Valley deposit: A geological introduction and overview

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Abstract

The Valley deposit is located in east-central Yukon, 367 km northeast of Whitehorse. In 2012, Golden Predator Mining Corp. originally sampled gold-mineralized quartz veins in outcrop at what is now known as the Valley deposit. Snowline Gold Corp. subsequently followed up on the mineralization through diamond drilling from 2021 to present. The Valley deposit is a reduced intrusion-related gold system characterized by sheeted quartz-carbonate veins hosting free gold and associated lead-bismuth-tellurium sulphides, within a multi-phase, reduced granodiorite intrusion. The phases of the intrusion are physically and chemically distinct, exhibiting the evolution of a magma over time. Gold mineralization is strongly associated with vein density, whereby vein densities of >10 veins per metre correlate with gold grades of >1 g/t. In June 2024, the initial mineral resource estimate defined an Indicated Mineral Resource of 76 Mt at 1.66 g/t Au for 4.05 Moz Au, and an Inferred Mineral Resource of 81 Mt at 1.25 g/t Au for 3.26 Moz Au using a 0.4 g/t Au cut-off grade (Burrell et al., 2024).

Plain language summary

Snowline Gold Corp. is a Yukon-based mineral exploration company that has carried out a substantial drilling campaign between 2021 and 2024 on the newly discovered Valley deposit. The deposit is located in east-central Yukon, 367 km northeast of Whitehorse, and 227 km east of Mayo. The Valley deposit is characterized by an intrusive rock containing a high abundance of gold-bearing quartz veins. The deposit covers an area approximately 700 by 400 m and extends to a depth of 400 m. The gold mineralization occurs at surface and is of unusually high grade for this type of deposit. This high-quality discovery has sparked interest for gold exploration in the eastern Yukon, and has stimulated further exploration for similar styles of mineralized systems. In early 2024, an initial mineral resource estimate was completed on the Valley deposit, and in 2025 this will be updated to include the most recent drilling.

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Introduction

The Valley gold deposit (hereafter referred to as 'Valley') is located in east-central Yukon, near the headwaters of Old Cabin Creek, centred at 63°37'45"N and 131°18'03"W. It is situated 227 km east of the Village of Mayo and 367 km northeast of Whitehorse.

In 2012, evidence of gold mineralization at Valley was discovered by Shane and Luke Carlos while working for Golden Predator, who had optioned the original claims from 18526 Yukon Inc. A bedrock chip sample along the western edge of the deposit yielded 4.2 g/t Au over 4.7 m across one of the few outcrops along Old Cabin Creek, and a select sample from an arsenopyrite-rich quartz vein on the eastern edge of the intrusion returned 152 g/t Au. Both these samples were following up on a stream-sediment gold anomaly of 110 ppb Au identified 580 m downstream, collected the previous year. Prior to this sampling, exploration programs carried out in 1963 and 1968 by Dynasty Syndicate and Atlas Explorations Limited, respectively, had mapped the outline of the main intrusion and copper-bearing veins to the north of the Valley stock, but at that time, gold was not part of the geochemical analysis.

Intermittent mineral exploration was conducted in the region in the early 1980s by AGIP Canada Ltd., who were primarily assessing the regional intrusions for uranium potential and found the first indications of gold in the vicinity of Valley. At that time, exploration efforts were focused around the Emerald Lake area, located 10 km southeast of Valley. In 1996, Yukon Gold Corp. carried out a sizable exploration program, consisting of drilling at four targets within the Rogue plutonic complex, including at the Reid target, located 9 km east of Valley. However, due in large part to the Bre-X Minerals Ltd. scandal in 1997, and Yukon Gold Corp. having claims adjacent to Bre-X's deposit in Busang, Indonesia, the company went bankrupt and much of the work was never reported. Of note, the results from the one report that was published (Lueck, 1997) were enough to entice 18526 Yukon Inc. to the region and stake the original claims at Valley.

Since 2021, Snowline Gold Corp. has completed 124 diamond drillholes (123 NQ2, 1 PQ), totalling 52 785.7 m. The Valley deposit is remarkable for a number of reasons: it has relatively consistent and continuous high grades returned for the deposit style, which was previously thought to primarily host lower gold grades (<1 g/t Au); the highest grades at Valley are near surface and distributed in a favourable way for eventual development; and initial metallurgical test work has returned favourable average gold recoveries varying from 94 to 96% across a range of grades, material sizes and metallurgical approaches.

