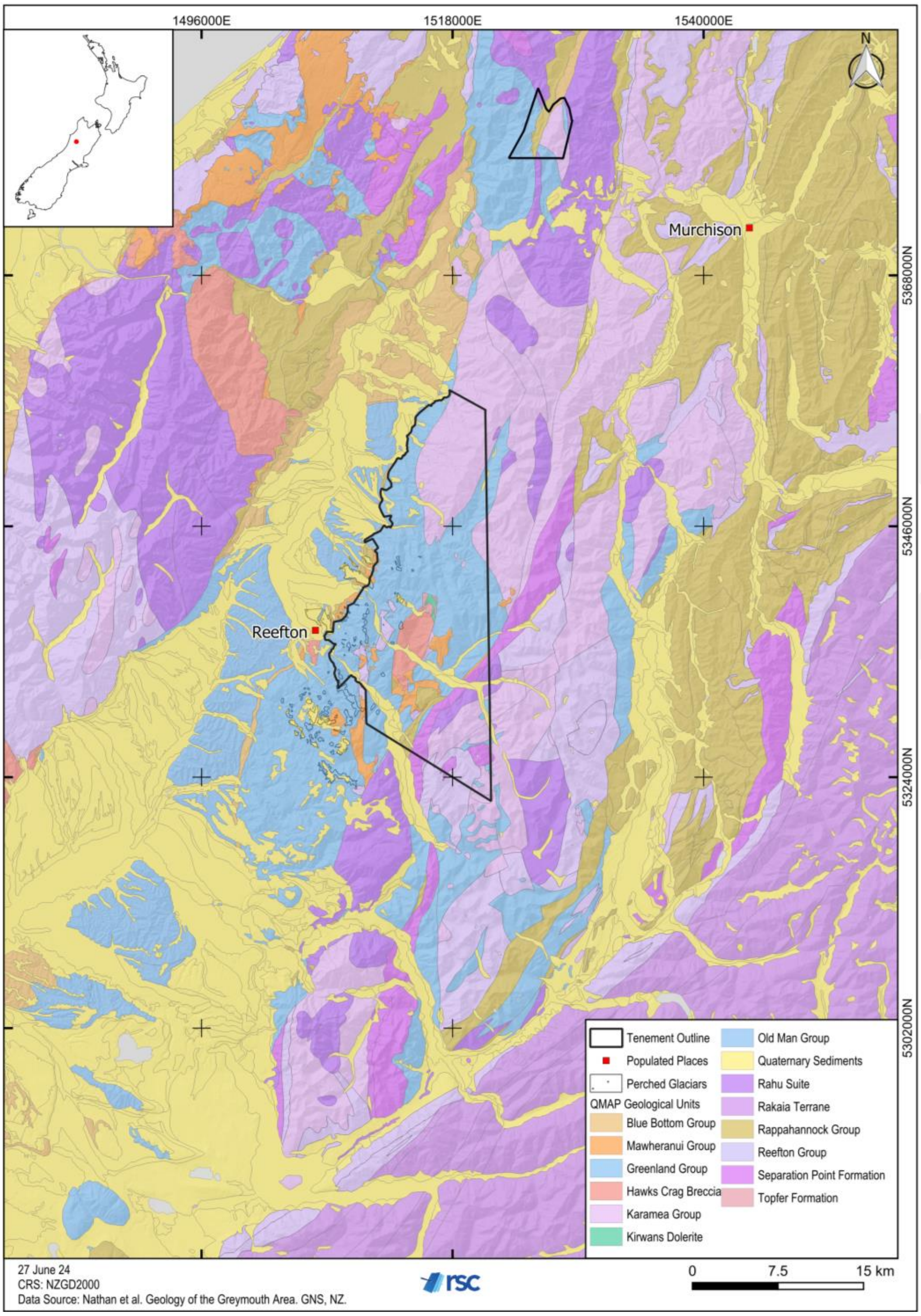
7.1 Regional Geology

The basement rocks of the South Island of New Zealand are divided into two main geological provinces: the Western Province and Eastern Province. The Western Province is composed of Early-to-Mid Palaeozoic metasedimentary and volcanic terranes that formed on the margin of the Gondwana supercontinent, and the Eastern Province is composed of exotic terranes that were accreted onto the Western Province in the Late Palaeozoic to Early Cretaceous (Mortimer, 2004). The two provinces are intruded and separated by the Median Batholith, which comprises a complex series of typically gabbroic-granitic plutons, that were generated during subduction along the southeastern margin of Gondwana, in the Mid-Palaeozoic to Cretaceous (Mortimer et al., 1999). With the cessation of subduction in the Mid-to-Late Cretaceous, Gondwanaland proceeded to break-up, and compressional tectonics gave way to crustal thinning, rifting and extension. This shift in the tectonic regime resulted in the widespread emplacement of granitic plutons, the exhumation of metamorphic core complexes along regional-scale detachment faults and the accumulation of thick successions of fluvial fanglomerate sediments. Regional extension eventually led to the submergence of, at least most of, the South Island and widespread deposition of Oligocene marine sedimentary rocks. Oblique-compression and initiation of the Alpine Fault in the Miocene resulted in displacement of the basement units and the eventual formation and uplift of the Southern Alps in the Pliocene. The currently active Alpine Fault has ~470 km of dextral offset and marks the major plate boundary between the Australian and Pacific plates. Glaciation in the Quaternary resulted in widespread deposition of gravels and glacial sediments, that have now been reworked and partially removed by processes of rainfall-induced erosion, associated with rapid uplift along the Southern Alps.

7.1.1 Western Province

Situated west of the Alpine Fault, the Western Province is made up of two north trending terranes: the westernmost Buller Terrane, composed of variably metamorphosed continentally derived, Ordovician sandstones and mudstones with no intercalated volcanic rocks and the eastern, more heterogeneous Takaka Terrane, composed of Cambrian to Early Devonian, siliclastics, carbonates and volcanic rocks. The two terranes are thought to have amalgamated in the Devonian (Nathan et al. 2002) and are in fault contact along the Anatoki Thrust. The tectonostratigraphic terranes are bordered to the east by the Median Batholith, which is composed of the Darrian Suite, the Rahu Suite and the Separation Point Suite of plutons. The relatively smaller Jurassic-age Kirwans Dolerite is hosted entirely within the Buller Terrane. Two other, typically contiguous, granitoid batholiths lie entirely within the Western Province: the Devonian to Carboniferous Karamea-Paparoa Batholith and the Late Cretaceous Hohonu Batholith. All of these basement rocks were variably deformed and metamorphosed in the Devonian-Cretaceous, with the highest metamorphic grades, amphibolite-granulite facies, reached in gneisses of the Pecksniff Metasedimentary Gneiss and the Victoria Paragneiss, in the Paparoa and Victoria ranges (Figure 7-1; Nathan et al. 2002).

Several fault-bounded sedimentary outliers are preserved in the Buller Terrane. These include some typically well indurated and stratified sequences of Devonian marine sandstone, limestone and mudstone of the Reefton Group and some Cretaceous non-marine, typically sedimentary rocks of the Pororari Group, that are best represented by the coarse-grained, poorly sorted Hawks Craig Breccia (Nathan et al. 2002). All of these rocks are locally cut by Late Cretaceous, narrow, metre-scale, dykes and sills of lamprophyre, basalt and trachyte (Adams & Nathan, 1978). The sedimentary outliers and igneous rocks are cut by a regional unconformity that, on the western margins of the Buller Terrane, separates Late Cretaceous Paparoa Coal measures from overlying Eocene Brunner Coal measures and other Tertiary, shallow marine to deeper marine cover rocks. Another later, regional unconformity separates the mainly marine Tertiary cover rocks from overlying Quaternary glacial and alluvial deposits.



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CRS: NZGD2000
Data Source: Nathan et al. Geology of the Greymouth Area. GNS, NZ.

Figure 7-1: Regional geological map, modified from Nathan et al. (2022).

7.2 Local Geology

The Reefton Goldfield is hosted entirely within Ordovician-age rocks of the Greenland Group, which form part of the Buller Terrane (Figure 7-2). In the Reefton area, the Greenland Group forms a ~35-km-long by 15-km-wide north-northeast trending belt of rocks, that is bounded to the north and east by granitic plutons of the Late-Devonian to Carboniferous Karamea, and Cretaceous Rahu and Separation Point batholiths. In the south and west, the block is in fault contact with higher-metamorphic grade paragneisses of the Paparoa metamorphic core complex. The southern and western margins of the Greenland Group are typically obscured by Tertiary sediments and Quaternary gravels, including thick accumulations that have infilled the down-faulted Grey-Inangahua Depression, a fault-bounded graben, to the west of Reefton (Nathan et al., 2022).

7.2.1 Greenland Group

The Greenland Group is a turbiditic sequence of alternating greywackes and argillites that were deformed and metamorphosed to lower greenschist facies in the Silurian to Devonian (~450–387 Ma; Adams 2004, Turnbull et al. 2016). The sequence is dominated by greywacke-sandstone and beds are typically 0.2–2 m thick, separated by layers of argillite typically 10–30 cm thick. The greywackes typically contain >50% quartz with lesser albite, partially recrystallised rock fragments and muscovite (Milham & Craw, 2009). Argillites are less quartz-rich and more micaceous. The metamorphic mineral assemblage consists of quartz, muscovite, albite, chlorite, titanite, calcite and/or Mg-Fe carbonate and epidote. Despite undergoing metamorphism and several phases of deformation, primary sedimentary features in the Greenland Group rocks are typically preserved and include graded bedding, cross-bedding, load casts and flame structures. Diagenetic ankerite spots are also preserved and delineate original bedding in some of the finer-grained argillites.

7.2.2 Reefton Group

The Devonian-aged Reefton Group occurs as five small outliers, all with faulted contacts with the older Greenland Group. Eleven units have been differentiated within the quartzose sandstone (quartzite), limestone and mudstone (shale) sequence, which are ~1,500 m thick. The Reefton Group is inferred to have been deposited in shallow marine beach to shelf environments (Bradshaw, 1995; Nathan et al., 2002).

7.2.3 Brunner Coal Measures

The Brunner Coal Measures constitute the oldest Eocene sedimentary rocks, in the Reefton area, consisting of quartz sandstone, conglomerate, carbonaceous shale, and lensoid coal seams, locally up to 10 m thick (Nathan et al., 2002). The formation is characteristically quartzose, being largely derived from deeply weathered, granitoid basement rocks. Having been deeply buried in some areas, the sandstone beds are typically silica-cemented and thus form characteristic bluffs and plateaus (Nathan et al., 2002).

7.2.4 Quaternary Deposits

Much of the Grey and Inangahua valleys have a complex cover of late Quaternary moraine, river and alluvial fan gravel, coastal and lagoon deposits and swamps. These surface and near-surface deposits, together, record a succession of ice advances and contemporary periods of low sea levels and intervening interglacial high sea levels (Nathan et al., 2002).

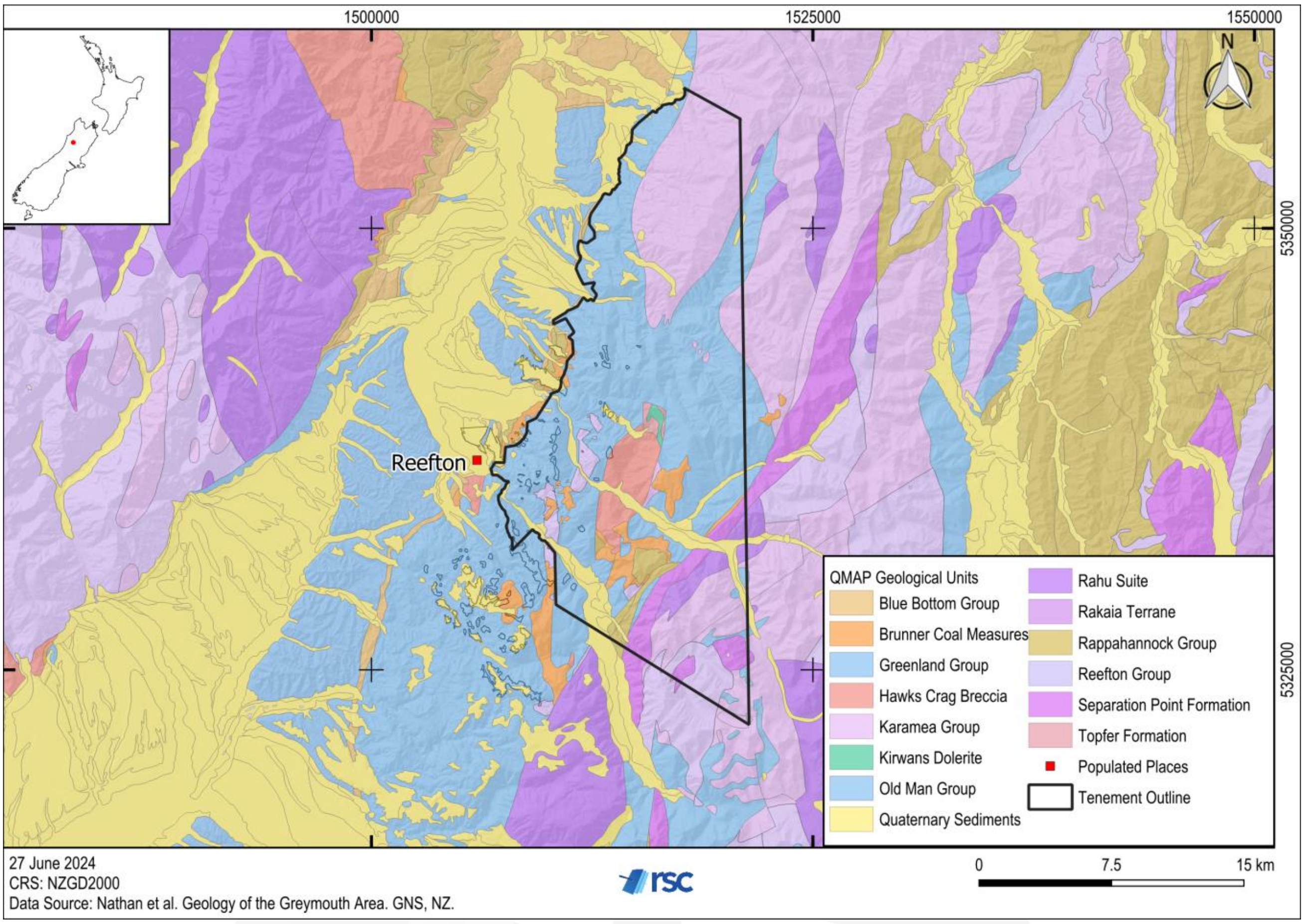


Figure 7-2: Map of geological units in the Reefton Area. Modified after Nathan et al., 2002.

7.2.5 Alteration

The majority of Greenland Group rocks in the Reefton Goldfield are unaltered with no visible metasomatic effects, except close to mineralised quartz veins. Diagenetic ankerite spots are typically preserved in some of the finer-grained argillites. Alteration of these spots is apparent in zones up to 20 m adjacent to mineralised veins, where the original ankerite has partially recrystallised and been replaced by siderite. Silicification of host rocks is typically minor and extends only a few cms from veins. Metamorphic porphyroblasts of arsenopyrite and lesser pyrite, with only minor Au enrichment, mark some of the metamorphic shear zones, and these sulphides may reflect a late metamorphic mobilisation of metamorphogenic fluids along some regional-scale structures in the goldfield (MacKenzie et al., 2016). Although disseminated arsenopyrite extends up to 200 m in the sheared host rocks at the Globe Progress deposit, a cm- to m-scale zone is more typical for sulphides surrounding some of the other smaller Au deposits (e.g. Wealth-of-Nations, Keep-it-Dark). Hence, the best geochemical indicators of an alteration halo in host rocks, around the Au deposits, is Au (typically <100 ppb), As and Sb (both typically <100 ppm). Studies at the Birthday Reef, Blackwater deposit indicate that the extent of the alteration halo is <20 m from the Au-bearing veins (Hamisi et al. 2017).

7.2.6 Structure

Primary bedding (S0) in the Greenland Group rocks is overprinted by a very subtle, bedding-parallel, early metamorphic foliation (S1) that is typically weak and not typically recognised in the field; being only visible in thin section and under the microscope (Maw, 2000). The only potential macroscopic evidence of this D1 deformation is an area ~2–4 km north of Globe Progress, where a limb with atypical east-trending strike and gently south-dipping bedding is cut by the regional S2 metamorphic cleavage (Allibone et al. 2020).

Elsewhere in the district, the Greenland Group has a moderate-to-steep dip and is tightly folded, north–northeast plunging upright folds (F2), that formed during the latter stages of regional metamorphism and prior to emplacement of the Karamea Suite of intrusions in the east (Gage, 1948; Rattenbury & Stewart, 2000; Turnbull et al., 2016). The folds are the dominant structures in the Reefton district and comprise a set of six major F2 folds which are traceable for 15–20 km along strike (Allibone et al., 2020). Major fold limbs are typically 1–2 km across and fold axial surfaces dip 45–90° east and west. The regional-scale folding resulted in a pervasive fold axial cleavage (S2) that is best developed in argillaceous protoliths, but is also locally preserved in the more massive greywacke units as an associated fracture cleavage. Mapping of preserved primary bedding features and angular relationships between bedding and cleavage has enabled the distinction of younging directions for many of the fold limbs, and indicate that only a few of the major folds are overturned (Allibone et al., 2020). Fold intensity varies locally throughout the goldfield and smaller-scale parasitic folds, with limbs typically 100–200 m across, occur on some of major fold limbs (Maw, 2000).

Some of the F2 folds are cut by northeast-striking, late metamorphic shear zones (D3; D2b of Allibone et al., 2020, see Table 7-1) that typically lie subparallel to the axial surfaces of these folds. These shears can be up to 40 m wide and traced for >10 km. The shears are typically situated on major F2 fold limbs or along F2 fold hinges, separating limbs with markedly different bedding dip orientations. Most of the Reefton Au deposits are concentrated along these shear zones and are best developed where the shears cut across the most tightly folded host rocks. In the northern parts of the goldfield, the Capleston and Crushington deposits are hosted in subparallel north- to northeast-striking shear zones that cut the limbs of a major north-trending regional-scale fold, the Waitahu Syncline. To the south, the sizeable Golden Progress deposit is situated at the intersection of the north-striking Oriental Shear Zone and the west-striking Globe Progress Shear Zone, that cuts across a series of tight F2 folds, on the eastern limb, of the Globe Hill anticline. The Oriental Shear Zone extends further southward and hosts the General Gordon, Empress and Supreme satellite deposits. A subparallel shear to the east hosts the smaller Souvenir Deposit. Further south, the Merrijigs deposits are hosted within a north-striking shear, that is partially contiguous with, and connects the southern end of the Oriental Shear Zone with the north-northeast-striking Krantz Creek Shear Zone (KCSZ). The KCSZ is the most extensive D3 structure in the Reefton Goldfield and extends ~12 km from Merrijigs to the east side of the Blackwater area. It is broadly concordant with the eastern limb of the regional scale Waiuta syncline. At Blackwater, the historical Birthday Reef, is hosted in north-northeast-striking shear that transects both the hinge and a zone of parasitic F2 folds, in the west-dipping limb of the Waiuta anticline (Allibone et al. 2018). To the east of the KCSZ, the Big River deposits are hosted in a north-northeast-striking D3 shear zone, that cuts the Big River F2 syncline on the eastern margin of the goldfield.

The shear zones do not extend into any of the exposed late Palaeozoic sediments, nor do any of these later rocks host any Au deposits, hence the Au-bearing structures are thought to predate the Devonian marine sediments of the Reefton Group, as well as the late Devonian to Carboniferous plutonic rocks of the Karamea Suite and the Cretaceous granitoids of the Rahu and Separations Point Suites.

The F2 folds and ductile D3 shears are locally cut by a generation (D4) of more brittle cataclastic shears and faults. Locally and in many of the Reefton Au deposits, these D4 structures have reactivated the D3 shears with up to tens of metres of offset (Allibone et al. 2020). Younger D5 structures consist of a set of predominantly northwest–southeast steeply dipping brittle faults that offset the basement, mineralised zones and overlying Cretaceous to Cenozoic cover rocks, and these are thought to have been active since the Mid-Cretaceous (Allibone et al. 2020).

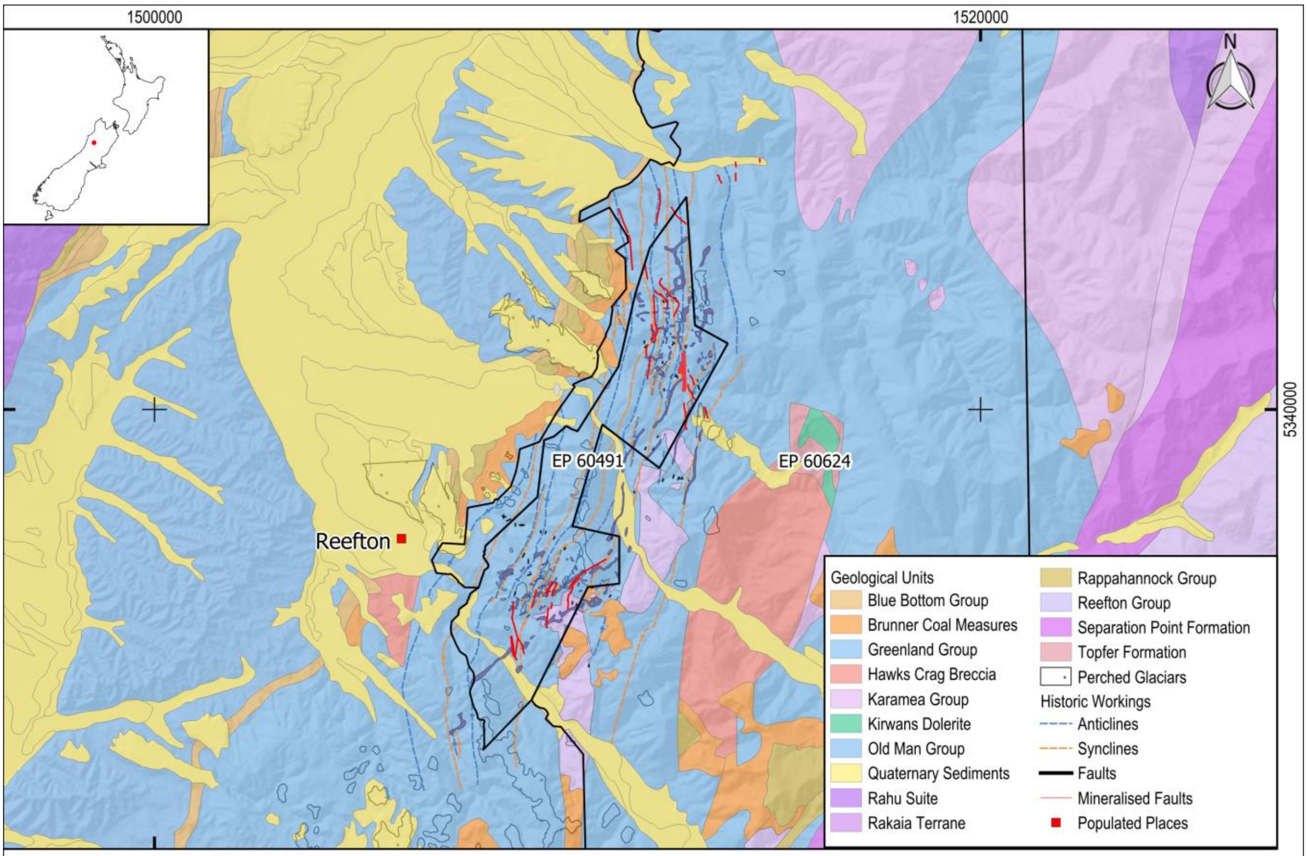
Table 7-1: Summary of deformational and mineralisation events in the Reefton Goldfield.

Age	Class	Mineral Associations	Comments	Source
Oldest	D1		Early bedding-parallel foliation, cryptic changes in bedding dip and younging direction, apparently unrelated to D2.	Allibone et al. 2020; Maw, 2000.
450 ± 10Ma	D2/D2a	Late metamorphic carbonate spots, arsenopyrite porphyroblasts. Metamorphic chlorite, muscovite, ankerite.	Regional shortening, gently plunging upright F2 folds, S2 cleavage, contractional and transfer, tear shear zones, lower greenschist facies metamorphism.	Allibone et al. 2020; Maw, 2000; MacKenzie et al. 2016.
438±6Ma	D3/D2b	Stage 1 quartz veining with minimal stibnite. Main mineralisation stages: 1. Grey translucent quartz with Au and arsenopyrite, 2. Grey translucent quartz with Au, arsenopyrite, and trace stibnite.	Probable initiation of the Krantz Creek Shear Zone continued displacement of the Golbe-Progress and Oriental Shear Zones. Phase 1 mineralisation.	Maw, 2000; Milham and Craw, 2009; MacKenzie et al. 2016; Allibone et al. 2020.

7.3 Property Geology

The Project Area is dominated by Greenland Group metasediments, a turbiditic sequence of alternating greywackes and argillites that were deformed and metamorphosed to lower greenschist facies in the Silurian to Devonian (~450–387 Ma; Figure 7-3; Adams 2004, Turnbull et al. 2016). The sequence is dominated by greywacke-sandstone and beds are typically 0.2–2 m thick and separated by layers of argillite typically 10–30 cm thick. The greywackes typically contain >50% quartz with lesser albite, partially recrystallised rock fragments and muscovite (Milham & Craw, 2009). Argillites are less quartz-rich and more micaceous. The metamorphic mineral assemblage consists of quartz, muscovite, albite, chlorite, titanite, calcite and/or Mg-Fe carbonate and epidote. Despite undergoing metamorphism and several phases of deformation, primary sedimentary features in the Greenland Group rocks are typically preserved and include graded bedding, cross-bedding, load casts and flame structures. Diagenetic ankerite spots are also preserved and delineate original bedding in some of the finer-grained argillites.

Mineralisation at the Reefton Project has been intercepted at Pactolus. The Pactolus vein has been drill tested over 500 m in length, and to 300 m depth. The vein varies in width from 3–12 m. Mineralisation is dispersed throughout the vein, and high-grade intercepts have been reported from ~300–460 RL.



27 June 2024
CRS: NZGD2000
Data Source: Nathan et al. Geology of the Greymouth Area. GNS, NZ.

Figure 7-3: Geological map of EP 60491 and part of EP 60624.

7.4 Controls on Mineralisation

The earliest evidence of hydrothermal fluid flow and Au mineralisation in the Reefton Goldfield occurs within D3 shear zones. Although not all the shears are significantly mineralised, most are characterised by late metamorphic, arsenopyrite (typically acicular) and pyrite porphyroblasts that have grown across the S2 metamorphic fabric and have been rotated subsequently and deformed by anastomosing shears. Where shearing has been most-intensely focused, hydrothermal quartz has infilled around and within the deformed porphyroblasts. In the mineralised shears at the main Au deposits, early Au and arsenopyrite-bearing quartz veins fill faults and fractures in the mineralised host rocks. Typical hydrothermal quartz textures include undulose extinction, stylolitic veins, annealed quartz grain boundaries and other recrystallisation textures indicative of plastic-ductile deformation.

Visible Au is relatively abundant at most historical Reefton deposits and Au-bearing sulphides (arsenopyrite >> pyrite) and sub-mm sprays of acicular Sb-bearing sulphides (either stibnite or boulangerite-jamesonite) are present in many of the quartz veins (MacKenzie et al., 2014). Arsenopyrite is typically concentrated in slivers of wall rock along vein margins and along subparallel stylolitic seams within the white quartz veins. At Blackwater and the Birthday Reef, where these early Au-bearing veins are particularly well-developed and continuous, chloritic veins cut across the white quartz and are typically associated with coarse visible Au. Chlorite alteration also extends into the host rock, where hydrothermal chlorite has replaced carbonate spots several metres from the veins. The original ankeritic carbonate spots have also been partially recrystallised and replaced by siderite, and this defines a subtle metre-scale alteration envelope around the veins. Ductile deformation is further evidenced in some quartz veins by the presence of dark mylonitic anastomosing shears, that track along vein margins and cut across the early white quartz, stylolitic seams and chloritic veins (MacKenzie et al., 2016).

The early Au and arsenopyrite-bearing quartz veins were cataclastically deformed (D4) as the Greenland Group was exhumed and uplifted through the brittle-ductile transition. This brittle phase of deformation overprints all of the Reefton Au deposits to some extent, but is best developed in the Au mineralised rocks of the Globe-Progress deposit. Therefore, early quartz veins are intensely fractured and infilled with cross-cutting stibnite and/or pyrite veinlets. Quartz, stibnite, pyrite, arsenopyrite and Au also infill cataclastic breccias. In many deposits, late-stage prismatic quartz and euhedral stibnite infill minor open-space cavities within veins.

8. Deposit Types

There are two main mineralisation types in the Reefton area: orogenic Au hosted deposits in the Greenland Group and younger intrusion-related Au ± Cu deposits related to the Devonian to Carboniferous Karamea suite of plutonic rocks on the goldfield's eastern margin. Some intrusion-related sheeted scheelite vein deposits have been investigated near Reefton (e.g. Kirwans Hill and Bateman Creek); however, these deposits typically have very low Au grades and are likely Carboniferous or Cretaceous in age (Pirajno & Bentley, 1985; Brathwaite & Pirajno, 1993)

Minor, Late Cretaceous intrusion-hosted Cu mineralisation has been reported in a granitic dyke cross-cutting Greenland Group metasedimentary rocks, from the southern part of the Reefton Goldfield near Blackwater (Dickie et al., 2019). However, this dyke is small (cm- to m-scale), very low-grade Au (anomalous Cu and Mo), and hence RGL does not consider it a target for potential mining.

8.1 Orogenic Gold

Orogenic Au lodes form in metamorphic rocks of the mid-to-shallow crust of compressional settings, where Au-bearing fluids (derived from dehydrated metamorphosed rocks) migrate upwards from depth, via structural conduits, and precipitate Au (often within quartz veins) following cooling and decompression (e.g. Fyfe & Henley, 1973; Gaboury, 2019). The term orogenic gold was introduced by Bohlke (1982), but the popularity of the term orogenic Au deposit was started by Groves (1993). While lode-Au is the predominant economic deposit type found within metamorphic belts, these settings may also host Au-dominant intrusion-related deposits, as well as deposits with non-typical metal associations (e.g. Groves et al., 2003). The crustal continuum model argued that orogenic Au mineralisation occurred at pressures and temperatures covering a wide range of depths, from the sub-greenschist to granulite facies (Groves 1993; Groves et al. 1998, 2003).

More-recent literature (e.g. Phillips & Powell 2009, 2010), has suggested that the crustal continuum model is not applicable over the broad range of temperatures and pressures as initially proposed, but only for restricted ranges of depth and temperature — mostly for greenschist facies conditions. Notwithstanding the controversy of their formation, a large number of gold deposits that range in nature from replacement-style (Vielreicher et al., 1994), quartz-vein hosted (e.g. Robert & Brown, 1986) and those demonstrably associated with intrusions (e.g. Salier et al., 2004), are classed as orogenic Au deposits. This results in a plethora of different characteristics associated with orogenic Au deposits (e.g. Gaboury, 2019).

The historical deposits in the Reefton Goldfield are the orogenic Au type. The main Au mineralisation event at Reefton occurred in the latter stages of greenschist facies metamorphism of Greenland Group rocks. Whole-rock geochronological studies indicate peak metamorphism at either ~450 Ma (Rb-Sr whole-rock ages, Adams 2004) or ~387 Ma during collision and accretion of the Buller and Takaka terranes (U-Pb ages of inherited zircons in cross-cutting granitoids, Turnbull et al., 2016). Accretionary tectonics and compression caused thickening of the metasedimentary pile and resulted in the development of regional-scale folds. As deformation progressed, the folds tightened and metamorphogenic fluids were focussed along shears that transected fold limbs and locally refracted around fold hinges (Figure 8-1). Early Au-bearing quartz veins were emplaced in the shears, and their associated structures and textures record a transition from metamorphic fluid flow to hydrothermal deposition, that was concurrent with a transition from ductile to brittle deformation (MacKenzie et al., 2016). The quartz vein textures, elemental associations (Au-As-Sb), approximate depth of emplacement (near the brittle-ductile transition), tectonic setting and relative timing (late metamorphic with a post-metamorphic overprint; temporally unrelated to any intrusive event) are characteristics typical of other Phanerozoic orogenic Au deposits around the world.

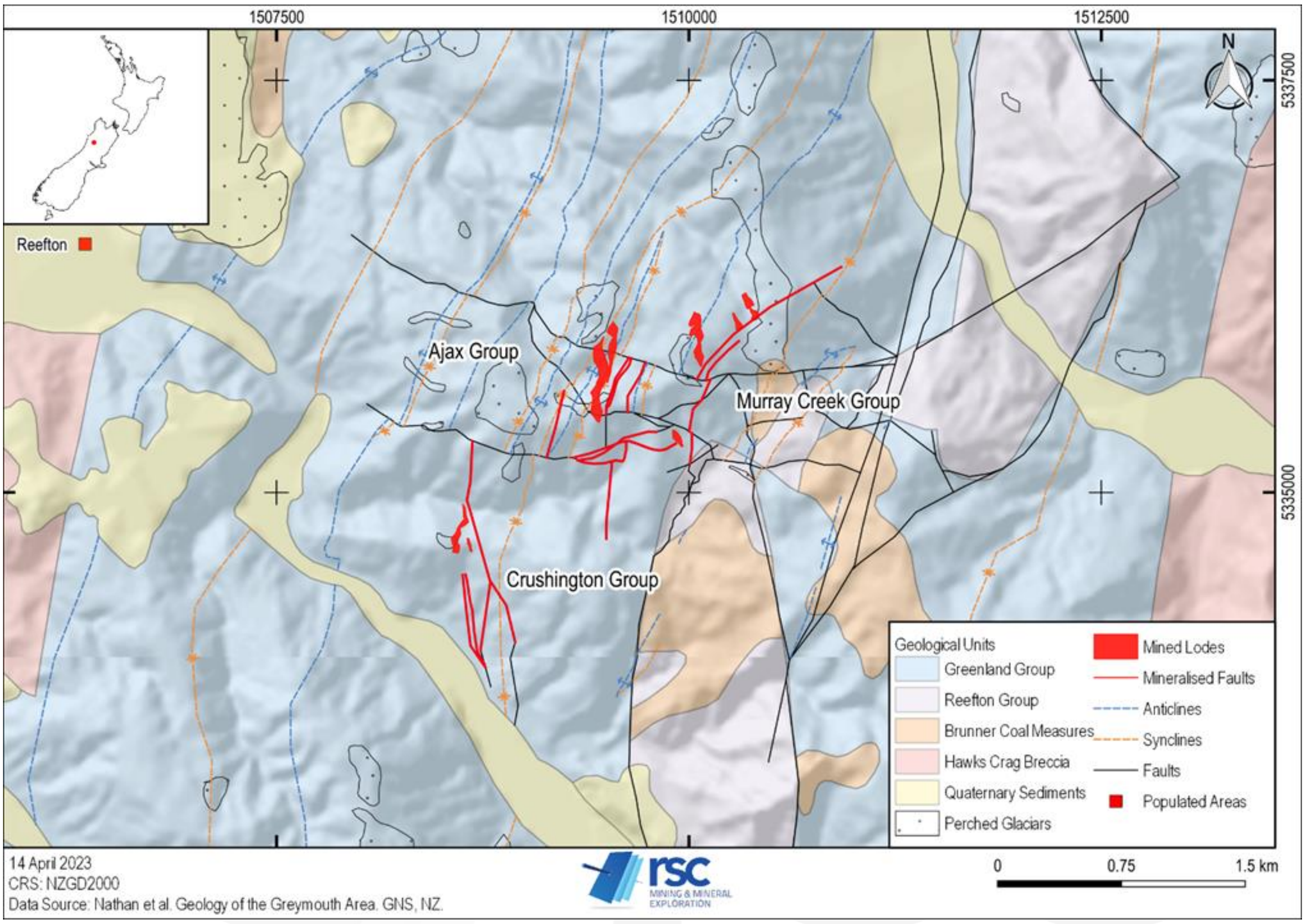


Figure 8-1: Historically mined lodes east of Reefton township.

The structural setting and host rocks of the Reefton Au deposits are most similar to the Palaeozoic rocks of the western Lachlan Orogen, that host the central Victoria goldfields, in southeastern Australia (Cox et al., 1991). The historical Au mines at Bendigo and Ballarat, and the currently producing Fosterville Au mine in Victoria, are hosted in Ordovician turbidites which formed along the active Gondwana margin, concurrently with, and in a similar structural setting to, the Greenland Group rocks in New Zealand's Buller Terrane (Cooper & Tulloch, 1992). At Bendigo and Ballarat, Au-bearing quartz veins are hosted in typically shallowly plunging anticlinal hinges and in paragenetically early faults and transpressional shears that cut the folds, and were reactivated with metre-scale displacements (Wilson et al., 2016). Whereas the Birthday Reef, at Reefton, is a single vein with a strike length of 100s of metres and >1,200 m continuous vertical extent, the Victorian mineralised vein arrays typically have 100s of metres strike length, but rarely extend >20 m down dip. Like Reefton, structurally controlled veins and fold-hosted vein arrays are typical; however, unlike Reefton, mineralised saddle reefs in anticline hinges are typical in Victoria. The saddle reefs are thought to represent the uppermost part of the Victoria goldfield mineral system. Although saddle reefs have not been discovered at Reefton, this may reflect that there has been more extensive erosion in the Buller Terrane and deeper levels of the mineral system are currently exposed. The central Victoria turbiditic sequence is underlain by greenstone belt volcanics, interlayered marine-volcanogenic sediments and subvolcanic intrusive rocks. Some of these units have been structurally emplaced along major thrusts in the goldfield and host minor orogenic Au mineralisation (Bierlein et al., 2004). The base of the Greenland Group is not exposed, so it is not known whether there are any underlying volcanic and/or subvolcanic rocks. Some of the orogenic Au deposits in the Victoria goldfield are spatially related to a suite of mafic to intermediate dykes, related to the Late Silurian to Devonian suite of post tectonic intrusions that are widespread throughout the western Lachlan Orogen. These dykes which include dolerite, gabbro, peridotite and more andesitic lithologies are hosted in regional-scale fault zones that transect the goldfield and locally host crosscutting Au mineralisation. In the Buller Terrane, folded Greenland Group rocks are cut by north-trending lamprophyre and dolerite dykes, and some of the orogenic Au deposits are spatially associated with these dykes, and/or hosted in some of the same regional-scale structures. The age of the dykes is poorly constrained; however, Bierlein et al. (2004, and references therein) report some of the dykes to be pre-mineralisation, metamorphosed and/or hydrothermally altered.

Late Palaeozoic host rocks of the Meguma Terrane, Nova Scotia, Canada share a remarkably similar structural setting and deformational history to the Reefton (and central Victoria) goldfields (Bierlein et al., 2004). The Meguma Group is part of a Cambrian to Ordovician sequence that formed along, and was accreted onto, the continental margin of Avalon during the Acadian orogeny. Like the Buller Terrane and Greenland Group, the Meguma is dominated by slates, argillites and lesser sandstones that were metamorphosed to greenschist facies in the Late Palaeozoic. The Meguma Group hosts over 300 historical orogenic Au deposits including Nova Scotia's biggest historical producer the Goldenville deposit (212,300 oz Au; Ryan & Smith, 1998). Like the Reefton deposits, the orogenic Au deposits in the Meguma Group are hosted within faults and shears, that cut across limbs, and near the hinges of regional-scale, steeply dipping, shallow-plunging, upright anticlinal folds. The Au mineralised veins in the Meguma are narrow (cm- to m-scale), and structurally controlled in reverse faults and associated fold-related fractures. Arsenopyrite is the dominant sulphide, but pyrrhotite and pyrite are also present. Gold occurs as visible Au in veins as well as Au-bearing sulphides disseminated in metasedimentary host rocks. The Meguma Au deposits include both the high-grade, Au-bearing vein type (e.g. Caribou Gold District) and lower-grade, disseminated Au-bearing sulphide type that is hosted in argillite and interbedded metasandstones (e.g. Touquoy Zone; Bierlein et al., 2004). Many deposits are a combination of the two (e.g. Osprey Gold's Goldenville Project; Pettigrew et al., 2017).

8.2 Intrusion-Related Gold

The oldest intrusive rocks in the Reefton area are the Devonian to Carboniferous Karamea Suite of plutons, which intrude the Greenland Group along the eastern margin of the goldfield. Various porphyry-Mo occurrences, rich in molybdenite-chalcopyrite, are associated with discrete high-level tonalite, granodiorite and granite bodies that have intruded along pre-existing regional-scale faults, that run subparallel to and along the margins of the Karamea batholith (e.g. west Nelson, Prijano, 1985). The younger Cretaceous, Rahu Suite, also intrudes along the eastern margin of the Reefton Goldfield and has the potential for porphyry-style mineralisation. Some discrete granitic plutons that intrude Greenland Group rocks, near the western boundary of the igneous belt, have low levels of Mo and are associated with greisen hydrothermal alteration (e.g. McConnochie granite, Kirwans Hill, Bateman Creek and Farmer Creek; Pirjano, 1985).

8.2.1 Kirwans Hill & Bateman Creek Occurrences

Greisen-related scheelite, Au and sulphide mineralisation is recognised at Kirwans Hill and Bateman Creek. The Kirwans Hill deposit consists of a sheeted-vein system that is hosted in Greenland Group rocks directly above a greisenised, hydrothermally altered, granite stock, that is exposed in Batemen Creek (Pirajno, 1985; Figure 8-2). The granitic intrusion is hosted within a north-northwest-striking fault that cuts the host Greenland Group rocks and is thought to be related to the Karamea Suite intrusions of Devonian to Carboniferous age (Brathwaite & Pirajno, 1993). The W-bearing quartz veins, above the intrusion, consist of scheelite and varying amounts of pyrite, pyrrhotite, chalcopyrite, arsenopyrite and loellingite with minor molybdenite, cassiterite, sphalerite ± trace Ag-Pb-Bi-sulphosalts. Greisen-style alteration around the veins includes biotite, tourmaline, fluorite, apatite, epidote, albite, and late-stage pyrite and carbonate. Some visible Au occurs with arsenopyrite and pyrite in quartz veins adjacent to the scheelite-bearing vein system. However, it is unclear how the two vein systems are related. The historicalKirwan's Reward Au mine is located several hundred metres to the south of Kirwans Hill and consists of outcropping high-grade Au-bearing quartz boulders. The mined boulders were not in situ, and their genetic origin and relationship to the Kirwans Hill vein system remain unclear (Pilcher & Cutovinos, 2008).

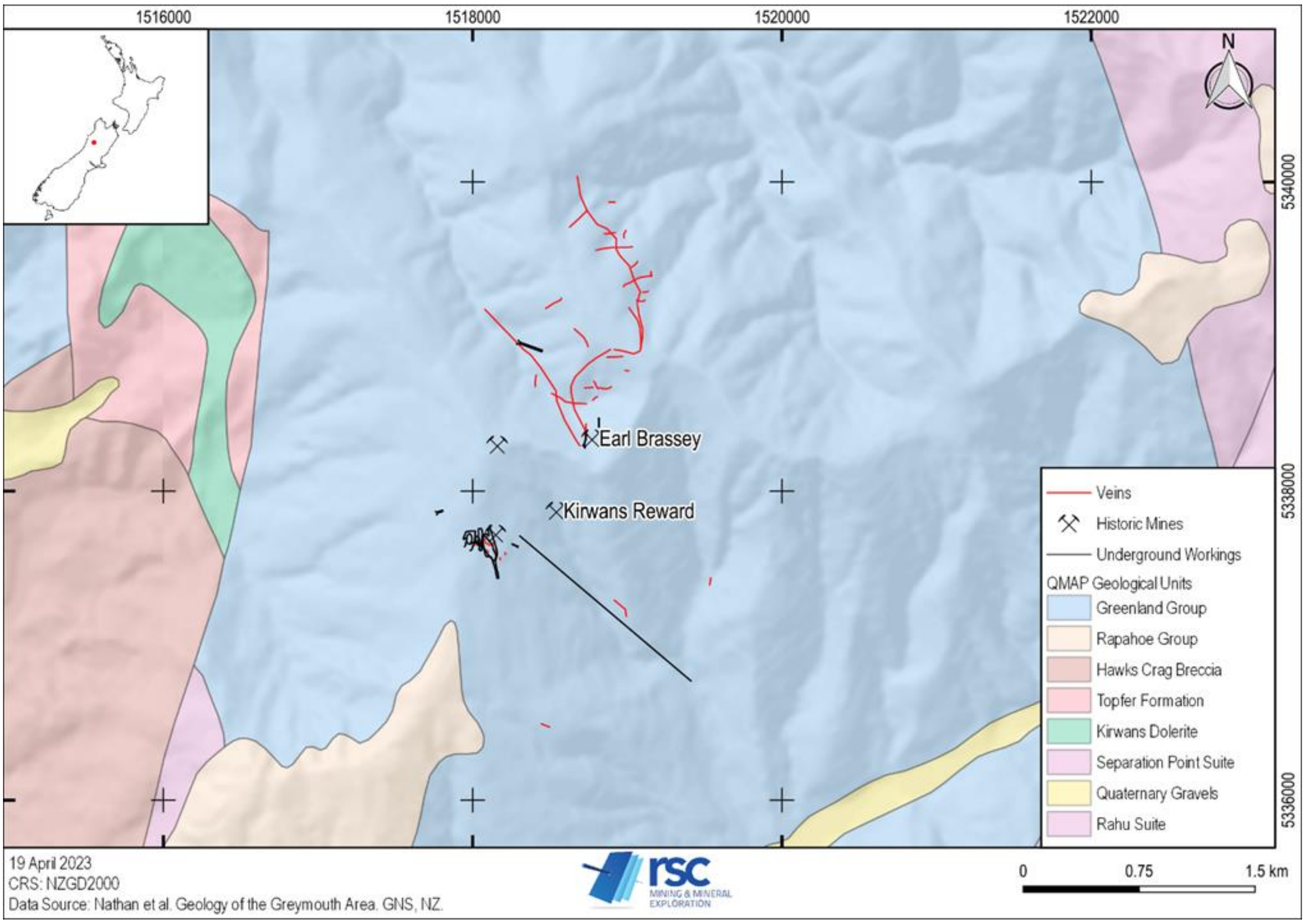


Figure 8-2: Geological map of Kirwan's Hill.