In 2024, Snowline published an initial mineral resource estimate that defined an Indicated Mineral Resource of 76 Mt at 1.66 g/t Au for 4.05 Moz Au and an Inferred Mineral Resource of 81 Mt at 1.25 g/t Au for 3.26 Moz Au using a 0.4 g/t Au cut-off grade (Burrell et al., 2024). This resource is based on drilling completed to the end of the 2023 field season, and does not consider the additional 25 000 m drilled at Valley during the 2024 field season.

Tectonic setting

The Valley deposit is situated within the Selwyn basin, which consists of Neoproterozoic to lower Paleozoic, predominantly off-shelf sedimentary sequences, and lesser volcanic sequences, derived from, and deposited on the southwestern margin of the North American craton (Fig. 1; Colpron et al., 2007; Colpron and Nelson, 2011). The basinal rocks (NAb, Fig. 1) were deposited in shallow to deep water marine settings along the ancestral North American continental platform (NAm, Fig. 1). Terranes currently found outboard of the Selwyn basin were emplaced during progressive tectonic accretion from the latest Permian to mid-Cretaceous (Nelson et al., 2013).

Initial accretion of the Yukon-Tanana terrane and associated oceanic terranes to the continental margin is believed to have occurred during the late Permian and early Triassic. This was followed by subsequent terrane accretion and deformation in the Early Jurassic to mid-Cretaceous (115–90 Ma). Strain associated with this collision was accommodated along the Dawson, Robert Service and Tombstone thrust faults. This led to deformation and lower to middle greenschist metamorphism of the Selwyn basin and younger rocks near the thrust faults, extending outward into the eastern foreland limit of the Canadian Cordillera. This regional deformation included a phase of northeasterly directed compression that variably shortened units of the Selwyn basin through extensive faulting and folding.

The southwestern Selwyn basin is truncated by the Tintina fault, a right-lateral strike-slip fault (Fig. 1), and is bounded to the north by the Dawson thrust fault. Restoration of the displacement along the Tintina fault places the Selwyn basin adjacent to the Yukon-Tanana uplands of east-central Alaska (Gabrielse, 1985; Gabrielse et al., 2006).