9. Exploration

RGL restarted exploration in the Project Area in 2019 with the Capleston/Crushington exploration programmes. Exploration activities since 2019 have been significant, with the compilation of a large geochemical dataset of legacy data, extensive geochemical sampling, geological mapping and geophysical surveys.

9.1 Geological Mapping

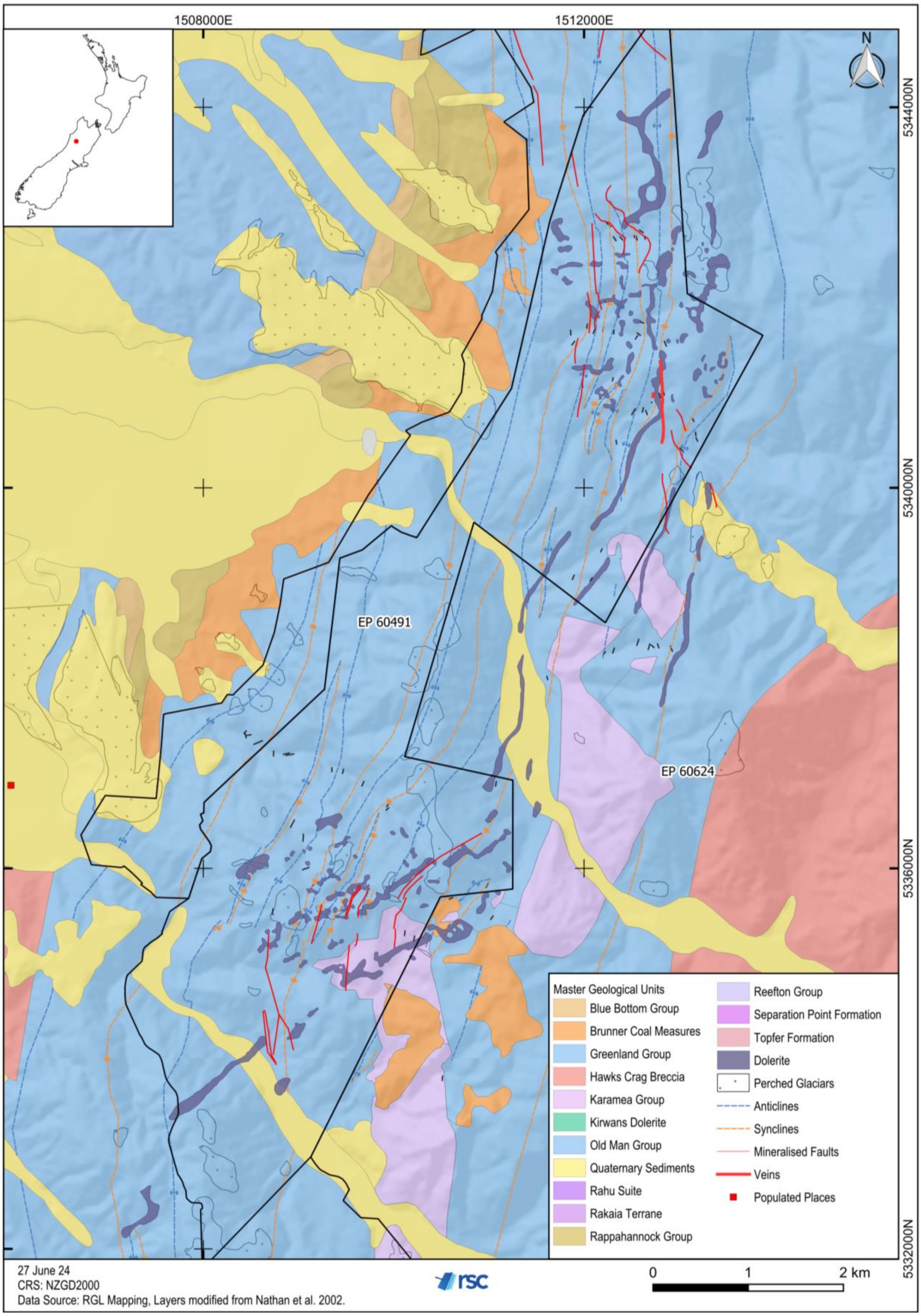
Prior to 2019, the majority of the geological mapping was conducted on a regional scale, targeting historical mines and possible lode extensions (e.g. Corner, 2005; Allibone, 2012). RGL has completed detailed mapping (1:250 and 1:1,000) over the Capleston, Orlando, and Murray Creek prospects. Mapping was driven by geochemical anomalies identified during soil sampling (e.g., Figure 9-15), and sites of structural complexity.

Dr Doug MacKenzie was contracted for the first phase of 1:1,000 mapping of three of the areas of interest covered by the regional soil grid (north-Murray Creek, Orlando, and Pactolus-Fiery Cross). RGL geologists have completed further detailed (1:250; 1:500) mapping over Golden Treasure, Pactolus, Murray Creek, and Stony Creek.

Mapping included the recording of lithology, bedding/cleavage relationships, younging, and mineralisation. Dykes interpreted by the geophysical data processing (section 9.5), and important features in the understanding on controls on mineralisation, were validated in the field where possible and added to the database of other known outcrops in the area compiled from field mapping by OceanaGold mappers Jongens (2012), Gage (1948 field mapping sheets) and Hunting (1986).

Geological notes from field mapping were entered as point data into an SQL database from .csv files, either created while logging in the field, on a portable hand-held personal device, or recorded in field notebooks, by hand, and later entered into Excel spreadsheets.

The resultant map for the Project Area is displayed in Figure 9-1, with zoomed-in versions illustrating the Capleston and Murray Creek areas in Figure 9-2 and Figure 9-3, respectively.



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CRS: NZGD2000
Data Source: RGL Mapping, Layers modified from Nathan et al. 2002.

Figure 9-1: Geological map of the Reefton Goldfields.

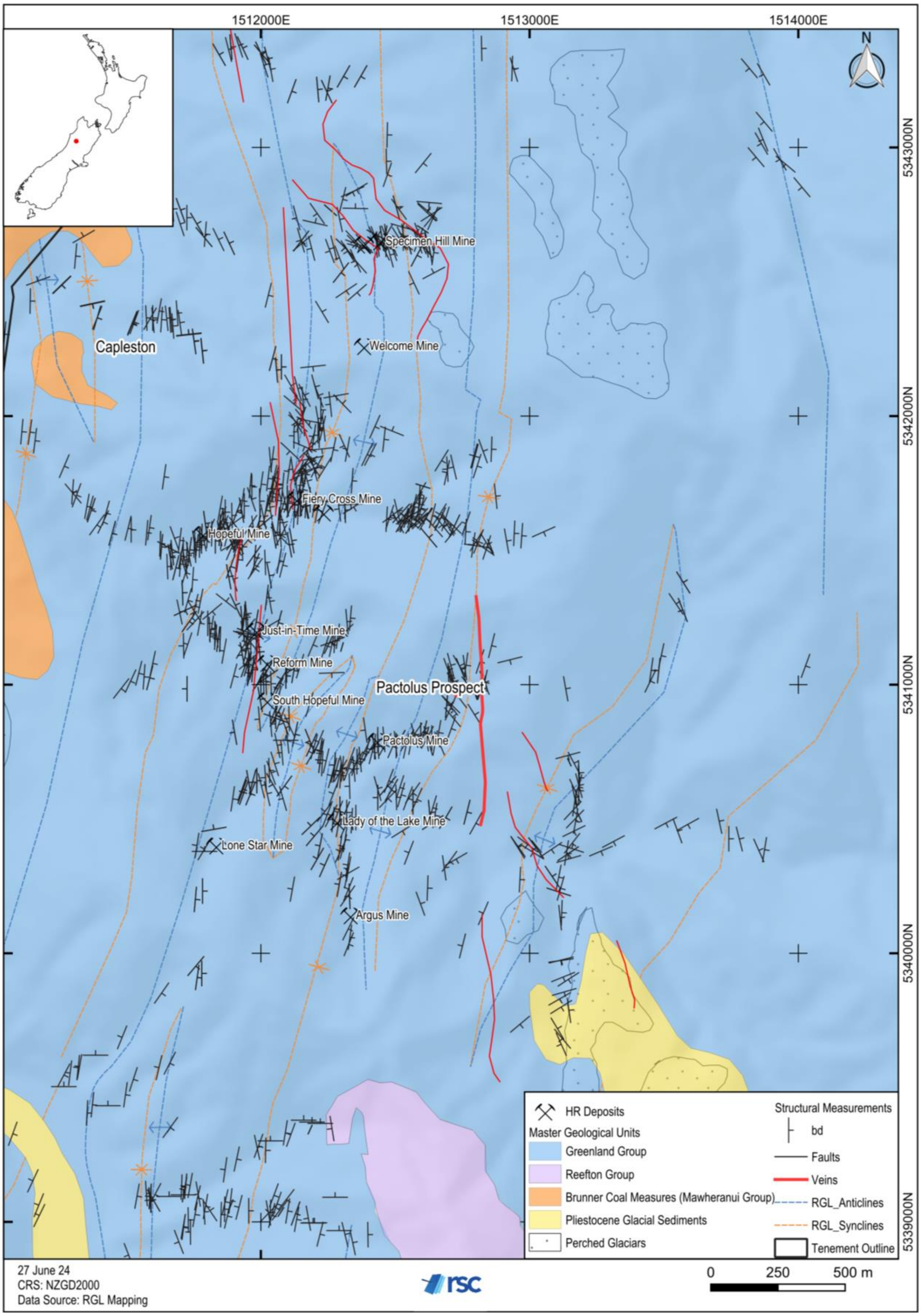


Figure 9-2: Detailed geological map of the Capleston area.

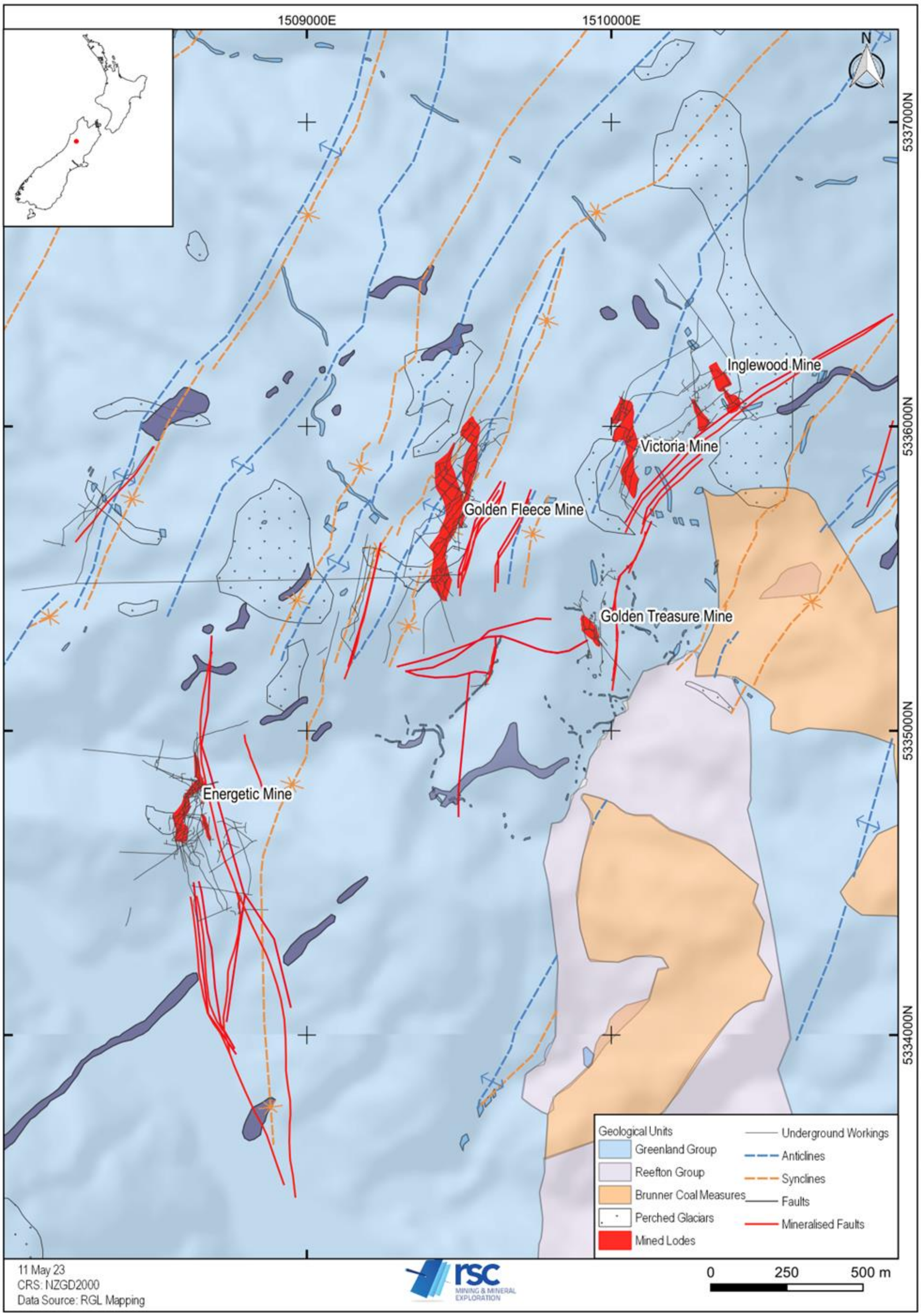


Figure 9-3: Detailed geological map of the Murray Creek area.

9.2 Petrology

Samples for petrological analysis were sent to an RGL contractor, Dr MacKenzie, at the University of Otago, where they were made into polished sections. Petrology was used to locate and describe Au-bearing mineral phases, as well as to describe rock types surrounding mineralisation. Samples selected for analysis included samples from sites of strong mineralisation, i.e., Pactolus and Fiery Cross, or from outcrops to help determine the overall structure and deformation of the property. Dr MacKenzie examined the samples and selected a number of sulphides from each slide to examine, in detail, under transmitted and reflected light using 2.5x, 4x, 10x and 40x objectives. Petrological descriptions of the rocks analysed follow in Table 9-1.

Table 9-1: Petrological summary of rock samples from EP 60491 (Capleston).

Sample ID	Location	Au (g/t)	Description
RG4_GERS1823 (Figure 9-4)	Pactolus 1512845E 5340999N	32.1	Foliated and crenulated argillite with abundant disseminated sulphides. The sample is cut by a centimetre-scale quartz vein. The vein is brecciated and cut by carbonate and Fe-oxides after sulphides. The sulphides are predominantly arsenopyrite and these are typically acicular, oriented with their long axis subparallel to the crenulation cleavage and boudinaged.
RG5_GERS1824 (Figure 9-5)	Pactolus 1512845E 5340999N	34.6	Highly sheared argillite cut by centimetre-scale quartz-carbonate veins. The sheared argillite is partially replaced by abundant sulphides dominated by arsenopyrite and lesser pyrite. The quartz-carbonate vein contains angular fragments of mineralised argillite that have been extensively veined by an earlier generation of quartz veins. There are at least two generations of quartz veins in this sample. The visible sulphides are associated with the earlier generation of mineralisation.
GERS1825	Pactolus 1512845E 5340999N	4.04	Hydrothermal mineralised breccia from the Pactolus vein. Breccia contains fragments of argillite and greywacke cemented by quartz. Arsenopyrite is concentrated in and has preferentially replaced host rock fragments rather than the hydrothermal quartz. Quartz matrix is cut by shears. The quartz-breccia and shears are locally mutually crosscutting, hence are likely to be of the same generation.
Sample 890	Pactolus 1512783E 5341000N	n/a	Altered dolerite, that is mineralised on the margins of a cross-cutting quartz-carbonate vein, in the southern tributary of the upper Pactolus Stream.
Fiery Cross Float (Figure 9-6, Figure 9-7)	Fiery Cross 1512151E 5341678N	n/a	Samples consist of early, white vein quartz, which has been brecciated and infilled by a later generation of stibnite and euhedral clear quartz. The early quartz is relatively coarse and has a dusty appearance under the microscope due to the abundance of fluid inclusions. The boundaries between the early quartz grains are typically irregular and serrated and evince dynamic recrystallisation. The quartz grains are deformed with some deformation bands and undulose extinction. The stibnite that cuts the early quartz appears massive in hand sample, but is typically euhedral under the microscope and associated with a generation of inclusion-free quartz, that is typically euhedral as well. The stibnite veins are composed primarily of stibnite with only minor quartz. Rare blebs of Au are included in the stibnite veins.
Sample 950	Valhalla Adit 1511896E/5341514N	n/a	Fissile argillite sample, from the historical mine, dump outside the entrance to the Valhalla drive. The sample exhibits carbonate spots and S0 + S2 cleavage directions.

Sample 932	Northeast Pactolus 1512747E 5341007N	n/a	Quartz vein in sheared argillite in northern tributary of the upper Pactolus stream —northeast and approximately along strike from main Pactolus vein. Sample is a white hydrothermal quartz vein with slivers of wall rock. Quartz has evidence of dynamic recrystallisation and a typical texture of orogenic quartz veins, that have deformed in a ductile to semi-ductile manner.
Golden Treasure vein (Figure 9-8)	Murray Creek 1510119E 5335325N	n/a	The sample is composed of early white hydrothermal vein quartz that has been brecciated and infilled by a later generation of stibnite. The early quartz appears dusty under the microscope due to the abundance of submicron-size fluid inclusions. This quartz is deformed with local deformation bands, undulous extinction and irregular recrystallised grain boundaries that evince dynamic recrystallisation. The stibnite is relatively undeformed and infills fractures and veins that cut the early quartz, and occurs typically as elongated prisms. The stibnite is associated with minor fine-grained quartz that is relatively inclusion-free and euhedral. Some of the stibnite veins contain grains of Au surrounded by massive stibnite.

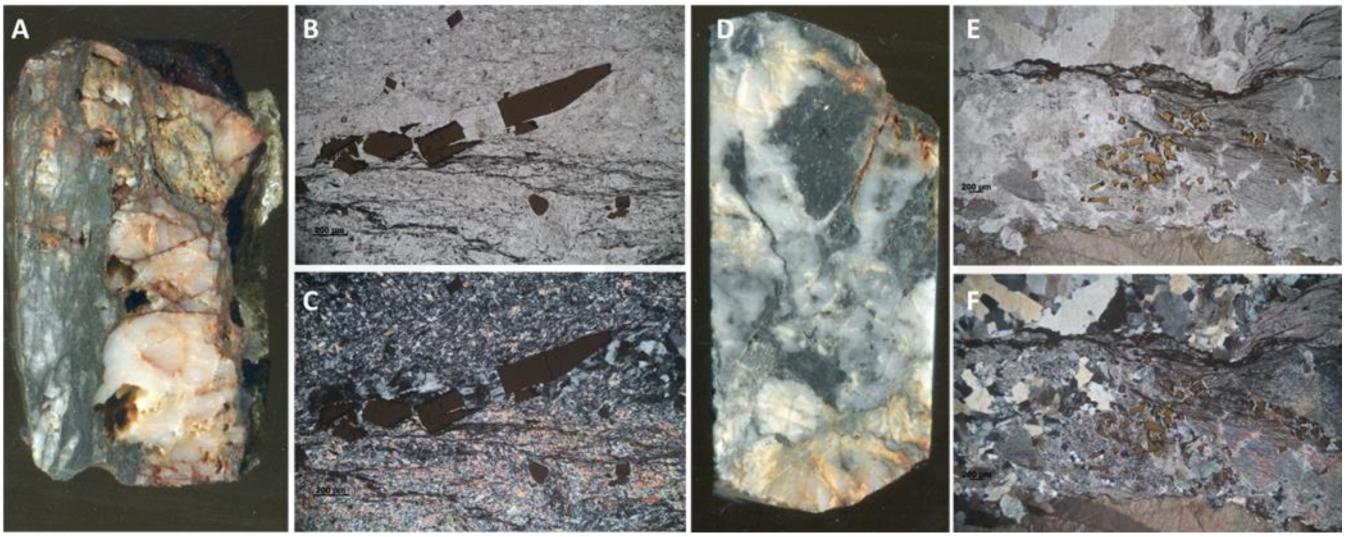


Figure 9-4: Photographs and photomicrographs of two samples from Pactolus. **A.** Rock sample RG4_GERS1823. **B.** RG4 section in plane polarised. The sample is foliated and crenulated argillite with abundance sulphides (predominantly acicular arsenopyrite), cut by a centimetre-scale quartz vein. **C.** Photograph B in cross-polarised light. **D.** Rock sample RG5_GERS1824. **E.** RG5 section in plane polarised light. This sample consists of highly sheared argillite cut by centimetre-scale quartz-carbonate veins. Argillite is partially replaced by abundant sulphides, dominated by arsenopyrite and lesser pyrite. **F.** Same section as E. in cross-polarised light.

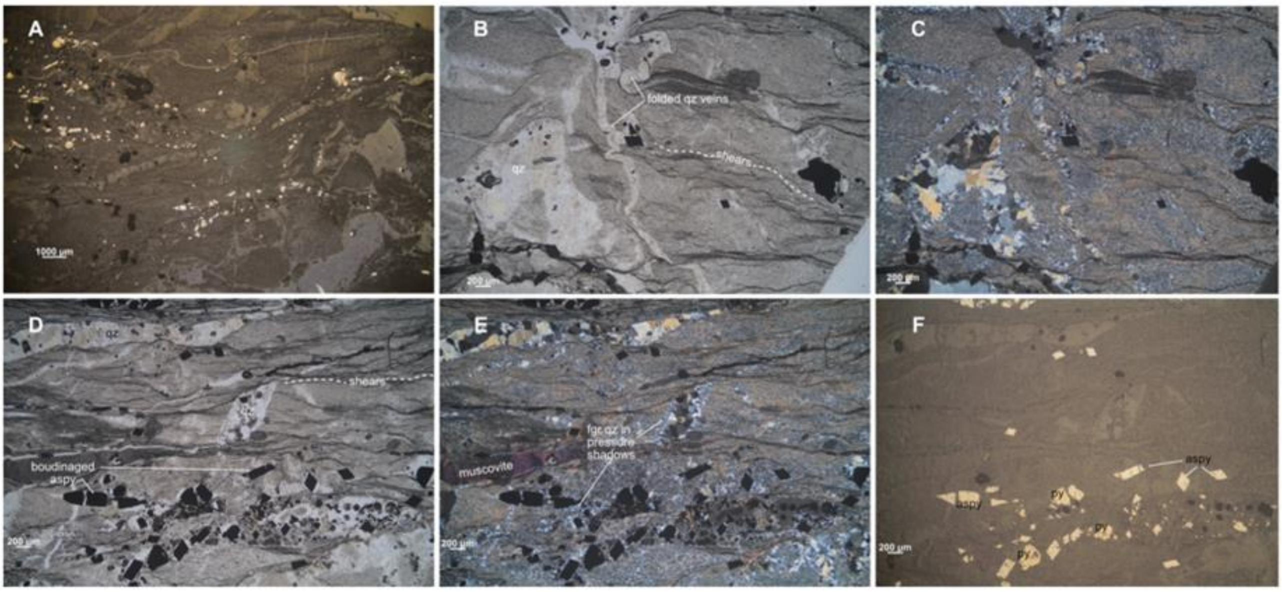


Figure 9-5: Reflected and plane polarised transmitted light photomicrographs of GERS1824 collected from Pactolus. **A.** Disseminated subhedral to euhedral arsenopyrite and minor anhedral pyrite in quartz veined and sheared argillite. **B.** Folded quartz veins cut by shears (white dashed line). Diamond-shaped arsenopyrite (black opaques), some with quartz - filled pressure shadows, are disseminated in the host argillite and along quartz vein margins. **C.** Same section as B. under crossed polarised light. **D.** Plane polarised light. Close-up of disseminated arsenopyrite (aspy), locally boudinaged and infilled with quartz. Shears, parallel to the quartz-filled pressure shadows or 'wings' around the sulphides, cut the argillite host rock and the quartz veins. **E.** Same section as D. under crossed polarised light. Fine-grained quartz that has infilled pressure shadows in boudinaged arsenopyrite also rims deformed and disrupted early quartz veins. **F.** Same section as D. and E. under reflected and transmitted light. Disseminated, silver-coloured arsenopyrite is typically euhedral, diamond-shaped and also occurs as elongated prisms that are boudinaged. Brassy-coloured pyrite is more equant and subhedral.

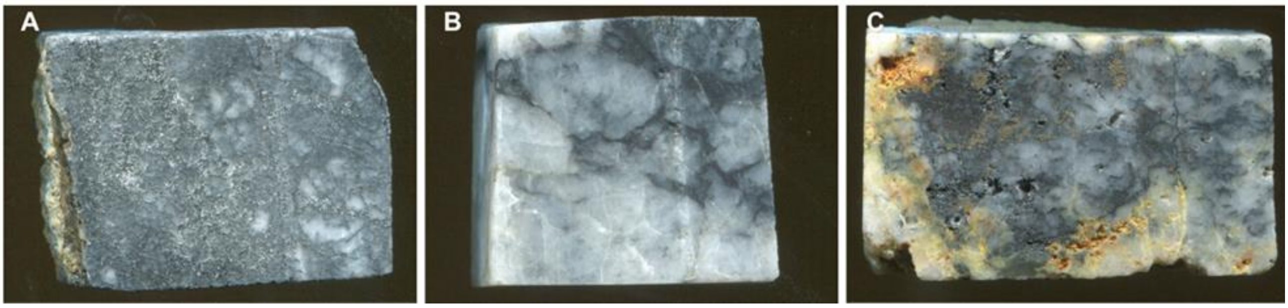


Figure 9-6: Fiery Cross float samples, brecciated hydrothermal quartz vein infilled with stibnite.

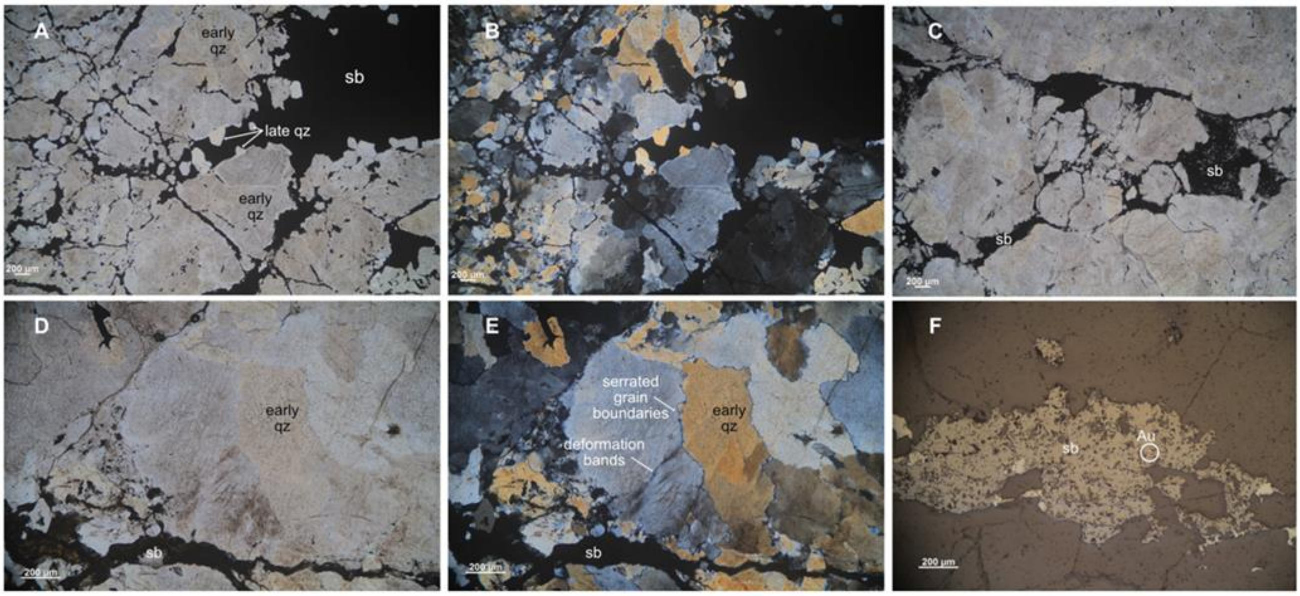


Figure 9-7: Fiery Cross float samples, photomicrographs . **A.** Plane polarised light. Brecciated early quartz vein infilled with stibnite (black opaque, sb). The early quartz is inclusion-rich giving it a 'dusty' appearance. Intergrown with the stibnite are euhedral grains of relatively late quartz that are finer-grained and clearer with fewer inclusions; **B.** Same section as A. under crossed polarised light; **C.** Plane polarised light. Brecciated, early, inclusion-rich quartz cut and infilled with stibnite. **D.** Plane polarised light. Close-up of early hydrothermal quartz. The grains are relatively coarse-grained and inclusion-rich. **E.** Same section as D. under crossed polarised light. The early quartz grain boundaries are deformed, and the grain boundaries are serrated and evince bulging and dynamic recrystallisation. **F.** Reflected light. Close-up of stibnite infilling brecciated, early quartz. The stibnite is light and dark grey depending on its polish. An irregular inclusion of Au is circled.

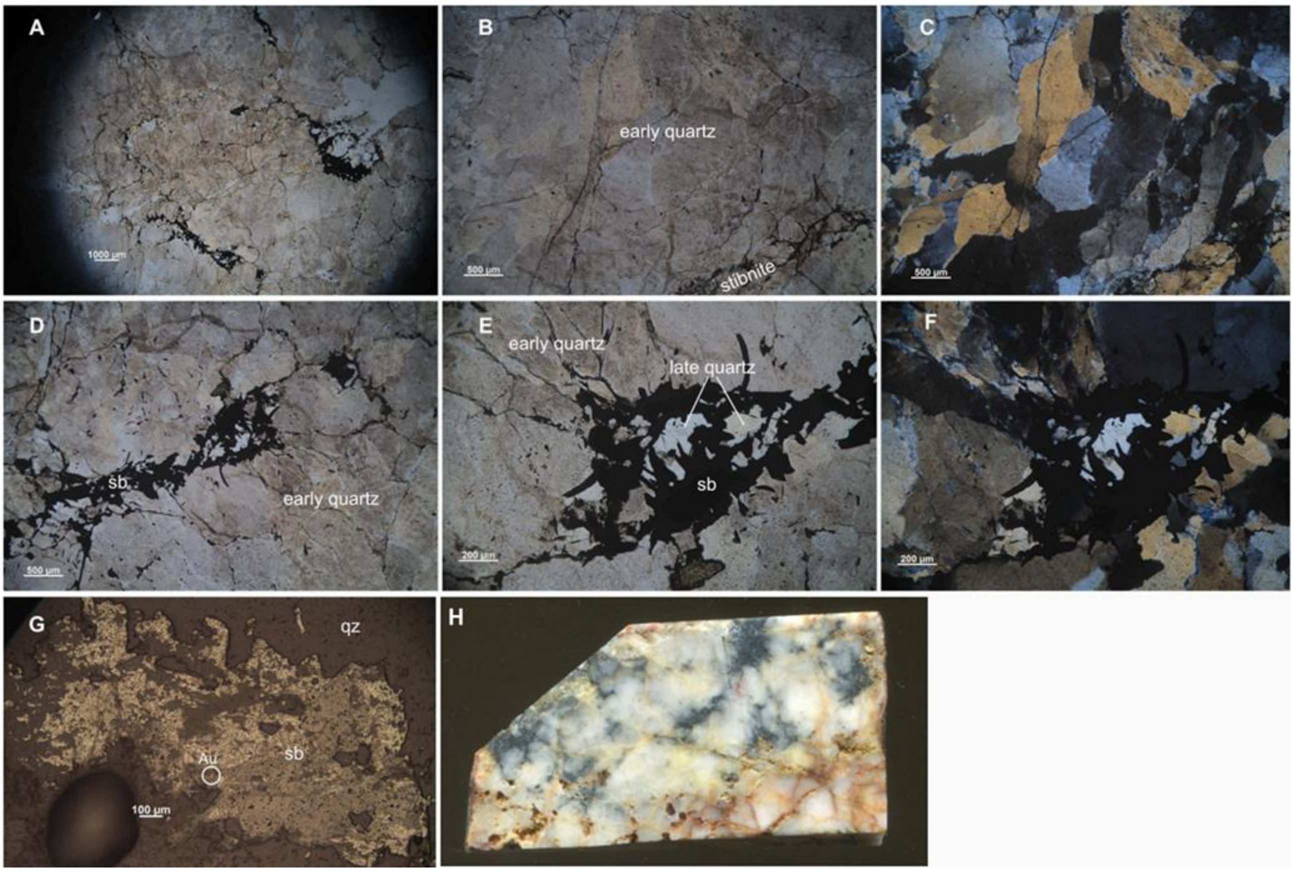


Figure 9-8: Photomicrographs of Golden Treasure vein. **A.** Plane polarised light. Brecciated hydrothermal vein quartz infilled with veins of stibnite (black, opaque). **B.** Plane polarised light. Close-up of relatively early, vein quartz in A. which is

inclusion-rich, giving it a ‘dusty’ appearance. **C.** Same section as B. under crossed polarised light. The quartz grain boundaries are typically serrated and indicate evidence of bulging and dynamic recrystallisation. **D.** Plane polarised light. Stibnite vein cutting relatively early hydrothermal quartz vein. The stibnite (sb) is euhedral with slender prisms. **E.** Plane polarised light. Close-up of stibnite vein illustrating relatively late quartz associated with the stibnite vein. The late quartz is much clearer with fewer inclusions than the early vein quartz. **F.** Same section as E. under crossed polarised light. **G.** Reflected light. Close-up of stibnite. The stibnite is light and dark grey depending on its polish. An irregular inclusion of Au is circled. There is a bubble in the slide, to the left of the scale bar. **H.** Original rock sample, hydrothermal quartz vein infilled with stibnite.

Selected samples were examined at the University of Otago using field emission gun scanning electron microscopy (FEG-SEM) with electron backscatter diffraction (EBSD). This was conducted to determine the mineral associations with gold, in different forms of mineralisation across the tenement (Table 9-2).

Table 9-2: Rock samples from Capleston tenement, SEM summary.

Sample ID	Au (g/t)	SEM Description
RG4_GERS1823 (Figure 9-9)	32.1	Under the SEM, the sulphides are typically fractured and weathered to Fe-oxides. Gold blebs up to 10 µm occur as inclusions in some of the arsenopyrite grains, and as free Au blebs associated with the oxidised sulphides. It is unclear whether these blebs were initially primary free Au grains or Au inclusions that have been liberated from the oxidised sulphides during weathering.
RG5_GERS1824 (Figure 9-10)	34.6	The sulphides in the sheared argillite consist of both arsenopyrite and pyrite and these are typically intergrown. Gold blebs up to 12 µm occur in both pyrite and arsenopyrite grains. Free Au grains are also relatively common, and a large free Au grain of ~250 µm occurs in the quartz-carbonate vein. Some of the sulphides in the sheared argillite are deformed and fractured and some of the Au inclusions have been remobilised along the sulphide fractures.

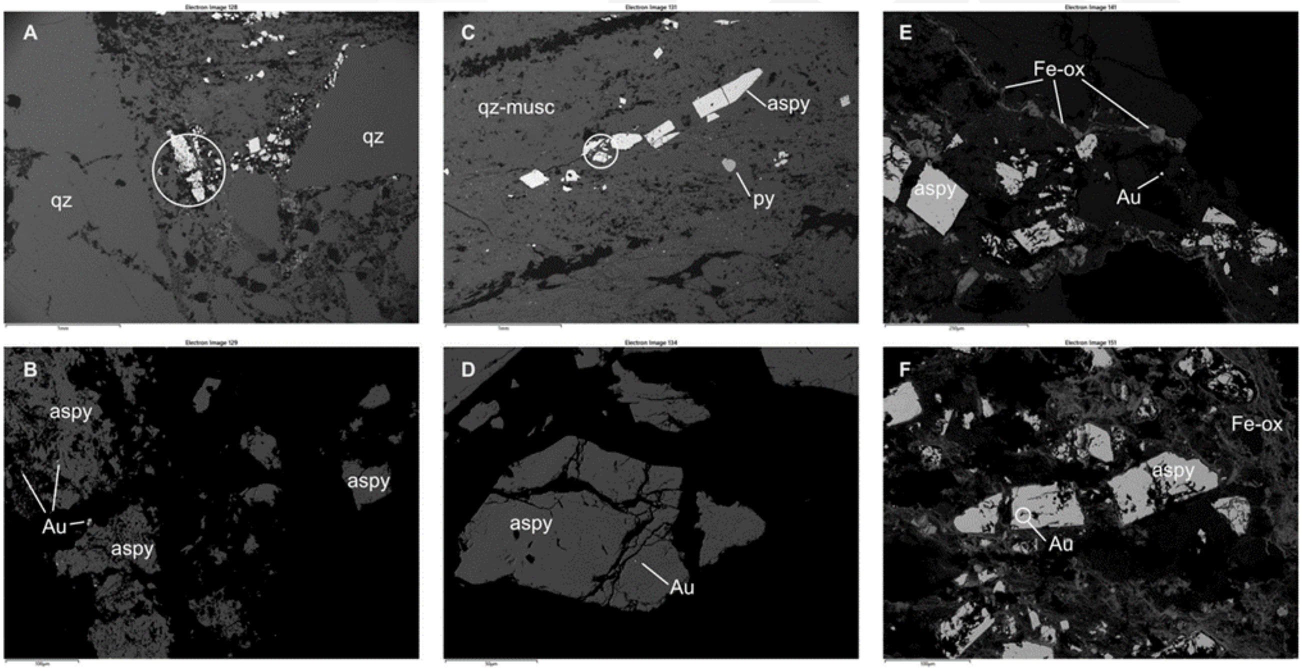


Figure 9-9: SEM backscatter images. **A.** A fragment of mineralised argillite (right-hand side) is entrained in a quartz vein (left-hand side). The sulphides are dominated by arsenopyrite (aspy, bright white). **B.** Close-up of arsenopyrite grain is circled in A. The grain contains several Au inclusions up to 10 µm. **C.** Typical acicular, fractured and boudinaged arsenopyrite grains (bright white) with lesser, more equant pyrite (bright grey) in a quartz-muscovite-rich matrix. **D.** Close-up of arsenopyrite grains circled in C. with typical sub-micron size Au inclusion. **E.** Typical weathered arsenopyrite and

lesser pyrite surrounded by irregular Fe-oxides (Fe-ox). Some free Au blebs up to 10 µm occur near the weathered sulphides. **F.** Fractured arsenopyrite grains are surrounded by irregular anhedral Fe-oxides. Rare Au inclusions are visible in some arsenopyrite grains.

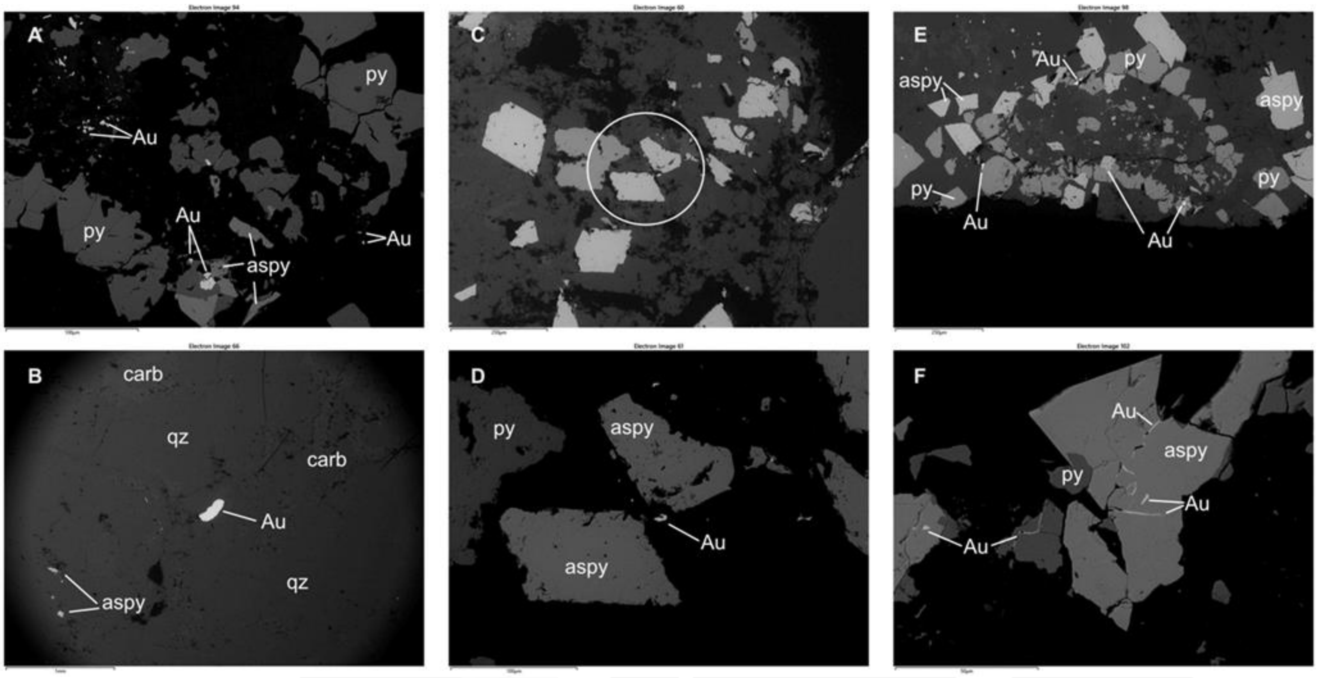


Figure 9-10: RG5_GERS1828 SEM backscatter images. **A.** Disseminated sulphides, dominated by pyrite and lesser arsenopyrite and several blebs of free Au. A grain of intergrown pyrite and arsenopyrite contains a relatively large inclusion of Au (11 µm) in the pyrite portion of the grain. **B.** Large bleb of free Au (250 µm) and minor arsenopyrite in a quartz-carbonate vein. **C.** Disseminated arsenopyrite and pyrite in a quartz-muscovite-rich argillite matrix. **D.** Closeup of arsenopyrite grains and part pyrite grain circled in C. Free Au blebs up to 10 µm occur in the matrix near the sulphides. **E.** Disseminated arsenopyrite (bright white) and pyrite (bright grey) in argillite matrix. Gold inclusions up to 12 µm occur in some pyrite grains and along the contact between pyrite and arsenopyrite (middle, centre of image). **F.** Gold inclusions and infilling fractures (up to 15 µm long) in arsenopyrite and pyrite.

The general textures and paragenesis of the samples analysed are typical of the Reefton Goldfield. The samples exhibit evidence of an early generation of hydrothermal vein quartz that has been sheared, locally brecciated, and infilled by a later generation of stibnite, pyrite, arsenopyrite, minor quartz and Au. The early quartz veins are associated with arsenopyrite which has preferentially replaced the host rocks and host rock fragments within the veins. Pyrite is relatively minor in these samples and may be either metamorphic pyrite or early pyrite associated with the early quartz veins and arsenopyrite. There is likely to be micron-scale free Au associated with the early veins, and/or solid solution Au associated with arsenopyrite, but none was observed optically.

Under the higher magnification of the SEM, it is evident that the sulphides in each of the analysed samples are predominantly arsenopyrite with lesser pyrite. The arsenopyrite is typically euhedral with two common shapes (diamond and acicular), whereas the pyrite is more equant and subhedral. In all samples, there were examples of arsenopyrite intergrown with pyrite, indicating that the two are coeval mineral phases. Only very rarely was zoning noted (in pyrite in RG1 and arsenopyrite in RG4). The sulphides are typically deformed, rotated along the cleavage, and fractured. Gold blebs, ranging in size from ~1–15 µm, were observed as inclusions in sulphides from all the samples and occurred in both arsenopyrite and pyrite. Some rare Au inclusions have been remobilised along fractures within deformed sulphides, but most occur as isolated inclusions within the grains. Free Au is relatively rare, but does occur typically near the sulphides and as rare, isolated blebs in quartz (e.g. RG2). In one sample (RG5), a large bleb of free Au (~250 µm) occurs in a centimetre-scale quartz-carbonate. This bleb is sufficiently large to be visible under reflected light microscopy, using the 40x objective lens.

Three mineralised core samples were collected from mineralised intercepts in DD_PAC_001 and DD_PAC_002 to understand how gold presents in Pactolus. Samples were examined under the microscope, and a selection of sulphides from each was examined in detail under reflected light using 2.5x, 4x, 10x and 40x objectives (Figure 10-4). At these magnifications, including the highest (40x), no gold was visible in the sulphides. Polished sections are described in Table 9-3.

Table 9-3: Drill core samples from the Pactolus Programme polished section petrological summary.

Sample ID/Hole ID	Depth (m)	Au (g/t)	Description
RG1_DD_PAC2 **DD_PAC_002**	134.3	11.7	Well foliated fine-grained greywacke with crosscutting crenulation cleavage. Sample is cut by quartz-carbonate veins that are subparallel to the crenulation cleavage. Relatively coarse-grained pyrite porphyroblasts (up to 250 µm) and smaller diamond-shaped and acicular arsenopyrite grains (50 µm) are disseminated in the wall rock and along quartz vein margins.
RG2_DD_PAC2 **DD_PAC_002**	136.9	10.3	Foliated and crenulated, fine-grained greywacke cut by deformed quartz veins. Some of the quartz veins are sheared and boudinaged. Fractures in the quartz veins are infilled with later carbonate. The greywacke wall rock contains abundant sulphides dominated by arsenopyrite and lesser pyrite. The sulphides are locally fractured and acicular arsenopyrite grains are typically boudinaged and infilled with quartz.
RG3_DD_PAC1 **DD_PAC_001**	133.5	7.02	Fine grained greywacke cut by deformed quartz veins. The greywacke wall rock contains abundant arsenopyrite and pyrite. Arsenopyrite grains are typically acicular and locally boudinaged. Pyrite grains are more equant and less common.

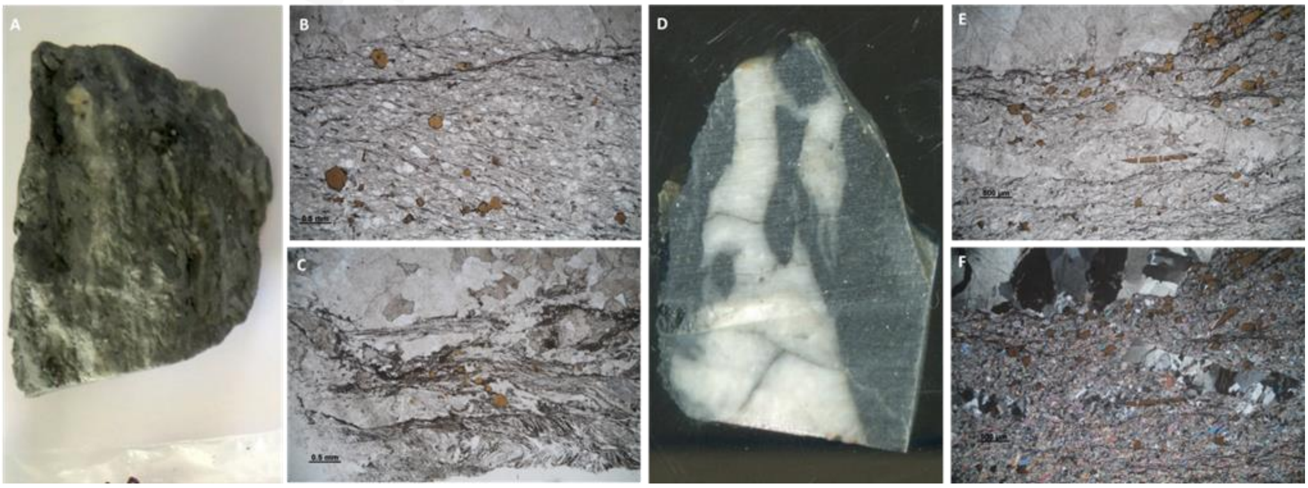


Figure 9-11: Photographs and photomicrographs of the petrology samples. **A.** RG1_DD_PAC2: sample of silicified greywacke with quartz veins, pyrite and arsenopyrite. **B.** Plane polarised light photomicrograph of RG1 exhibiting well foliated greywacke and coarse pyrite porphyroblasts. **C.** Plane polarised light photomicrograph of RG1 illustrating foliated greywacke with crosscutting crenulation cleavage. **D.** RG2_DD_PAC2: sample of sheared, fine-grained greywacke with frequent quartz veins and intense arsenopyrite-pyrite mineralisation on vein selvage. **E.** Plane polarised light photomicrograph of RG2 capturing a quartz vein and fine greywacke with abundant sulphides along the vein selvage. **F.** Same section as E in cross polarised light.

After the samples were examined by optical microscopy, the samples were carbon coated and examined at the University of Otago by field emission gun scanning electron microscopy (FEG-SEM) with electron back scatter diffraction (EBSD). Results indicated mineral associations with Au, which are described in Table 9-4.

Table 9-4: Drill core samples from the Pactolus Programme SEM analysis summary.

Sample ID/Hole ID	Depth (m)	Au (g/t)	SEM Description
RG1_DD_PAC DD_PAC_002	134.3	11.7	Some of the pyrite and arsenopyrite grains are intergrown (Figure 9-12D) and thus appear to be the same generation. Microparticulate Au inclusions occur in both pyrite and arsenopyrite grains with Au blebs up to 13 µm, but more typically ~1 µm (Figure 9-12A–F).
RG2_DD_PAC2 DD_PAC_002	136.9	10.3	Gold blebs up to 12 µm, but more typically 1–3 µm, occur as inclusions in both pyrite and arsenopyrite (Figure 9-13A–F). Rare blebs of free Au occur in one quartz vein associated with arsenopyrite that occurs along the vein margin and locally extends into the vein (Figure 9-13C–D). Pyrite and arsenopyrite are locally intergrown (Figure 9-13B), occur as inclusions in one another (Figure 9-13E) and appear coeval.

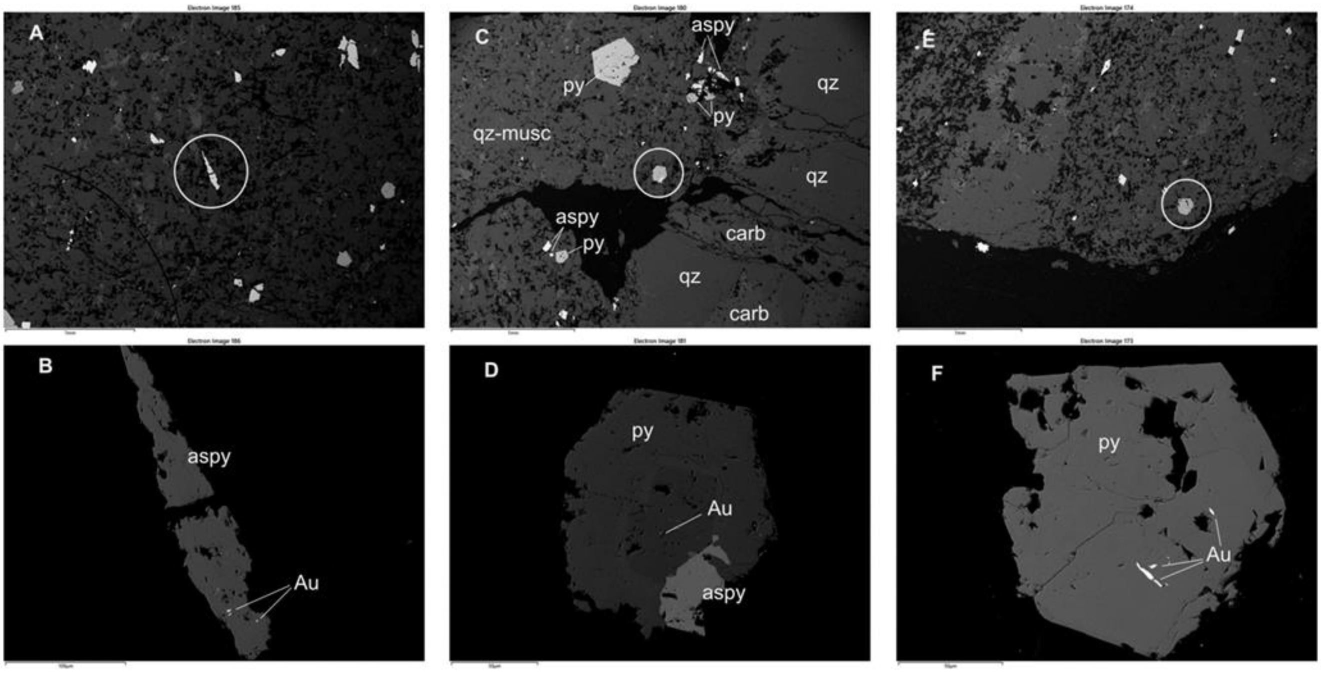


Figure 9-12: RG1_DD_PAC2 135.3 m SEM backscatter images. **A.** Disseminated sulphides in quartz-muscovite (qz-musc)-rich matrix. Arsenopyrite (aspy) appears brighter white than pyrite (py) (grey). **B.** Close-up of arsenopyrite grain, circled in A, with Au blebs up to 5 µm. **C.** Disseminated aspy and py concentrated in the wall rock and along the margin of a quartz-carbonate vein. **D.** Close-up of pyrite grain circled in C. Pyrite and arsenopyrite are intergrown. The pyrite grain is zoned with a 1-µm bleb of Au in the core (darker grey) of the pyrite grain. **E.** Disseminated sulphides in greywacke wall rock cut by relatively sulphide-poor, quartz vein. **F.** Subhedral pyrite grain circled in E. The grain contains several Au inclusions up to 13 µm.

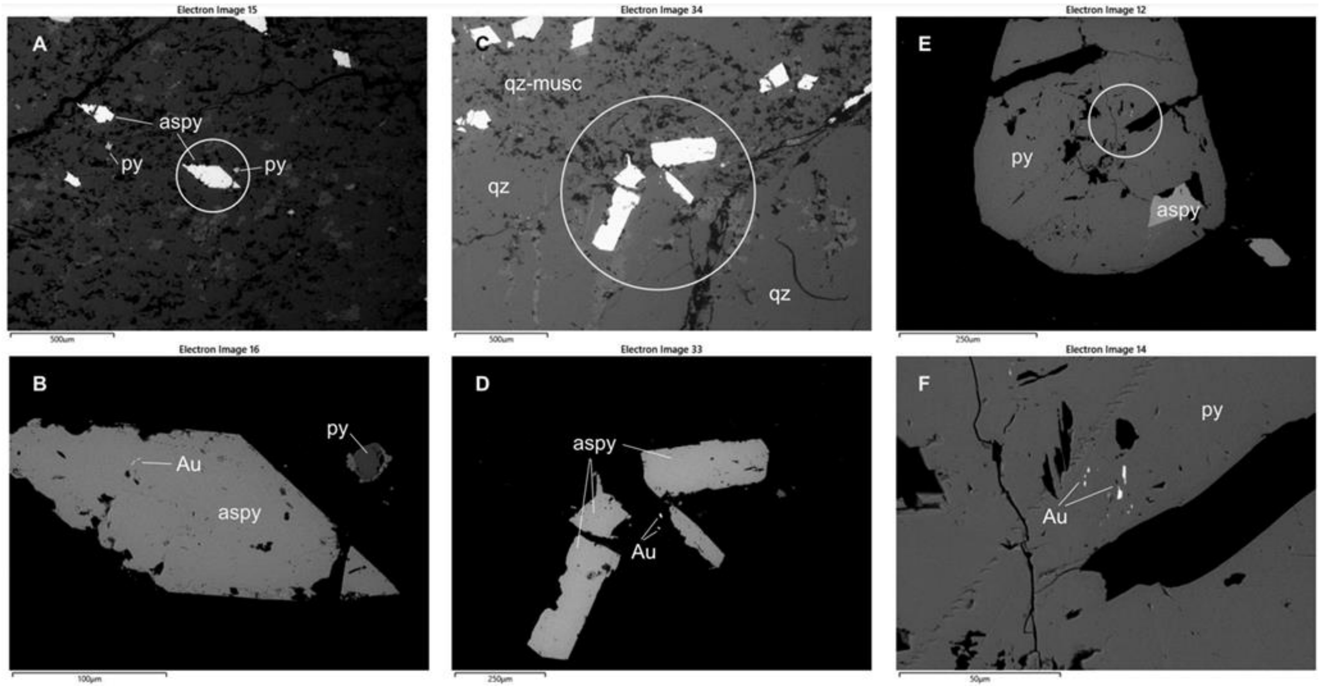


Figure 9-13: RG2_DD_PAC2 136.9 m SEM backscatter images. **A.** Euhedral arsenopyrite (bright white) and pyrite (grey) in a matrix of quartz, muscovite and carbonate. **B.** Close-up of arsenopyrite grain circled in A. Several micron-scale Au blebs in the large grain of arsenopyrite. Smaller grains of arsenopyrite surround and form the rim of a grain of pyrite to the right of the larger grain. **C.** Arsenopyrite grains concentrated along the margin of a quartz vein (lower half of image). Some of the arsenopyrite grains partially extend into the quartz vein. **D.** Close-up of arsenopyrite grains circled in C. Free Au grains up to 12 µm are spatially associated with arsenopyrite, but occur in the quartz vein. **E.** Pyrite grain with an inclusion of arsenopyrite. **F.** Close-up of the core of pyrite grain circled in E, illustrating inclusions of Au up to 3 µm.

Under the higher magnification of the SEM, it is evident that the sulphides in each of the analysed samples are predominantly arsenopyrite, with lesser pyrite. Gold blebs ranging in size from ~1–15 µm were observed as inclusions in sulphides from all the samples and occurred in both arsenopyrite and pyrite. Some rare Au inclusions have been remobilised along fractures within deformed sulphides, but most occur as isolated inclusions within the grains. Free Au is relatively rare but does occur, typically, near the sulphides and as rare, isolated blebs in quartz (e.g. RG2; Figure 9-13).

9.3 Geochemical Sampling

9.3.1 Soil Sampling

As of 8 July 2024, RGL collected 17,259 soil samples (excluding repeat samples). Samples were collected following regional grids at a nominal grid size of 100 m x 20 m, or 200 m x 20 m, or infill grids ranging between 20 m x 10 m and 50 m x 20 m. Soil samples were collected from pits below a depth of 20 cm. Handheld GPS units were used to navigate to sample sites. A spade was used to collect the sample from the C-horizon. A sample of 0.8–1.5 kg was collected in a sampling bag and then stored in calico bags until the end of day.

Geological notes from soil sampling were entered into an SQL database from .csv files, either created while logging in the field, on a portable hand-held personal device, or recorded in field notebooks by hand, and later entered into Excel spreadsheets. Field teams consisted of a geologist and a field technician. Field geologists recorded the following data at each site location: depth, soil horizon sampled, colour and the lithology of any fragments present in the hole, along with any points of interest or notes on why a sample was moved or skipped.

RGL has completed seven regional grids (Capleston, Orlando, Murray Creek, Stony Creek, Raglan, Caledonia, and Bald Hill; Figure 9-14). Infill grids are planned around anomalous zones found in the regional grids. So far, eleven infill grids have been completed (Pactolus Infill, Pactolus East, Pactolus South, Golden Treasure North and South, Golden Fleece, Energetic North, Raglan, Caledonia West, Hopeful, and Stony Creek; Figure 9-14). Samples were moved or skipped if the point was in an alluvial zone (i.e. a river). If there was obvious contamination from historical workings, an auger was used to sample the C-horizon at a greater depth, below the contamination issue (>1.0 m deep).

Samples collected were from the C or B-C soil horizon. The C-horizon is well-developed clay, anywhere between 10–100 cm deep. Where C-horizon clay was not available, the B-C horizon was sampled collecting a mix of clay and soil. The B-horizon (purely soil and organic matter) was not sampled as the sample material dries to such a low weight that it is not feasible to sieve enough of a fine portion for pXRF analysis.

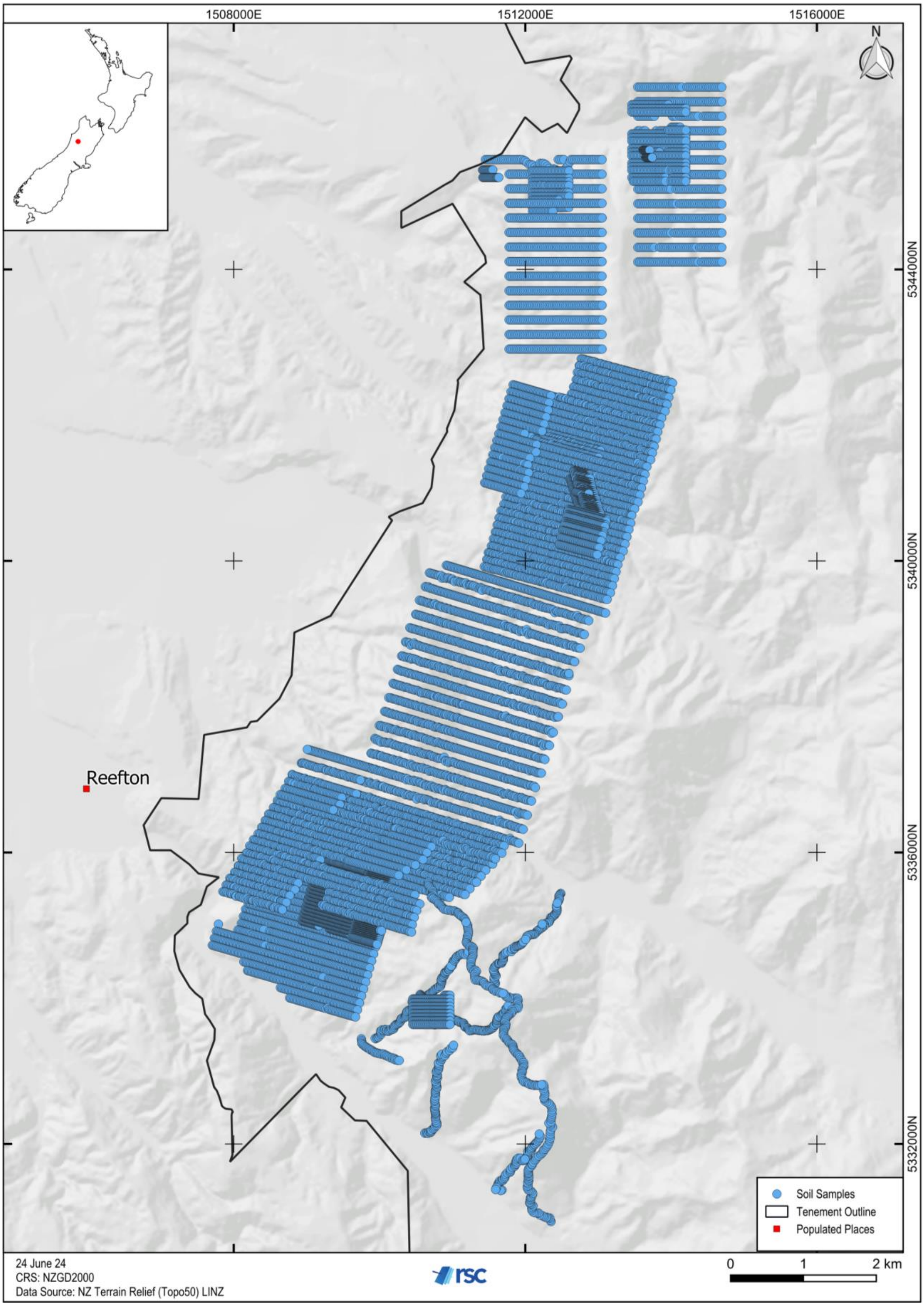
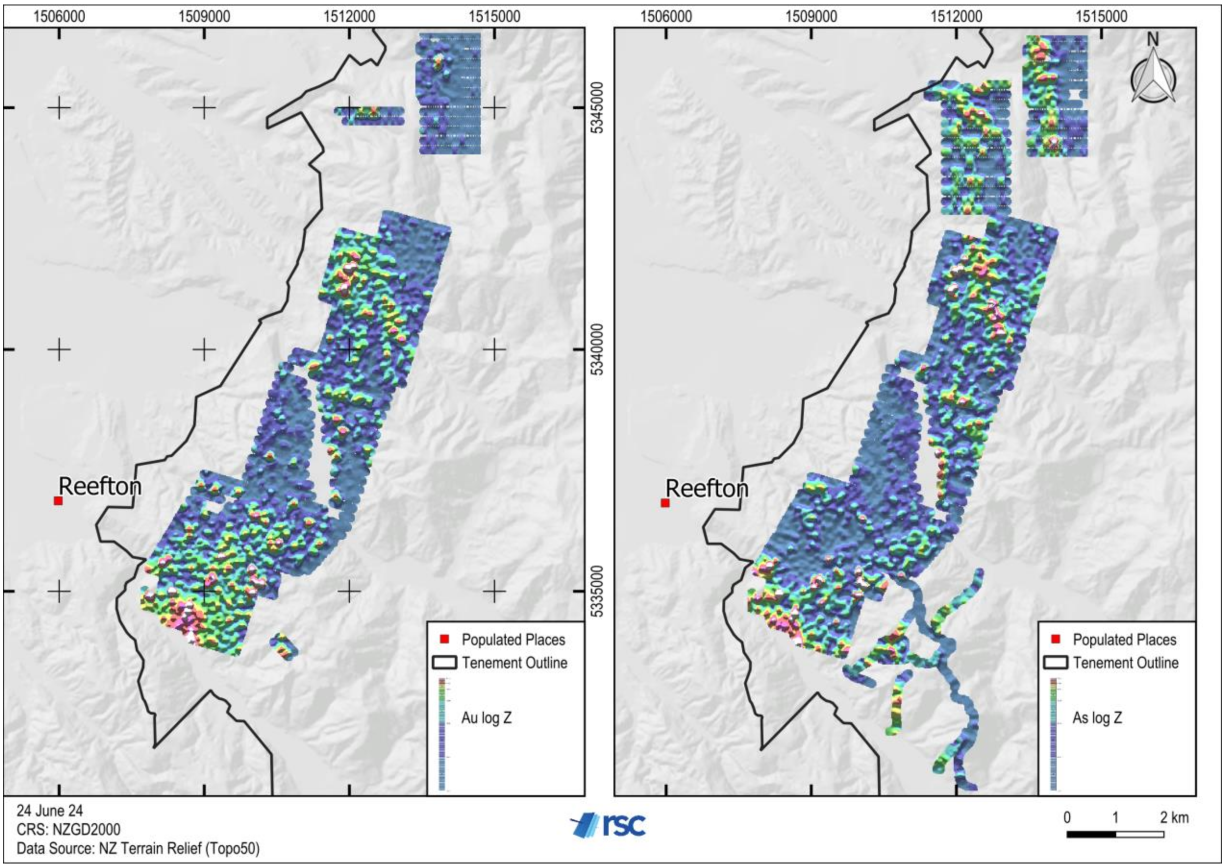


Figure 9-14: RGL soil samples.

RGL has compiled comprehensive geochemical data from the extensive sample grids. Arsenic and stibnite, and to a lesser extent, lead, were used as pathfinder elements to indicate geochemical anomalies that might represent Au mineralisation. Z-score normalisation of the data was performed so that the raw concentrations can be compared in a consistent number space. Figure 9-15 presents two geochemical heatmaps (Au and As), where a number of anomalies can be identified in both maps.

A summary of the soil sampling results for Au, As, Pb, Sb and W is presented in Table 9-5. As of the effective date, 16,456 soil samples (excluding quality control samples) have been analysed by pXRF. Of these, 15,337 returned detectable As, with a mean of 31 ppm and a median grade of 12 ppm. A total of 12,221 samples returned a detectable Au grade from laboratory analysis (section 11.2.2), with a mean of 34.7 ppb and a median grade of 4 ppb.



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CRS: NZGD2000
Data Source: NZ Terrain Relief (Topo50)

Figure 9-15: Geochemical maps from soil sampling. **Left** Au heat map; **Right** As heat map.

Table 9-5: Soil summary results.

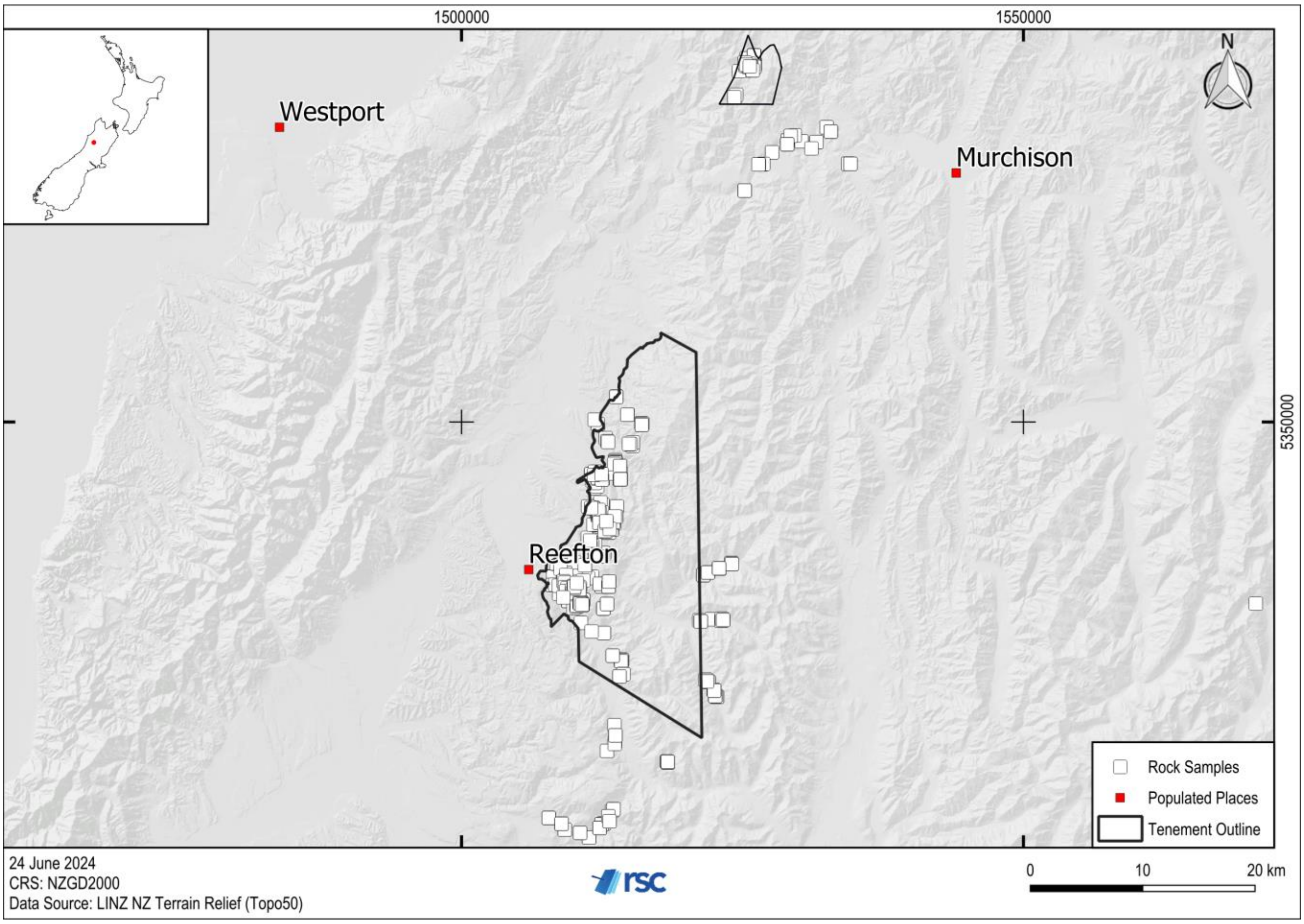
	Au	As	Pb	Sb	W
Analytical Method	Au_TL43	pXRF	pXRF	pXRF	pXRF
Unit	ppb	ppm	ppm	ppm	ppm
No. of Samples Analysed	12,221	16,456	16,456	16,456	16,456
Limit of Quantification	1	2	2	20	20
No. of Samples above LOQ	11,698	15,337	15,674	5,053	5,289
Minimum	1	2	2	18	8
Maximum	32,100	14,458	4,323	5,070	67
Mean	34	31	19	17	3
Median	4	12	13	0	0

Note: Only validated, corrected data were used to inform the summary results.

9.3.2 Rock-Chip Sampling

As of 8 July 2024, RGL has collected 814 rock chip samples (Figure 9-16). Samples are from geological mapping and stream-sediment sampling sites. Rock samples were entered into an SQL database from a .csv file. All samples were photographed and stored in Reefton. Some rock-chip samples were collected for petrology analysis (section 9.2) or kept as reference samples. The remaining samplers were sent to SGS for pulping, then returned and analysed with a pXRF and sent to SGS Waihi for fire assay (Code PRP505).

Due to the obligatory partial tenement relinquishment (a condition of extending the permit duration), some of the samples now lie outside the current property boundaries.



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Data Source: LINZ NZ Terrain Relief (Topo50)

Figure 9-16: Rock sample locations.

The results of the rock-chip sampling programme are summarised in Table 9-6 and Figure 9-17. Four samples returned very high As grades, above 10,000 ppm, which are from the Golden Treasure and Pactolus prospects, and five samples returned very high Sb grades, above 100,000 ppm (10% Sb), which are from the Golden Treasure and Fiery Cross prospects.

Table 9-6: Rock-chip summary results.

	Au	As	Pb	Sb	W
Analytical Method	FAA505	pXRF	pXRF	pXRF	pXRF
No. of Samples Analysed	502	502	502	502	502
LOQ	0.01	2	2	20	20
No. of Samples Analysed LOQ	197	281	364	155	144
Minimum (ppm)	0.01	2	3	28	8
Maximum (ppm)	93.9	16,714	13,682	5,057	112
Mean (ppm)	3.4	46	72	491	19
Median	0.06	17	23	43	13

Note: Only validated, corrected data were used to inform the summary results.

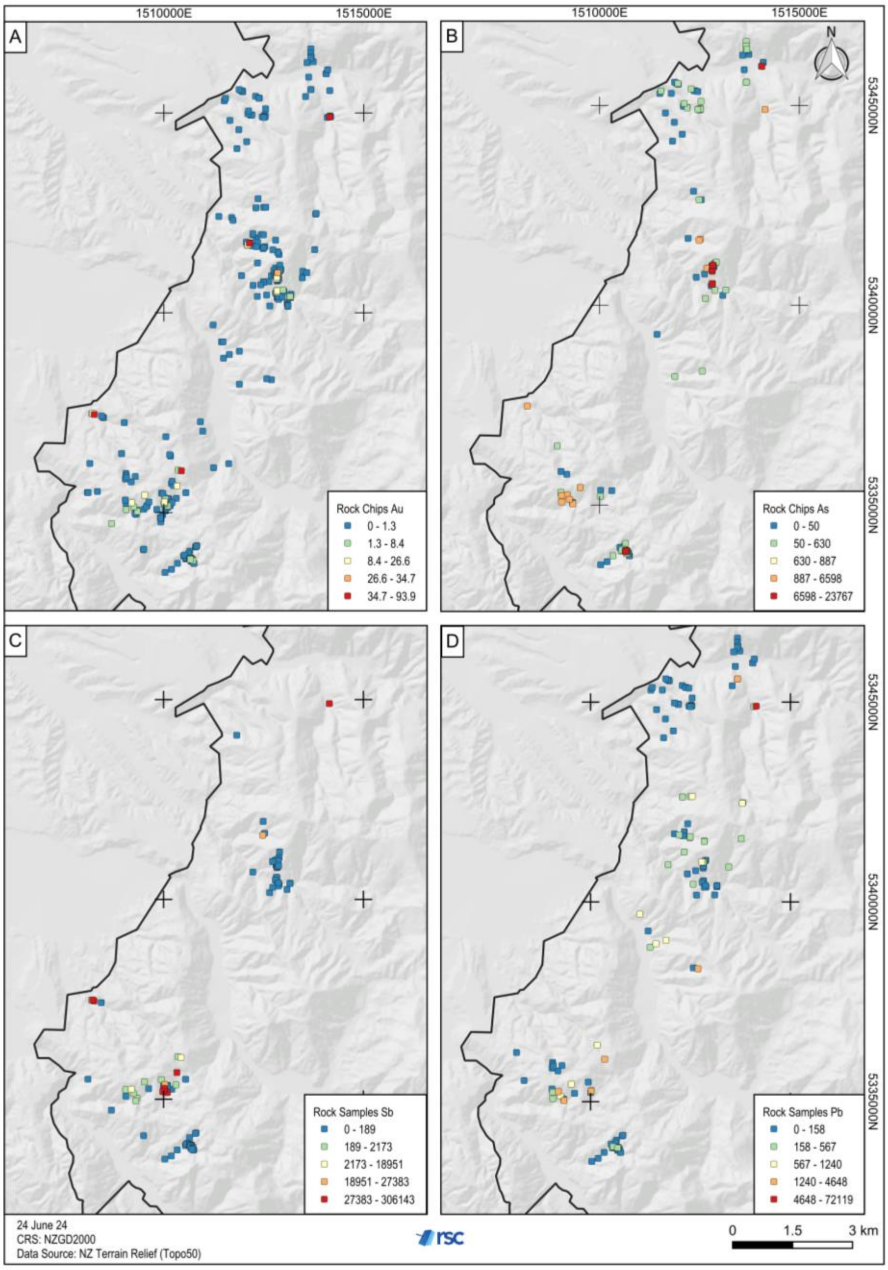


Figure 9-17: Rock-chip sample results for **A.** Au (ppm), **B.** As (ppm), **C.** Sb (ppm), and **D.** Pb (ppm).

9.3.3 Stream-Sediment Sampling

A regional stream-sediment sampling programme was designed and executed to cover a large tract of ground dominated by granitic intrusives, specifically targeting potential intrusive-related Au mineralisation. Sample locations were pre-selected focussing on areas sampled during historical exploration programmes that were not previously analysed for Au and/or ground where trace element geochemistry indicated some anomalism.

The sampling targeted fine sandy/clayey material along active stream margins, where flood waters would deposit residual suspended material along stream bands and mini terraces. Sampling was undertaken over a 30–50 m stretch of each drainage, collecting material where fines had settled. Sediment was sieved and flocculated in the field, and ~2–3 kg of wet fines were collected per site, and transported back to the RGL offices/workshop for further sample preparation and analysis. The samples were analysed using BLEG techniques.

A total of 169 stream-sediment samples have been collected to date (Figure 9-18). Due to the obligatory partial tenement relinquishment (a condition of extending the permit duration), some of the samples now lie outside the current property boundaries.

The results of the stream-sediment sampling programme are summarised in Table 9-7. Only four samples returned detectable grades of Sb and W. Elevated Au grades (>17 pm) correspond to elevated As grades (>45 ppm) in the southwest of the permit, around Stony and Lankey Creeks. Tributaries into the Rip and Tear Creek and the Landing Creek, in the centre of the project, also returned anomalous Pb, Au and Sb grades (Figure 9-5).

Table 9-7: Stream-sediment summary results.

	Au	As	Pb	Sb	W
Analytical Method	Au-AA1	pXRF	pXRF	pXRF	pXRF
No. of Samples Analysed	153	152	152	152	152
LOQ	0.001	2	2	20	20
No. of Samples Analysed LOQ	153	97	152	4	4
Minimum (ppm)	0.1	3	6	26	9
Maximum (ppm)	174	91	59	34	10
Mean (ppm)	3.9	11.6	23	29	9.75
Median	1.1	7	23	29	10

Note: Only validated, corrected data were used to inform the summary results.

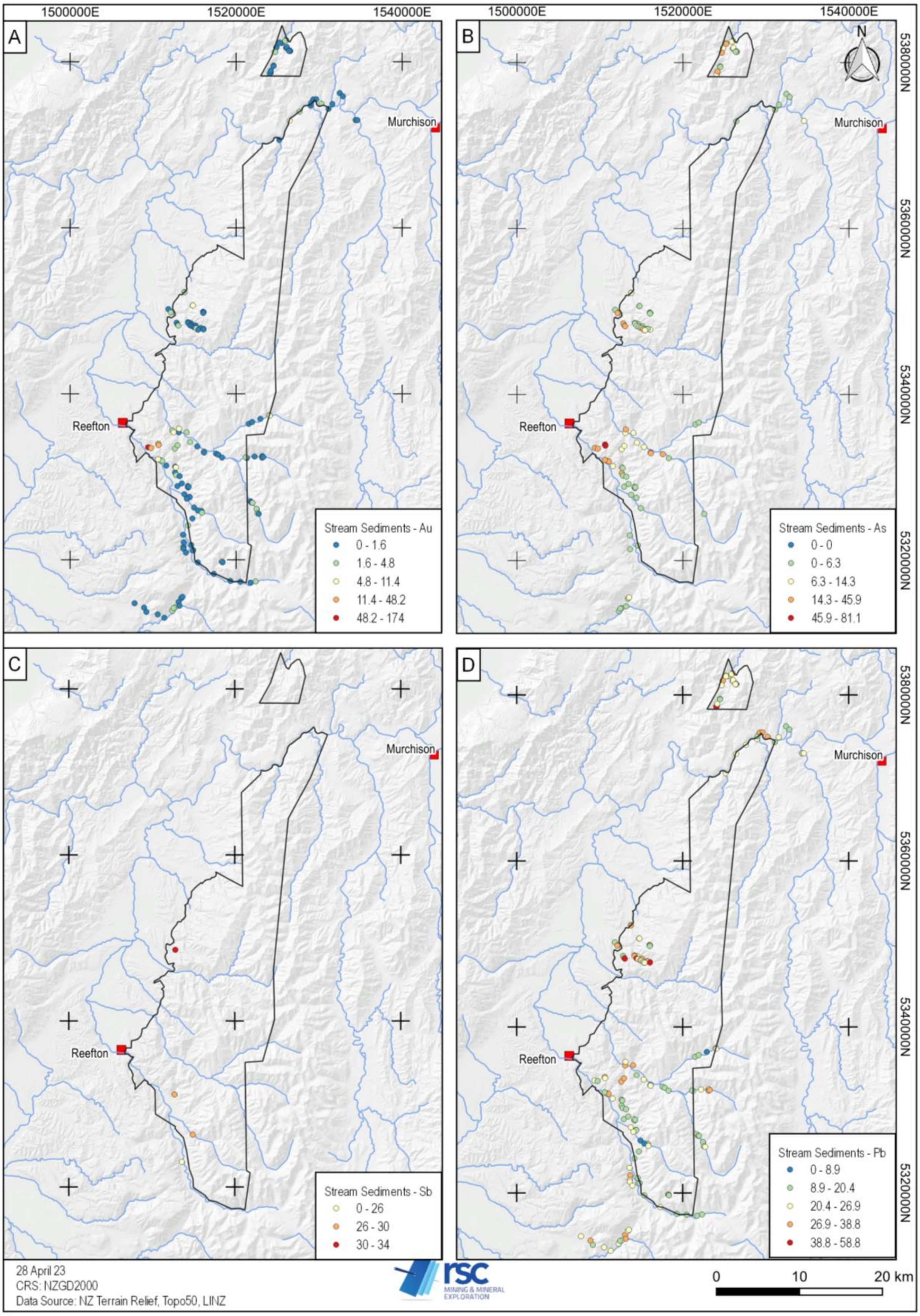


Figure 9-18: Stream-sediment sample locations. **A.** Au (ppm), **B.** As (ppm), **C.** Sb (ppm), and **D.** Pb (ppm).

9.3.4 Channel Sampling

Mineralised veins at Pactolus and Golden Treasure were channel sampled (Table 9-8, Figure 9-19 (Pactolus), and Figure 9-20 (Golden Treasure)). Veins were sampled in 1 m or 0.5 m intervals, depending on the width of the outcrop. Before sampling, outcrops were cleared of debris and alluvial sediments with shovels and hammers to uncover the full extent of the veins. Results of the sampling is presented in Table 9-9.

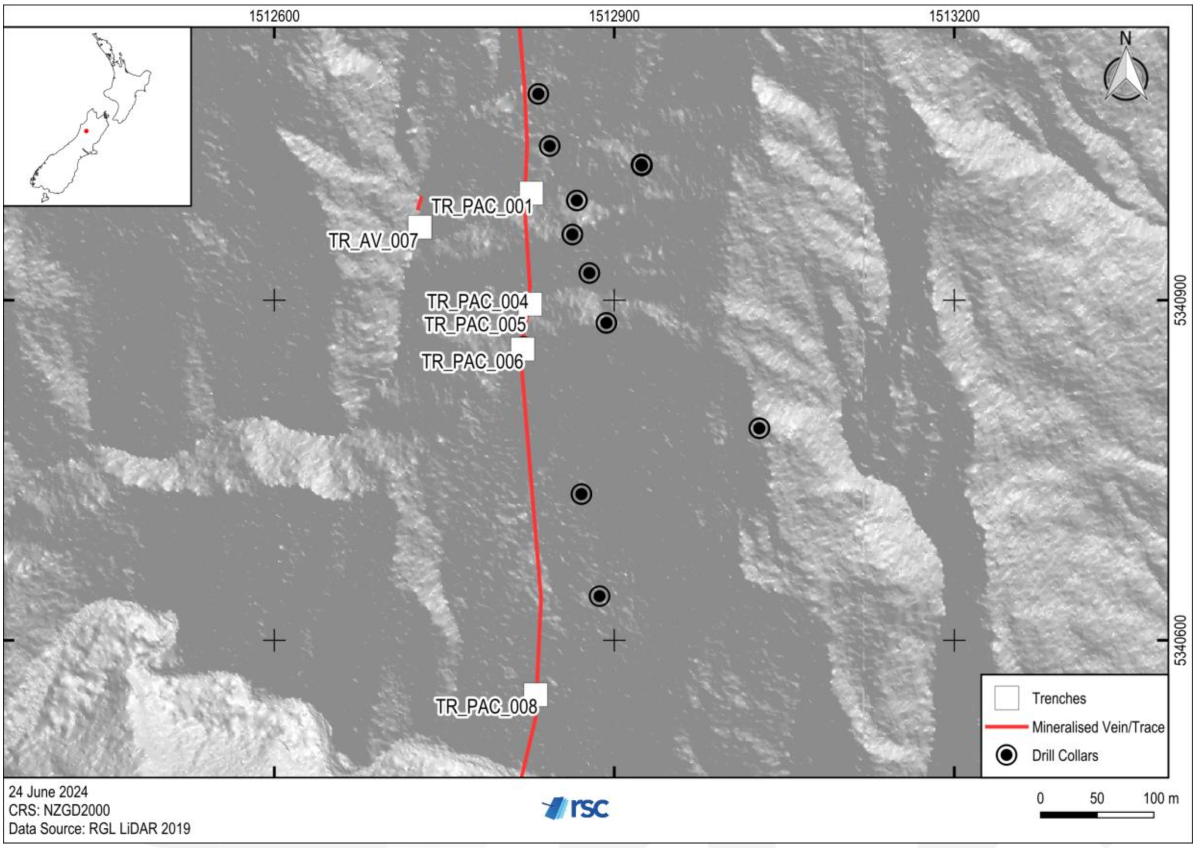
Table 9-8: Channel sample locations at Pactolus and Golden Treasure.

Channel ID	Hole Type	Easting (NZTM)	Northing (NZTM)	Elevation	Length (m)	Azimuth (true)
TR_PAC_001	Trench	1512827	5340994	487	7	340
TR_GT_002	Trench	1510018	5335275	400	3	182
TR_GT_003	Trench	1510016	5335266	400	7	182
TR_PAC_004	Trench	1512826	5340896	474	4	005
TR_PAC_005	Trench	1512826	5340895	474	5	005
TR_PAC_006	Trench	1512820	5340859	475	5	005
TR_PAC_008	Trench	1512831	5340552	329	5	005

Table 9-9: Geochemical results from channel samples at Pactolus and Golden Treasure.

Channel ID	Sample ID	From (m)	To (m)	Au (ppm)	As (ppm)	Sb (ppm)
TR_PAC_001	RC02017	0	1	32.1	5847	46
TR_PAC_001	RC02018	1	2	12.55	2424	36
TR_PAC_001	RC02019	2	3	4.04	7823	68
TR_PAC_001	RC02020	3	4	8.87	9694	49
TR_PAC_001	RC02021	4	5	3.98	15528	122
TR_PAC_001	RC02022	5	6	34.6	366	37
TR_PAC_001	RC02023	6	7	0.11	0	0
TR_GT_002	GERS6024	0	1	5.92	4911	168
TR_GT_002	GERS6025	1	2	4.87	5706	158
TR_GT_002	GERS6026	2	3	0.6	1266	172
TR_GT_003	GERS6027	0	1	10.8	10004	17212
TR_GT_003	GERS6028	1	2	3.66	1369	38173
TR_GT_003	GERS6029	2	3	0.3	375	2130
TR_GT_003	GERS6030	3	4	10.8	850	223

TR_GT_003	GERS5651	4	5	1	280	123
TR_GT_003	GERS5652	5	6	1.49	2153	123
TR_GT_003	GERS5653	6	7	19.8	4465	161
TR_PAC_004	GERS6075	0	1	8.61	9459	0
TR_PAC_004	GERS6076	1	2	10	10644	63
TR_PAC_004	GERS6077	2	3	0.87	2807	38
TR_PAC_004	GERS6078	3	4	3.78	4740	42
TR_PAC_005	GERS6083	0	1	9.53	9314	0
TR_PAC_005	GERS6084	1	2	10.1	12559	50
TR_PAC_005	GERS6085	2	3	14.9	9568	69
TR_PAC_005	GERS6086	3	4	2.99	5434	55
TR_PAC_005	GERS6087	4	5	3.21	4071	32
TR_PAC_006	GERS6088	0	1	10.6	14041	42
TR_PAC_006	GERS6089	1	2	9.52	14655	103
TR_PAC_006	GERS6090	2	3	10.5	16598	71
TR_PAC_006	GERS6091	3	4	17.1	23767	79
TR_PAC_006	GERS6092	4	5	13.4	21207	137
TR_PAC_008	GERS6145	0	1	0.1	330.3	37
TR_PAC_008	GERS6146	1	2	2.12	5567	62
TR_PAC_008	GERS6147	2	3	0.07	388.4	37
TR_PAC_008	GERS6148	3	4	9.44	11619.1	70
TR_PAC_008	GERS6149	4	5	16.1	16122.8	94



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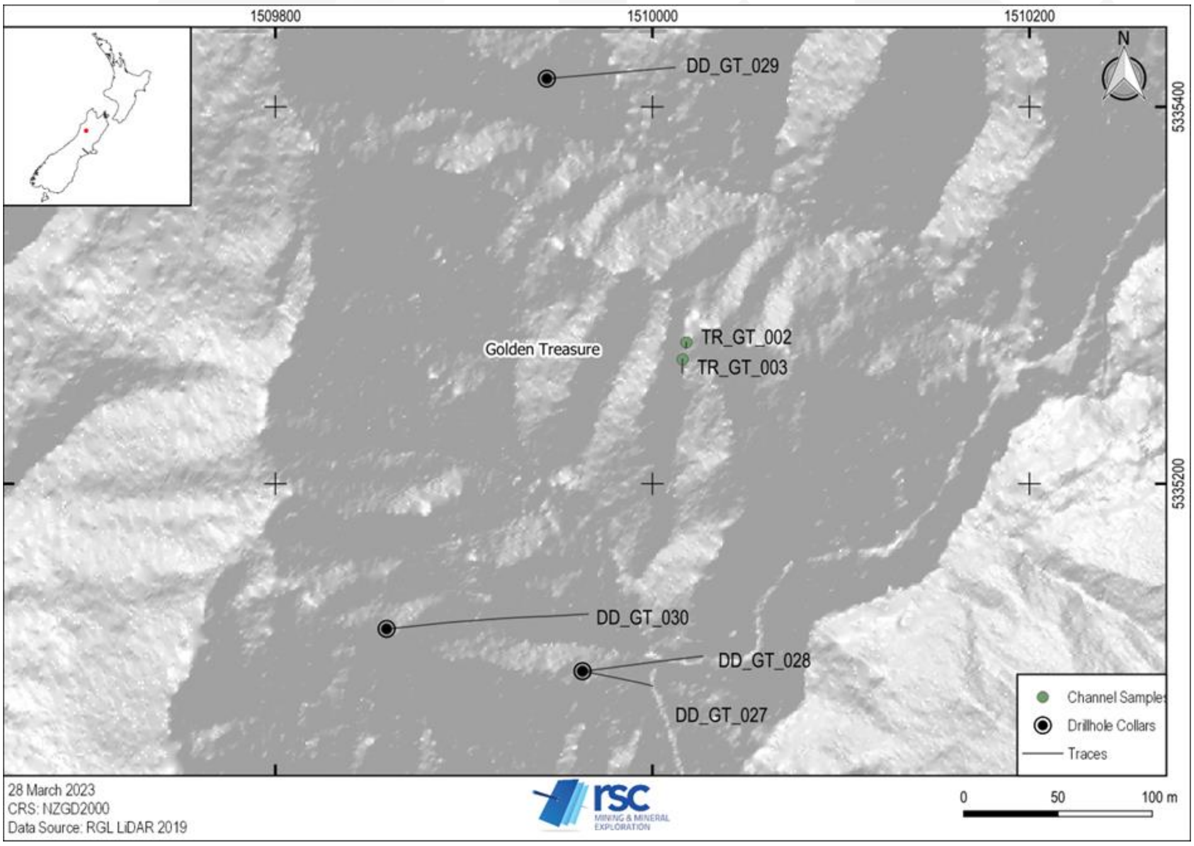
Data Source: RGL LiDAR 2019

Figure 9-19: Location of the trench at Pactolus.