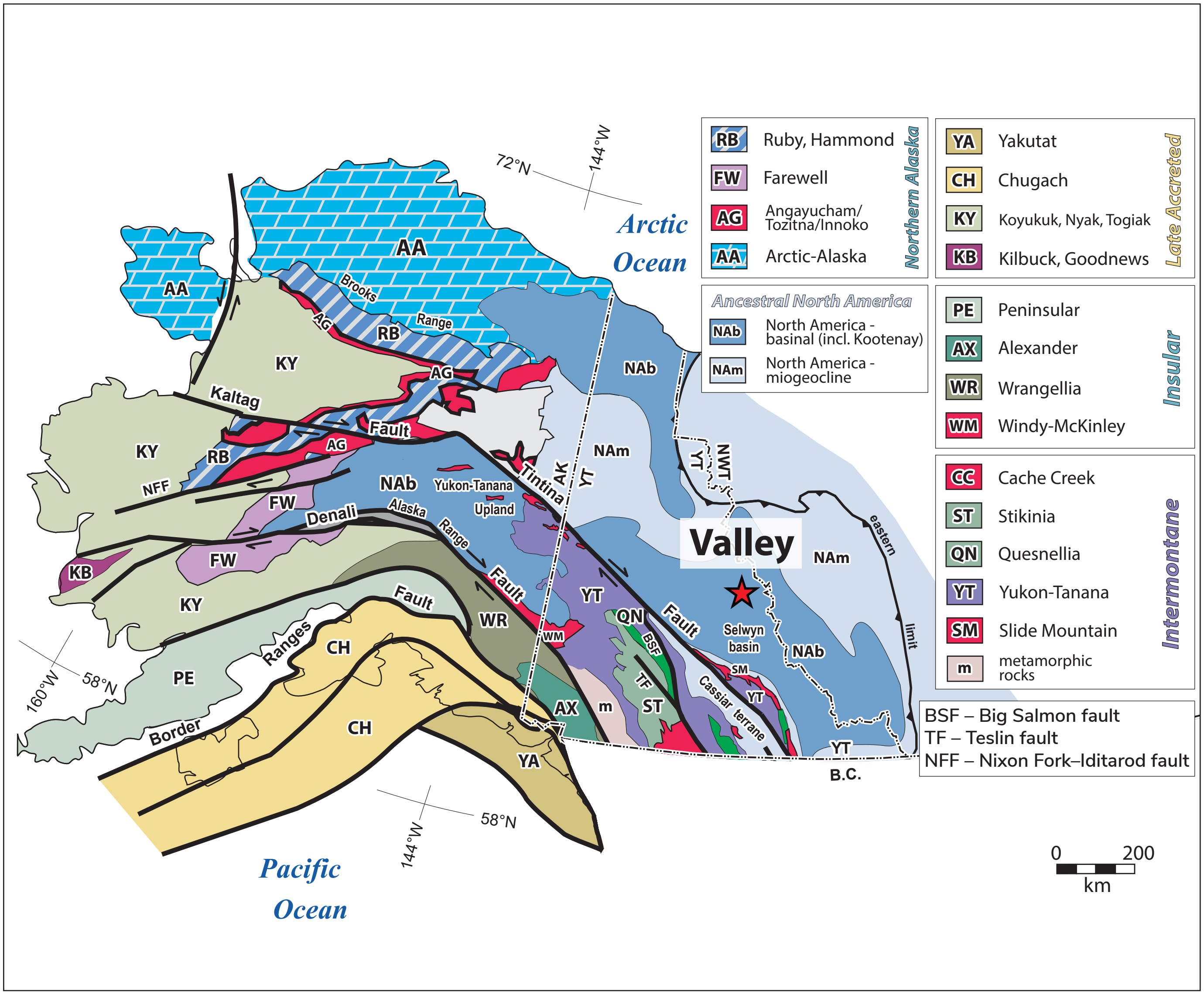

Figure 1. Tectonic setting of the northwestern Cordillera (after Colpron et al., 2007).

Figure 2 illustrates the known thrust fault systems in the area, which includes the Selwyn Valley, Hess-Macmillan, Elmer Creek and Arrowhead fault systems. The stratigraphy southwest of the Selwyn Valley thrust fault (northeast of the study area), as well as the Arrowhead and Elmer creek thrust faults, was regionally folded into a large drag fold along the dextral Hess-Macmillan fault system (Fig. 2), which lies just southwest of the Valley deposit.

Regional geology

Numerous plutons, stocks, plugs and associated dikes and sills of the metallogenically favourable Mayo and Tombstone plutonic suites intrude the stratigraphy within the project area. Table 1 lists the regional stratigraphy and intrusions, which will be discussed in the context of the geology below.

Sedimentary units

Lithological units within the Selwyn basin include thick sequences of weakly to moderately metamorphosed mudstone, siltstone and quartz-rich sandstone, interbedded with regionally extensive carbonate, rare carbonate debris flows, and volcaniclastic units (Fig. 3). The basal unit of the Selwyn basin is the Hyland Group, which consists of three major formations, from oldest to youngest: Yusezyu Formation (coarse with lesser fine clastic rocks); Algae Formation (limestone); and

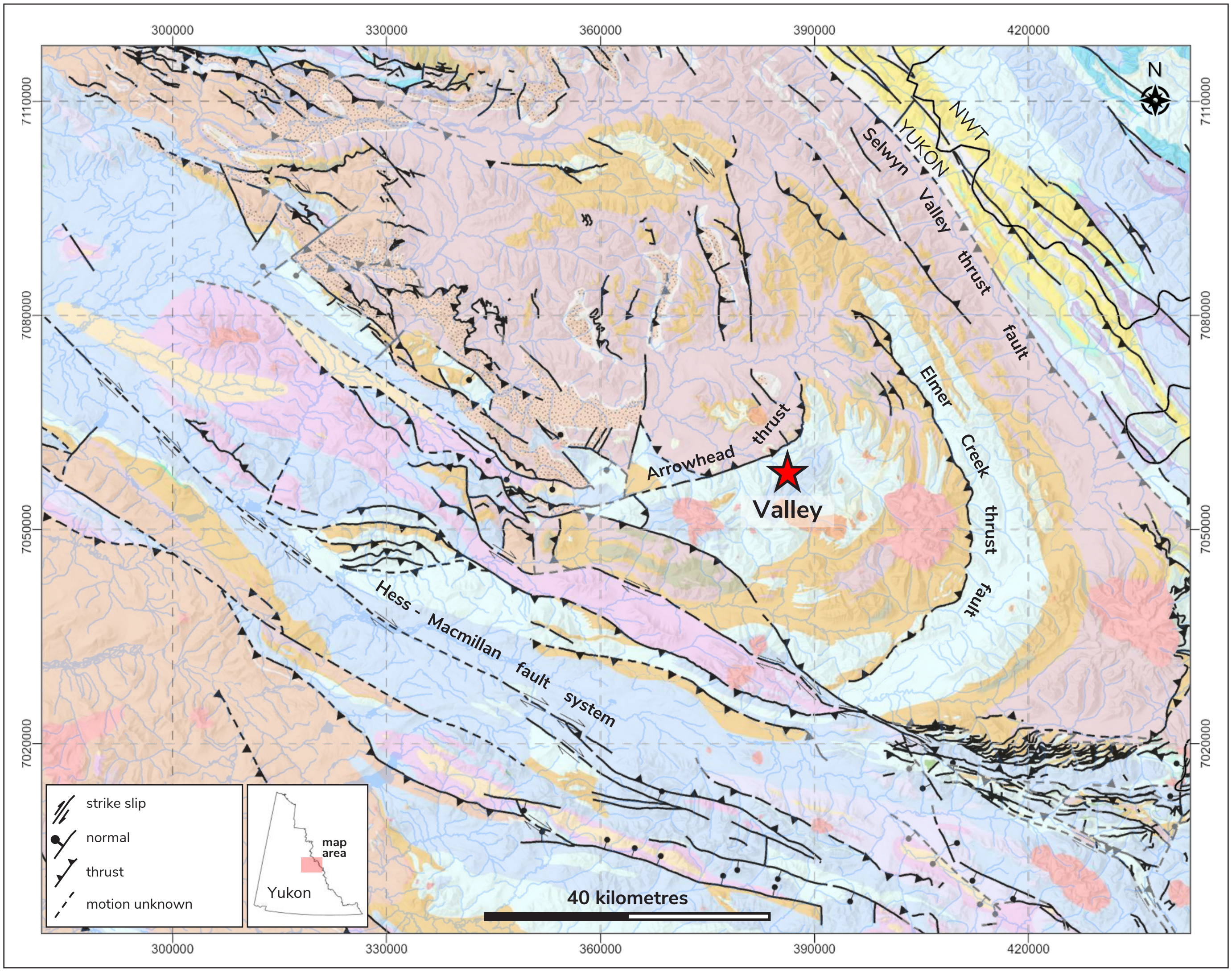

Figure 2. *Regional geology of the Rogue project area (modified from Yukon Geological Survey, 2022).*

Narchilla Formation (primarily fine clastic, including green and maroon shale divided into the Arrowhead Lake and Senoah members).

The Hyland Group is overlain by the Cambrian Gull Lake Formation (fine-grained clastic rocks, minor volcanic and volcaniclastic rocks), which is subsequently overlain by the Ordovician to Silurian Road River Group (black shale, chert and dolomitic siltstone; Fig. 3).

The Devonian to Mississippian Earn Group conformably and locally unconformably overlies the Selwyn basin succession and dominantly consists of black shale, chert and marine conglomerate (Fig. 3). Limited exposures of fine-grained clastic and carbonate rocks of the Carboniferous to Permian Mount Christie Formation are juxtaposed against the older units along faults.

Igneous units

Mid-Cretaceous (115–90 Ma) magmatic rocks are found across the Selwyn basin, and plutons of this age intrude the Neoproterozoic and Paleozoic rocks, as well as younger, overlying stratigraphy. These mid-Cretaceous plutons appear to mostly postdate the dominant, northwest-verging regional deformation, intruding across major structures and exhibiting little internal strain. The most-inboard and youngest of these intrusions form an arcuate belt of plutons, dikes and sills along the northern margin of the basin and are collectively known as the Tombstone-Tungsten belt (Mortensen et al., 2000; Hart et al., 2004). Magmatic rocks within the Tombstone-Tungsten belt are mid-Cretaceous, chemically reduced, and commonly associated with gold and tungsten mineralization

Table 1. *Table of layered and plutonic rocks (after Yukon Geological Survey, 2022).*