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CRS: NZGD2000
Data Source: RGL LiDAR 2019

Figure 9-20: Location of trenches at Golden Treasure.

9.3.5 Interpretation of the Combined Geochemical Dataset

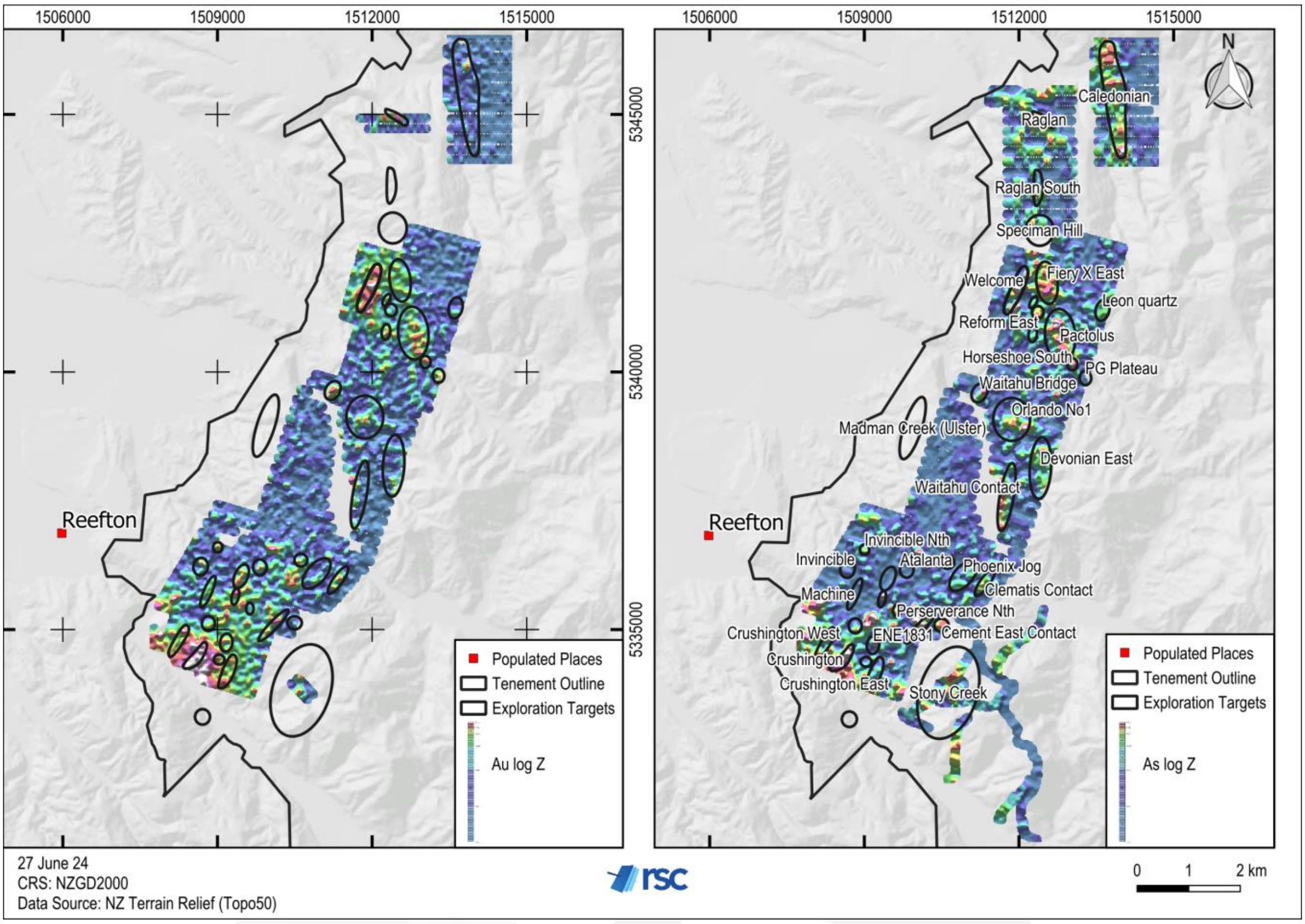
Gold geochemistry has an inherently highly skewed population distribution. To moderate this skewness, RGL used a log z-score levelling algorithm. This algorithm has been used for Au, As, Sb, and W; thereby producing an additive dataset, if geochemical indices are applied.

In addition to using its own internally collected data, RGL used historical soil and wacker soil geochemical datasets accumulated by previous companies. Each dataset was levelled (using the log z-score algorithm) individually prior to combining the data. This removes inconsistencies due to differing detection limits and differing analytical techniques.

The combined geochemical dataset identifies known Au mineralisation within the Reefton Project (i.e. historical mines) and also identifies new soil geochemical anomalies (Figure 9-21). Following the identification of the soil geochemical anomalies, RGL conducted ground-truthing visits, and confirmed these anomalies represent hard-rock Au mineralisation.

A z-score normalisation is implemented by subtracting the mean of any element in a population, and then dividing it by the standard deviation of that element in that same population. A z-score normalisation is mathematically simple: a z-score value of 1 means that the sample is one standard deviation positive from the mean, and a value of -1 indicates one standard deviation negative from the mean. As a result, elements that have different ranges in raw concentrations (potentially orders of magnitude) can be compared in a consistent number space. It also means that z-score values, for multiple elements, can be added together to make poly-element indices, where each element has the same weighting.

Because geochemical data are compositional, and thus typically total 100% [or 1,000,000 parts per million (ppm)], they suffer from a constant sum or closure issue; they are not independent, and consequently, do not naturally inhabit a 'real number' space (Euclidean space) (e.g. Aitchison, 1982; Aitchison, 1986; Aitchison et al., 2000). A CLR transform has been used, which opens the dataset by transforming it, such that the components are no longer dependent in a geometrical sense. It transforms the dataset from a simplex space to an Euclidean space. Assessing the dataset using the CLR-transformed data allows for better insights compared to the raw elemental data, as the CLR values account for variation in the other elements in the sample, rather than just considering a single component, in a compositionally closed space.



27 June 24
CRS: NZGD2000
Data Source: NZ Terrain Relief (Topo50)

Figure 9-21: Geochemical anomalies from levelled Au (left) and As (right) datasets.

9.4 Lithological Classification

The chemistry of pulverised rock-chip, channel, soil (section 9.3), and diamond drill core samples (section 11.2.1) was determined using an Olympus Vanta pXRF instrument. The suite of elements allowed for a number of geochemical and data analysis techniques to be applied, including a principal component analysis. From this work, a classification scheme was built to allow for the discrimination of lithology based on geochemistry (Figure 9-22). The classification scheme was built and validated on drill core data and then applied to soil and wacker data, where it is particularly effective at discriminating mafic dykes within the Greenland Group (Figure 9-23).

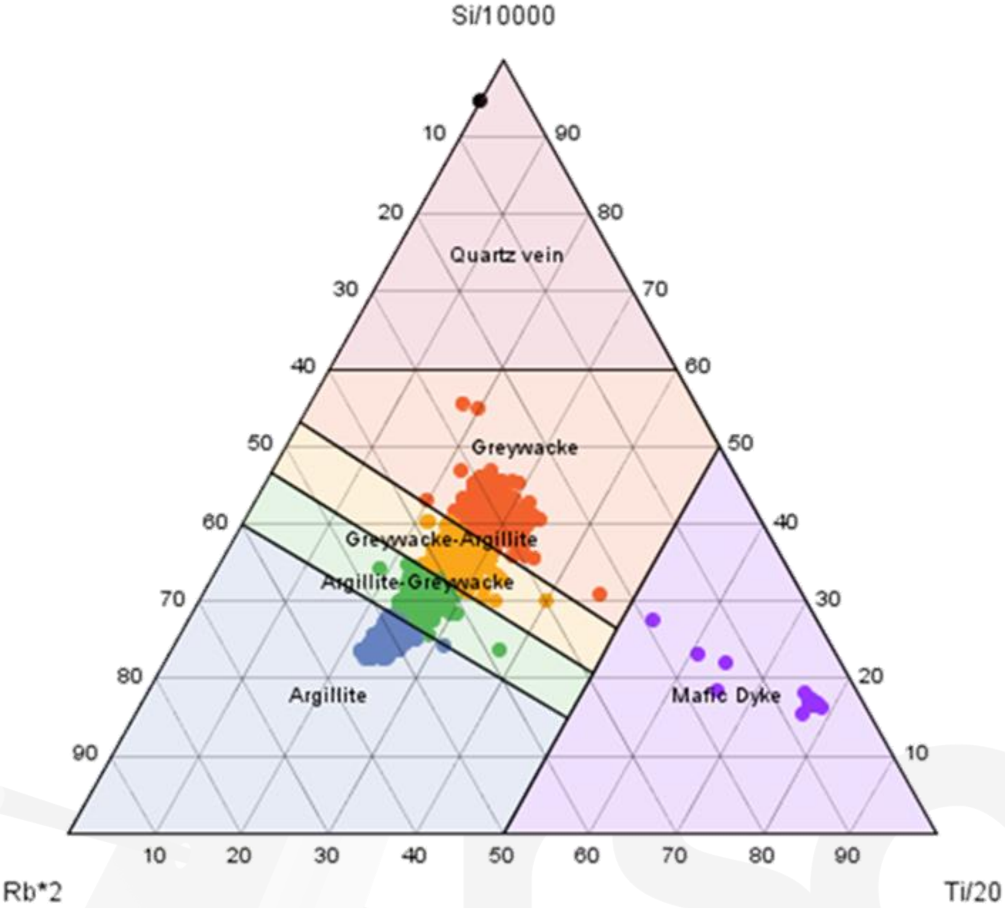


Figure 9-22: Ternary classification diagram of rocks in the Reefton Goldfield.

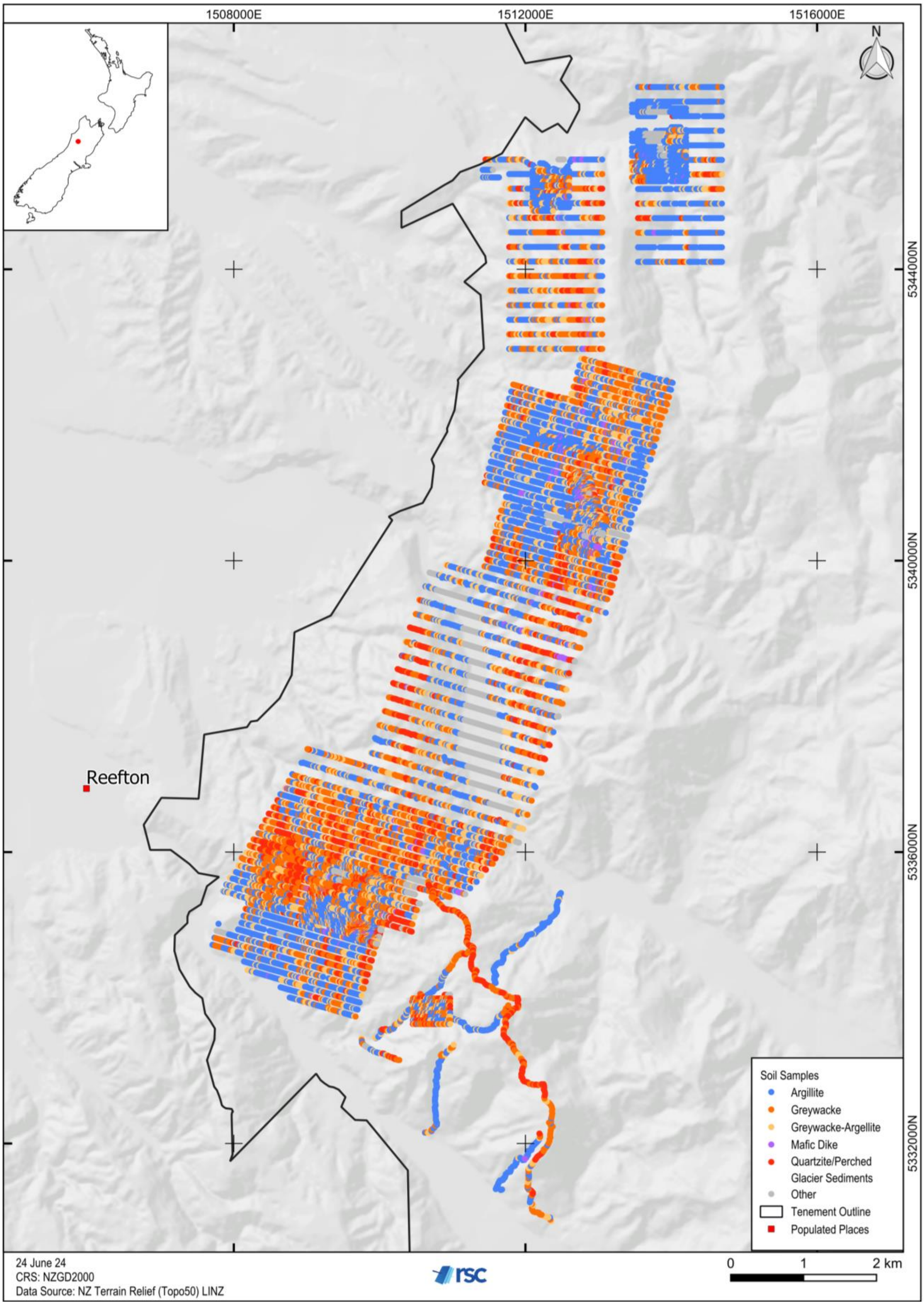


Figure 9-23: Lithology classifications applied to soil samples in the Reefton Project.

9.5 Geophysics

9.5.1 Reprocessing Crown Geophysical Survey Data

As discussed in section 6.2.3.6, the Crown conducted an airborne magnetic and radiometric survey of the West Coast of the South Island (Vidanovich, 2013). The Reefton Goldfield lies within the 'north block' of the survey area.

RGL commissioned Fathom Geophysics (Fathom) to reprocess the raw magnetic and radiometric data to aid in target generation across the goldfield.

Fathom applied four filters to the magnetic data.

- First vertical derivative (1VD): accentuates the shorter wavelength (shallow-source) components at the expense of longer wavelength (deeper) features. Noise is also enhanced in this process.
- Horizontal gradient magnitude (HGM): calculated from the orthogonal x and y derivatives of the magnetic field. The filter highlights the location of contrasts in susceptibility (source body edges), assuming vertical sided sources. However, this filter is not independent of the direction of magnetisation, as is the case for the analytic signal filter. Additionally, the location of a peak (ridge) in the HGM image will be offset in the down-dip direction, if the source body is dipping.
- Analytic signal (ASig): uses the local amplitude of the analytic signal, calculated from the x, y and z derivatives of the grid. The analytic signal peaks over the edges of wide bodies and over the centre of narrow (dyke-like) bodies. Source body edges can be located by tracing the peaks in the analytic signal amplitude. The analytic signal has low sensitivity to remanence.
- Tilt angle filter (tilt): defined as the arctangent of the ratio of the vertical derivative to the horizontal gradient magnitude, of the field. For isolated sources, the tilt angle is positive over the source, crosses through zero at or near the edge of a vertical sided source, and is negative outside the source region. The tilt angle filter is excellent for highlighting structure in magnetic data. It responds equally well to shallow and deep sources.

In addition to the standard suite of filters, Fathom applied a unique method of grid-based, semi-automated structure detection (Figure 9-24). These structure detection filters employ an edge detection filter that differs from conventional filters, in that the results obtained are a measure of asymmetry regardless of amplitude. This methodology means that structures in areas of low contrast are highlighted just as well as those in areas of high contrast, as long as the frequency range of the structures being extracted is present (where frequency correlates with scale, and to a large degree with depth). This additional processing is important for areas where structures separate lithological units, exhibiting similar magnetic properties, and where the strength of the magnetic responses are very subtle.

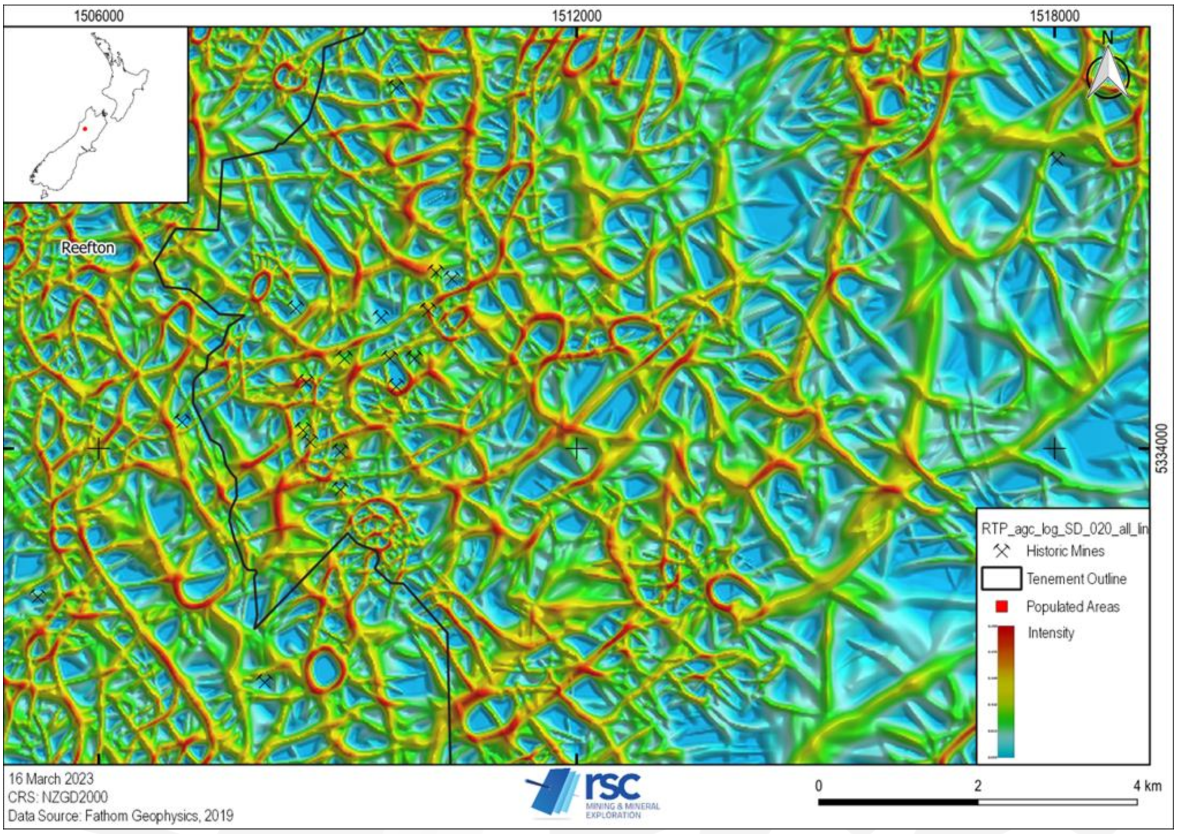


Figure 9-24: Structural complexity from the reprocessed Vidanovich, 2013 data.

9.5.2 Ground Geophysics

In August 2019, RGL engaged PGC Geophysics to conduct a resistivity and induced-polarisation survey at the Crushington prospect. The objective of the survey was to map any disseminated sulphides associated with quartz veins. Both the chargeability signature of any disseminated sulphides and any resistivity low associated with the weathered quartz veins were envisaged to be subtle.

The survey was designed to cover the area with a 3D survey block. Two deeper looking lines were included to map any deeper sources that could cause edge effects in the 3D processing. The 3D survey consisted of a series of 2D lines of 64 electrodes at a spacing of 5 m, and the deeper looking lines consisted of 64 electrodes at a spacing of 10 m.

A total of 11 resistivity/induced polarisation (Res/IP) lines were acquired at the Crushington prospect, a summary of which is provided in Table 9-10. Of those, nine were acquired with 5-m electrode separation, forming the main 3D block, and two with 10-m electrode separation. The two lines, with the longer electrode separation, were extensions of 1001 and 1008 and the electrode separation, 10 or 05, was added to the line number for identification. One line, 101199, was a repeat of 1011 for data quality and verification. All lines were typically east-trending cross the slope, as the dominant geological trend is north-south.

The eight unique lines with 5-m electrode spacing were processed first as individual lines (2D) then as a group (3D). Lines 100110 and 100810 were processed as individual lines. As line 101199 was used for data quality and verification only, it was not included in the final processing. Due to the severe and steep undulation of the survey area and thick vegetation, line cutting was extremely difficult. The severity of the topography caused issues in line cutting, which explains the layout of these Res/IP lines (Figure 9-25).

Table 9-10: Summary of Resistivity/IP survey lines. All measurements were acquired with full power settings (600V, 2.5A and up to 250W).

Line	Date	Electrode Spacing (m)	Array Length (m)	Readings (Tx/Rx)
100105	25/08/2019	5	235	180/1477
100110	25/08/2019	10	630	180/1477
1003	26/08/2019	5	235	180/1477
1004	18/08/2019	5	235	180/1477
1005	19/08/2019	5	235	180/1477
1006	26/08/2019	5	235	180/1477
100805	17/08/2019	5	235	180/1477
100810	16/08/2019	10	630	180/1477
1009	24/08/2019	5	235	180/1477
1011	19/08/2019	5	235	180/1477
101199	25/08/2019	5	235	180/1477

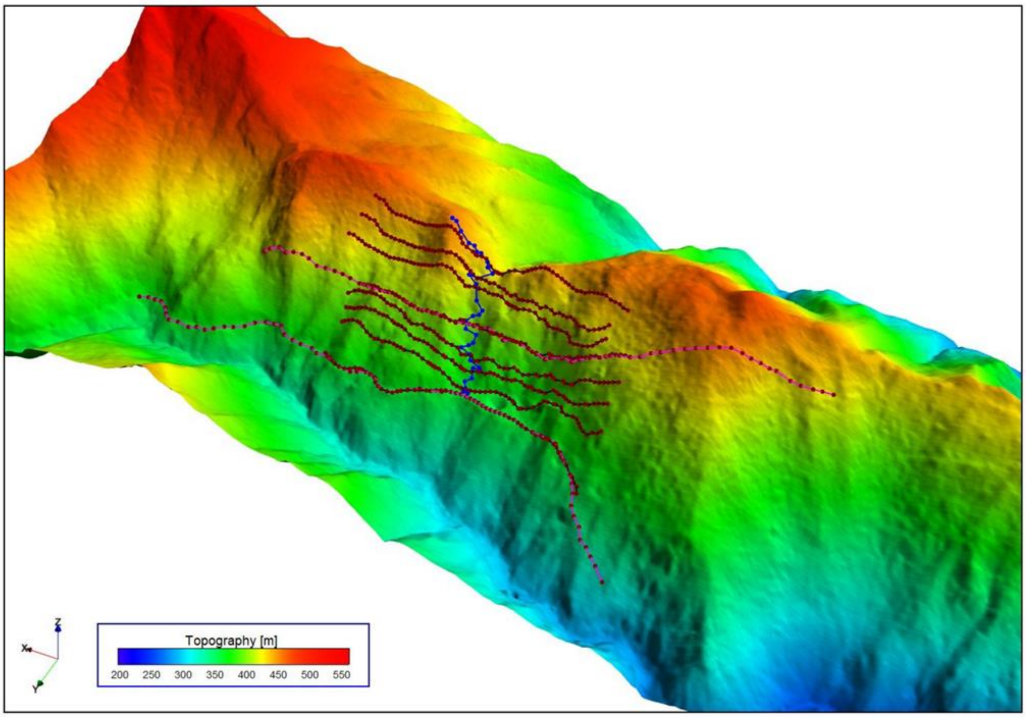


Figure 9-25: 3D perspective view of the IP survey area, viewed from the northwest. Digital terrain model generated from LiDAR data. Blue line represents a steep track from Energetic picnic area to the ridge.

The instrument for the IP survey was an ABEM Terrameter LS2, which is an integrated transmitter/receiver/switching relay unit. The ERI survey equipment consists of multichannel cables (on reels), 300-mm stainless-steel electrodes, and jumper cables connected the cables with those electrodes. The main relay unit sits between the two multi-channel cables and is powered by deep-cycle 12 V batteries. Multiple gradient arrays were applied to all lines to increase the data resolution and effectiveness of this survey. The measurement sequence (protocols) was customised for this survey and, as an additional step, the protocol was re-arranged with an in-house optimising software, to minimise the effects of the common charge-up effects at electrodes (Palmer, 2019).

The 3D survey block consists of all lines with 5-m electrode spacing. Several approaches to 3D inversion were trialled. The final 3D inversion was based on linear perturbation with a separate damping of 0.01.

Figure 9-26 presents the model of chargeability for the main 3D block, viewed from the south, looking into the plane of the hill and presented as a set of isosurfaces. The model also incorporates legacy drilling data from the Crushington holes completed by OceanaGold. The drillholes have been colour coded to the assay results of Au. Although the isosurfaces extend to great depths, only the upper 50 m should be considered relevant.

The chargeability isosurfaces reveal one main anomalous zone in the centre of the survey area (Figure 9-26, Figure 9-27). The chargeability values are not very high, but the anomalous zones range from 8–11 mV/V, compared to a background of 4 mV/V. There is another anomaly at the western end of the survey area, but it does not fully extend to the southern end of the volume (Palmer, 2019).

The model of resistivity is presented as isosurfaces in Figure 9-26. The model indicates a wider resistivity low in the middle of the survey area, represented as a dome-shaped darker blue isosurface. By comparing the resistivity and changeability models in an interactive 3D viewer, the main chargeability feature is located at the eastern end of this resistivity low ‘dome’ like feature. The resistivity low ‘dome’ and the chargeability features do not trend in the same direction, and the chargeability features do not extend fully through the model, possibly indicating a fault. Further 3D studies and correlating these studies with drillhole data may help define any faults, if present.

Correlating the Au results from RDD0048 with the chargeability results suggests that the main chargeability volume is between the two sections of Au grades. This implies wall-rock alteration around a vein (possibly disseminated pyrite), and that the edges of the chargeability volume are areas of interest with respect to Au mineralisation. Wall-rock alteration is noted in RDD0053, although this drillhole is ~25 m south of the edge of the grid.

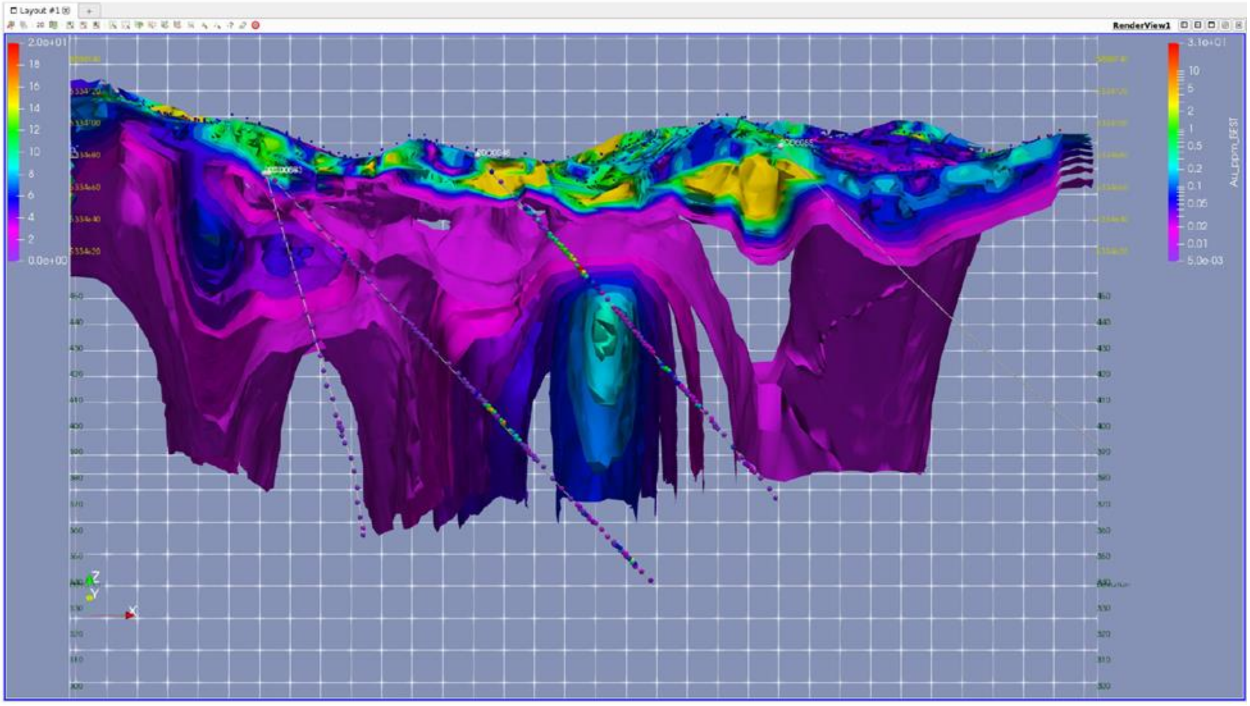


Figure 9-26: 3D view of the main 3D block, viewed from the south. Layers (isosurfaces) are of chargeability values with the colour legend in the top left corner. Also included are a few drillholes and their assay results. The colour legend for the assay results is in the top right corner.

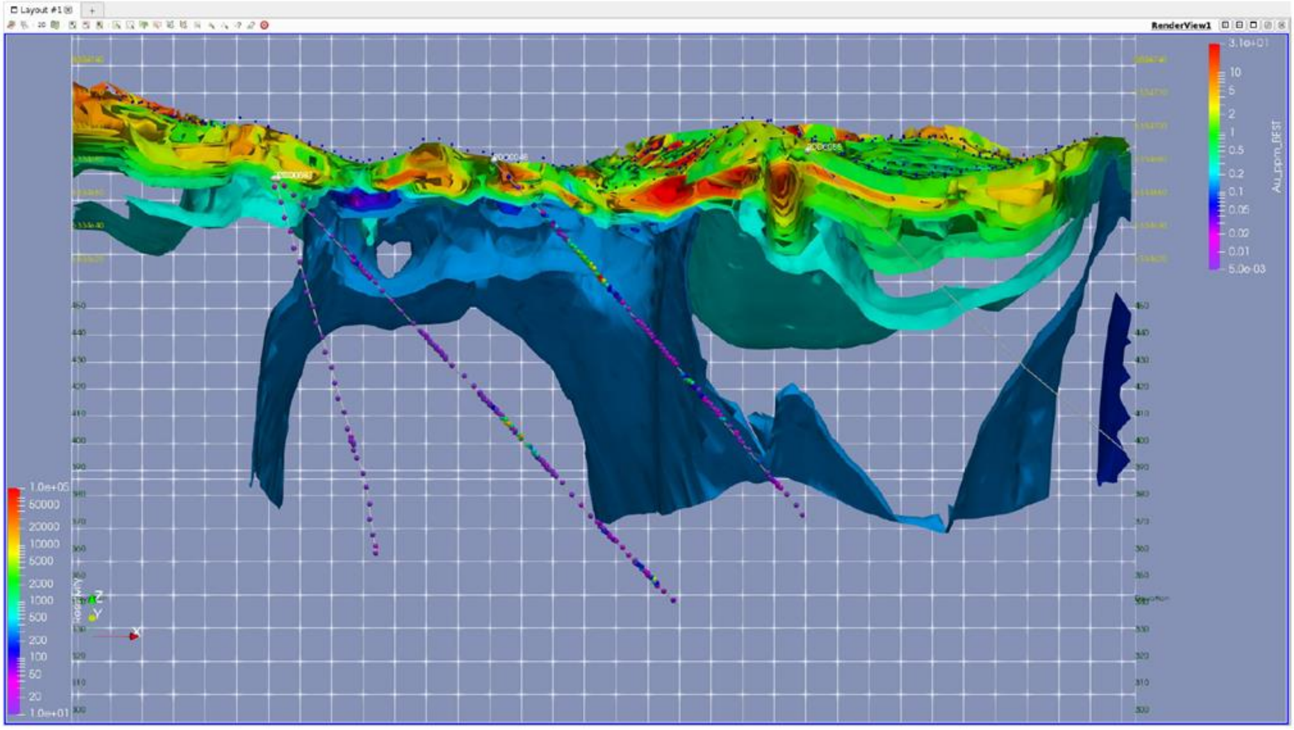


Figure 9-27: 3D view of the main 3D block, viewed from the south. Layers (isosurfaces) are of resistivity values with the colour legend in the top left corner. Also included are a few drillholes and their assay results. The colour legend for the assay results is in the top right corner.

9.5.3 UAV Programme

In 2021, RGL invested in a drone system capable of acquiring unmanned aerial vehicle (UAV) geophysical and remote imaging datasets, in particular magnetic, photogrammetry and LiDAR data. RGL owns a DJI Matrice 300 Drone for UAV operations, a Geometrics MagArrow magnetometer for acquiring magnetic anomaly data sets, and a DJI Zenmuse LI LiDAR system with a DJI D-RTK Base Station 2 base station. The steep terrain around Reefton, and across the property, makes UAV operations an ideal solution for collecting good-quality geophysical data in challenging terrain.

RGL acquired three magnetic anomaly datasets over sites of interest within EP 60491 (Capleston, Murray Creek, Crushington; Figure 9-28), and one in EP 60624 (Raglan, Figure 9-29). The aim of these datasets was to support the interpretation of the structural framework of the property, in particular to understand the relationship between the structural and mineralisation around magnetic intrusive features in the region. For mission design and execution, RGL used UgCS Expert software and to Oasis Montaj to pre-process the magnetic anomaly dataset. Fathom Geophysics was commissioned to provide support and high-level processing of these data. The data were collected at 30-m line spacing, and the drone was flown between 20 m and 50 m above the canopy. Although data collection, and particularly drone height, could be optimised for depth of target magnetic anomaly, the risk of anomalously tall trees along the flight path meant restricting the altitude of the drone to a safe height.

Magnetic anomaly pre-processing included correcting the data for diurnal magnetic variability and cropping the data to relevant areas, while the processing steps included a 1D Forward Fourier Transform, reduction of the data to pole and levelling. Once gridded, the data were smoothed and refiltered to remove corrugations.

The equipment used to carry out the survey consisted of the following.

- DJI Matrice 300 RTK drone: with an autonomy of 35 minutes, while carrying a 1-kg payload, and the total capacity of lifting up to 9 kg. The dimensions of the drone, propellers excluded, are 810 mm × 670 mm × 430 mm (unfolded) and 430 mm × 420 mm × 430 mm (folded).
- Geometrics MagArrow: a laser pumped caesium vapour (C2133 non-radioactive) total field scalar magnetometer of 1 kg weight and 1 m length, tethered 2.7 m below the drone (Figure 9-28a). The MagArrow takes 1,000 readings every second while the drone follows the flight time and tie line paths. This magnetometer was equipped with a GPS, enabling the recording of time, location, and magnetic field readings.
- Static base station magnetometer: in order to monitor the diurnal variations in the Earth's magnetic field, a rapid-cycling GEM Overhauser, proton precession magnetometer was set up to take autonomous readings every three seconds (Figure 9-28b). These variations were subsequently removed from the field data.

The MagArrow was set to UTC (Universal Time Coordinated), whereas the base station was set to NZT (New Zealand Standard Time). Magnetometers and survey specifications are outlined in Table 9-11.

The data were collected in geodetic coordinates (latitude and longitude) using WGS84 (version G2139), and later converted to the NZTM2000 projection.

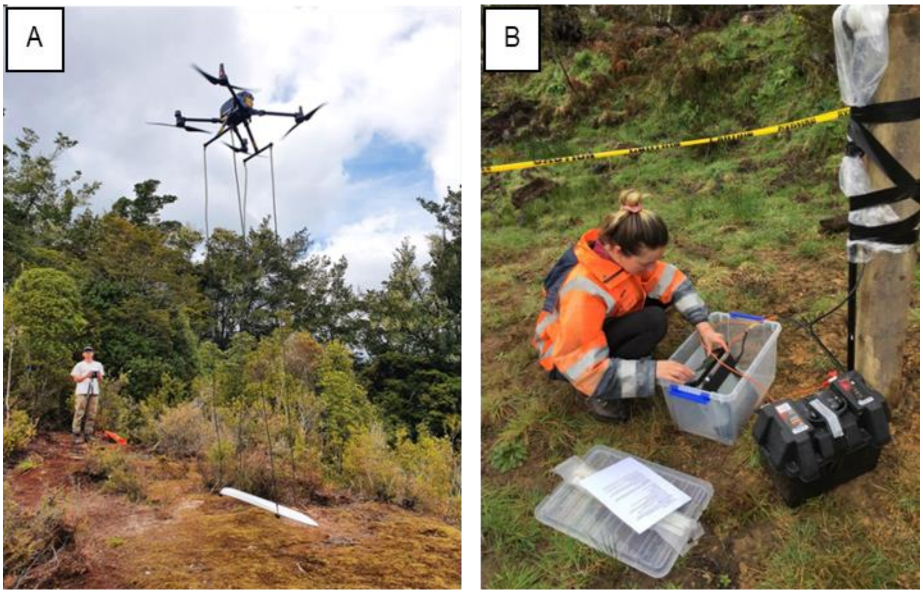
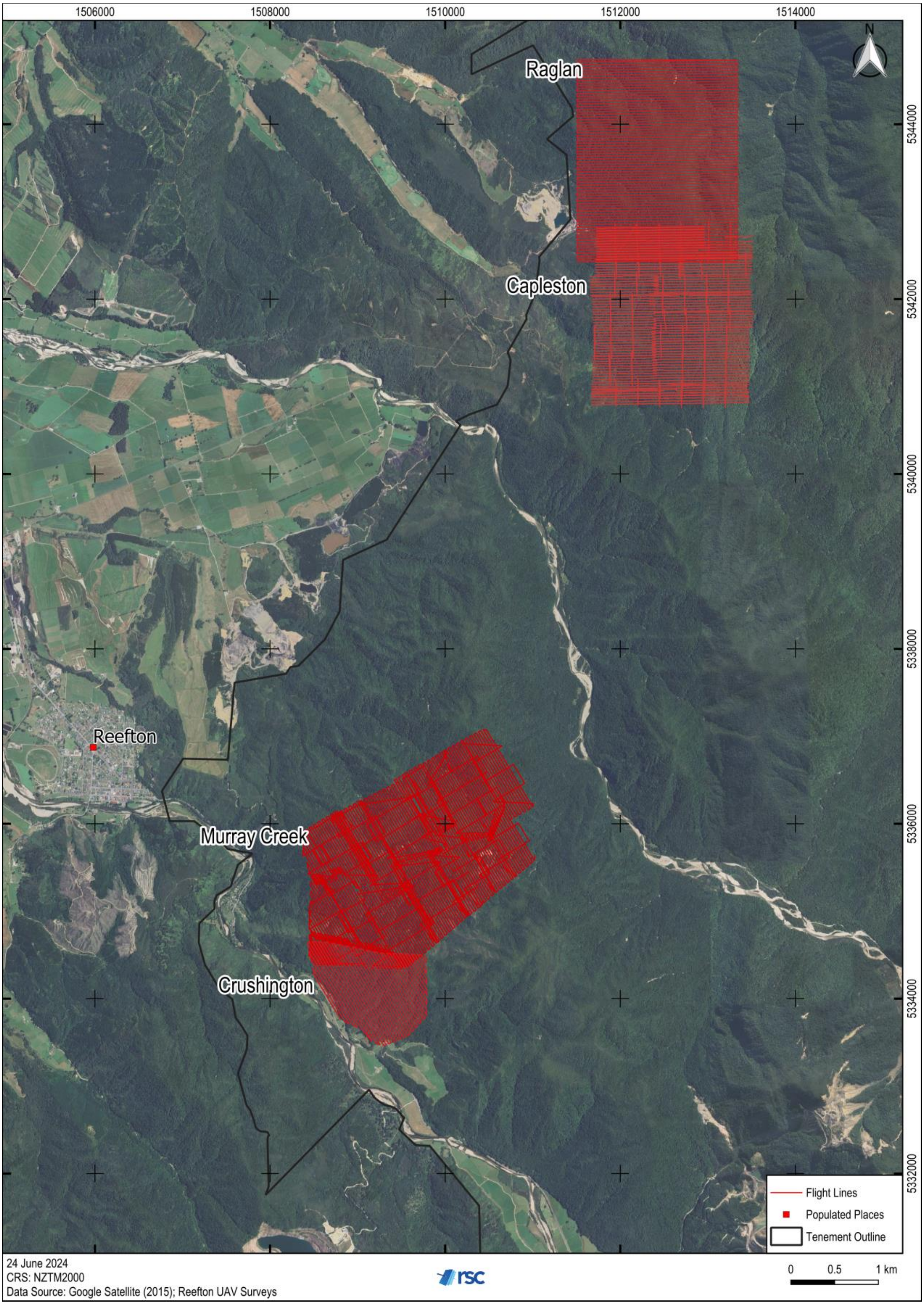


Figure 9-28: Photographs of the UAV surveying process. **A.** UAS with the DJI M300 drone and the MagArrow magnetometer. **B.** GEM Overhauser magnetometer in a typical base station configuration.

Table 9-11: Magnetometer and survey specifications.

Survey	Details	Survey Specifications
UAV Magnetic Survey Specifications	Permit	EP 60491 Capleston
	Date	21 October 2021 to 18 February 2022
	Survey Number	2
	Line Orientation	N90E (Capleston) N150E (Murray Creek)
	Line Spacing	30 m
	Number of Lines	160 FL 64 TL (Capleston) 279 FL 63 TL (Murray Creek)
	Length of Lines	196 km (Capleston) 241 km (Murray Creek)
Base Magnetometer Survey Specifications	Survey Mode	Base
	Datum	57,500 nT
	Time	Synced with roving
	File	01survey.b
	Cycling	3.0 second cycling time
	Turning	Tune initialise N Autotune Y 57.4 microT
	AC Filter	60 Hz
	Display Mode	Text
	Text	N/A
	ID	1
MagArrow Survey Specifications	Type of Magnetometer	Laser pump caesium vapour (C2133 non-radioactive) total field scalar
	Sample Rate	1,000 Hz
	GPS Pulse	1 PPS
	Time	UTC
	Data Storage	32 GB Micro SD card, U3 speed class
	Altitude (above ground level)	57.3 m
	Speed	4 m/s
	Altitude (above ground level)	60 m
	Maximum Flight Time (with load)	35 min



24 June 2024
CRS: NZTM2000
Data Source: Google Satellite (2015); Reefton UAV Surveys

Figure 9-29: UAV survey area map, illustrating flight line paths.

9.5.4 Results and Interpretation

Reprocessing of the Crown's geophysical survey for RGL by Fathom Geophysics (see section 6.2.3.6), in combination with RGL's ultra-detailed unmanned aerial vehicle (UAV) magnetic data, has resulted in a number of new filtered images and vector files, which have been used to infer a number of geological features on a regional scale.

Fathom Geophysics developed a method of grid-based, semi-automated structure detection (Figure 9-24). The goal in developing structure detection was to move towards an automated interpretation of potential field data, that would be most similar to an interpretation by a person. Structure detection is a phase congruency algorithm based on oriented exponential filters (Kovesi, 1999).

The structure detection filter is a feature-detection algorithm used to highlight ridges, valleys or edges in gridded data. The results differ from other feature-detection routines in that the results are a measure of symmetry or asymmetry, irrespective of amplitude. The analysis is completed using the local phase rather than the signal amplitude, meaning that features in areas of low contrast are highlighted just as well as those in areas of high contrast, as long as the frequencies are present. High values in the structure grid indicate that the structure is close to a step edge. A small step change will have a higher value than a higher amplitude change that is more gradual.

The method is also multi-scale by design. For structures to be highlighted, they must be present at more than one scale, eliminating minor edges that may be present over a narrow frequency range. The use of exponential filters to determine the scale allows for some inference as to the depth of the structures detected, when the filter is applied to potential field data. The reported wavelength is the shallowest upward continuation level used, and the approximate depth should range between 0.5 and 1 times this wavelength. This depth estimate is based on Jacobsen (1987). While not perfect at separating sources from different depths, the method provides a good first-pass estimate of which features extend to depth, and which are only surficial.

Feature detection filters can be applied in various orientations, allowing the quantification of the major structural orientations in a belt. It is also used to highlight features with certain orientations, or that are parallel or perpendicular/oblique to a feature of interest.