Geologic time/Unit name	Unit description
Mid-Cretaceous	
Tombstone plutonic suite	biotite-hornblende clinopyroxene granite (94–90 Ma)
Mayo plutonic suite	biotite granite, K-feldspar porphyry granite; includes quartz monzonite, granodiorite (98–93 Ma)
Mississippian	
Mount Christie Formation	burrowed/interbedded greenish-grey, cherty shale and green shale, chert, shale and siltstone
Devonian to Mississippian	
Earn Group	black shale and chert, chert pebble conglomerate, minor sandstone, minor felsic to intermediate volcanic rocks
Ordovician to Silurian	
Road River Group	
Steel Formation	rusty green to buff argillite, minor black shale and chert, prominent orange-weathering dolostone bed
Elmer Creek Formation	chert and siliceous shale (graphitic and bioturbated in upper part); grey chert and siliceous argillite in lower part, rare limestone
Upper Cambrian	
Old Cabin Formation	basic volcaniclastics, breccias, lapilli tuff, flows, sills, dikes, minor sedimentary units
Lower Cambrian	
Gull Lake Formation	mafic metavolcanic and volcaniclastic rocks, siltstone and argillite
	fine clastic rocks with local basal limestone, limestone conglomerate, with local volcanic and volcaniclastic units (observed at Old Cabin Creek)
Neoproterozoic to Lower Cambrian	
Hyland Group	undifferentiated
Narchilla Formation	dark grey, green and maroon shale; grey and green siltstone to phyllite; minor fine-grained, white, thinly bedded sandstone; minor green-grey sandstone interbedded with siltstone; rare medium-bedded, brown to grey quartz arenite and quartz grit
Arrowhead Lake Member	maroon-weathering, maroon and pale green argillite, minor quartzite, conglomerate, limestone
Algae Formation	limestone ± sandy with local shale, calc-silicate, marble
Yusezyu Formation	primarily maroon and red-weathering argillite and siltstone of Upper Maroon Member; calcareous, brown-weathering sandstone, grey to white-weathering quartzite, minor shale, argillite and grit

(Mortensen et al., 2000; Hart et al., 2004). The Tombstone-Tungsten belt comprises several plutonic suites including the Tombstone, Mayo and Tungsten suites (Hart, 2005). The Tombstone suite (94–90 Ma) is alkalic, variably fractionated, slightly oxidized, contains magnetite and titanite, and has primary, but no xenocrystic zircon (Table 2). The Mayo suite (98–93 Ma) is sub-alkalic, metaluminous to weakly peraluminous, fractionated, but with early felsic and late mafic phases, and moderately reduced with titanite dominant (Table 2). The Tungsten suite (98–96 Ma) is peraluminous, entirely felsic, more highly fractionated, and reduced with ilmenite dominant.

Deposit lithology

The Valley stock is a Mayo suite, multiphase granodiorite intrusion hosted by a series of steeply dipping Silurian to Devonian sedimentary beds of the Steel Formation and Earn Group. The predominant intrusive phase is a coarser grained phase of granodiorite. Distributed throughout the intrusion, and also occurring as dikes intruding the surrounding sedimentary rock package, are a medium-grained granodiorite and a fine-grained porphyritic granodiorite. The following sections detail the different lithologies identified around and within the Valley deposit.

The Steel Formation and Earn Group

The Selwyn basin sedimentary package hosting the Valley stock consists of a series of interbedded siltstone, shale, sandstone, breccia and chert of the Silurian Steel Formation. In the southeast part of the deposit area, 500 m from the known intrusion contact (Fig. 4), the bedding orientation shows a series of beds that dip steeply (>70°) to

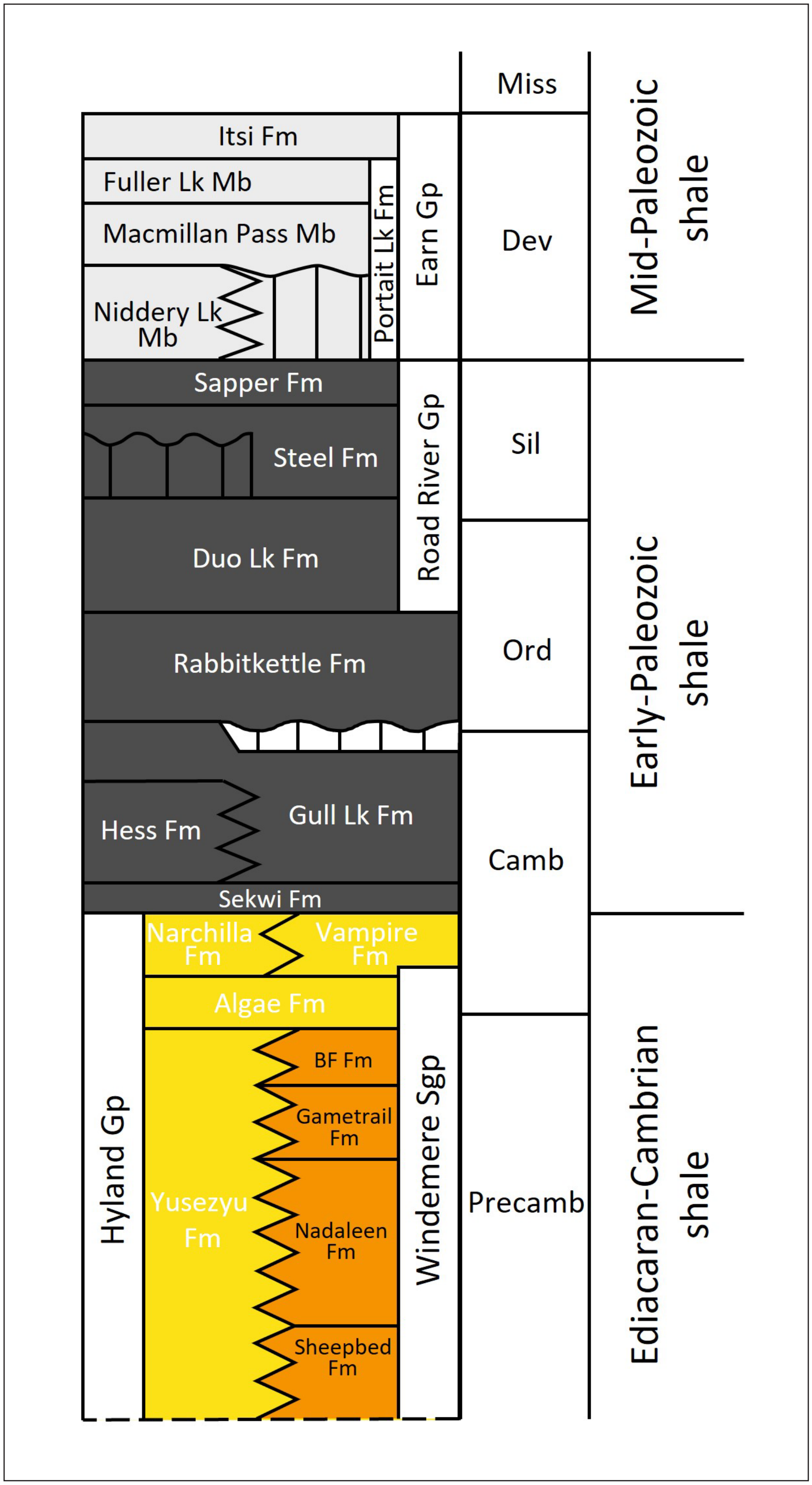

Figure 3. *Simplified stratigraphy of the Selwyn basin (after Sack et al., 2018), including the Windermere Supergroup stratigraphy, which is in the Rackla area. BF: Blueflower.*

Table 2. *Summary of characteristics of the Tombstone and Mayo plutonic suites (after Hart et al., 2004).*

Characteristics	Tombstone suite	Mayo suite
age	94–90 Ma(1)	98–93 Ma(1)
dominant lithologies	alkali feldspar, syenite to quartz syenite	monzonite to granodiorite
pluton size	moderate	small
plutons	zoned, mafic margins, felsic cores	simple, later mafic phases
grain size	coarse, cumulate	medium to fine grained, locally porphyritic
mafic phases	pyroxene (aegirine-augite)>hornblende >biotite	biotite>hornblende; clinopyroxene common
dominant Fe-Ti indicator minerals	magnetite>titanite	titanite
accessory minerals	epidote, allanite, melanite, apatite, fluorite, zircon	allanite, apatite, zircon
SiO_2 range	50–70%	55–75%
aluminum saturation index (ASI)	metaluminous, except where highly fractionated (0.65–1.1)	metaluminous to weakly peraluminous (0.6–1.15)
alkalinity	alkaline to peralkaline	subalkaline
Fe_2O_3/FeO	0.2–1.1	0.15–0.45
average magnetic susceptibility (x10-3 SI)	1.79	0.11
Cr (ppm)	most <20, some 20–80	most 20–100, some 100–600
inherited zircons	none	some
initial Sr ratio	0.710-0.720	0.7115–0.7140
εNdT	–7 to –9	–8 to –13
oxygen isotopes	9 – 11	11 – 14
zircon saturation temperature (ZST)	820°C	780°C
associated mineralization	Au-Cu-Bi-U-Th-F	Au-Bi-Te, W, As, Ag-Pb
characterization	alkalic, slightly oxidized metaluminous, radiogenic, syenite cumulates	metaluminous, moderately reduced, radiogenic, biotite granodiorite

Note: (1) Dates from Yukon Geological Survey [2023].