The Crown aeromagnetic data were run through the structure detection routine using different starting wavelengths. The results using 320 m as the starting wavelength was found to be useful for highlighting deep-seated structural corridors, which have the potential of being pathways for deep-sourced mineralising fluids. It is difficult to map these corridors using the original RTP data as their presence is masked by the strong amplitude and high-frequency variations present in the data.

In addition to deep-seated structures, the structure detection routine was run using small starting wavelengths (20 m and 40 m) and outputted as orientation grids. The resultant grid provides a distribution of edges categorised by their dominant strike. When imaged, these data provide a noticeably clear representation of the dominant trends and orientations across the data, particularly the domaining of folds (axes, limbs) and fold closures. Breaks in the fold patterns or changes in fold intensity are known foci of mineralisation within the Reefton Goldfield (Allibone, 2010; Allibone, et al., 2020).

Basic dolerite dykes are a key unit in the Project area, and the distribution of these is important for ongoing exploration. The dykes are potential proxies for faults, which may have been fluid conduits during mineralisation, as dykes often take advantage of pre-existing crustal weaknesses during their formation. As the intrusion of the dykes appears to be pre- or syn-mineralisation, they become important proxies for structural controls on mineralisation.

The dykes have a distinctive magnetic signature (moderate to strong amplitude, high frequency), which can be recognised in the aeromagnetic data and enhanced using custom-designed filtering. The magnetic data were filtered to keep only the shallow (high-frequency) component of the signal by using the differential upward continuation method. Separation filtering using differential upward continuation can be used to approximate the magnetic response, arising from different depth intervals, below the surface. Complete separation of responses is not possible; however, the method is useful for discerning 'shallow' from 'deep' sources. In effect, band-pass filters (with a physical meaning) are being applied to the data. In this case, a shallow (0–160 m) residual was taken.

To further enhance the dolerite dykes, an additional filtering routine was applied to the residual RTP grid. The '1vd-h' filter is simply the difference between the first vertical derivative and the horizontal gradient magnitude of the input grid. This filtering enhances the high-frequency component of the signal; emphasising detail and highly magnetic near-surface sources. Further refinement of the resulting image was needed, as it was established that the filtering was also highlighting drainages. The river systems in the area contain alluvial boulders of granite, sourced upstream in the Victoria Range. These boulders can sometimes give the rivers a similar magnetic response as the dolerite dykes. Further refinement of the dykes was achieved by removing any features which had a strong response in the airborne radiometric data.

In the Murray Creek Survey area (Figure 9-31), the highest values of MS (red colour) are in the central to southern part of the map in a northeast orientation. In the same way as in the Capleston area, these features are interpreted to be dolerite dykes that have also been recorded in the survey area. From both studies, the location of the dolerite dykes can be delimitated with more accuracy (red highs in Figure 9-30 and Figure 9-31). This information was used for improving the mineralised vein model in the Capleston area and for targeting possible areas of interest in the Murray Creek area. Further studies have been completed in Crushington (Figure 9 32), Raglan-Caledonian (Figure 9 33), and Buller (Figure 9 34).

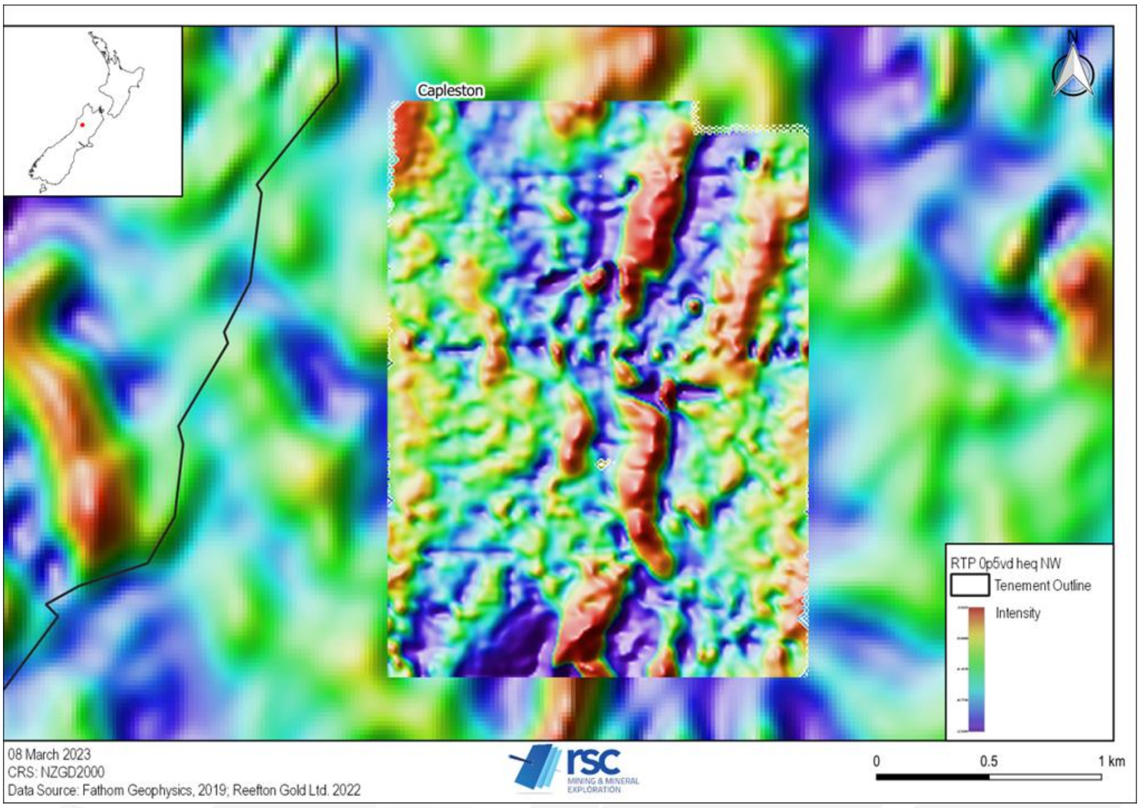


Figure 9-30: Reduce to the pole (RTP) UAV magnetic map, with first vertical derivative filter from Capleston area.

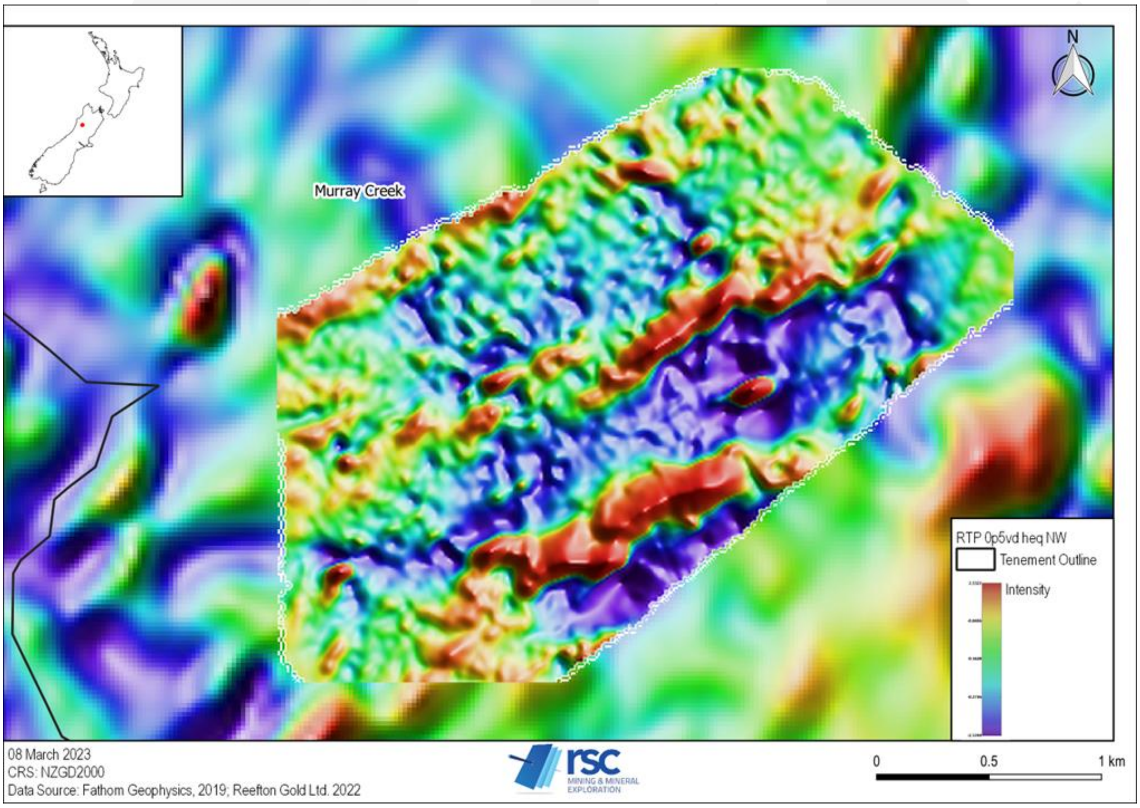


Figure 9-31: Reduce to the pole (RTP) UAV magnetic map, with the difference between the first vertical derivative and the horizontal gradient magnitude from Murray Creek.

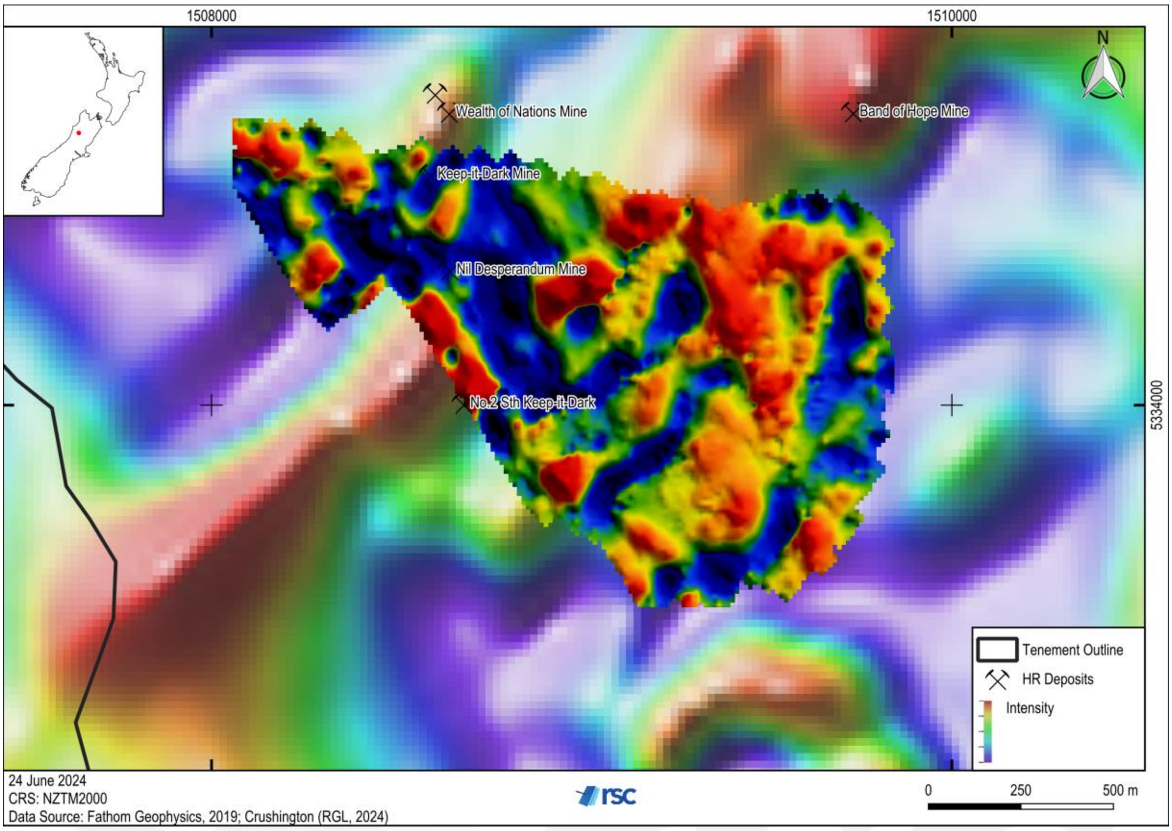


Figure 9-32: Unprocessed reduce to the pole (RTP) UAV magnetic map, with first vertical derivative filter from Crushington area.

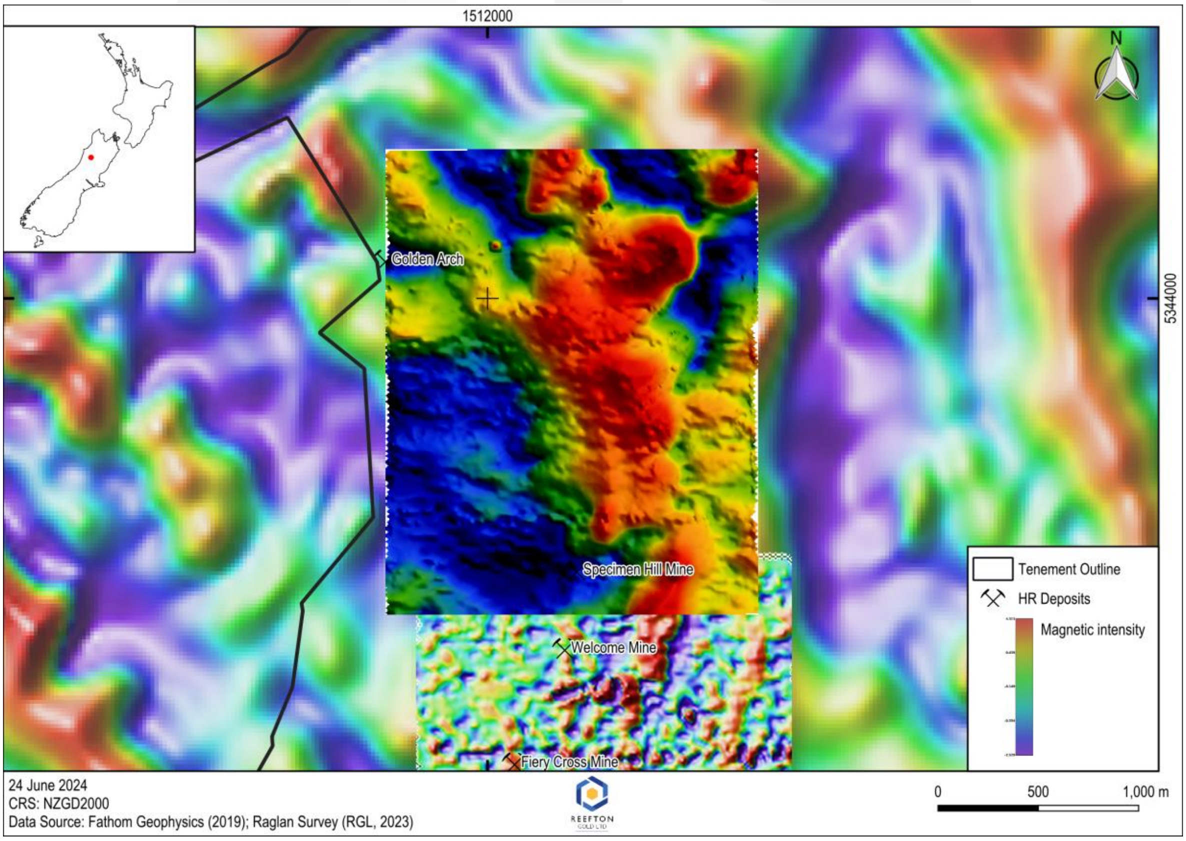
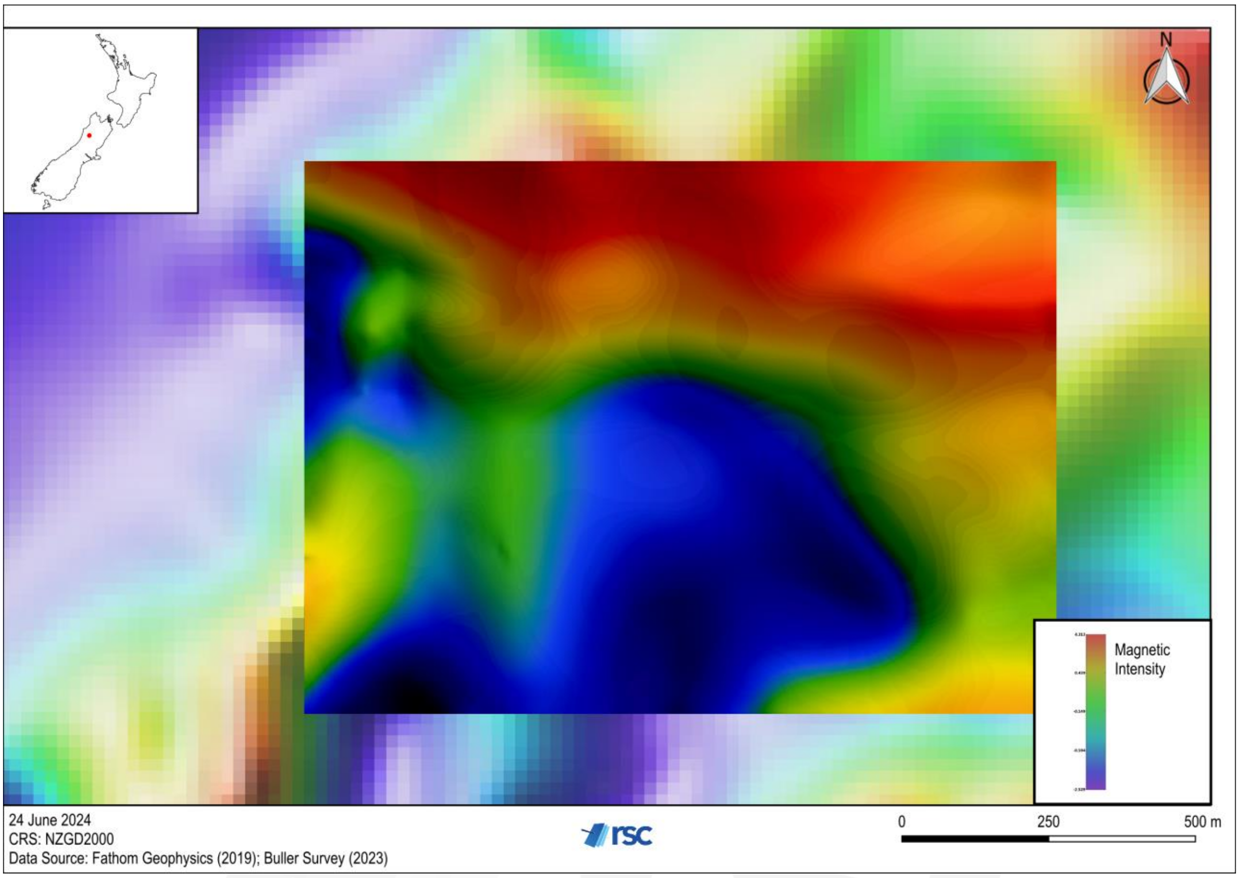


Figure 9-33: Unprocessed reduce to the pole (RTP) UAV magnetic map, with first vertical derivative filter from Raglan area.



24 June 2024
CRS: NZGD2000
Data Source: Fathom Geophysics (2019); Buller Survey (2023)

Figure 9-34: Reduce to the pole (RTP) UAV magnetic map, with first vertical derivative filter from Buller area.

9.6 Remote Sensing

RGL commissioned remote-sensing studies over the licence area, that were conducted by Fathom Geophysics, using data from ASTER infrared channel imagery and Sentinel2, to locate areas of possible hydrothermal alteration.

Satellite data were acquired for the Reefton area to identify areas of alteration, that could be associated with potential mineralisation. The ASTER data were downloaded as surface-corrected reflectance for bands 1–9, and surface-corrected emissivity for bands 10–14. These data were ortho-rectified using the 30 m SRTM data over the area. Sentinel-2 data were downloaded as ortho-rectified Level 1 data. These data were surface-corrected using the Sentinel Application Platform (SNAP–sen2cor) produced by the European Space Agency.

Due to the dense vegetation cover in the Reefton Goldfield, little useful data were obtained from the remote sensing imagery.

9.7 LiDAR & Orthophotography

From 16–17 April 2019, Landpro Ltd (Landpro) collected LiDAR and Medium Format Digital Camera Imagery of EP 60491 (Capleston). The aerial survey data were captured using the Reims Cessna Skymaster, ZK-SVY, from a variety of altitudes, from 5,000–8,500 ft, above mean sea level. Data were captured using the following systems:

- Leica RCD30 80MP RGBN Image Sensor (SN:82552); and
- Leica ALS60 LiDAR Sensor (SN: 6129).

Global Navigation Satellite Systems (GNSS) and Inertial Measurement Unit (IMU) data were processed using WEST Base Station and precise ephemeris data. The GNSS and IMU were processed in a tightly coupled loop to give an optimum trajectory. These data were then applied to the LiDAR and Image exterior orientations prior to LAS and ortho creation. Image data were created using Leica FramePro and any radiometric adjustments were applied, as required. LiDAR data were generated via CloudPro.

A '1st run' automatic classification was carried out on the raw LiDAR points, using Terrasolid's TerraScan software, to separate the LiDAR points into ground hits and non-ground hits, resulting in a >90% correct classification. After this, a manual classification was done, over the required area, to edit the points with gross classification errors, that may have occurred in the automatic classification process.

The orthophotography imagery was developed into tiffs using Leica FramePro. The exterior orientation was obtained by using IPAS CO+, which uses the trajectory and event file to determine an accurate orientation of every image.

The imagery was then run using Pix4D. Key points were computed on the images, and matches were then determined. From these matches, Automatic Aerial Triangulation (AAT) was run. This process results in the creation of an orthomosaic based on orthorectification.

Processing of the LiDAR data was completed by Fathom Geophysics.

RGL acquired four remote imaging datasets (LiDAR and photogrammetry) at target drill sites, and areas of exploration with no prior LiDAR available, within the Reefton Project (Figure 9-35). The aim of these datasets was to support drilling operations, and aid fieldwork planning. For mission design and execution, the UgCS Expert software was used. For LiDAR processing, RGL used Global Mapper software and DJI Terra, while Agisoft and DJI Terra were used for photogrammetry. For all data, a digital elevation model and photomosaic were the final processing results. The processing of both LiDAR and photogrammetry datasets followed standard routines of data quality control and cleaning, gridding, and outputting mesh models.

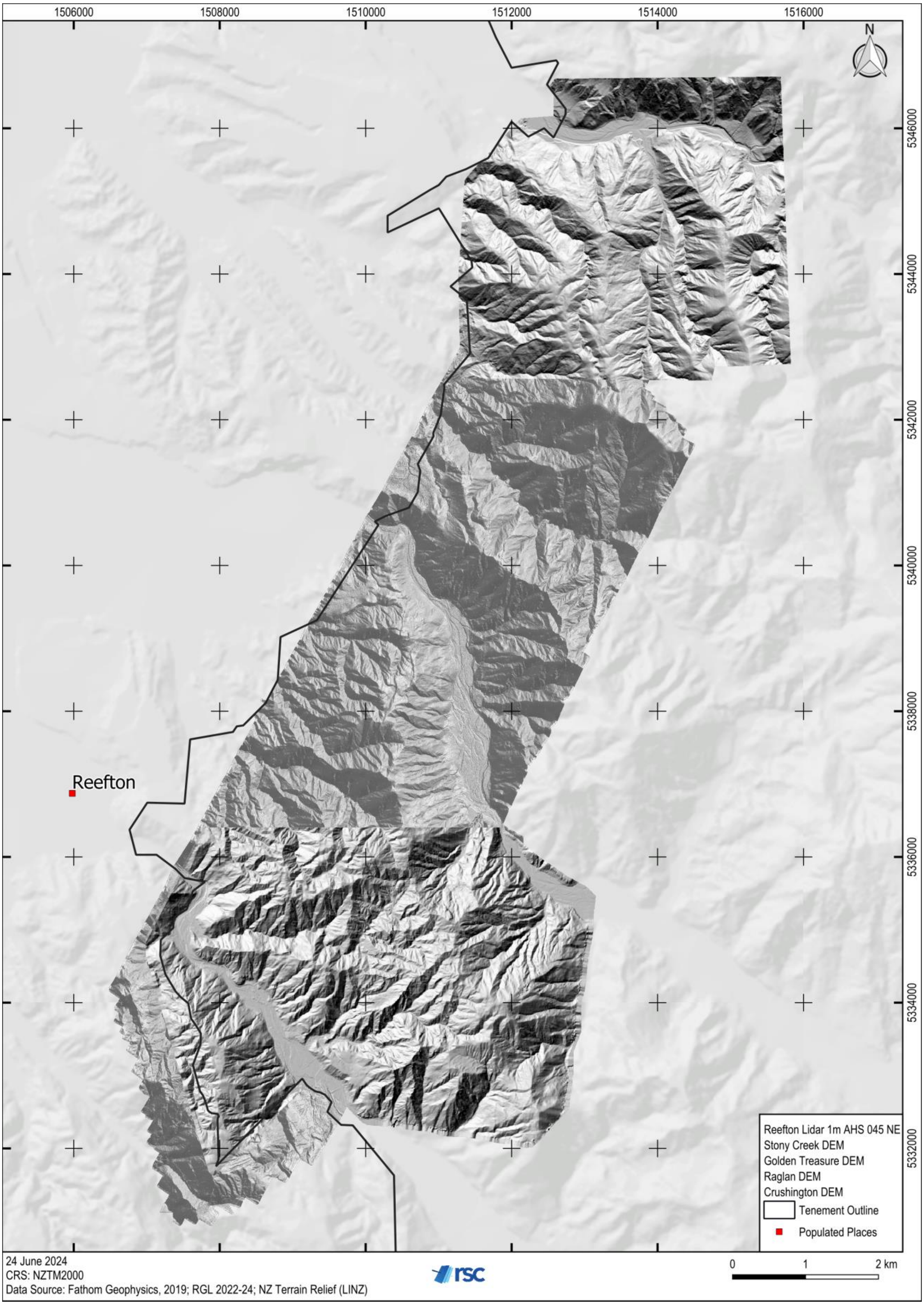


Figure 9-35: LiDAR flown and processed by RGL (2019–2024).

9.8 3D Solid Geological Modelling

9.8.1 Pactolus

RGL generated a basic 3D solid geological model of the Pactolus vein system. The model was originally based on geological and structural measurements from the outcropping Pactolus quartz vein. The model has subsequently been updated with downhole intercepts from the drilling programmes (Figure 9-36).

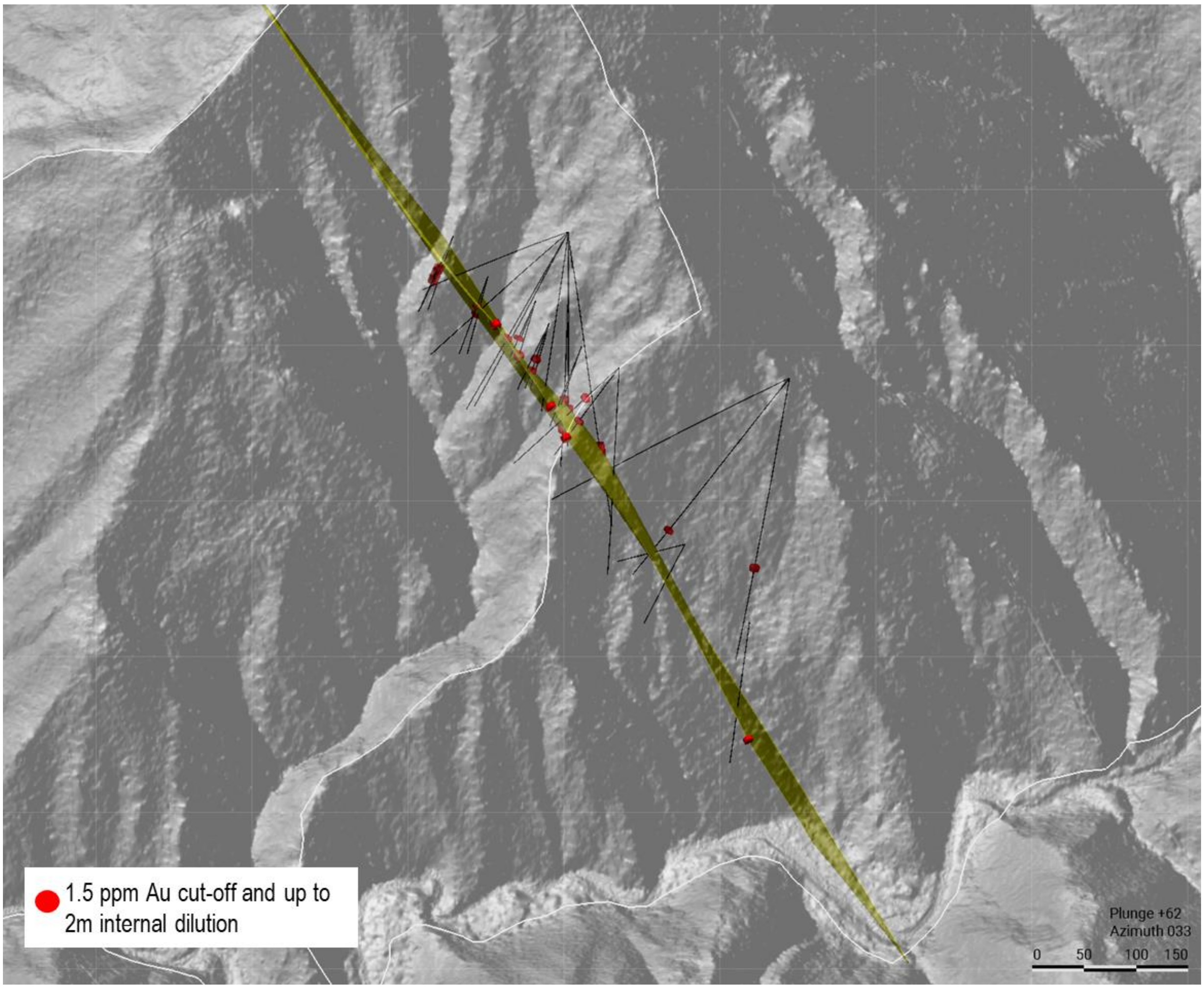


Figure 9-36: Pactolus 3C geological model.

9.8.2 Murray Creek

RSC was contracted over December and January 2024 for an in-depth analysis of data from Murray Creek to produce a detailed 3D model of the area. RSC used pXRF and assay data from soil samples, rock chips, and drill core, magnetic susceptibility readings from drill core, and mapping by RGL and others to produce a lithological model of the area. Combining this with magnetic and structural complexity (from magnetic surveying by RGL), and data from old mine workings, 10 drill targets were produced (Figure 9-37).

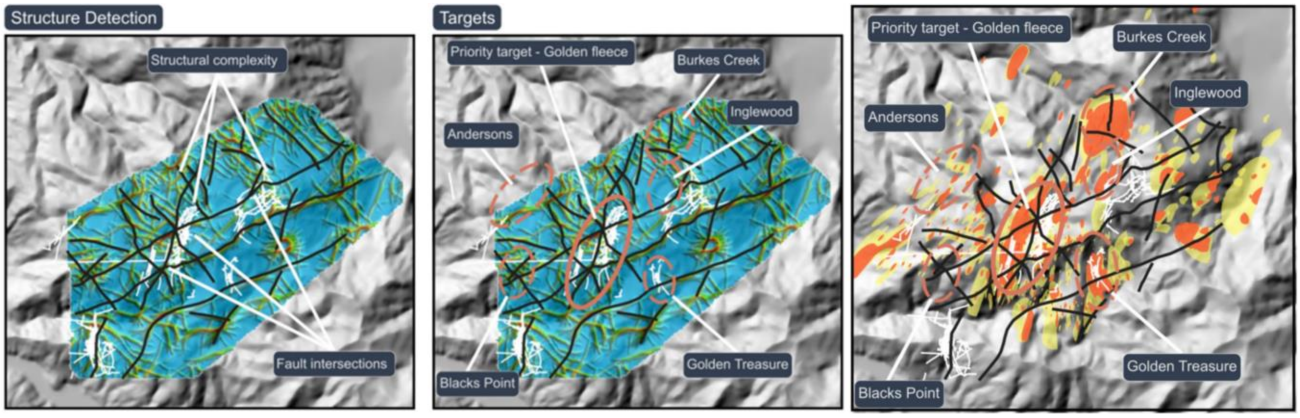


Figure 9-37: Structural complexity and targets (left and middle); Numerical Au model from soil geochemistry (right). Modelling completed by RSC.

9.9 Exploration Target Interpretation

The Reefton Goldfield is a classic orogenic system containing numerous structurally controlled Au deposits, hosted in tightly folded, greenschist-facies Greenland Group sediments. Gold deposits are predominantly clustered along the intersection of north-trending shear and fault zones and areas of intense folding. Quartz veins are typically discordant to bedding and strike parallel to axial surfaces of regional-scale north-plunging folds. Two end-member styles of mineralisation are described: an early generation of relatively undeformed Au-and-arsenopyrite-bearing quartz veins (e.g., Phoenix-Inglewood at Murray Creek), and a later, shallower, more brittle event that is characterised by Au and stibnite-bearing quartz breccias (e.g., Golden Treasure).

RGL completed a comprehensive process of data compilation, data processing, and the creation of new interpretations and exploration targets for the project areas in 2020, and again in 2023. Using a mineral systems approach, coupled with new datasets and new processing technology associated with those datasets, RGL prioritised the features listed above to produce targets for further exploration.

Table 9-12 lists the key characteristics of the orogenic Au mineral system based on source, transport and deposition. Then it identifies how each of these characteristics manifests, in terms of the geology/proxies to geology, the geophysics and the geochemistry. Finally, it identifies the attributes in the various databases, that can be queried, in search of such characteristics within the Reefton Goldfield.

An empirical target identification and ranking system was implemented using a set of knowledge-based queries, based on the Table 9-12. A total of 33 ranked and scored Au exploration targets were identified during the initial targeting process conducted in 2020. RGL has focussed much of its extensive geochemical and geophysical exploration programme around the five areas within the Reefton Project (Capleston, Crushington, Murray Creek, Stony Creek, and Orlando) that contain the majority of the exploration targets. This culminated in a significant greenfield discovery (Pactolus) and the identification of several additional greenfield prospects.

In 2023, RGL re-ran the targeting process again, refining the number of exploration targets to 21 (Figure 9-38). The mineral systems approach to exploration and targeting lends itself to all scales and allows reiteration of the targeting, as new data and understanding of the geology matures. The reiteration of the targeting and ranking process has endorsed the earlier ranking, and, in addition, places equal emphasis and attention on both new discoveries, historical mine ore shoot extensions, and near mine duplications of structures (Figure 9-38; Table 9-13).

Table 9-12: Critical parameters of the sub-crustal mineral system orogenic gold model at the district to deposit scale.

Mineral System Requirement		Geological Parameter	Geological Expression/Proxy	Geochemical/Geophysical Response	Data Attribute
Energy Source	Subduction at a convergent margin	Lithostratigraphic sequences corresponding to arc and accretionary sequence indicating geodynamic setting	Greenland Group — thick turbidite sequence deposited on active continental margin	Greenland Group — thick turbidite sequence deposited on active continental margin	Regional QMAP/Regional geological mapping (e.g., Figure 7-1)
		Strong metamorphic gradients dominated by low-P Barrovian metamorphic terranes	Sub-greenschist — amphibolite facies domain		
		Classic deformation sequence of D1 to D4 with late orogenic collapse	D1 thrusting, D2–D3 upright folding and thrust reactivation D3–D4 oblique-slip shearing/faulting	Aeromagnetic linears define major structures	Mag_RTP_SD_lin_640/320
Fluid & Ore Source	Thermal energy to drive sub-crustal mineral system	Heat from igneous intrusion	Contact metamorphic aureoles, surrounding crustal intrusions — hornfels Greenland Group rocks		Regional QMAP/detailed geological mapping (e.g. Figure 7-2)
		Metamorphic gradients	Low-pressure metamorphic facies		
	Fluid flow from below MOHO into crust	Lithosphere to crustal-scale plumbing system	>100 km-long fault of shear-zone within low-strain rock sequences with well-preserved structures and textures		Regional QMAP and RGL mapping — faults (e.g. Figure 7-3). Mag_RTP_SD lin 640/320.
	Au-bearing fluid from sub-crustal sources	Anomalous metal enrichment in permeable zones	Anomalous metal enrichment along shear/fault zones	Linear multi-element (Ag, As, Au, Bu, Hg, Sb, Te, W) soil or rock-chip anomalies	Au, As, Sb log (Z)-score maps and contours (e.g. Figure 9-15).
	High fluid flux around margins of granite intrusions	Rigidity contrasts between minor intrusions and host rocks	Granite intrusions <1-km diameter within host sequences	Aeromagnetic, radiometric and gravity gradients in district-scale surveys. Local geochemical anomalies	RTP_vdmhgm_heq_hc Rad_TC_heq_NE

		Sheared margins of irregular granite intrusions	Changes in dip and/or strike of intrusion margins along curvilinear shear zones	Discontinuous gold anomalies along granite intrusion contact	Au, As, Sb log (Z)score maps and contours (e.g., Figure 9-15).
Enrichment & Focussing Mechanism	Focussed fluid infiltration to suitable structural sites	High-damage zones in second- or third-order faults adjacent to first-order faults	Jogs representing 10–30° angular variations from the mean strike of first-order faults	Change in strike of regional aeromagnetic linears. More resistive zones (?)	Mag_RTP_SD_lin_640/320
		Cross faults that accommodate the high-damage-zone jogs	Arrays of cross faults at ~70° to the second- or third-order faults	Arrays of aeromagnetic linear zones at high angle to the more continuous regional linear zones	Mapped fold anticline/syncline axis & form lines (e.g. Figure 9-1).
		Fluid infiltration due to rotation of blocks between faults with the same kinematics	Complexity of structure at fault intersections	Local non-linear aeromagnetic patterns	RPT_agc_SD_160_complexity
		Metal enrichment in fluid plumbing systems	Alteration zones near fault intersections	Gold and related elements (particularly As, Sb, Te, W) anomalies	Au, As, Sb log (Z)score maps and contours (e.g., Figure 9-15).
Trap	High fluid flux into structural trap sites in host rock sequences	Locked-up anticlinal or antiformal folds	Typically, 30–40º apical angles for asymmetrical folds with steep back limbs		Mapped fold anticline/syncline axis & form lines (e.g. Figure 9-3)
		Thrust or oblique-slip duplexes	Folded thrust sequences with complex structural geometries	Complex aeromagnetic signatures with anomalous closure within the regional aeromagnetic pattern	RTP_agc_SD_complexity, (highlights areas of intense complexity vs less complexity)
	Fluid migration into stratigraphic trap sites	Strong rheology contrasts between units in rock sequences	Contrasts between competent and incompetent rock units	Geochemical distinction between psammites and pelites	pXRF data identifying lithologies (e.g. Figure 9-23)
		Reactive host rocks	Rock units with high Fe/(Fe þ Mg) ratios or high C contents	High-magnetic intensity pixels for Fe-rich rocks. IP or TEM anomalies for C-rich rock units	RPT_agc_SD_40_NS/22.5
Surface Expression	Uplift to lower lithostatic pressures	Major vertical displacement of lithostratigraphic successions	Late conglomerate/coal-forming basins juxtaposed against lower rock units	Strong radiometric contrasts at district-scale	Regional Mapping Rad_TC_heg_NE

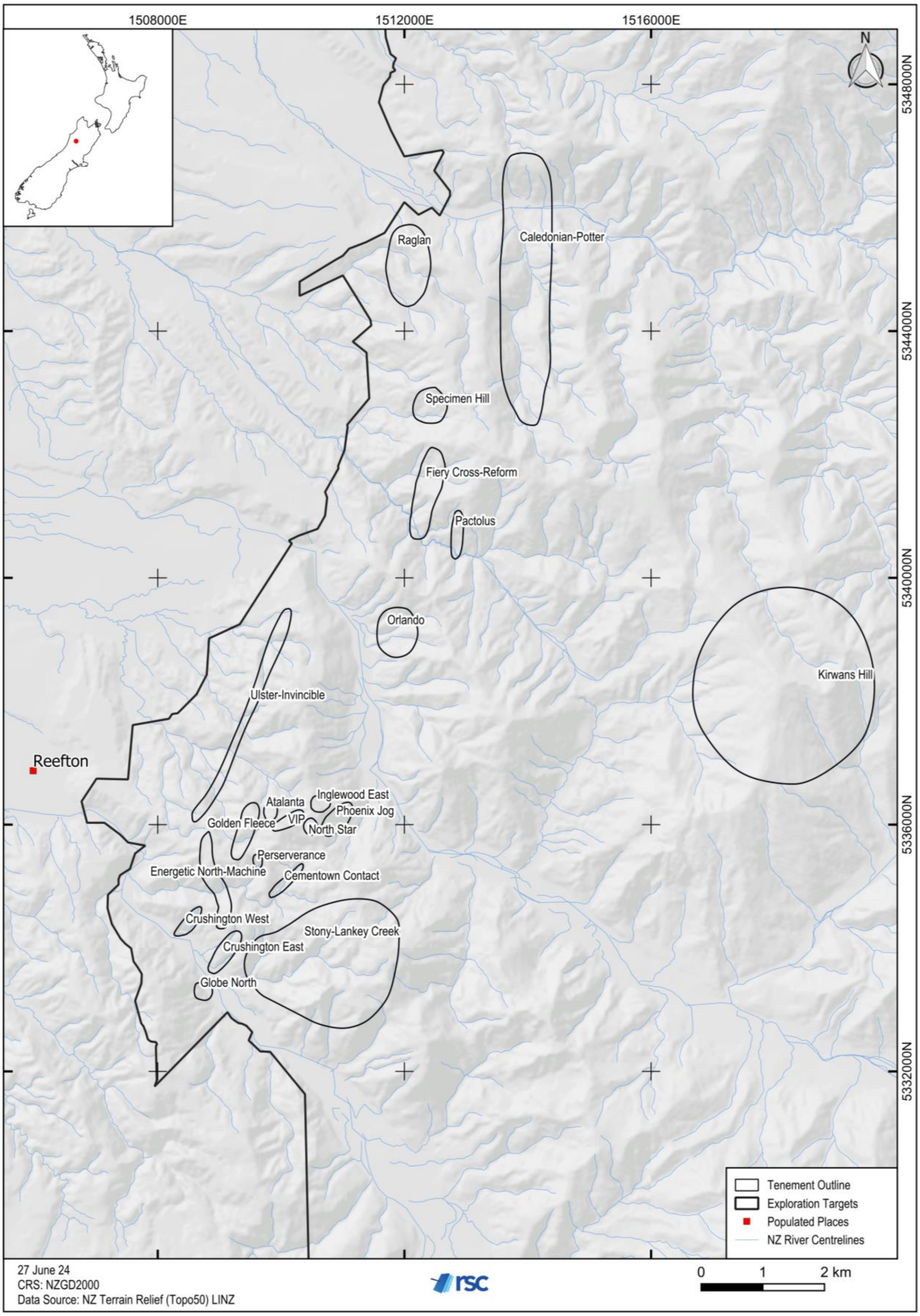


Figure 9-38: Location of exploration targets identified by RGL.

Table 9-13: Table of exploration targets.

Name	Easting	Northing
Pactolus	1512843	5340636
Specimen Hill	1512428	5342653
VIP	1510166	5336042
North Star	1510494	5335942
Crushington East	1509140	5333935
Crushington West	1508473	5334374
Fiery Cross-Reform East	1512315	5341258
Globe North	1508743	5333218
Phoenix Jog	1510901	5335951
Cementown Contact	1510147	5335046
Golden Fleece	1509449	5335800
Energetic North-Machine	1508950	5334943
Orlando	1511891	5339033
Caledonian-Potter	1514040	5344500
Inglewood East	1510646	5336253
Perseverance	1509629	5335320
Atalanta	1509845	5336158
Ulster-Invincible	1509195	5337186
Stony-Lankey Creek	1510920	5333557
Raglan	1512089	5344943
Kirwans Hill	1518149	5338147

10. Drilling

RGL completed a total of 41 diamond drillholes from August 2019 to April 2024, carried out in three phases and summarised in Table 10-1. The location of the drillholes, in the properties, are presented in Figure 10-1. Diamond core was drilled as either HQ, PQ, or NQ in size. Tables of all drillhole collar locations can be found in Table 10-2. Drillholes were drilled within EP 60491 and EP 60624.

Table 10-1: Summary of the RGL drillholes within the Reefton Project.

Prospect	Hole Type	No of Holes	Total Depth (m)	Avg Depth (m)	Year Drilled	
					From	To
Keep it Dark	Diamond	1	140.9	140.9	2019	2019
Pactolus	Diamond	30	4,991.3	161.1	2020	2024
Welcome	Diamond	2	467.9	233.9	2021	2022
Golden Treasure	Diamond	4	547.7	136.9	2022	2022
Raglan	Diamond	4	510.0	127.5	2023	2023
Total	Diamond	41	6668.6	161.2	2019	2022

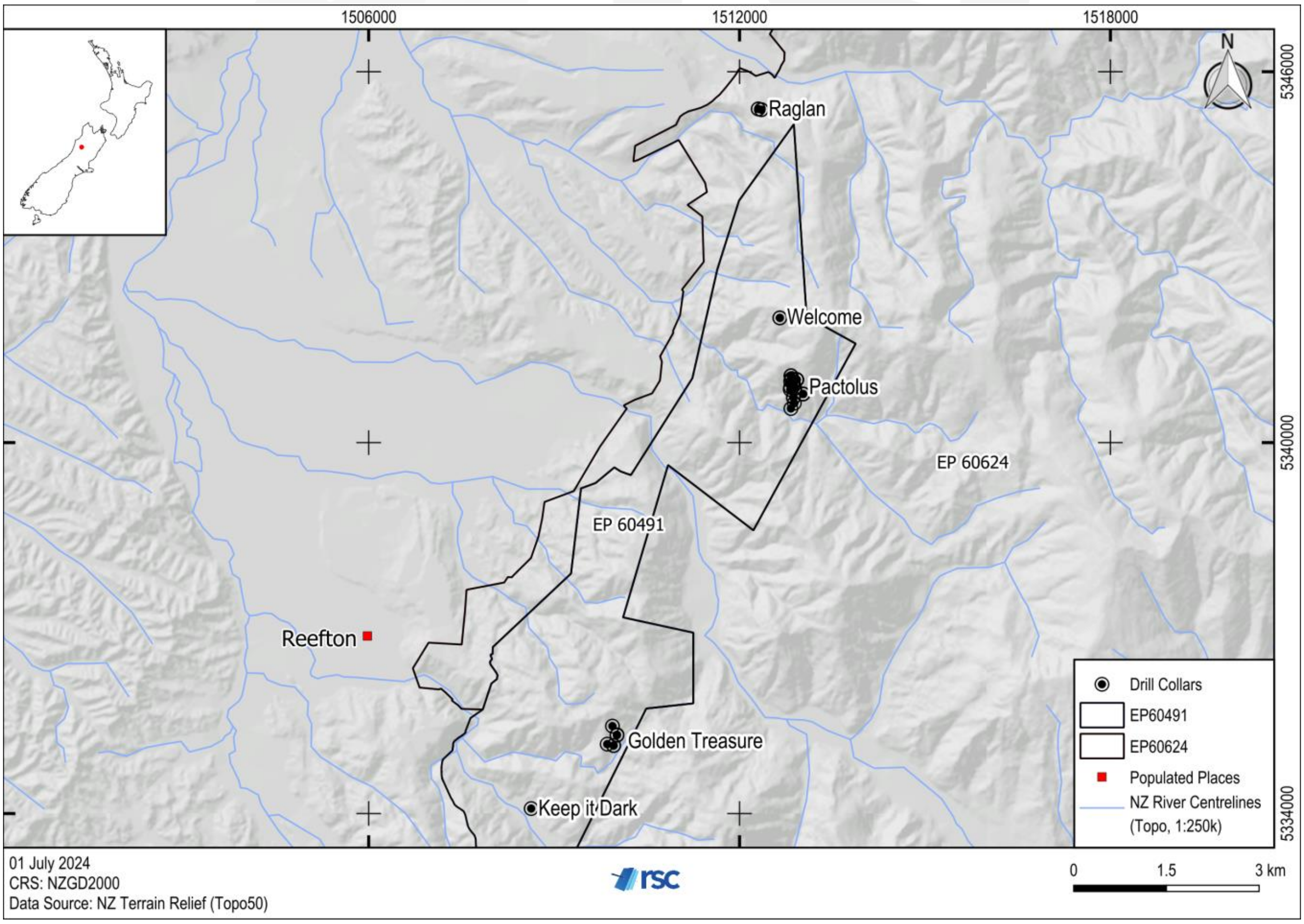


Figure 10-1: RGL drillhole collars.

Table 10-2: Collar details for RGL drillholes.

Hole ID	Northing	Easting	RL (m)	Azimuth	Dip	Depth (m)
DD_PAC_001	5341019	1512924.1	541.0	257	-50	224
DD_PAC_002	5341019	1512924.2	541.0	280	-45	204.4
DD_PAC_003	5341019	1512924.3	541.0	279	-71	305.4
DD_PAC_004	5341019	1512924.4	541.0	213	-52	225
DD_PAC_005	5341019	1512924.5	541.0	213	-70	305.6
DD_PAC_006	5341019.6	1512924	541.0	304	-42	189.7
DD_PAC_007	5341019.7	1512924	541.0	201	-43	299
DD_PAC_007A	5341019.8	1512924	541.0	202	-42	37.5
DD_PAC_008	5340787	1513028	505.3	297	-42	312.3
DD_PAC_009	5340787.1	1513028	505.3	268	-50	284.6
DD_PAC_010	5340787.1	1513028	505.3	230	-60	330.2
DD_PAC_011	5341019	1512924.3	540.9	224	-41	178.95
DD_PAC_014	5340988	1512867	503.9	250	-60	44.95
DD_PAC_015	5340988	1512867	503.9	250	-70	89
DD_PAC_016	5340988	1512867	503.9	250	-45	63.7
DD_PAC_017	5340958	1512863	500.0	250	-45	75.6
DD_PAC_018	5340958	1512863	500.0	250	-60	81.9
DD_PAC_019	5340958	1512863	500.0	250	-70	92.3
DD_PAC_020	5340924	1512878	500.0	250	-55	96.7
DD_PAC_021	5340924	1512878	500.0	250	-70	100
DD_PAC_022	5341082	1512833	500.0	250	-55	87.3
DD_PAC_023	5341082	1512833	500.0	250	-70	107.7
DD_PAC_024	5341082	1512833	500.0	250	-45	85.9
DD_PAC_025	5341036	1512843	506.0	250	-55	91.2
DD_PAC_026	5341036	1512843	506.0	250	-70	90
DD_PAC_035	1512893	5340880	516.5	265	-45	118.5
DD_PAC_036	1512893	5340880	516.5	292	-57	191.8
DD_PAC_037	1512826	5340896	474.2	220	-65	254.1
DD_PAC_038	1512826	5340895	474.6	264	-63	115
DD_PAC_039	1512820	5340859	475.5	238	-57	150

DD_PAC_040	1512831	5340552	329.7	220	-55	154.1
DD_GT_027	5335100.5	1509962.9	400.0	101	-70	106.1
DD_GT_028	5335100.5	1509962.9	400.0	85	-50	103.4
DD_GT_029	5335415	1509944	554.1	85	-50	106
DD_GT_030	5335123	1509859	537.8	85	-60	232.2
DD_WEL_012	5342018	1512652	613.3	299	-60	290.5
DD_WEL_013	5342018	1512652	613.3	263	-46	177.4
DD_KID_001	5334081	1508629	212.6	76	-80	140.9
DD_RAG_031	1512369	5345369	437	102	-45	206.6
DD_RAG_032	1512369	5345369	437	104	-65	178.8
DD_RAG_033	1512291	5345408	422	130	-45	107.8
DD_RAG_034	1512291	5345408	422	130	-65	16.8

10.1 Keep it Dark

Keep it Dark consisted of a single hole (DD_KID_001) drilled into the historical Keep-It-Dark workings in the southern section of the EP 60491. The hole was drilled by EcoDrilling using a Coretec 1300 diamond drill. The hole was drilled at a dip of 80° and was terminated after 140.9 m. This hole drilled PQ size core until 59.4 m, then switched to HQ core. DD_KID_001 intercepted a void and did not intercept mineralisation.

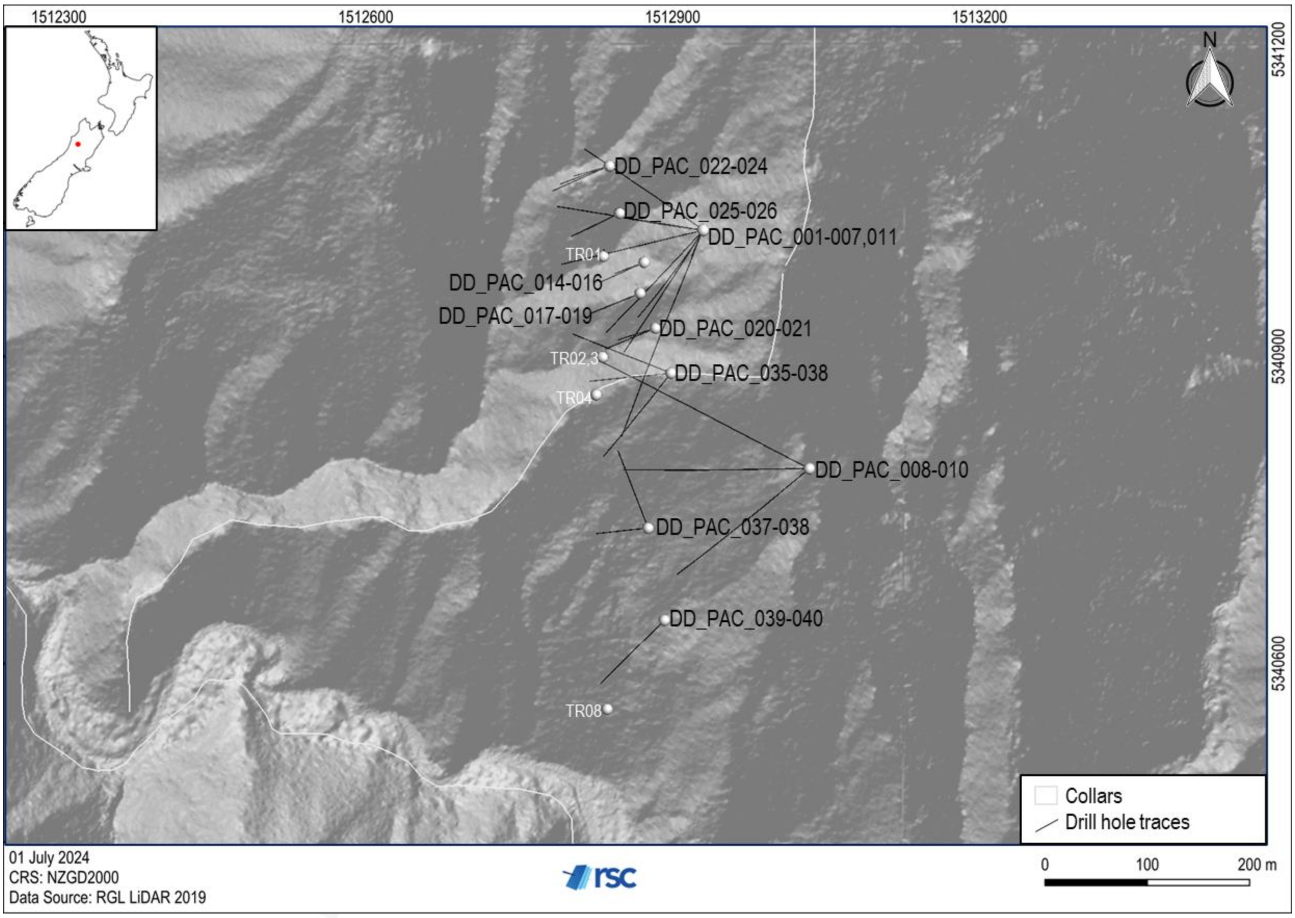
10.2 Pactolus

The Pactolus programme consisted of three phases. Phase One drilling commenced in January 2021 using a helicopter-supported Christensen CS1000 P4 drill rig, supplied by Alton Drilling. This programme collared PQ-sized core to 100–150 m, then reduced to HQ core. A total of 12 holes were drilled from the first two drill pads, with the purpose of testing the Pactolus vein system (Figure 10-2; DD_PAC_001 to DD_PAC_011), totalling 2,896.6 m. All holes were successful in reaching target depth.

Phase Two began in March 2022 using an Alton LT100 mini rig. This smaller rig is capable of drilling NQ core to a depth of 80–120 m. A total of 13 holes were drilled totalling 1,106.25 m (DD_PAC_014 to DD_PAC_026). The mini rig was used to confirm the orientation and plunge of the high-grade ore shoots in the Pactolus vein system.

The third phase of drilling at Pactolus commenced in December 2023 after samples from trenching and mapping indicated the possible extension of the Pactolus mineralisation trend. Phase three consisted of six drillholes (DD_PAC_035 to DD_PAC_040). The drill programme utilised an Alton LT140. Drillholes are collared in PQ, then reduced to HQ and NQ. The rig is capable of drilling HQ to 100 m, then reducing to NQ to 250 m. There were no notable intercepts in phase three.

The most significant intercepts at Pactolus were calculated with a 1.5 ppm Au cut-off and up to 2-m internal dilution (Table 10-3). Notable intercepts include DD_PAC_002 with 5 m at 6.28 ppm Au, DD_PAC_004 with 12 m at 9.41 ppm Au, and DD_PAC_022 with 19 m at 1.69 ppm Au, inclusive of 2 m at 8.2 ppm Au (Table 10-3).



01 July 2024
CRS: NZGD2000
Data Source: RGL LiDAR 2019

Figure 10-2: Drillhole collar and traces at Pactolus.

Table 10-3: Significant intercepts for Pactolus, calculated with a 1.5 ppm Au cut-off and up to 2-m internal dilution.

Hole ID	From	To	Interval	Au (ppm)
DD_PAC_001	132.5	135	2.5	4.75
DD_PAC_002	133	138	5	6.28
DD_PAC_004	183	195	12	9.41
DD_PAC_005	218	223	5	2.24
DD_PAC_005	258	260	2	5.26
DD_PAC_007	214	219	5	2.92
DD_PAC_007	244	246	2	1.71
DD_PAC_009	219	221	2	4.40
DD_PAC_010	221	225	4	2.69

DD_PAC_015	76	81	5	3.13
DD_PAC_016	41	43	2	2.77
DD_PAC_018	43	46	3	2.75
DD_PAC_018	58	60	2	3.11
DD_PAC_022	54	56	2	8.20
DD_PAC_025	33	35	2	3.53

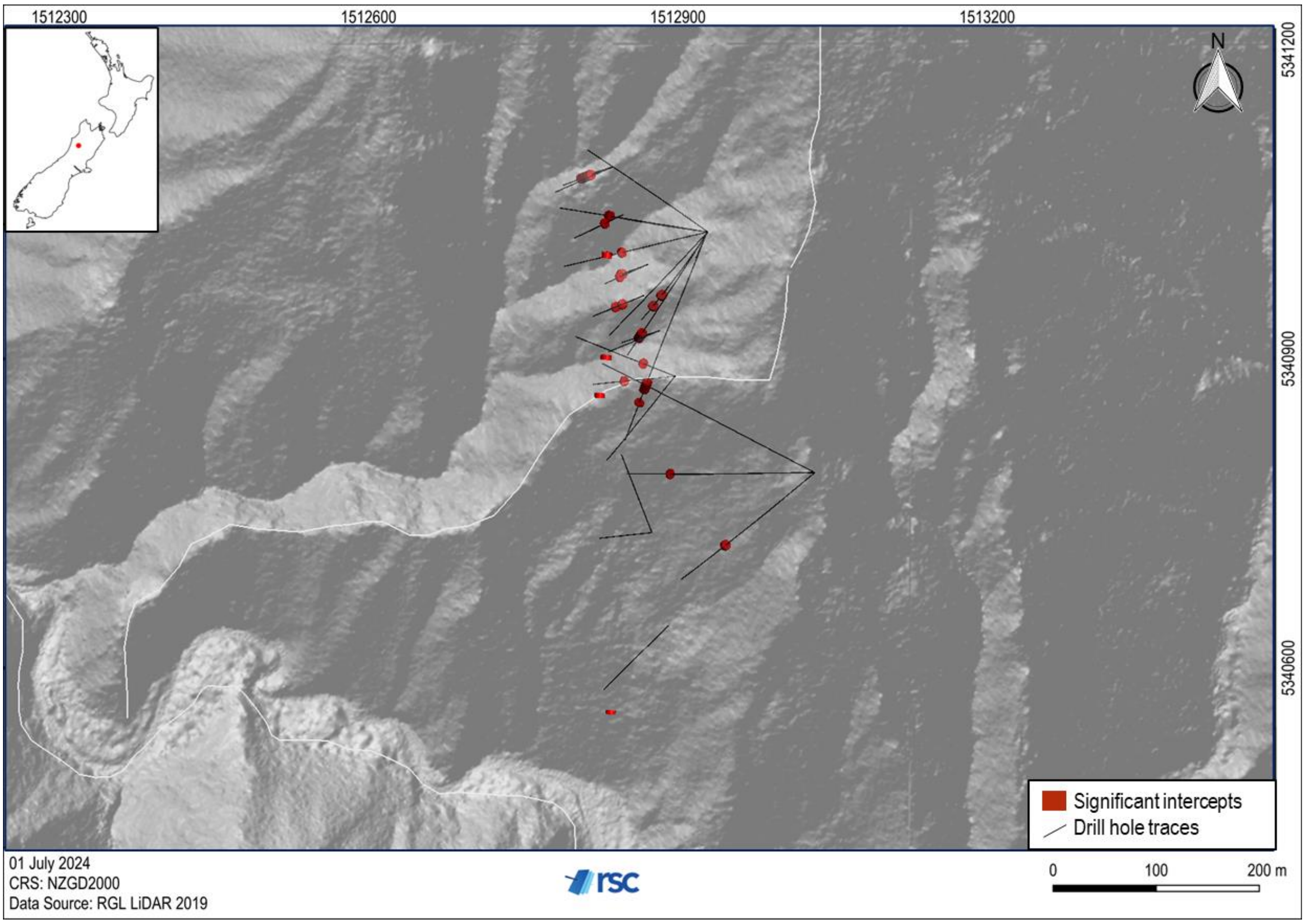


Figure 10-3: Significant intercepts from drill core in the Pactolus programme.

10.3 Welcome

The Welcome programme is located to the east of the historical Welcome-Hopeful mine workings. The aim of the programme was to test geochemical anomalies identified in the soil sampling and geological mapping. The programme consisted of two drillholes (DD_WEL_012 and DD_WEL_013; Figure 10-4) totalling 376.5 m, which were drilled using a helicopter-supported Christensen CS1000 P4 drill rig supplied by Alton Drilling. The Welcome programme collared PQ-sized core to 100–150 m, then reduced to HQ core. DD_WEL_013 was terminated prematurely due to adverse ground conditions. DD_WEL_012 intercepted 6 m of faulted and deformed greywacke, with weakly disseminated pyrite and no significant mineralisation.

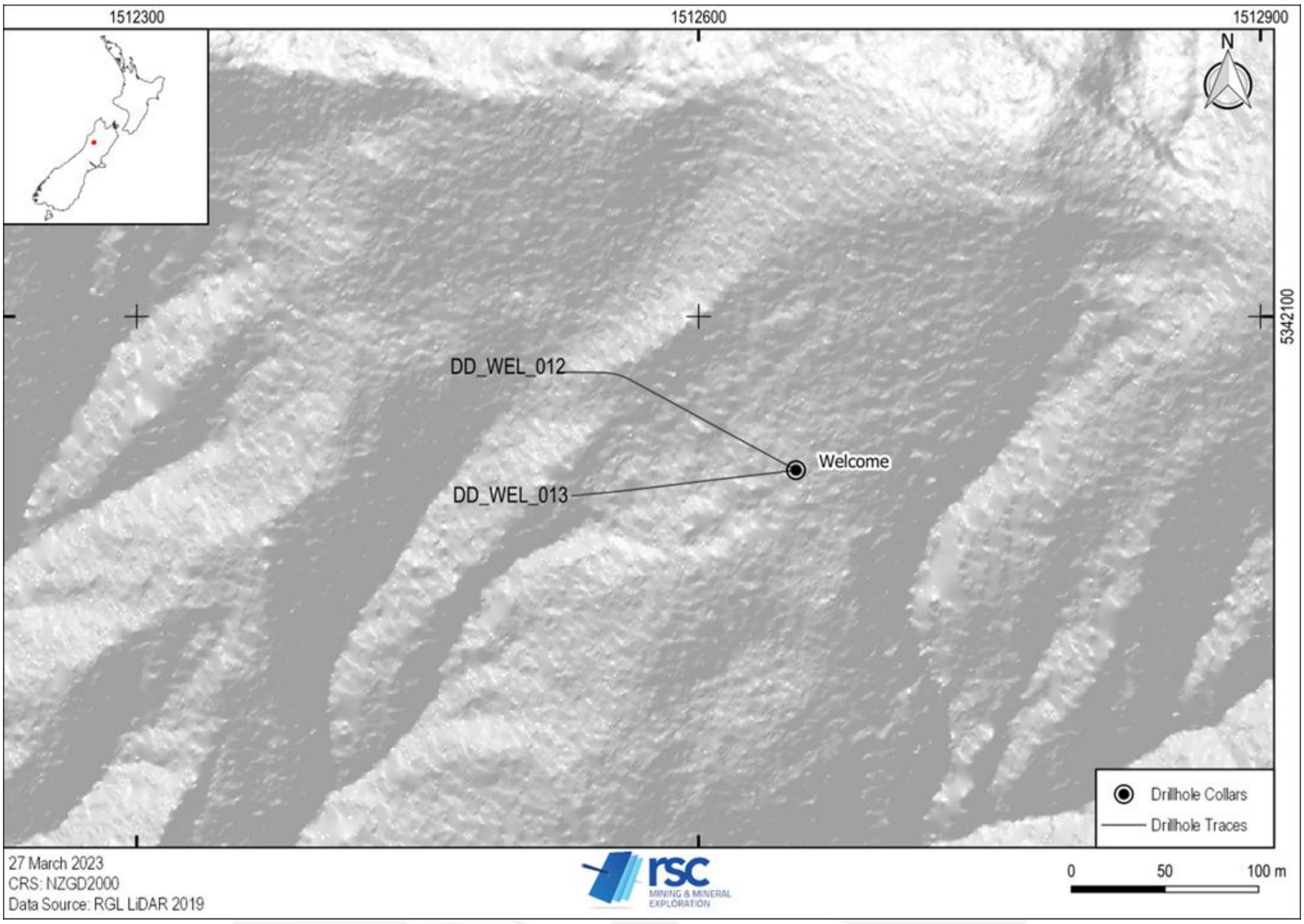


Figure 10-4: Drillhole collar and traces at Welcome.

10.4 Golden Treasure

Four holes were drilled into the Golden Treasure prospect between September and November 2022 (Figure 10-5). The first three holes were drilled using an Alton LT100 rig, capable of drilling NQ core to 80–120 m. The final hole (DD_GT_030) was drilling by and Alton LF70 rig, which drilled HQ core.

Holes DD_GT_027, DD_GT_028 and DD_GT_030 targeted a geochemical anomaly identified in the soil sampling. DD_GT_029 targeted the northern extension of the historical Golden Treasure workings. None of the four holes intercepted mineralisation; however, DD_GT_029 did intercept a void (from historical workings).

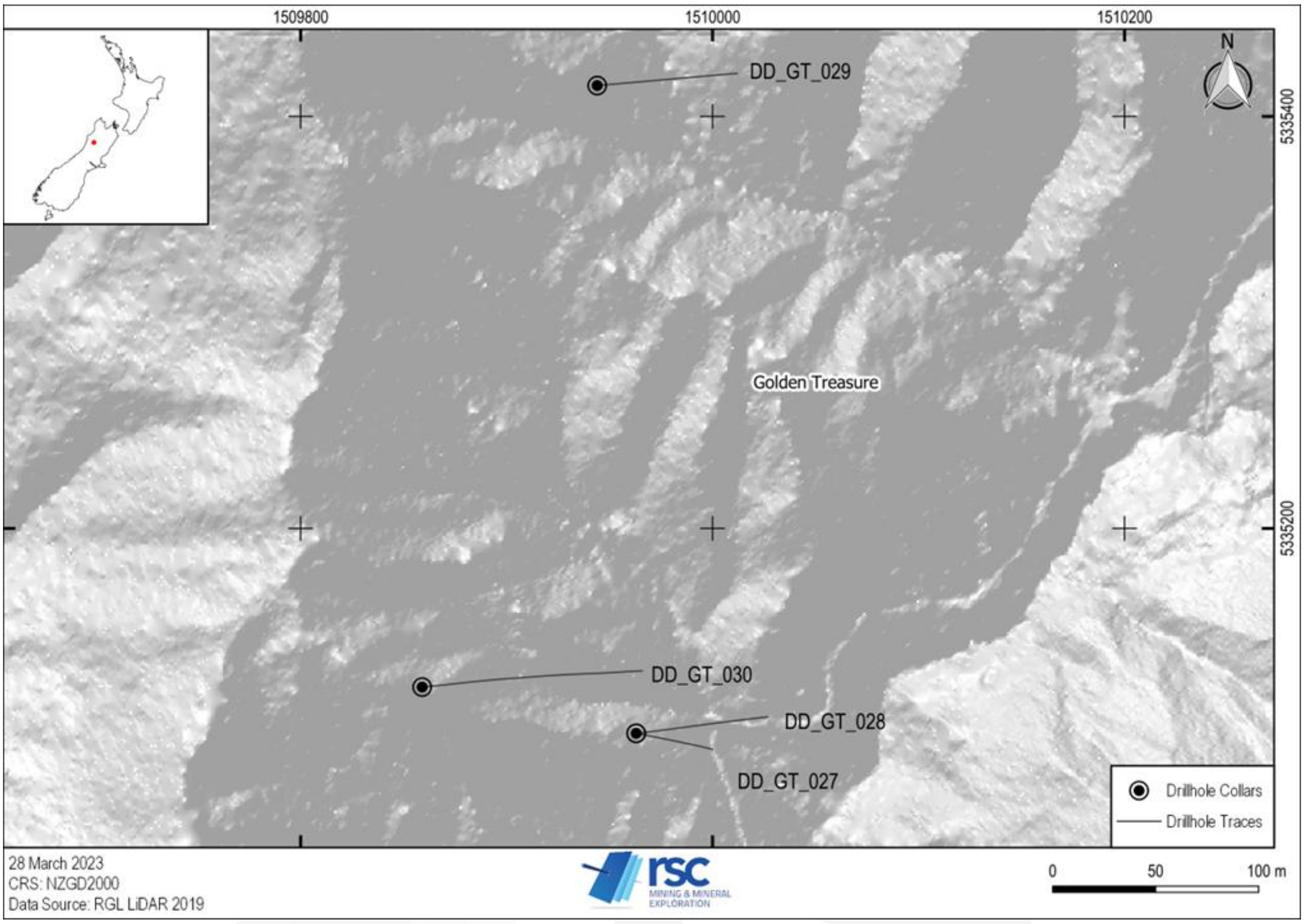


Figure 10-5: Drillhole collars and traces at Golden Treasure.

10.5 Raglan

A programme of four drillholes targeted a north-trending soil (Pb) anomaly identified during the 2023 soil sampling programme (Figure 10-6). The holes were drilled using an Alton LF70 rig, which drilled PQ and then reduced to HQ.

DD_RAG_031 and 032 intercepted a fault zone at 125.7 m and 141.0 m respectively. In DD_RAG_031 the fault presented as ~1 m wide, laminated with strong chaotic brecciation and graphite alteration. The fault in DD_RAG_032 presented as ~1 m wide brecciated quartz in gouge. DD_RAG_033 intercepted a 6.9-m fault from 101.0–107.9 m. The fault has strong graphite alteration, some brecciated quartz, and laminated grey quartz. The pXRF detected no anomalous As and no samples were submitted for Au analysis.

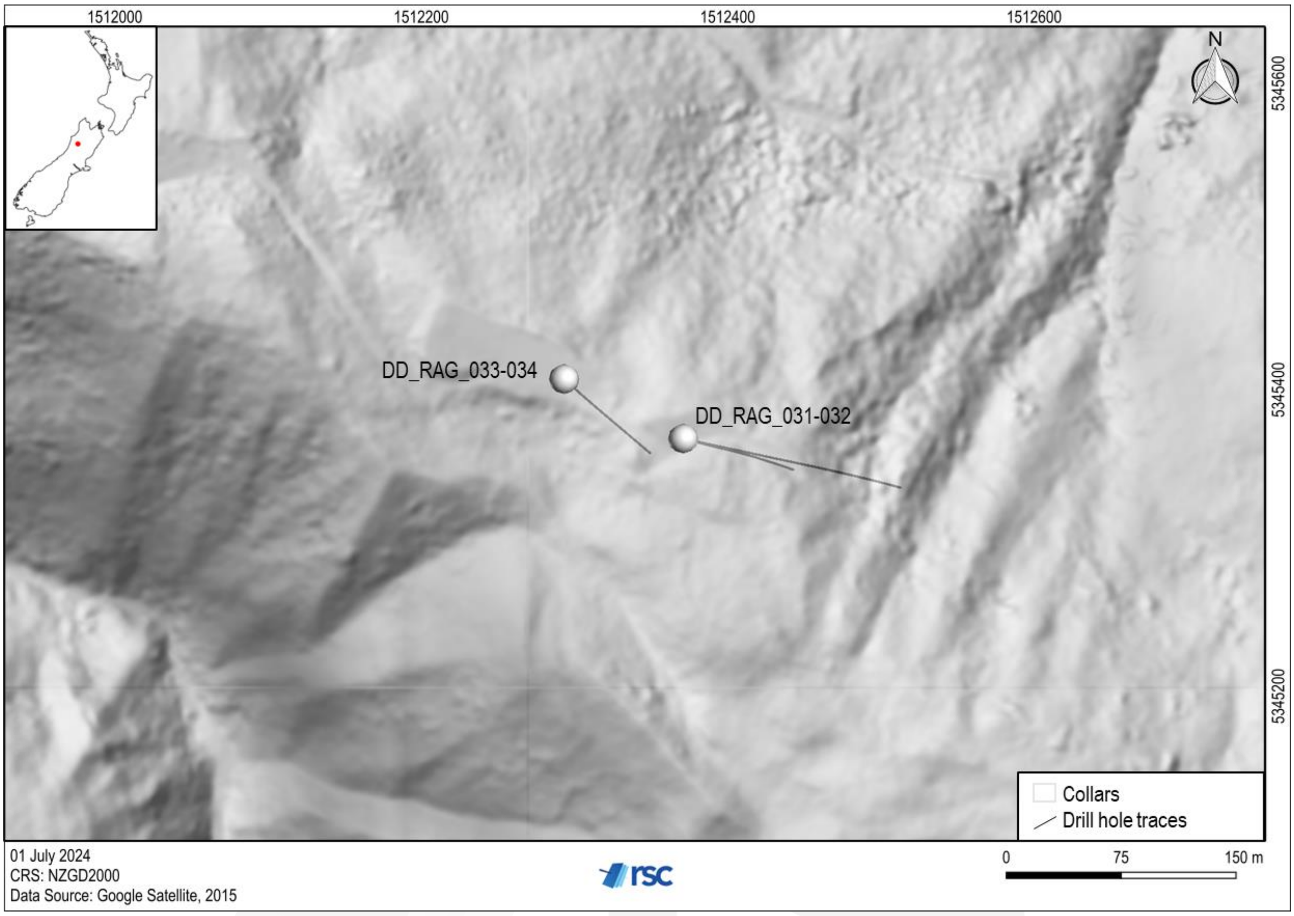


Figure 10-6: Drillhole collar and traces at Raglan.

11. Sample Preparation, Analyses & Security

11.1 Sample Preparation

11.1.1 Soil Samples

A bulk sample of ~0.5–1 kg was collected in the field and taken back to RGL's office for preparation. Samples were dried in a customised incubator, set at 38°C, for a minimum of two days. Once the samples were fully dried, they were sieved to <180 µm in size. A sub-sample of 50–100 g was scooped from the <180 µm size fraction for analysis. The remaining material was retained and stored in Reefton.

11.1.2 Stream-Sediment Samples

The bulk sandy material was collected along a 30–50-m zone of a stream bed. While in the field, RGL geologists sieved the stream sediments to remove coarse material (>1 mm). The sieved material was then agitated in a bucket of water. After ~5–10 seconds, the suspended sediment was decanted into a second bucket, leaving the coarse material at the bottom of the bucket. Approximately 150 ml of flocculent was added to the bucket of suspended sediment. Once the sediment had flocculated, the water was decanted off, and the 'flocs' of sediment transferred to a numbered and labelled sample bag. The sediment was dried at the RGL offices, and a 50-g sample was sampled for in-house analysis, while the rest of the material was sent to ALS Brisbane for laboratory analysis.

11.1.3 Rock-Chip Samples

Rock-chip samples were sent to SGS Laboratories, Westport for sample preparation. Samples were crushed and pulverised to 85% passing 75 µm. The pulverised rock-chips were split into two samples: a ~50 g sent for laboratory analysis, and the reject returned to RGL for pXRF analysis and storage.

11.1.4 Drill Samples

The majority of drillholes were sampled in full, typically following 1-m sample intervals unless geological contacts (i.e. dolerite intrusions) dictated otherwise. NQ core was analysed as whole core; therefore, only requiring cutting along sample intervals. PQ and HQ core were sampled as half core.

Drill core samples were sent to SGS Westport for sample preparation. Core was crushed to 75% passing 2 mm, and 1-kg split of material was pulverised (to 85% passing 75 µm). No split duplicates were collected during the crushing steps. Two scoops were taken from the pulveriser bowl: one for laboratory analysis (~150 g) and the other for pXRF analysis (~100 g). The pulp reject is stored in Reefton.

11.2 Analysis

11.2.1 Portable Xray-Ray Fluorescence

RGL analysed a total of 13,195 soil samples, 353 stream-sediment, 1,372 rock-chips, and 5,824 drill core samples were by pXRF to produce a multi-element geochemical dataset. Samples were analysed with an Olympus Vanta VMR instrument, with a 4 W, 50 kV rhodium anode and a large silicon-drift detector. The instrument was operated using a field test stand and a laptop with Vanta PC Software. The approach adopted by RGL followed industry best practice as outlined in Fisher et al. (2014) and Gazley et al. (2014).

To prepare the samples for analysis, ~20 g of sample material was collected from the sample bag using a spoon and poured into a 40-mm sample cup, with the base of the cup covered by 4-µm polypropylene film. The sample cup was put in the test stand and analysed using 3-beam Geochem mode. A beam — also referred to as a filter — is a combination of voltage and amperage that allows different elements to be detected. Analysis times were set to 15 s for each beam. To ensure the quality of the pXRF data, standard operating procedures were strictly adhered to, which included a solid quality control framework.

The pXRF data were corrected using calibration plots derived from certified reference materials (CRMs) inserted and analysed for each analytical session. The calibration plots are based on the expected values of the CRM plotted against the analysed values of the CRM samples (Fisher et al., 2014). The gradient of the linear fit between the expected and the analysed values defines the correction factor used to correct the elemental data.

11.2.2 Laboratory Analysis: Soil Samples

A 50–100-g fine-sieved (<180 µm) soil sample was sent to ALS Geochemistry, Brisbane for Au-TL43 analysis. The analysis consisted of 25-g sample digestion by aqua regia, followed by trace Au analysis by ICP-MS. The detection limit for Au by this method is 1 ppb.

All samples from the regional grids (Capleston, Orlando and Murray Creek) were analysed for Au, at ALS in Brisbane, using an aqua regia digest and an ICP-MS finish. Approximately 5% of the samples were analysed for a full multi-element suite using a 4-acid digest and ICP-MS finish.

ALS Brisbane is independent to RGI/RGL.

11.2.3 Laboratory Analysis: Stream Sediment Samples

The dried samples (~300–500 g) were shipped to ALS Brisance for bottle roll cyanide extraction Au recovery, followed by AAS finish. Results are reported in ppb with a lower detection limit of 1 ppb (Table 11-1).

11.2.4 Laboratory Analysis: Rock-Chip Samples

Pulverised rock-chip samples were analysed by 50-g fire assay with AAS finish at SGS Waihi (SGS Code FAA505). The detection limit for Au by this method is 0.01 ppm (Table 11-1).

SGS Waihi is independent to RGI/RGL.

11.2.5 Laboratory Analysis: Drill Core Samples

Pulverised drill core samples were analysed by 50-g fire assay with AAS finish at SGS Waihi (SGS Code FAA505). The detection limit for Au by this method is 0.01 ppm. As part of SGS' internal quality control, SGS conducted repeat analyses, also at a rate of ~5%.

Samples from Keep it Dark were sent to ALS Perth for assaying. Pulverised samples were analysed by 50-g fire assay with AAS finish (ALS Code Au-AA26).

ALS Perth is an ISO 17025 accredited laboratory, and independent of RGI/RGL.

Thirteen 3-kg samples were also analysed by screen fire assay (FAS30K) at SGS Waihi to establish the presence of nuggetty Au. Samples were screened to 75 µm.

Table 11-1: Summary of the laboratory method codes for assay and geochemical analyses.

Analysis Type	Sample Type	Laboratory	Method	Description
pXRF	Soils/rock-chips/stream-sediments/drill core	RGL office	-	pXRF of ~20 g of pulp
Low-level Au	Soils	ALS Brisbane	Au-TL43	Low-level aqua regia digest
High-level Au	Soils	ALS Brisbane	Au-AROR43	Aqua regia digest
BLEG	Stream sediments	ALS Brisbane	Au-AA1	BLEG with extraction AA finish
Fire assay	Rock-chips/drill core	SGS Waihi	FAA505	50-g charge FA, AAS finish
Screen Fire Assay	Drill core	SGS Waihi	FAS30K	3-g charge, screened at 75 µm
Fire Assay	Drill core (Keep in Dark only)	ALS Perth	Au-AA26	25-g charge FA, AAS finish

11.3 Density & Moisture Content

No density or moisture measurements have been completed to date. This is considered appropriate by the QP for an early-stage exploration project; however, the QP recommends the density measurements are collected once the project progress to resource drilling.

11.4 Security

An RGL geologist was on-site for the duration of the drilling for the first hole (DD_KID_001); but thereafter, RGL geologists were only on site to markup holes, and to observe the drilling through mineralised zones. When not at site, an RGL geologist remained in daily contact with the drillers via VHF radios. The drillers frequently sent photographs of the recovered core to RGL. The core was removed from site weekly via helicopter.

A secured processing facility in Reefton stored core and resulting samples in locked shipping containers, while not being worked on. Core samples were transported to SGS New Zealand Limited in Westport by RGL employees for sample preparation and analysis. Sample submission sheets to SGS were in both digital and paper form.

For the ground geochemical surveys, RGL field geologists collected the samples in the field and returned them to the secure processing facility in Reefton. Soil samples were dried and sieved on-site to obtain a fine fraction. The coarse soil rejects were retained, and the coarse reject and surplus fine fraction are stored in locked containers on site. The fine soil fraction was sent by international courier to ALS Brisbane, Australia.

Stream-sediment and rock-chip samples were transported to SGS Westport by RGL employees. The splits for analysis were sent to SGS Waihi and reject samples were collected by an RGL employee, and returned to the Reefton site for storage in a locked container.

An SOP covering sample transport and chain-of-custody details was not available for RSC to review. The QP recommends an SOP is created that captures this process.

11.5 Data Quality

11.5.1 Data Quality Objective

Every data collection process implicitly comes with expectations for the accuracy and precision of the data being collected. Data quality can only be discussed in the context of the objective for which the data are being collected. In the minerals industry, the term 'fit for purpose' is typically used to convey the principle that data should suit the objective. In the context of data quality objectives (DQOs), fit for purpose could be translated as 'meeting the DQO'.

The Reefton Project is early-stage exploration project. The near-term goal of the exploration programmes presented in this Report is defining exploration targets. However, if the potential of these exploration targets proves sufficient, the collected exploration data are intended to support Minerals Resources classified into at least the Inferred category. This ultimate Mineral Resource classification objective sets a requirement for the level of quality of the data and determines the DQO.

11.5.2 Quality Assurance

Quality assurance (QA) is about error prevention and establishing processes that are repeatable and self-checking. The simpler the process and the fewer steps required the better, as this reduces the potential for errors to be introduced into the sampling process. This goal can be achieved using technically sound, simple, and prescriptive SOPs and management systems.

In discussing the suitability of QA systems for the data collection that might underpin a future MRE, and the potential impact of these processes on the resource classification, RSC has applied the process summarised in Figure 11-1. This summary discusses whether:

- processes are clearly documented in an SOP, and they represent good practice;
- the SOP includes clearly defined data quality objectives;
- the SOP includes clear details on quality control (QC) measures; and
- the site visit confirmed adherence to the SOPs.

For each part of the sampling, preparation and analytical process, a comment on the expected associated risk with respect to resource classification is provided.

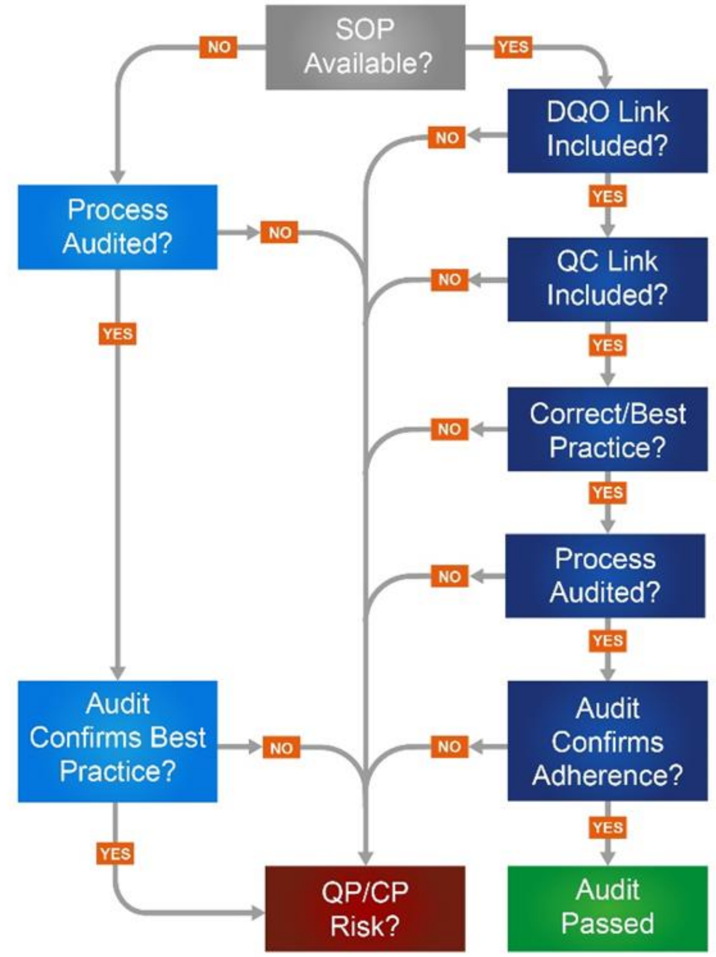


Figure 11-1: Flow chart of RSC's QA review process.

11.5.2.1 Soil Samples

RGL collected four different types of primary sample — soil samples, stream-sediment samples, rock-chip samples and diamond drill core samples. Diamond drill core and soil samples are the predominant sampling methods conducted and used to identify exploration targets; only these methods are therefore discussed below.

11.5.2.1.1 Surface Sample Location

Surface location data were captured using a Garmin GPSMAP 66i handheld GPS with a horizontal accuracy of ~3 m. An SOP was in place for the collection of surface location data. The SOP outlines an industry-standard procedure, but it does not include any information on the objectives, and is text-heavy. To improve clarity, and for ease of reference, RSC recommends outlining the procedure in a step-by-step, bullet-point fashion. It is also recommended to provide specifics where possible. For instance, the SOP states that "when a location needs to be precisely recorded, waypoint averaging should be applied". It is not immediately clear, however, in which cases more precisely recorded waypoints are required. The *Guideline for GPS Use* also does not state for how long the waypoint should be averaged; but the *SOP Soil Sampling* document states "an average waypoint of 3–5 minutes should give a sufficient accuracy". However, the QP notes that 3–5 minutes is less than the recommended time, as Garmin recommends the waypoint averaging function should be used for a minimum of five minutes, but 7–10 minutes is preferred.

The SOP describes what actions should be undertaken if the performance of the GPS becomes poor. To better quantify what poor performance means, the QP recommends using the accuracy information provided by the GPS. The GPS accuracy can be used to set thresholds that define when certain steps to improve GPS performance should be undertaken. Ideally, the accuracy of the GPS is monitored before collecting a waypoint, and recorded when capturing a waypoint.

The surface sample location collection process was not audited by the QP. However, based on the review of the SOP and discussion with RGL geologists, the QP considers the location data procedure poses a low risk with respect to the quality objective.

11.5.2.1.2 Primary Sample

An SOP detailing the collection of soil samples was available for review, and the sampling methods are summarised in section 11.1.1. The SOP is of a decent standard and describes industry best practice; however, it does not include clear enough language on the objectives. The SOP is prescriptive, and includes a step-based sampling procedure, noting quality control steps (collection of field repeats). The process was not audited by the QP; however, based on discussions with RGL geologists, the QP considers that there is low risk with respect to data quality.

11.5.2.1.3 First Split

An SOP regarding the first-split process for soil samples was not available to review. From discussion with RGL geologists, dried soil samples were sieved to separate the fine fraction (<180 µm) from the coarse fraction. This process was not audited by the QP. Since sieving is a straightforward and standard industry procedure, the QP considers the risk with respect to the quality objective to be low.

11.5.2.1.4 Second Split

An SOP regarding the second-split process for soil samples was available to review. A scoop, ~20 g, of sieved fines was collected for analysis.

Based on discussions with RGL, a scoop of 50–100 g of sieved soil was collected and sent to ALS Brisbane. No SOP is available to review for this step. However, in the QP's opinion, due to the fine-grained nature of the sample, only a low risk to the quality of the sample is associated with the second split procedure.

11.5.2.1.5 Third Split

The third split, collecting an analytical aliquot, was conducted at ALS Brisbane. No SOP for the third splitting process was available for review. The QP did not audit this process; however, the QP is familiar with ALS laboratories and its SOPs. In the opinion of the QP, there is a low risk associated with the third splitting process with respect to the quality objective.

11.5.2.1.6 Analytical

Multi-element analysis of the soil samples was completed at RGL's office in Reefton using an Olympus Vanta VMR pXRF instrument. RSC provided RGL with a pXRF SOP that reflects industry best practices. The SOP includes procedures regarding a robust QC framework that, when followed, ensures the instrument is working according to its specifications and that no special-cause variation is introduced. The process was not audited, and the QP considers that the risk associated with the pXRF analysis is low with respect to the quality objective.

Soil samples were analysed for Au at ALS Brisbane. An SOP of the analytical processes was not available for review and the process was not audited. ALS Brisbane is an ISO 17025 accredited laboratory, and even though there is some residual risk as the laboratory has not been audited, the QP is conversant with ALS laboratories and its SOPs around the world, and in view of the quality objective, the risk associated with the Au analysis is considered low.

11.5.2.2 Diamond Drill Samples

11.5.2.2.1 Collar Location

Collar location procedures are outlined in the *SOP Drilling Rig Procedures* and *Guideline for GPS Use* documents. These SOPs outline the same procedure as discussed in section 11.5.2.1.1 for soil samples. Therefore, the same observations and comments apply here.