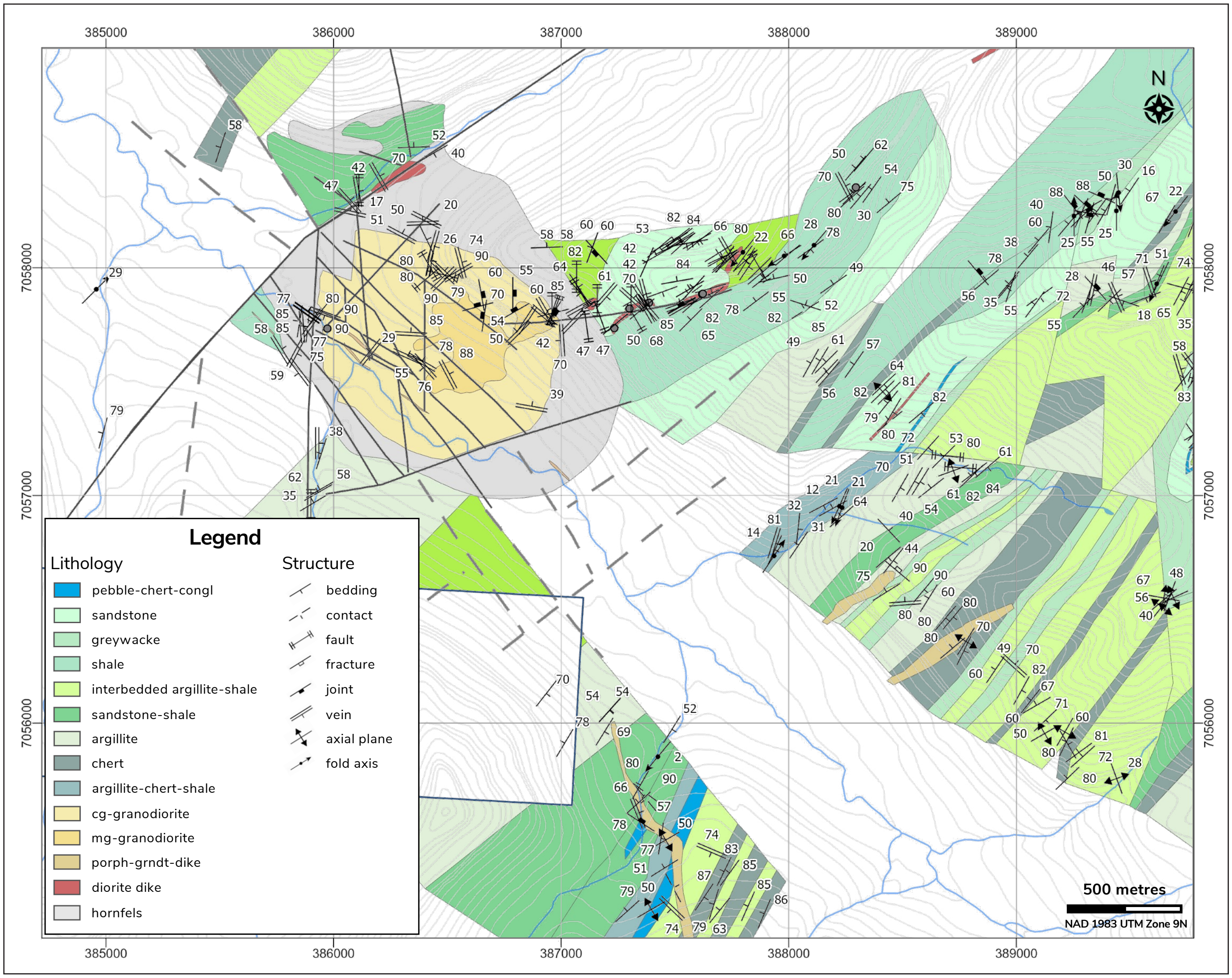

Figure 4. *Local geology of the Valley stock and surrounding sedimentary rocks (from Burrell et al., 2024). cg: coarser grained, congl: conglomerate, grndt: granodiorite, mg: medium grained, porph: porphyry.*

the northwest (220–250°). Bedding measurements adjacent to the intrusion collected from drilling and surface mapping strike roughly parallel to the intrusion contact and dip away from the intrusion. East of the Valley stock, the sedimentary package is more consistent with the siltstone, shales and sandstone observed in the Earn Group, suggesting an unconformity proximal to the Valley stock (Gamonal, 2023).

Thin sections have been collected from the hornfels section of the drill core where primary sedimentary textures are poorly preserved. The quartzite units of the sedimentary package are generally fine grained, and quartz grains are intergrown and subhedral (<1 mm); bedding is defined by changes in quartz grain size. Siltstones are predominantly quartz rich, interbedded with biotite and amphibole-rich layers. Amphibole is replaced by white mica, likely muscovite. The siltstone and shale units often contain disseminated diagenetic pyrite or pyrrhotite (Hamel, 2023).