Additionally, when using the waypoint averaging function on the Garmin GPSMAP 66i, Garmin recommends collecting four to eight samples taken at least 90 minutes apart. RSC recommends RGL update the *SOP Drilling Rig Procedures* to include repeat measurements taken 90 minutes apart, throughout the first day of drilling, as part of its quality control practices.

The SOP also states if mineralisation at depth is proven in one or more drillholes, RGL should consider having the collars surveyed using DGPS. To date, no drillhole collar locations were captured by a certified surveyor using a higher-accuracy instrument like a DGPS. The QP considers this appropriate for defining exploration targets, but recommends having a contract surveyor resurvey all collars that will be used to support an MRE with a DGPS.

The collar location collection process was not audited by the QP. However, based on the review of the SOP and discussion with RGL geologists, the QP considers that the collar location capture process presents a low risk with respect to the quality objective.

11.5.2.2.2 Downhole Orientation Survey

The downhole surveys were conducted using a Reflex EZ-Trac downhole instrument. RGL's drilling contractors surveyed the diamond drillholes at 6 m intervals below the mineralised zone and 30 m intervals above the mineralised zone, following the manufacturer's instructions for operating the survey tool. Downhole surveying was conducted by the drilling contractors; however, ideally, this process is monitored by the rig geologist. An SOP regarding the downhole survey is available; it is of a good standard and describes industry best practice; however, it does not include any information on the data quality objective. The SOP is prescriptive, includes a step-based operating procedure with lots of photographs. The quality control section is comprehensive, outlining daily checks, and tolerance ranges for gravity, magnetic field strength and magnetic field dip. The process was not audited by the QP; however, based on discussions between RGL geologists and the QP, the QP considers that there is low risk with respect to the quality objective, and this has been taken into account when identifying exploration targets.

11.5.2.2.3 Density

No density data have been collected at the Reefton Project so far. In the QP's opinion, this is acceptable when defining exploration targets, but should be collected for any subsequent resource estimation work.

11.5.2.2.4 Primary Sample

An SOP detailing the drilling of diamond core was available for review. The SOP is of fit for purpose, with relevant prescriptive steps and diagrams/images. It outlines the responsibilities of the geologists and drillers and covers important aspects of logistics, preparation, safety around the drilling campaign, downhole surveying and core recovery, and includes a minimum threshold of 90% recovery.

The QP did not audit the drilling operations as no drilling was taking place during the QP’s site visits.

The described processes of managing the diamond drill sampling and recovery is excellent and considered industry best practice.

11.5.2.2.5 First Split

The first split for the diamond core occurs in the core yard when cutting the core in half. An SOP regarding the first split of diamond core is available to review, describing that core is sampled along one-metre intervals, except in zones of distinct mineralisation (e.g. quartz veins or sulphide enrichment) where the sample interval was adjusted for lithological breaks.

RSC recommends updating the SOP to include different procedures for core with a different diameter. In the case of NQ core, RGL digressed from the SOP, as NQ core was sampled in full, rather than following the procedure of sampling half-core. Both HQ and PQ core were sampled in accordance with the SOP. The SOP also states the minimum and maximum sample interval to be 0.3 m and 1.0 m, respectively; however, the drill database indicates samples as long as 1.6 m were sampled. The remaining HQ and PQ half core was retained in the core tray for future reference and check analyses.

The marking, selecting, and cutting procedures were not audited by the QP. However, the QP reviewed the remaining core, sample marks and sampling documentation during the site visit. The SOP states core should be cut perpendicular to features of interest (e.g. shearing, faulting, significant veins and stockwork), and where these features are absent, core should be cut perpendicular to the rock fabric. The QP reviewed sections of cut core during the site, which indicated the SOP was followed. However, the QP notes it is best practice to mark and cut core along the orientation line (or a few degrees off it to preserve the line), and it is important to always sample the same half of the core to ensure no sampling bias is introduced. In core drilling campaigns where core orientation is not carried out or where it is difficult to align core in broken zones, this may lead to cut lines that are biased to preserve visible gold in the core, potentially leading to biased sampling.

Based on the SOP and observations made by the QP, the QP considers that the first splitting process poses a moderate risk with respect to the quality objective. The QP recommends changes are made to the core cutting procedures at the Reefton Project to minimise the risk of introducing selection bias.

11.5.2.2.6 Second Split

The crushing of the sample and second split happened at the laboratory (SGS Westport). The crushing parameters were set to 75% passing 2 mm at the laboratory, which is a standard passing for this step. A 1-kg split was collected by SGS Westport. An SOP for this second-split process was not available to review. SGS Westport is an ISO/IEC 17025 accredited laboratory, and, even though there is some residual risk with this part of the process not having been audited by a QP, the QP is conversant with SGS laboratories and its SOPs around the world, and considers the risk associated with the second split procedures to be low.

11.5.2.2.7 Third Split

Following crushing and splitting, SGS Westport pulverised the samples to 85% passing 75 µm before taking a 50-g split for analysis. An SOP for this third-split process was not available to review has not audited the third split but is familiar with SGS's SOPS. In the opinion of the QP, the risk associated with the third split QA is low.

11.5.2.2.8 Analytical

Multi-element analysis of the pulverised diamond core was completed at RGL's office in Reefton using an Olympus Vanta VMR pXRF instrument, and followed industry best practice and RGL's pXRF analysis SOP. A robust QC framework was in place to ensure that the instrument was working according to its specifications and that no special-cause variation was introduced. The process was not audited, and the QP considers that the risk associated with the pXRF analysis is low.

Pulverised diamond core samples were analysed for Au at SGS Waihi. No SOP of the analytical process was available for review and the process was not audited. SGS Waihi is an ISO 17025 accredited laboratory, and even though there is some residual risk as the process has not been audited, the QP is conversant with SGS laboratories and its SOPs around the world, and considers the risk associated with the Au analysis SOPs to be low with respect to the quality objective.

11.5.3 Quality Control

The purpose of quality control (QC) is to detect and correct errors while a measuring or sample-collection system is in operation. The outcome of a good QC programme is that it can be demonstrated that errors were fixed during operation and that the system delivering the data was always in control. Together with good QA (covered in section 11.5.2), it ensures that quality objective is met.

Good QC is achieved by inserting and constantly evaluating checks and balances. These checks and balances can be incorporated at every stage of the sample process (location, primary sample collection, preparation and analytical phases) and, if in place, should be monitored during data collection, allowing the operator to identify and fix errors as they occur.

11.5.3.1 Soil Samples

11.5.3.1.1 Surface Sample Location

No quality control practice checks, such as repeat measurements, were collected for the surface samples.

11.5.3.1.2 Primary Sample

The primary sample was collected by hand in the field. The quality of primary soil samples was tested by the collection of repeat samples. Repeat samples (sometimes called 'field duplicates') were collected at a rate of ~1:20, following the same methods and procedures as the primary sample, within ~0.5 m from the primary sample site. An *a posteriori* review of the repeat samples was conducted by RSC. The relative difference (RD) plot for As (Figure 11-2) does not indicate step changes or trends over time, indicating that the process was in control.

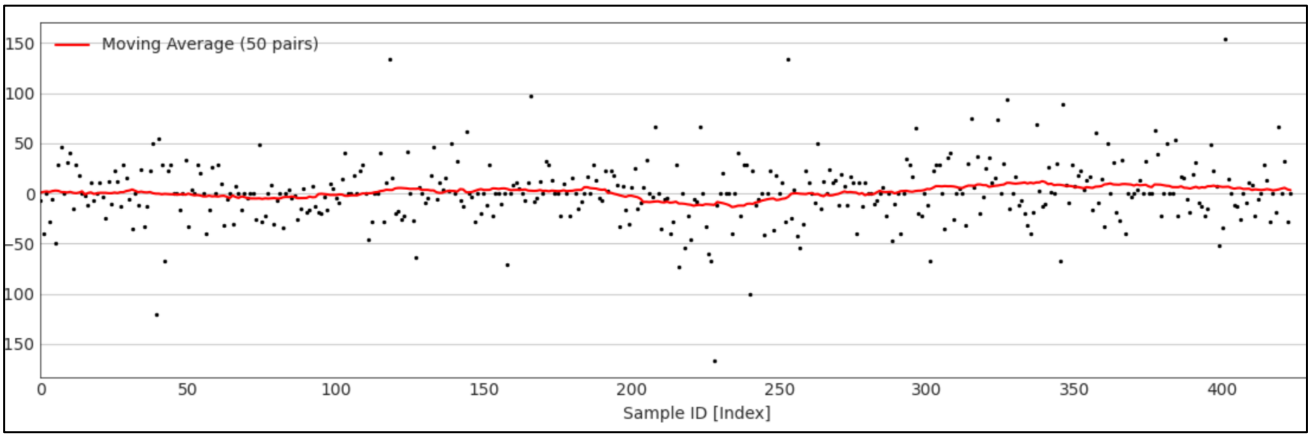


Figure 11-2: The RD in As grade between the original and field repeat samples against time. Data filtered to above LOQ (2 ppm).

11.5.3.1.3 First Split

The quality of the first splitting process (sieving dried soil samples to separate the fine fraction (<180 µm) from the coarse fraction) could not be monitored as the entire sample was sieved down to 180 µm.

11.5.3.1.4 Second Split

RGL collected second-split repeat samples at a rate of ~1:20 from the sieved soil samples, which were analysed by pXRF. The quality of the second split can be monitored by comparing the RD of the grade between the original and repeat samples, as presented in Figure 11-3. Data were filtered above the LOQ. The RD between second-split sample pairs typically varies from -60% to +70%. One outlier is reported (-102%); RSC could not confirm this was due to a sample swap. The variance reported for the second split is less than the variance reported for the primary sample, which is expected. No major step changes or trends are observed, as a result, the second-split process is considered to have been in control.

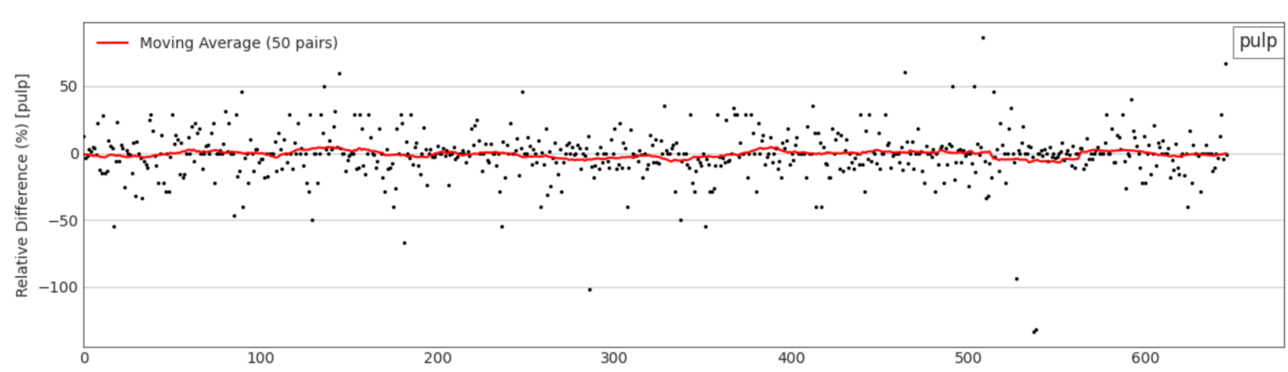


Figure 11-3: The RD in As grades between the original and second split repeat against time, illustrating soil samples only. Data filtered to above LOQ (2 ppm).

11.5.3.1.5 Analytical Process: ALS

RGL did not submit any blind certified reference material (CRM) or blank samples to ALS alongside the soil samples. Laboratory QC data (Internal reference material and laboratory blank data) were not available for RSC to review. RSC could therefore not assess if the analytical process was in control. Given that ALS Brisbane is an ISO 17025 accredited laboratory, RSC considers this acceptable for the delineation of exploration targets.

11.5.3.1.6 Analytical Process: Pulp-Sample pXRF

Certified reference material (OREAS112, OREAS232, OREAS235, OREAS238, OREAS239, OREAS23C, OREAS24B, OREAS24C, OREAS25A, OREAS45E, OREAS460, OREAS501B, OREAS600, OREAS60D, OREAS700, OREAS701, and OREAS920) were inserted in the sample stream for quality control during pXRF operation. Every pXRF operator started their session by analysing a blank and five CRMs. After that, only one CRM was analysed at a frequency of 1 in 20. A replicate measurement and repeat sample (second scoop from the sample bag) were analysed at a frequency of 1 in 20. At the end of the analytical session or day, the five CRMs and blank were analysed again. Reference materials were inserted in the sample stream to allow post-processing correction of the data, as well as to monitor the consistency of the pXRF analytical process during the measuring process. Blanks were inserted to ensure that any contamination of the instrument was identified before samples were analysed. Repeat measurements were used to test the precision of the instrument.

All pXRF measurements were calibrated against the OREAS standards. The geochemical data collected with the pXRF were corrected using calibration plots after every time the data were uploaded into the database. The calibration plots are based on the expected values of the CRM standards plotted against the analysed values of the standards. The gradient of the linear fit between the expected and the analysed values defined the correction factor used to calibrate the collected geochemistry data.

The control plot presented in Figure 11-4 covers CRMs analysed for the entire pXRF analytical programme (including the analysis of soil, stream, rock, drill and historical samples). Several step changes and trends were observed during the pXRF analytical process. The step change observed in August 2020 is due to a change in instrument. Minor but persistent trends over time (analytical drift) are a common phenomenon in pXRF analysis, and this was addressed by calibrating the data. The control plot for Al indicates two periods (May–July 2021 and May–August 2020) when the analytical process was not in control, this is marked by several erratic data points and trends observed in multiple CRMs. However, since the CRM data of other elements reviewed (Al, Fe, As (Figure 11-4), Sb and Rb) do not indicate erratic behaviour during the aforementioned periods, the pXRF analytical process is considered to have been in control.

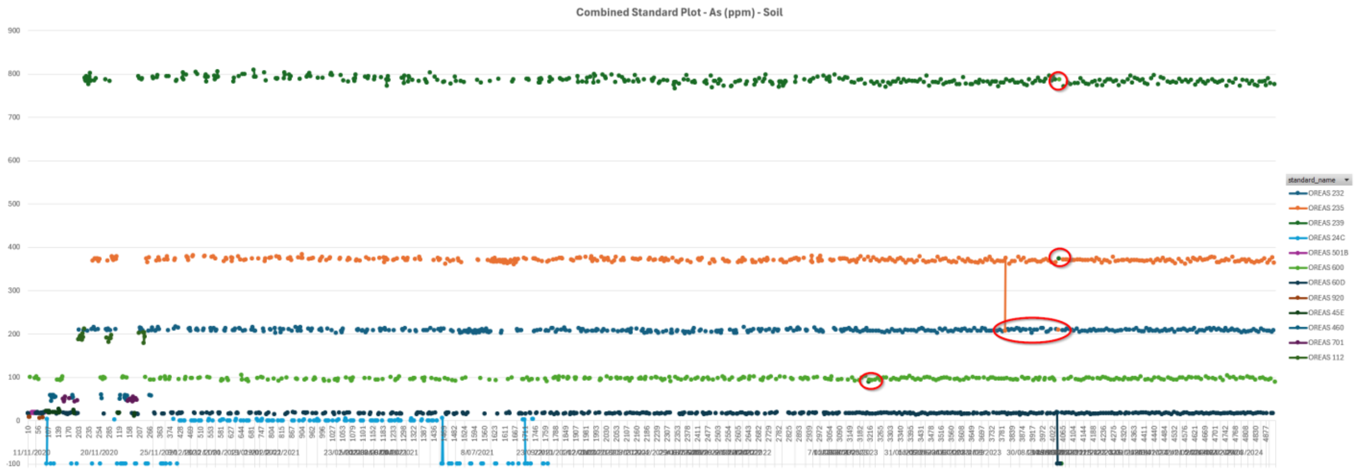


Figure 11-4: Combined CRM chart of selected CRMs analysed for As by pXRF, possible sample swaps noted by red circles.

The quality of the pXRF analytical process can also be assessed by reviewing the RD between the original and replicate measurements. A replicate measurement is where a second pXRF reading is taken without moving the sample. The RD plot present in Figure 11-5, indicates the analytical process was in control, with no trends or step changes observed in the data.

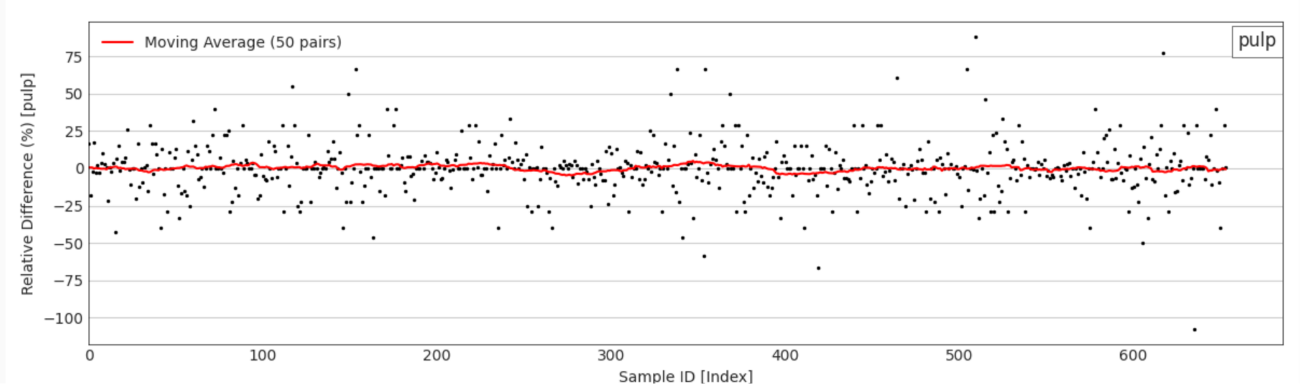


Figure 11-5: The RD in As grades between the original and replicate measurements against time, illustrating soil samples only. Data filtered to above LOQ (2 ppm).

11.5.3.2 *Diamond Drill Samples*

11.5.3.2.1 Collar Location

No quantitative collar location QC data were available to review, so it could not be established if the collar location data capture process was in control or not. Quality control of the collar location data, as derived from a combination of drillhole collar positions and downhole surveys, should occur on site, as surveys are being conducted by performing check measurements and applying performance thresholds, such as dog-leg severity for downhole surveys. RGL collected multiple hand-held GPS measurements at each collar and validated the collar coordinates against high-resolution LiDAR imagery. The multiple GPS measurements were not recorded in the RGL database. The QP recommends RGL records the repeat GPS measurements to be able to quantitatively assess the quality of the location data. However, based on the SOP, and LiDAR verification, the QP is in the opinion that, in view of the DQO, the risk associated with the collar location data is low.

11.5.3.2.2 Downhole Survey

The downhole survey was monitored daily via radio checks between the drilling contractors and RGL geologists. One hole, WEL013, was abandoned due to major deviations after it struck a major fault system at depth.

The downhole survey instrument was not tested at the start of each day, contrary to this being a requirement as per the SOP. No quantitative control data (e.g. magnetic field strength, magnetic dip, gravity) were recorded over the course of the drill programme to monitor the quality of the downhole survey data. The Reflex gyro survey device seeks out true north with no risk of magnetic interference and has internal QC procedures that flag surveys as failed if certain parameters (e.g. the misclose) exceed predetermined limits. The downhole surveys and the associated QC aspects were managed by the drillers. Because the Reflex Gyro Sprint-IQ is easy to operate, and because it auto-validates the survey data, the downhole survey process is considered to have been in control throughout the programme.

11.5.3.2.3 Density

No density data have been collected.

11.5.3.2.4 Primary Sample

The primary sample is collected at the drill bit. The quality and consistency of the primary sample for diamond drilling was monitored, by proxy, by assessing the core recovery. The drillers used drill blocks to record drill recovery, which were checked by RGL geologist during core mark-up. When poor core recovery was identified by the geologist (<90% as outlined in the SOP), the geologist would alert the drillers. The QP considers this good practice.

The quality control data, by proxy of recovery data, indicate that the diamond drilling process was not always in control with step-drops, and out-of-threshold recoveries demonstrated throughout the drilling campaign (Figure 11-6). The decrease in sample recovery corresponds to a change in drilling rigs and core size (switch to mini rig drilling NQ core). Recovery increased as the drilling operators became more familiar with the rig. Cyclic dips in the recovery correspond to the start of new holes, as the ground was typically more weathered at the surface. More recent drilling at Pactolus and Raglan has demonstrated an improvement in sample recovery due to the change back to HQ core.

The QP considers that low risk, associated with the NQ diamond core sampling consistency, exists, and there may be minor impacts on any resource classifications that are based on these data.

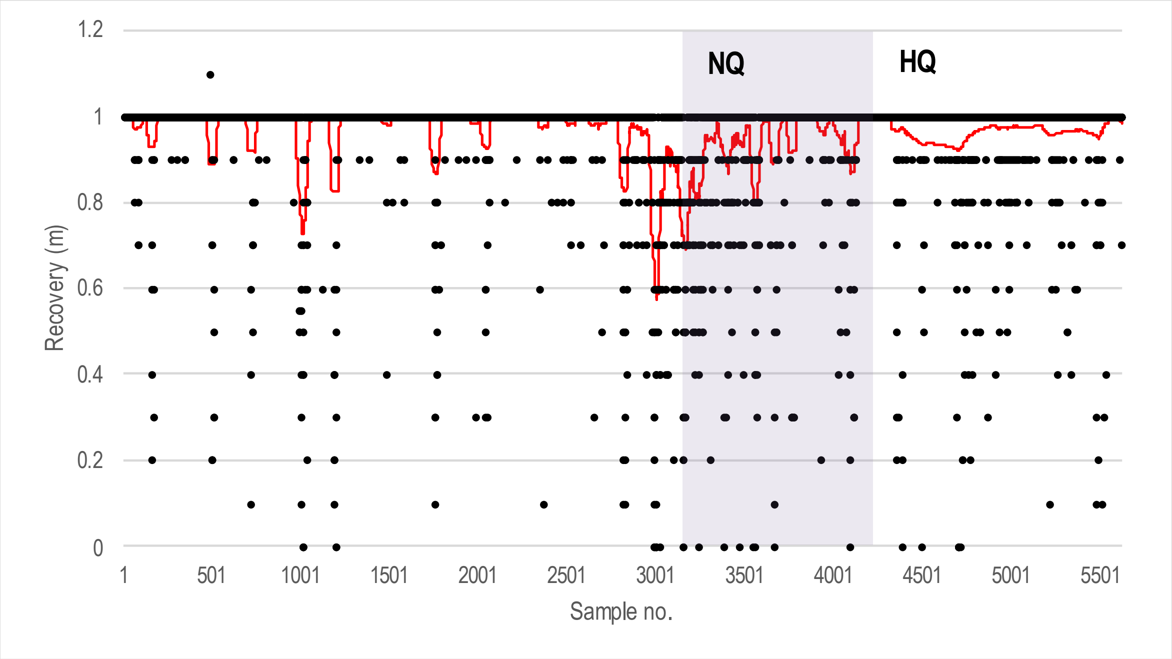


Figure 11-6: Sample recovery per metre sample. Shaded grey background represents data from NQ holes. The remaining data are from HQ and PQ holes.

11.5.3.2.5 First Split

The quality of the first splitting process is typically monitored by the collection of duplicate or repeat samples. The consistency of the splitting process can be broadly assessed by tracking the RD of the duplicate or repeat pairs over time.

For diamond drilling, the first split occurs when the core is cut. No first-split (half-core) duplicate or repeat samples were collected by RGL. Therefore, RSC cannot determine if the first-split process has been in control. In the QP's opinion, this is acceptable for the purpose of delineating exploration targets. However, the QP recommends collecting quarter-core samples to compare with the opposing quarter core sample for any diamond drillholes that are included in a future resource estimate (see Stanley, 2014) for an explanation.

11.5.3.2.6 Second Split

No second-split duplicates of core samples were collected during the crushing stage. Therefore, RSC cannot determine if the second-split process has been in control. In the QP's opinion, this is acceptable for the purpose of delineating exploration targets. The QP recommends collecting second-split repeat samples for any future resource delineation drilling programmes from the same samples that have core split duplicates.

11.5.3.2.7 Third Split

Further reduction of the drill core sample (pulverisation) was carried out at the laboratory, after which another split was collected. SGS Westport collected a duplicate sample at a frequency of one per batch, or at 1:100 for batches larger than 100 samples. The RD between sample pairs reporting above the Au detection limit is depicted in Figure 11-7. Only 14 third-split pairs returned Au data above the detection limit, which is not sufficient for a meaningful statistical analysis. Three sample pairs report ~30% difference, which corresponds to a difference of 1 ppm between the original and duplicate sample. In each case, the grade of the duplicate sample was higher than that of the original sample. This requires follow-up investigations with the laboratory and may require adjustment of the pulp splitting processes to better homogenise the material before the final aliquot is prepared.

Repeat samples collected from the pulp bag were also analysed by pXRF. Three outliers were removed from the data, reporting a RD of ~75%, which may represent sample swaps. No major trends and step changes were observed (Figure 11-8), and the third-split process is considered to have been in control.

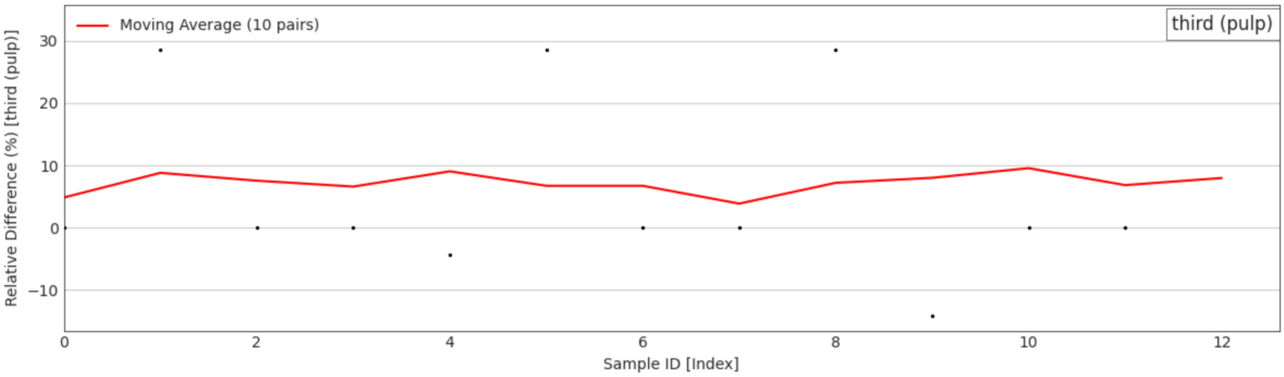


Figure 11-7: The RD in Au grades between the original and third-split duplicate pairs against time. Core Samples only. Au analysed by FA505 at SGS Waihi.

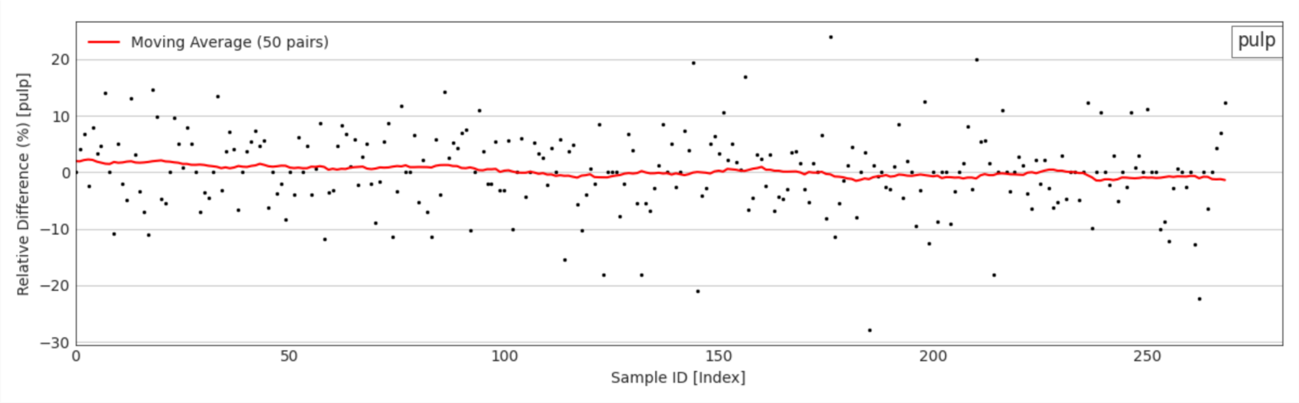


Figure 11-8: The RD in As grades between the original and third-split duplicate pairs against time. Core samples only. Arsenic analysed by pXRF at the RGL office.

11.5.3.2.8 Analytical Process: SGS

For the analysis of the drillhole samples, RGL inserted six different CRMs into the sample stream to control the quality of the analytical process (Table 11-2). No IRM data were available for RSC to review. RSC has conducted an *a posteriori* review of the CRM data to determine consistency of the analytical process that delivered the data. However, because only few and widely spaced data points per CRM are available, a statically valid, in-depth assessment of the CRM data is not possible. A visual assessment of Shewhart control plots, for the different CRMs inserted, indicated four of the CRMs reported at least one analysis reporting outside three standard deviations; however, none of these instances occurred on the same day. The QP recommends that RGL obtains and frequently reviews the SGS IRM data and insert CRMs at higher frequency so that their analysis becomes statistically meaningful.

Table 11-2: Certified reference material analysed for the Reefton Gold diamond core samples.

CRM	Source	Material	Cert. Value Au (ppm)	Standard Deviation	Number of Assays
SC110	Rocklabs Ltd	Sulphide	0.235	0.009	4
SL76	Rocklabs Ltd	Sulphide	5.960	0.192	6
Si81	Rocklabs Ltd	Sulphide	1.790	0.030	8
SE101	Rocklabs Ltd	Sulphide	0.606	0.013	10
OxE150	Rocklabs Ltd	Oxide	0.658	0.016	10
SN103	Rocklabs Ltd	Sulphide	8.520	0.146	5

RGL inserted 43 sample blanks across 34 work orders. Four sample blanks returned detectable but low grades of Au, ranging from 0.01–0.05 ppm (Figure 11-9).

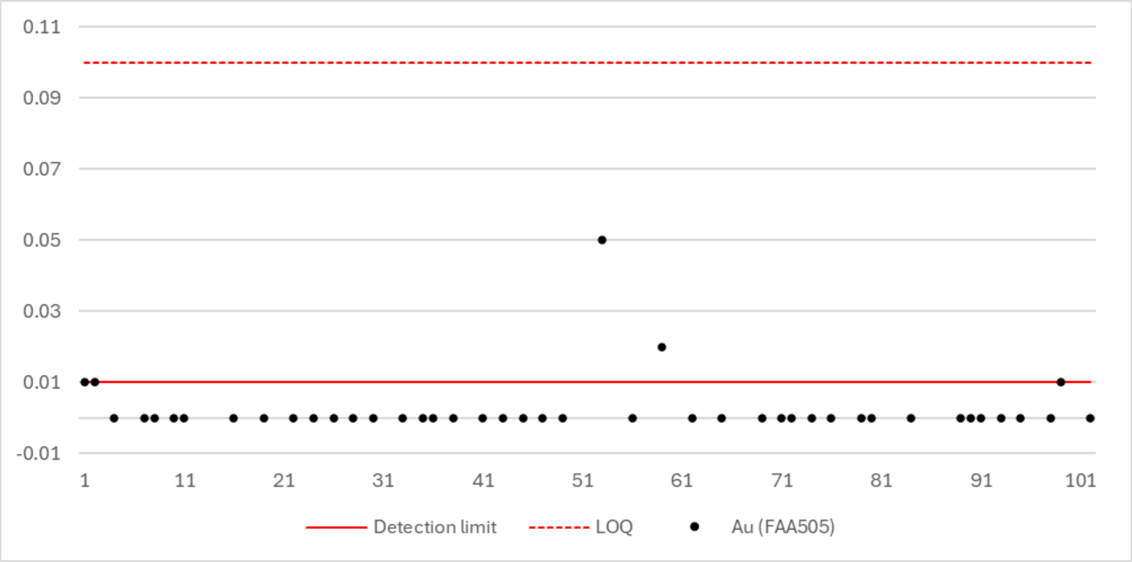


Figure 11-9: Plot of sample blank analysis conducted at SGS Waihi.

11.5.4 Quality Acceptance Testing

Quality acceptance testing (QAT) is where a final judgement of the data is made by assessing the accuracy and precision of the data, for those periods where the process was demonstrated to be in control, and separately for those periods where the process was demonstrated to be not in control. Accuracy and precision are evaluated, and a final pass/fail assessment is made based on the DQO.

11.5.4.1 Soil Samples

11.5.4.1.1 Surface Sample Location

There are no quantitative quality data available for the surface sample location collection process; hence, accepting the quality (accuracy and precision) of the surface sample location data, based on statistically defined thresholds, is not possible. Based on the review of processes, systems and tools available to determine surface sample locations (section 11.5.2.1.1), the surface samples location data are considered fit for the purpose of defining exploration targets.

11.5.4.1.2 Primary Sample

A practical way to check and verify the quality of a primary sample is to validate it against, or compare it with, a sample of a known grade. In simple terms, the difference between the analysed value and the 'known' value is then defined as the bias, a measure of sample quality. Precision can be benchmarked by comparing the variance in the measurements of samples with the variance in the check samples. This is the principle, for instance, behind the utility of laboratory CRMs.

A total of 424 repeat soil samples were collected in the field, of which, 429 sample pairs returned grade data above the LOQ for As (analysed by pXRF). The review of the As data indicates there is good correlation between the original and repeat hole, with a root mean square CV (RMSCV) (Stanley & Lawie, 2007 and Abzalov, 2008) of 27%. The quantile-quantile (QQ) plots do not indicate significant bias, and ranked Wilcoxon tests confirm that there are no statistically significant biases at 95% confidence. The scatter in the repeat data likely reflects a large component of natural inherent variability of As in the soil (Figure 11-10), and to a lesser degree variance from sampling errors.

The Au repeat data exhibit high variability (Figure 11-11), which is reflected in the RMSCV of 64.7%. At low grades (2–15 ppb), the QQ plot indicates there is no bias towards the original sample; and ranked Wilcoxon tests confirmed there are no statistically significant biases at 95% confidence (Figure 11-11).

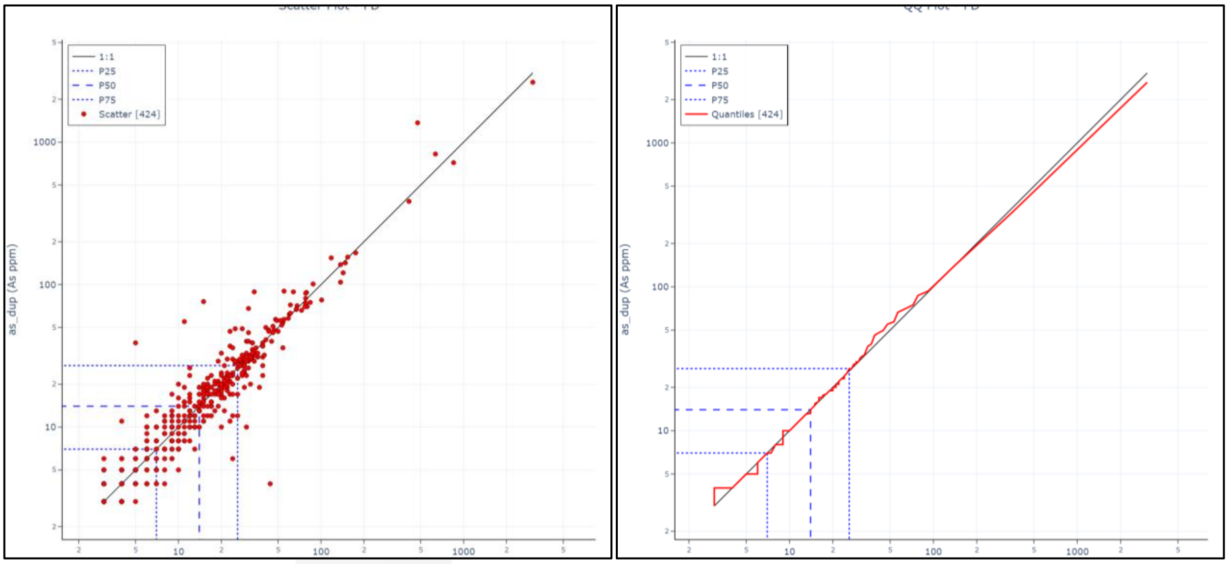


Figure 11-10: Scatter and QQ plots for field repeat samples analysed for As by pXRF. Data filtered to above LOQ (2 ppm As).

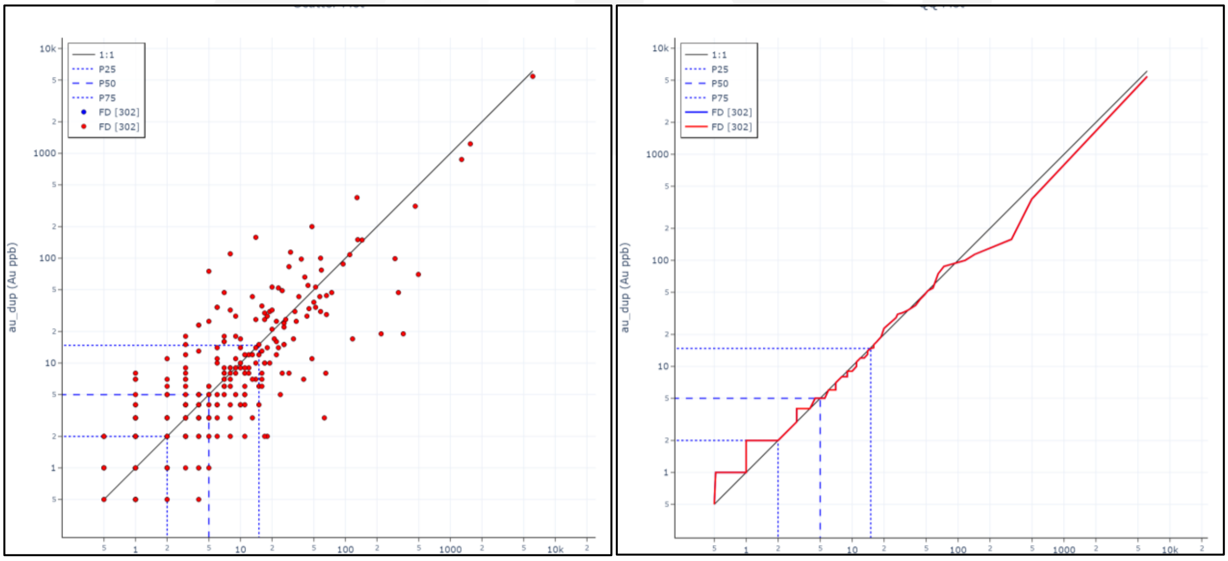


Figure 11-11: Scatter and QQ plots for field repeat samples analysed for Au by aqua regia extraction with ICP-MS at ALS Brisbane.

11.5.4.1.3 First Split

No QC data are available for the first splitting stage for the soil samples, hence the quality of the first splitting process cannot be quantitatively determined. Based on the adequacy of the operating procedures (section 11.5.2.1.3), the QP is of the opinion that data resulting from the first splits are fit for the purpose of delineating exploration targets.

11.5.4.1.4 Second Split

Scatter and QQ plots indicate a good correlation between second-split sample pairs (Figure 11-12). The QQ plot and ranked Wilcoxon test confirm there is no statistically significant biases at 95% confidence. The RMSCV is an acceptable 16%. As expected, the RMSCV of the second split repeat pairs is significantly lower than that of the primary sample repeat pairs.

Based on the quantitative quality data and the adequacy of the operating procedures (section 11.5.2.1.4), the QP considers the second-split data are fit for purpose with respect to the DQO.

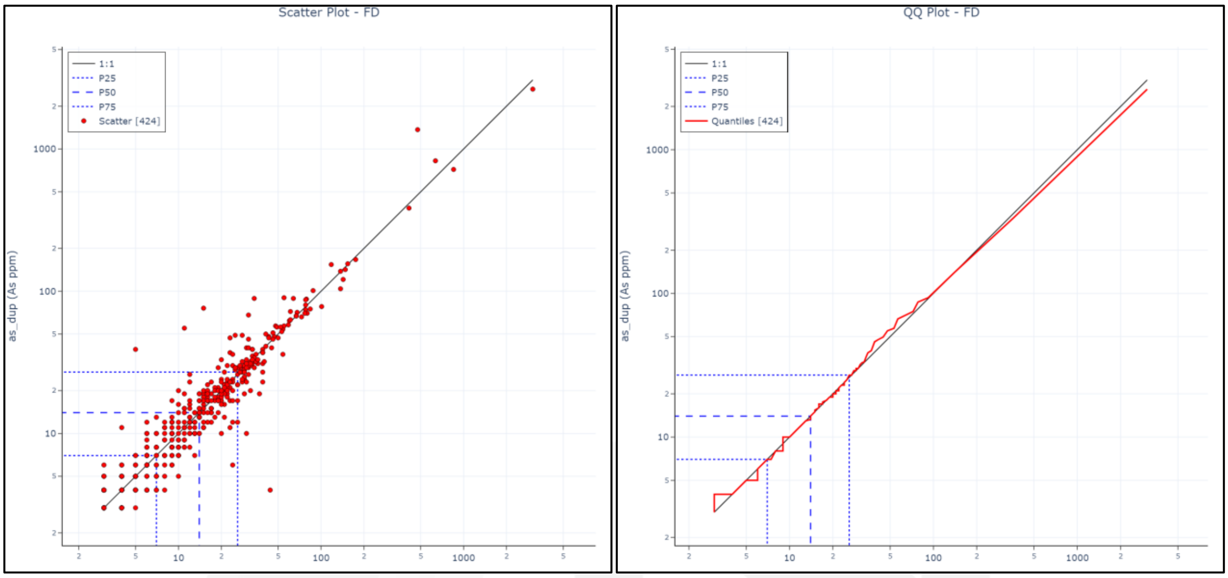


Figure 11-12: Scatter and QQ plots for second split soil samples, analysed for As by pXRF.

11.5.4.1.5 Analytical Process: ALS

No CRMs were inserted during the analytical process at ALS, and no IRM data were available. Therefore, the quality of the analytical process cannot quantitatively be determined. Based on the review of processes, systems and tools (section 11.5.2.1.5), the analytical data are considered fit for the purpose of estimation and resource classification.

11.5.4.1.6 Analytical Process: pXRF

To compensate for longer-term trends in pXRF analytical results related to instrumental drift, CRM data are used for calibration purposes. Because of this drift, the CRM data are not suitable to determine the accuracy and precision of the pXRF analytical data. As a proxy, replicate measurements collected at a rate of 1 in 20 were assessed by the QP. A review of the pXRF replicate data for As indicates a good correlation (RMSCV of 16%) and no statistical bias (as calculated by Wilcoxon test) between the original and replicate data (Figure 11-13). In the opinion of the QP, the pXRF data are fit for purpose with respect to the DQO.

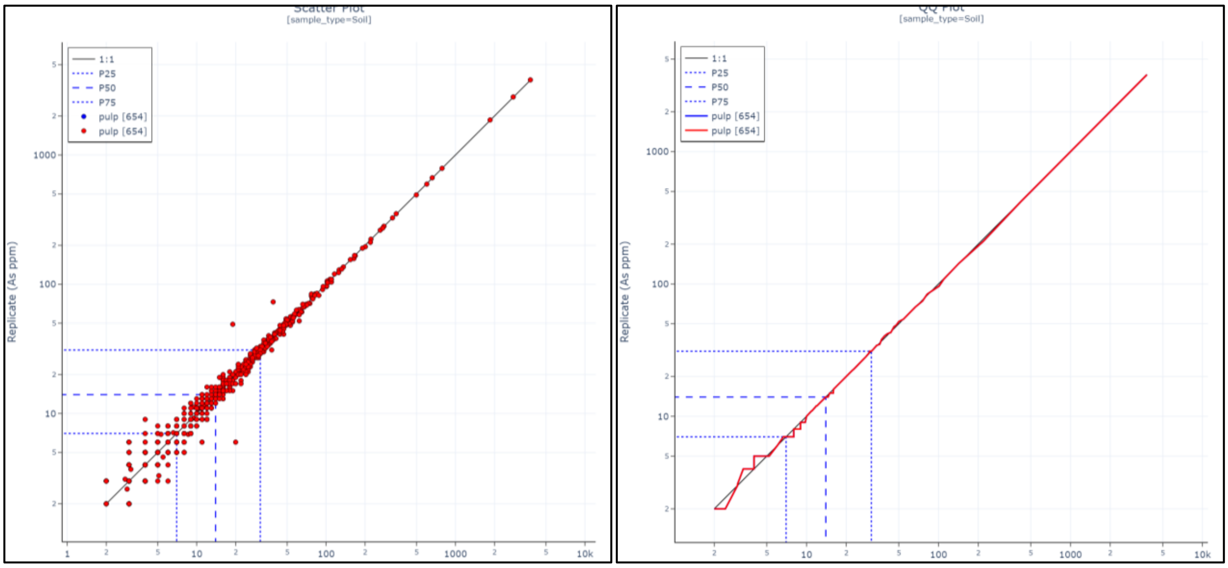


Figure 11-13: Scatter and QQ-plots replicate analyses, analysed for As by pXRF.

11.5.4.2 Diamond Drill Samples

11.5.4.2.1 Collar Location

There are no quantitative quality data available for the collar location collection process; hence, accepting the quality (accuracy and precision) of the collar location data based on statistically defined thresholds is not possible. Based on the review of processes, systems and tools available to determine collar locations (section 11.5.2.2.1), the collar location data are considered fit for the purpose of defining exploration targets.

11.5.4.2.2 Downhole Survey

No quantitative quality downhole survey data were collected, and therefore, the quality of the analytical process as determined by accuracy and precision cannot be determined. Based on the adequacy of the operating procedures (section 11.5.2.2.2), the downhole survey data are considered fit for the purpose of defining exploration targets.

11.5.4.2.3 Density

No density data have been collected.

11.5.4.2.4 Primary Sample

A practical way to check and verify the quality of a primary sample is to validate it against, or compare it with, a sample of a known grade. In simple terms, the difference between the analysed value and the ‘known’ value is then defined as the bias, a measure of sample quality. Precision can be benchmarked by comparing the variance in the measurements of samples with the variance in the check samples. This is the principle, for instance, behind the utility of laboratory CRMs.

For the primary sample, i.e. The sample collected at the drill bit, such options do not readily exist. The next practical way to determine the quality of the primary sample is to compare it with a sample of similar or better quality, taken at the same location. This process is often called ‘twinned drilling’, but it can be used anywhere, where a sample from drill type A is close enough to a sample from drill/sample type B.

As of the effective date of this Report, no twin drilling has been conducted at the Reefton Project. In the QP's opinion, this is acceptable for early-stage exploration programmes, but twin drilling, particularly of significant intersections, is recommended as the project progresses to resource definition.

The quality of the primary sample can be assessed, by proxy, through assessing sample recovery rates. Sample recovery was actively monitored during drilling (section 11.5.3.2.1). Drill core recovery for the Reefton Project averages 96%; however, it is noted that the average recovery for DD-PAC-014 was only 51%. DD-PAC-014 was the first hole drilled using the mini rig. Core recovery improved after hole 014, as the drillers became more familiar with the rig and ground conditions.

The QP notes that an average 96% recovery is a relatively standard recovery target for DD drilling, under most conditions. The data are fit for purpose of interpreting exploration results, but poor performance from DD-PAC-014 should be further reviewed in case of any future resource estimation.

As a back-door check for primary sample quality, the sample recovery can be used as a proxy to investigate the impact of grade distribution. No trend is observed between sample recovery and Au grade (Figure 11-14).

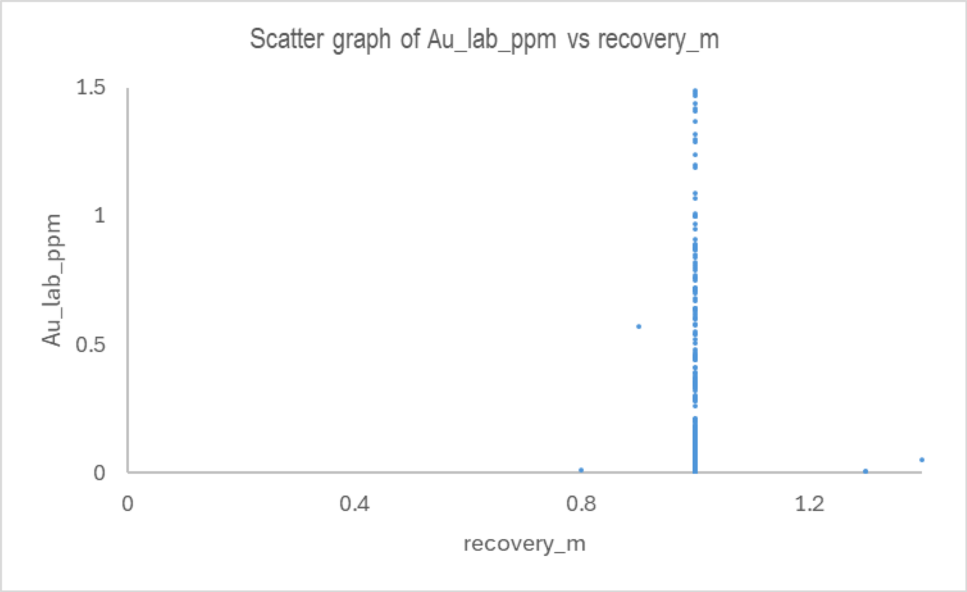


Figure 11-14: Sample recovery vs Au grade (laboratory fire assay).

11.5.4.2.5 First Split

No first-split duplicate samples were collected; therefore, it is not possible to determine the accuracy and precision of the first split based on statistically defined thresholds. Based on the adequacy of the operating procedures (section 11.5.2.2.5), in the QP's opinion, the sub-sampling methodology is appropriate for the style of mineralisation, and the quality of the data are accepted with respect to the DQO. The QP notes that in absence of orientation lines, and therefore a consistent cut line, there is a residual risk of sample selection bias towards visible gold or sulphide presence. This needs to be captured in the SOPs and must be controlled in future drilling by collecting duplicate samples from the core.

11.5.4.2.6 Second Split

The absence of quantitative QC data on the second split (crush) limits the ability to determine the quality of this split based on statistically defined thresholds. However, based on the adequacy of the operating procedures (section 11.5.2.2.6), in the

QP's opinion, the sub-sampling methodology is appropriate for the style of mineralisation, and the quality of the data are accepted with respect to the DQO. The QP recommends that duplication is routinely carried out by the laboratory to understand any quality issues at this stage of splitting.

11.5.4.2.7 Third Split

Third-split repeat samples of the PQ and HQ core were collected by SGS Westport. A minimum of one repeat was collected per work order batch. Additionally, for batches larger than 100 samples, additional repeats were collected at a rate of 1:100. A total of 39 repeat samples were collected; however, only 21 were analysed for Au, and only 13 sample pairs returned above detection limit (>0.01 ppm) Au grades. Figure 11-15 presents the scatter and QQ plots for Au. Wilcoxon signed-ranked test indicates there is no statistically significant bias introduced during the third (pulp) split.

A larger population (n=269) of third-split repeat pairs were analysed by pXRF. Arsenic data supports the quality of the Au data, with an RMSCV of 6%, and based on signed Wilcoxon tests, there is no statistically significant bias at 95% confidence.

SGS Waihi also collected and analysed additional third-split repeat samples as part of its internal QC processes (at least one per batch). Figure 11-16 presents the scatter and QQ plots for Au. Wilcoxon signed-ranked test indicates there is no statistically significant bias between the original and repeat analyses.

On the basis of the repeat analysis, in the opinion of the QP, the splitting of pulps produced data of an acceptable quality with respect to the quality objective.

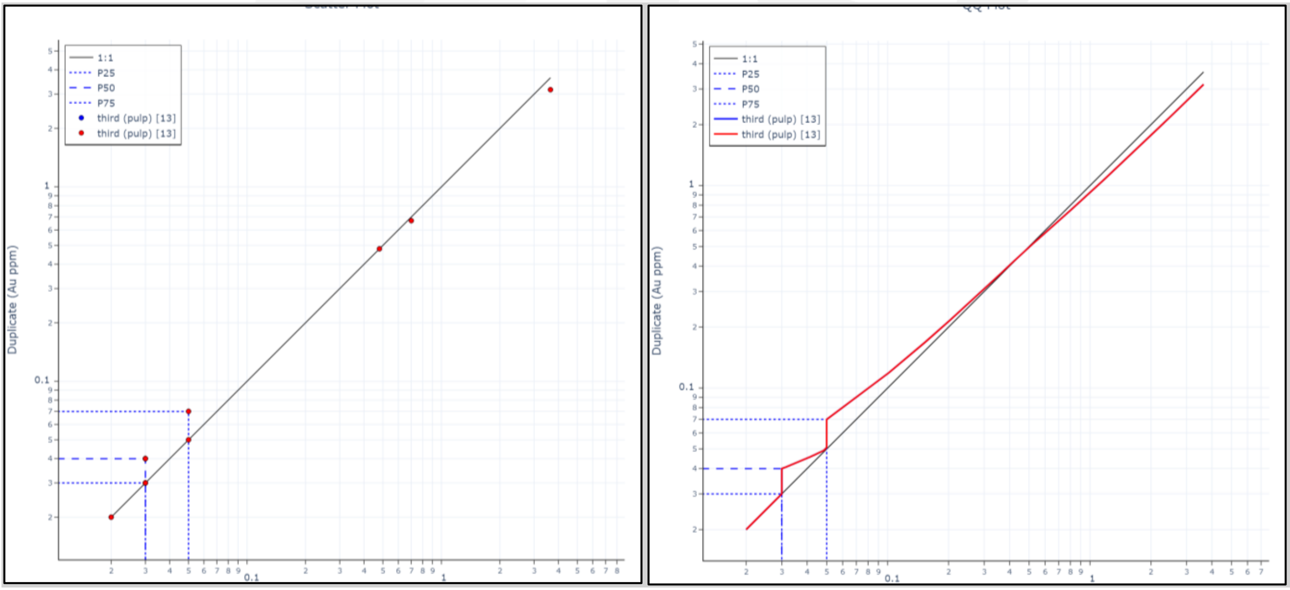


Figure 11-15: Scatter and QQ plots of third-split (pulp) repeat pairs from diamond drill samples collected by SGS Westport.

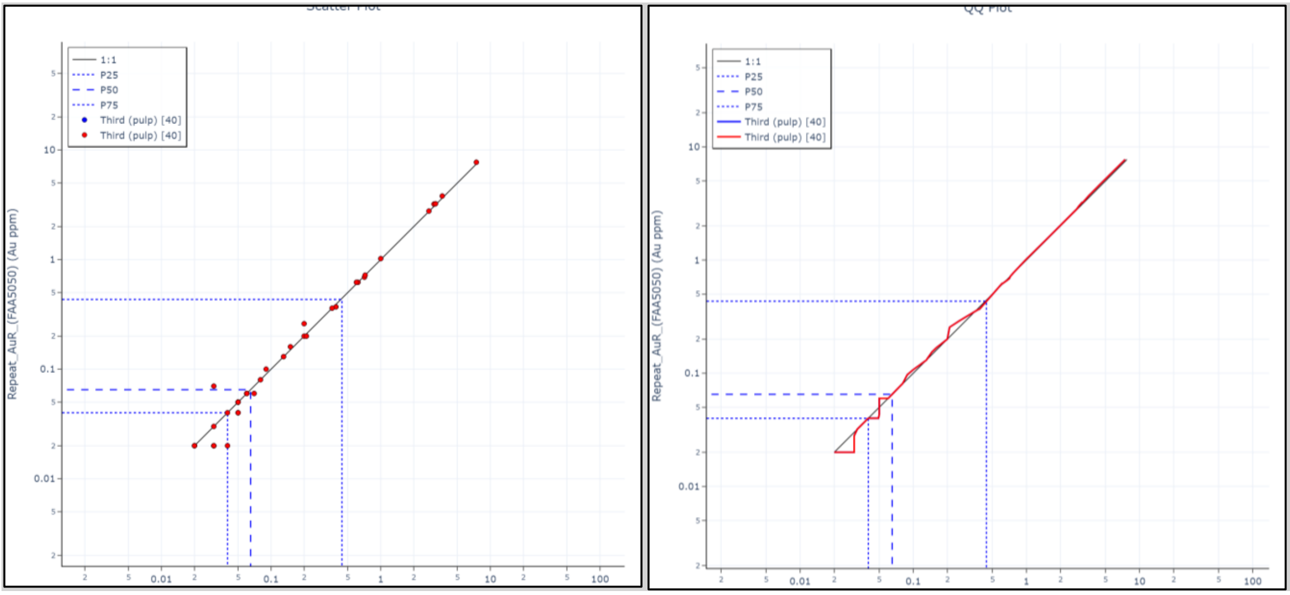


Figure 11-16: Scatter and QQ plots for third-split (pulp) repeat pairs from diamond drill samples collected by SGS Waihi.

11.5.4.2.8 Analytical Process: SGS

Due to the small sample size for each CRM (n<10), it is not possible to carry out a meaningful statistical analysis of the CRM data. A basic assessment of the CRM data did not suggest any issues. No SGS IRM data were available for review. Based on the adequacy of the procedures (section 11.5.2.2.8) and the visual assessment of the CRM data, in the QP's opinion, the analytical process can be expected to not have unduly affected the quality of the data to such a degree that interpretations of exploration potential cannot be made. The QP recommends RGL increases the number CRMs for future analytical programmes, specifically as the project progresses to resource definition.

11.6 Summary

Following a review of the available quality data and SOPs, the QP considers the location, sampling, preparation, and analytical data to be fit for the purpose of exploration targets and interpretation of exploration results. A summary of the data quality is presented in Table 11-3, where the process has been divided into the various sampling and preparation stages.

Table 11-3: Summary of data quality review for the Reefton Project. NA = not available. NS = not sufficient data. FA = fire assay.

Sample Type	Data Type	QA	QC	Accuracy	Precision	Fit for Purpose	Comment
Soil Sample	Surface Sample Location	Pass	NA	Unknown	Unknown	Yes	No quantitative control data collected for surface sampling programme.
	Primary Sample	Pass	Pass	Pass	Pass	Yes	SOPs available for review. No bias observed between primary and repeat sample pairs. Data fit for purpose.
	First Split	NA	NA	Unknown	Unknown	Yes	No SOPs or quantitative control data were available. Process is standard; data are fit for purpose.
	Second Split	Pass	Pass	Pass	Pass	Yes	SOP available for review. Quantitative control data indicate splitting process was in control, and data are fit for purpose.
	Analytical Process: ALS	NA	NA	NA	NA	Yes	No SOPs or quantitative control data were available. Process is standard; internationally accredited laboratory, data are fit for purpose.
	Analytical Process: pXRF	Pass	Pass	Pass	Pass	Yes	Comprehensive SOP. Quantitative control data were collected and indicate the data are fit for purpose.
Drill Sample	Collar Location	Pass	Pass	Unknown	Unknown	Yes	Collar location data were compared to LiDAR imagery to confirm quality. DGPS measurements recommended for future resource drilling.
	Downhole	Pass	NA	Unknown	Unknown	Yes	Comprehensive SOP; however, QC processes not adhered too.
	Primary Sample	Pass	Pass	Pass	Pass	Yes	SOP available for review. Recovery data indicates issues related to the switch of rig, but data are fit for purpose.
	Density	NA	NA	Unknown	Unknown	NA	No density data collected.
	First Split	Pass	NA	Unknown	Unknown	Yes	SOP was available for review. No quantitative control data collected.
	Second Split	NA	NA	Unknown	Unknown	Yes	No quantitative quality control data collected. Coarse crush reject was discarded after analysis. The QP strongly recommends the collection of coarse crush duplicates and to retain all excess coarse crush material for future quality check analysis.
	Third Split	NA	Pass	Pass	Pass	Yes	No SOP available for review. Quantitative control data collected indicate data fit for purpose.
	Analytical Process: SGS	NA	Pass	Pass	Pass	Yes	No SOP available for review. Blind CRMs and sample blanks indicate analytical process in control, and data fit for purpose.

12. Data Verification

12.1 Drillhole Database

A digital database was supplied to RSC by RGL. RGL manages a cloud-based Isogonal database. The QP, or RSC staff under his supervision, has independently reviewed the RGL drilling, soil sample and rock chip database, and supporting records, logs and photos. The first 11 drillholes were logged using paper logs before transitioning to digital logging via a tablet. RSC staff, under the supervision of the QP, verified a representative number of paper logs including collar, sampling, lithology and geotechnical logs against the digital database. One minor typo in the geotechnical log was identified and quickly corrected by RGL. The digital database contains more entries than the paper log, as some intervals were not logged at the time of drilling but were subsequently digitally logged when time permitted. The digital logs were also verified against the database, and no transcription errors were identified.

12.2 Collar Locations

During the second site visit, the QP visited drill platforms 1, 2, and 3 to verify collar positions (Figure 12-1). The QP did not visit the collar locations at the Golden Treasure prospect, as these holes have been remediated by RGL.

On the third site visit, the QP visited the collar locations at the new drilling target, Raglan. The QP did not visit new collar locations at Pactolus, as the area had been visited previously in 2021 and 2023. All collars checked by the QP matched the recorded collar location within a margin of error (GPS error range).

Figure 12-1: QP checking collar locations at Raglan (RAG032 &033).

12.3 Sampling Verification

During the site visits, the QP checked database entries with core retained on site (Figure 12-2). The QP also checked the SOP against core sample specifics. No issues or discrepancies were observed.

Figure 12-2: Core tray verification conducted by the QP (RAG31: Box 60 & 61).

12.4 Half Core & Pulp Check Sample Analysis

During the second site visit, the QP collected 30 half-core and 30 pulp duplicates of mineralised intervals to validate mineralised intervals and check for sampling bias. Samples were purely selected on geological mineralisation features and not on a minimal cut-off grade, to prevent selection bias in the analysis. These samples were bagged and sent to SGS Westport for sample preparation (half-core) and then to SGS Waihi (half-core and pulp duplicates) for sample analysis. Sample preparation and analysis followed the same methods as described in sections 11.1.4 and 11.2.3.

Figure 12-3 indicates two outlier samples, but otherwise suggests no bias in the sampling. It provides a good verification of the sampling, preparation and assaying processes conducted by RGL.

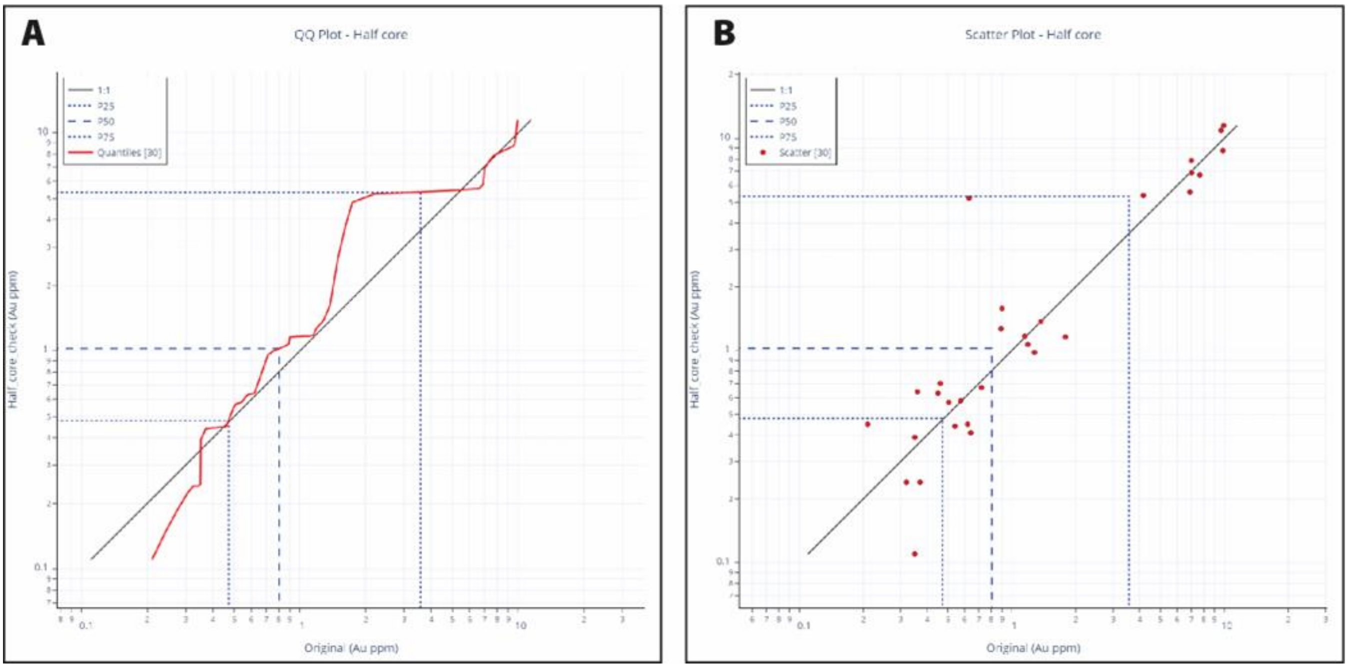


Figure 12-3: Comparison between half-core check samples. **A.** QQ plot, original sample on x-axis, check sample on y-axis; **B.** scatter plot.

Table 12-1: Precision summary table for half-core check samples.

Split Type	Analyte	N Pairs	Wilcoxon p-value	Wilcoxon (p95)	RMSCV (%)
Half Core	Au	30	0.627	Accept H0	40

The pulp sample check indicates no apparent bias for the selected samples (Figure 12-4). This interpretation is supported by a Wilcoxon test (Table 12-2), which demonstrates at 95% of confidence that H0 is accepted (no apparent bias). Root Mean Square CV (Stanley & Lawie, 2007 and Abzalov, 2008) for the selected population is 15% (Table 12-2), indicating a reasonable precision for pulp sample pairs that were assayed at different times.

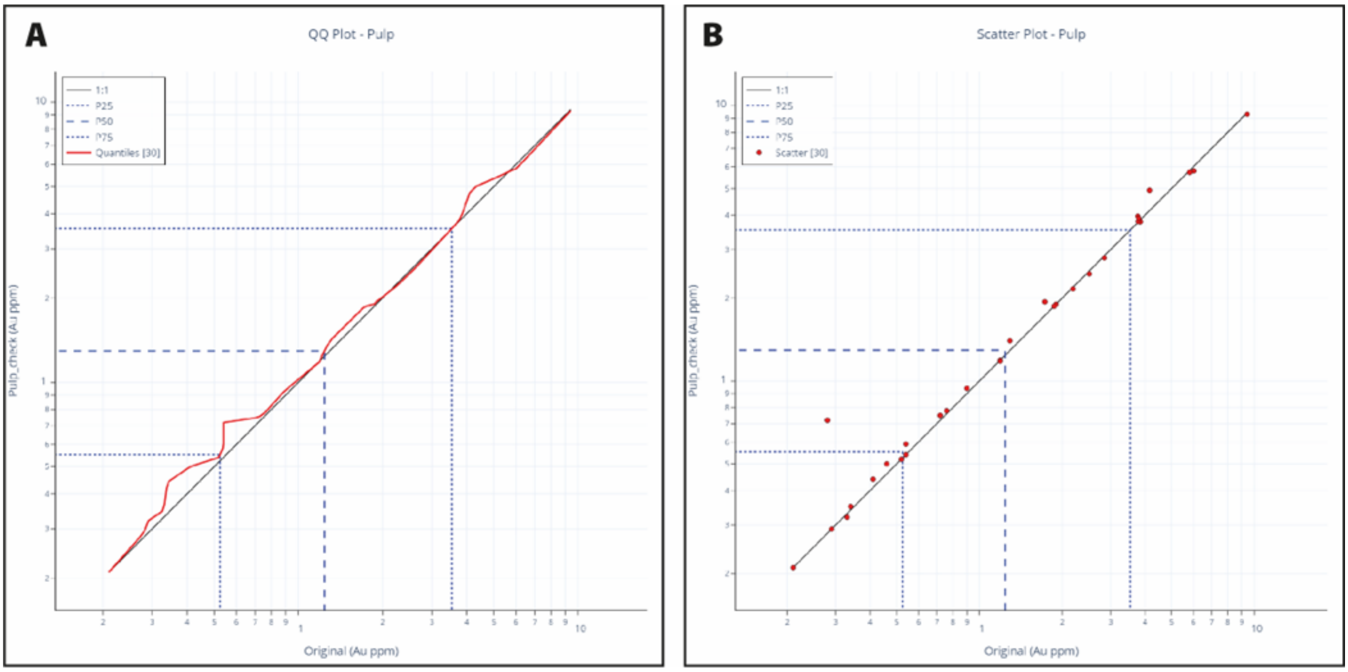


Figure 12-4: Comparison between pulp check samples. **A.** QQ plot, original sample on x-axis, check sample on y-axis; **B.** scatter plot.

Table 12-2: Precision summary table for pulp check samples.

Split Type	Analyte	N Pairs	Wilcoxon p-value	Wilcoxon (p95)	RMSCV (%)
Pulp	Au	30	0.273	Accept H0	15

12.5 Summary

Checks completed by the QP, or under the direct supervision of the QP, only uncovered minor database errors, which were corrected. The QP collected a total of 60 check samples (mix of half-core and pulp samples), which indicated an expected correlation compared with the original sampling. Overall, in the QP's opinion, the data were collected through proper processes, quality controlled to be fit for the purpose of exploration targeting, and the data resulting from the process managed well in appropriate management systems.

13. Mineral Processing & Metallurgical Testing

No metallurgical work has been completed on any of the RGL permits to date.

14. Mineral Resource Estimates

No Mineral Resources have been estimated for the Reefton Project to date.

23. Adjacent Properties

There are three other significant hard-rock Au property holders in the Reefton-Buller region: Federation Mining, Siren Gold Ltd, and OceanaGold (Figure 23-1).

Please note that the QP author has been unable to verify the scientific and technical information related to the adjacent properties discussed below in sections 23.1 to 23.3, and this information is not necessarily indicative of the mineralisation potential at the Reefton Project.

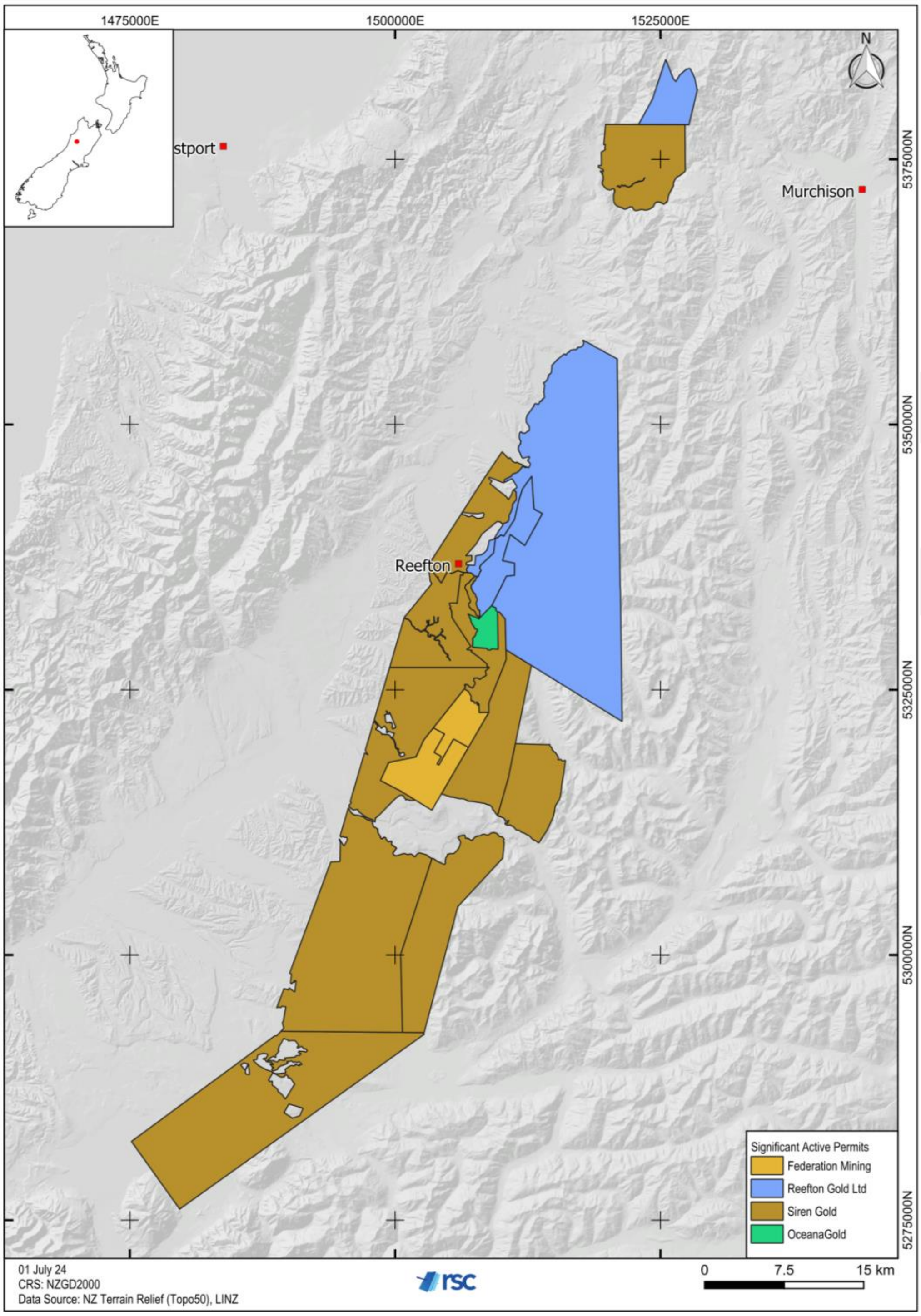


Figure 23-1: Significant properties in the Reefton area.

23.1 Federation Mining: Snowy River Project

Federation Mining has purchased the Snowy River Mine Project asset from OceanaGold. The project is located 20 km south of Reefton. Federation Mining's objective is to establish an underground mine at the site of the historical Blackwater mine. Construction of two 3.3-km twin declines is complete, which will provide a site for underground drilling to build greater geological confidence. OceanaGold has reported an Inferred Au mineral resource of 700,000 oz Au (Table 23-1; OceanaGold, 2018). A 20-year mining permit has been granted, and the company is aiming to start mining in 2024, with a 10-year mine life.

Table 23-1: Mineral resources reported at Snowy River (OceanaGold, 2018).

Company	Project	Classification	Cut-off (g/t)	Ore (Mt)	Au Grade (g/t)	Au (koz)
Federation Mining	Snowy River	Inferred	-	0.9	23.0	700

23.2 Siren Gold Ltd

Siren Gold Ltd (Siren Gold) is a Au exploration company, with property in the Reefton Goldfield, the Lyell Goldfield, and Sam's Creek, in the northern area of the South Island of New Zealand. Siren Gold has six key projects including Alexander River, Big River, Lyell, Sam's Creek, Auld Creek, and Cumberland. Siren Gold is listed on the ASX (ASX: SNG) and has reported Inferred mineral resources for Sam's Creek, Alexander River and Big River outlined in Table 23-2.

Table 23-2: Mineral resources reported at Siren Gold projects.[2]

Company	Project	Classification	Cut-off (g/t)	Ore (Mt)	Au Grade (g/t)	Au (koz)
Siren Gold	Sam's Creek	Indicated	1.5	3.3	2.8	295.6
		Inferred	1.5	5.8	2.8	528.8
	Alexander River	Inferred	1.5	1.07	4.95	169.6
	Big River	Inferred	1.5	0.83	3.94	105.5
	Supreme	Inferred	1.5	1.05	2.71	103.3
	Auld Creek	Inferred	1.5	0.58	3.53	65.8

23.3 Globe-Progress: Reefton Restoration Project

The former Globe Progress Mine is located seven km southeast of Reefton township. Commercial operations commenced in 2007, producing 610,000 oz Au over the eight-year life of the open-pit operation. The mine transitioned from operations to closure and rehabilitation in 2016 and is now known as the Reefton Restoration Project. Restoration has included a comprehensive closure and rehabilitation program, with works involving:

- removal of process plant and infrastructure;

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[2] Siren Gold Limited Annual Report 2023.

- water treatment;
- waste-rock reshaping and landscaping; and
- spreading topsoil and planting trees.

The Globe Progress Mine is the first modern large-scale Au miner in the South Island of New Zealand to move into closure.

24. Other Relevant Data & Information

There is no other known relevant data or information other than that which has been presented in this Report.

25. Interpretation & Conclusions

As of the effective date of this Report, RGL has undertaken ~six years of exploration work on the Reefton Project. Exploration work includes surface sampling, mapping, geophysical surveys, trenching, 3D modelling, and 6668.6 m of diamond drilling. While no significant drilling intersections were found during the 2023 drilling programme, strong gold mineralisation in numerous drillholes was intercepted at depth at RGL's most prospective target, Pactolus. Notable intercepts include DD_PAC_002 with 5 m at 6.28 ppm Au, DD_PAC_004 with 12 m at 9.41 ppm Au, and DD_PAC_022 with 19 m at 1.69 ppm Au, inclusive of 2 m at 8.2 ppm Au.

RGL has continued to conduct large soil sampling programmes consisting of four regional grids and seven infill sampling grids. Over 17,000 soil samples have now been collected and are in the process of pXRF analysis and laboratory Au analysis. Median Au and As grades are 4 ppb and 12 ppm, respectively; and, the soil samples have returned a maximum grade of 32,100 ppb Au, and 14,458 ppm As. Rock-chip sampling has also returned prospective results from Golden Treasure, Pactolus, and Fiery Cross. In 2023, RGL re-ran the targeting process, increasing the number of exploration targets from 18 to 21. The mineral system approach to exploration and targeting lends itself to all scales and allows reiteration of the targeting, as new data and understanding of the geology matures.

For the purpose of defining exploration targets, RGL's practices are considered appropriate by the QP for an exploration project. The risks identified in section 11.5 are predominantly minor and does not materially impact the delineation of exploration targets. However, any future resource drilling should be supported by updated SOPs and the collection of additional duplicate samples to monitor the quality of the sampling, splitting and analytical steps.

Mining in New Zealand is a sensitive subject, and even though the West Coast region has stronger support for mining than the rest of New Zealand, the QP notes RGL must effectively monitor and address these issues in order to not lose its social licence to practice.

26. Recommendations

A subsequent programme of works is recommended by the QP. In addition, the QP makes the following recommendations.

- Update soil sampling SOP to include details regarding sample splitting.
- Update diamond logging and sampling SOP to include procedures specific to different size core (e.g. PQ/HQ vs NQ).
- Undertake professional surveying of drill collar locations.
- Collect density and moisture data from diamond drill core.
- Update SOP and core cutting procedures — for orientated core, the core should be cut along the orientation line (or a few degrees off it to preserve the line). The same half of the core should be sampled for the entire core.
- Collect additional second split duplicate samples from diamond core. If the core is too delicate to sample as quarter core, RSC recommends crushing the entire sample before splitting it in half.
- Retain coarse crush reject material from drill samples.
- Collect third split duplicate/repeat samples from crushed diamond core.
- Increase the number of CRMs blindly inserted into the sample stream to monitor the quality of analytical process.

26.1 Phase 2

Following the exploration work conducted to date, 21 targets have been identified for follow-up exploration (Figure 26-1). Due to the large number of targets, the recommended Phase 2 work programme does not include all the targets. The QP recommends the following Phase 2 work.

26.1.1 Near Mine/Mine Extensions

Historical mines with the Reefton Project are clustered along predominantly north trending shear and fault zones that cut across areas of intense folding. Quartz veins are typically discordant to bedding and strike parallel to axial surfaces of regional-scale north plunging faults. Exploration conducted by RGL demonstrates potential extensions to mined lodes (most historical workings were mined to less than 200–300 m vertically) and the possibility of repeated lode-bearing structures immediately adjacent to historical workings.

26.1.1.1 Murray Creek

VIP (Victoria, Inglewood, Phoenix)

Victoria was part of a mine group (Victoria-Inglewood-Phoenix) which historically produced 33,877.22 oz Au @ 19.9 g/t Au (Barry, 1993). Mining finished at No 7 Level due to increasing costs to the company, decreasing grade — 15.5 g/t Au in the level mining ceased at, and indications of faulting at depth. RGL suggested that the fault below No 7 Level may be similar to that seen at Wealth of Nations — a minor offset that led to an additional 602 m of ore (located in Crushington: 208,970 oz @ 14.2 g/t Au; Gage, 1948). Therefore, potential exists for locating the continuation of these shoots below No 7 Level.

The Inglewood Shoot was 60 m long and ~1 m wide with a grade of 16.7g/t Au. Mining of the shoot ceased after faulting below No 2 Shaft level caused the grade to drop to 9.0 g/t Au (Downey, 1928). The reef in the upper and lower levels of the

Victoria Mine (immediately to the west) was displaced to the southeast by thrust faulting. It is likely that the fault encountered in the upper levels of the Victoria mine was also responsible for the pinching and displacement of the Phoenix and Inglewood shoots below No. 2 shaft level. Therefore, there is good potential for the down-dip continuation of Phoenix and Inglewood shoots (Barry, 1993).

Surface rock chips include 56.2, 48.0, 33.3, 30.3, and 23.2 g/t Au respectively. Soil samples report up to 113 ppb Au. Surface trenching revealed the following.

Inglewood Lode on surface:

- MC_C03 3m @ 31.7 g/t Au including 2m @ 47.1 g/t Au; and
- MC_C04 12m @ 6.4 g/t Au including 1m @ 63.9 g/t Au.

Phoenix Jog extension:

- MCCRAE05 3m @ 1.7 g/t Au; and
- MC_C06 2m @ 2.9 g/t Au.

The QP recommends an infill soil grid, 3D reconstruction of historical veins and ore shoots, and the targeting of potential replication of VPI shoots. The QP proposes 500 m of drilling to test the anomaly.

NorthStar:

Lying east and south of the Victoria-Inglewood-Phoenix system, ultra-detailed magnetics illustrate a dynamic structural offset (jog) of a dolerite intrusive. The offset coincides with a historical shoot (North Star) that was underexplored, an Au-As soil anomaly, and mapped outcropping quartz. This site is targeting a potential offset of the Inglewood mine. Historical mine plans indicate the reef was being dragged southeast in the eastern workings; the strong relationship of the dolerite with shoots in the mine system bodes well for finding new shoots along the Phoenix Jog. Rock chips along the jog include 35.1, 34.5, and 27.8 g/t Au respectively from brecciated, highly sulphidic quartz samples. Soil samples report up to 172 ppb Au. The QP recommends infill soil sampling, additional mapping and trenching of quartz veins, and 300 m of diamond drilling.

Perseverance North:

A strong geochemical anomaly lies north along strike of the Perseverance adit. The QP recommends extending 3D modelling of Golden Fleece to include Perseverance and Perseverance North.

Atalanta:

Lying between the Golden Fleece and Inglewood historical lodes, Atalanta presents a new mine target. Based on As-Au soil geochemical anomalism and 2D structural mapping, the QP recommends re-examining the surface geochemistry to rule out historical mine contamination, followed by lode modelling, and 400 m of diamond drilling.

26.1.1.2 Capleston

Specimen Hill:

The historical working at Specimen Hill lay on the intersection of the Capleston lodes and the north-northwest trending Pactolus Au-As soil geochemical anomaly. The QP recommends additional ultra-detailed geological mapping, re-logging existing drill core for 3D modelling, and compile existing geochemical data. This work will inform ~400 m of drilling to test potential lode-bearing structures identified.

Fiery Cross-Reform East:

Immediately east of the historical Fiery Cross lode (Capleston structure), a strong Au-As soil geochemical anomaly highlights a potential replication of the Capleston structure. A syn-anticlinal structure is interpreted. The QP recommends 3D modelling of the Capleston structure and adjacent Fiery Cross East structure and proposes 400 m of diamond drilling.

26.1.1.3 *Crushington*

- Energetic North, Machine, ENE1831, and Hercules North: These four targets represent north and/or east extensions of the Crushington (Energetic, Wealth of Nations, Keep it Dark) mined lodes. These cumulatively represent the largest single producers of Au in the Reefton Project. Accurate 3D reconstruction of the historical lodes, combined with ultra-detailed magnetic surveys and southerly extension of RGL's soil surface geochemistry, is recommended.

26.1.1.4 *Other High-Ranking Targets*

Raglan:

This area has strong structural complexity, and previously mapped quartz veining. The QP suggests a detailed mapping programme to follow up on soil anomalies found during a regional soil sampling programme.

Caledonian-Potter:

This area presents interesting geochemistry from previous exploration by OceanaGold. The QP recommends a programme of detailed geological mapping and a UAV magnetic survey over anomalous areas found during soil sampling. This work programme will inform ~500 m of drilling.

Cementown Contact:

This area presents Au mineralisation along the boundary between the Reefton Group and Greenland Group units. The QP suggest an initial drill programme of ~300 m of to test the mineral potential of this contact.

Orlando No. 1:

A strong Au-As soil anomaly (200 m x 20 m grid) coincides with mapped quartz veins and rafts of Reefton Group quartzites. Infill soil sampling and detailed mapping is recommended.

Ulster–Invincible:

Lying on the Blacks Point syncline-anticline, these targets represent northern extensions of the Andersons mine. The QP recommends detailed geological mapping, and an infill soil sampling programme to test the mineralised potential of this target.

Globe North:

A single-line soil Au-As anomaly (OceanaGold) coincides with the Crushington-Globe Progress syncline. The QP suggests RGL conduct an infill soil sampling to validate this anomaly.

Stony-Lankey Creek:

A regional geochemical stream-sediment programme, followed by soil sampling of Au-anomalous drainages, identified strong Au-As-Sb mineralisation along the contact of the Greenland Group and Reefton Group units. Detailed geological mapping, soil sampling, and UAV magnetic surveying is recommended.

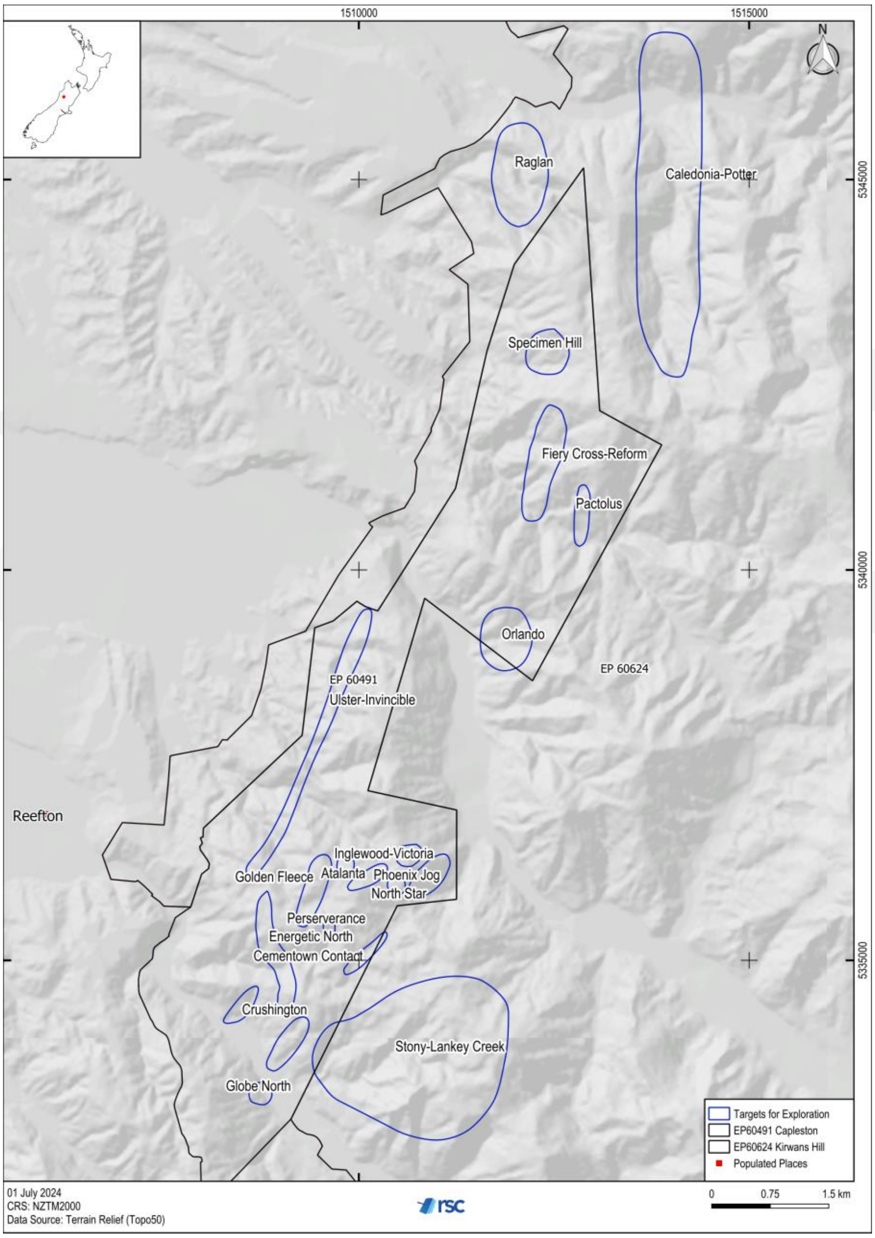

Figure 26-1: Phase 2 exploration targets.

26.2 Budget

The QP's recommended budget and tasks for the Phase 2 exploration programmes are presented in Table 26-1. Estimated costs are in Canadian dollars (CAD).

Table 26-1: Proposed exploration budget (CAD) for Phase 2 expenditure.

Category	Phase	Exploration Task	Estimated Cost (CAD)
Prospecting and Exploration Expenditures	2	Data Compilation	25,000
	2	Mapping	62,000
	2	Geochemistry	170,000
	2	Geophysics	25,000
	2	Drilling	725,000
Other Expenditures	2	Consenting	50,000
	2	Administration	172,000
	2	Corporate	63,000
Total Phase 2			1,292,000

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28. Certificate of Qualified Person:

I, **Sean Aldrich**, MSc MAusIMM MAIG of 20 Park Road, Warrington 9471, New Zealand do hereby certify that:

- I am Principal Geologist at RSC Consulting Ltd, located at 245 Stuart Street, Dunedin 9016, New Zealand.
- The Technical Report to which this certificate applies is titled *'Technical Report on the Reefton Project, New Zealand'* with an effective date of 8 July 2024.
- I was awarded an MSc from the University of Waikato in 1996.
- I am a Member, registered and in good standing, with the AIG in Australia (recognised overseas professional organisation) as member 8521.
- Throughout my career, I have practiced continuously as an underground and open pit mining geologist, exploration geologist, exploration manager, and consultant for mining and exploration firms in a range of commodities. I have undergone continuing professional development with recognised courses and training seminars.
- I have read the definition of 'qualified person' set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with professional associations (as defined in NI 43-101), and past relevant work experience, I fulfil the requirements to be a 'qualified person' for the purposes of NI 43-101.
- I completed site visits (personal inspection) of the Project 20 April 2021, 20–21 March 2023, and 18–19 June 2024.
- I am responsible for all sections of this Technical Report.
- I am independent of the issuer, Rua Gold Inc, applying all of the tests in section 1.5 of National Instrument 43-101.
- I have no prior involvement with the Property that is the subject of this Technical Report.
- I have read National Instrument 43-101 and Form 43-101F1, and this Technical Report has been prepared in compliance with that Instrument and Form.
- As of the effective date of this Technical Report, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.

Signed this 8 July 2024 in Dunedin, New Zealand:

/Sean Aldrich/

Sean Aldrich, MSc MAusIMM MAIG
Principal Geologist Exploration, RSC Consulting Ltd