Intrusive phases

There are two distinct phases to the granodiorite, which are both medium grained in texture; however, one is visibly coarser grained. The coarser grained phase and the finer grained phase are herein referred to as the 'coarser grained granodiorite' and the 'finer grained granodiorite', respectively. The coarser grained granodiorite is equigranular, and composed of 40% plagioclase (2 mm), 20% quartz (<7.5 mm), 15% K-feldspar (0.5 mm), 10% biotite (0.2 mm), 5% hornblende (0.2 mm) and abundant titanite (<0.5 mm; Hamel, 2023). The 800 by 1100 m intrusion is slightly elongated to the northwest, and is bounded by faults to the northwest and west. The intrusion is open at depth, and based on the drilling conducted to date, the potential for a preferred plunge orientation is currently unknown.

The finer grained granodiorite is located to the east of the coarser grained granoditorite, and has a lateral extension of 300 m. There are also shallow, east-dipping, medium-grained granodiorite dikes throughout the coarser grained phase of the intrusion. The composition of the finer grained granodiorite is very similar to the coarser grained granodiorite, but has a slightly higher quartz content and a grain size range of 0.1–1.5 mm.

A fine-grained porphyritic granodiorite unit is slightly more mafic than the coarser grained granodiorite. It is observed throughout the deposit in the form of dikes, as a minor uniform intrusion, and as an intrusive breccia hosting clasts of coarser grained granodiorite and country rock. The uniform intrusion was identified 250 m below surface, and measures approximately 500 m in length by 150 m in width. The fine-grained porphyritic granodiorite is a later phase of the multi-phase intrusion. The mineralogy consists of a bimodal population of 10–20% phenocrysts and 80–90% groundmass. The phenocrysts are plagioclase and quartz (2 mm) in a groundmass of 50% plagioclase (0.05 mm), 20% K-feldspar (<1 mm), 10% quartz (0.05 mm), 10% biotite (0.05 mm) and 1–2% pyrrhotite (0.2 mm).

Structural setting

Rocks of the Neoproterozoic to Paleozoic Selwyn basin underwent intense deformation during a compression event between the Jurassic and mid-Cretaceous. This episode of deformation caused intense shortening, resulting in tight folding and thrusting that is evidenced by the Arrowhead thrust fault, which is in the vicinity of the Valley deposit (see Fig. 2). This event also caused significant tilting of stratigraphic units producing southeast-dipping and northeast-striking beds, which is the prominent orientation observed. Folding associated with this event is seen to the east of the Valley stock, along a northeast-striking fault that puts black shales of the Earn Group in contact with sandstones and conglomerates of the Road River Group. The axial plane of these faults is controlling northeast-striking dioritic dikes.

Due to the lack of outcrop around the Valley stock, the interpretation of faults is based on geophysical data and downhole drill data. In particular, an unmanned aerial vehicle (UAV) magnetic survey flown over Valley in 2021 identified lineaments that were later confirmed as fault zones. Using these tools, steeply dipping faults oriented northwest, north, west and northeast were interpreted in the Valley deposit area. These faults are characterized by gouge material and have local slickensides, displaying minimal evidence of shear movement. In some cases, these faults are healed by hydrothermal breccias composed of quartz + pyrite cement that support angular fragments of intrusive rock. The north-oriented faults are interpreted as representing the oldest deformation event. The north-oriented faults bound northwest-oriented faults, which controlled the emplacement of the intrusive units and subsequent sheeted veins. West-oriented faults are interpreted as linkage relay structures between subparallel northwest faults. The youngest episode of deformation is represented by northeast-oriented faults such as Arrowhead Pass fault, located to the north and northeast of the Valley deposit. Kinematics of these faults have not been fully interpreted due to the absence of marker horizons and poor rock exposure; however, normal post-mineralization offsets are interpreted from geochemistry due to the zonation of gold-associated pathfinders.

Alteration

Alteration at the Valley deposit can be classified into three distinct alteration facies, each controlled by the underlying lithology. Alteration box plots in Figure 5 illustrate a predominantly fresh intrusion having local alteration trends progressing toward chlorite, sericite and potassium feldspar. Alteration within the Valley stock can be characterized based on either the granodiorite or porphyry intrusive phase. The contact metamorphic aureole is expressed over ~50–100 m from the contact of the Valley stock before transitioning into fresh, unaltered sedimentary rocks.

Intrusion-related alteration

The granodiorite has been altered by weak to strong, pervasive sericite and chlorite alteration assemblages. Argillic alteration is also present; however, it is usually localized within fault structures and fracture zones.

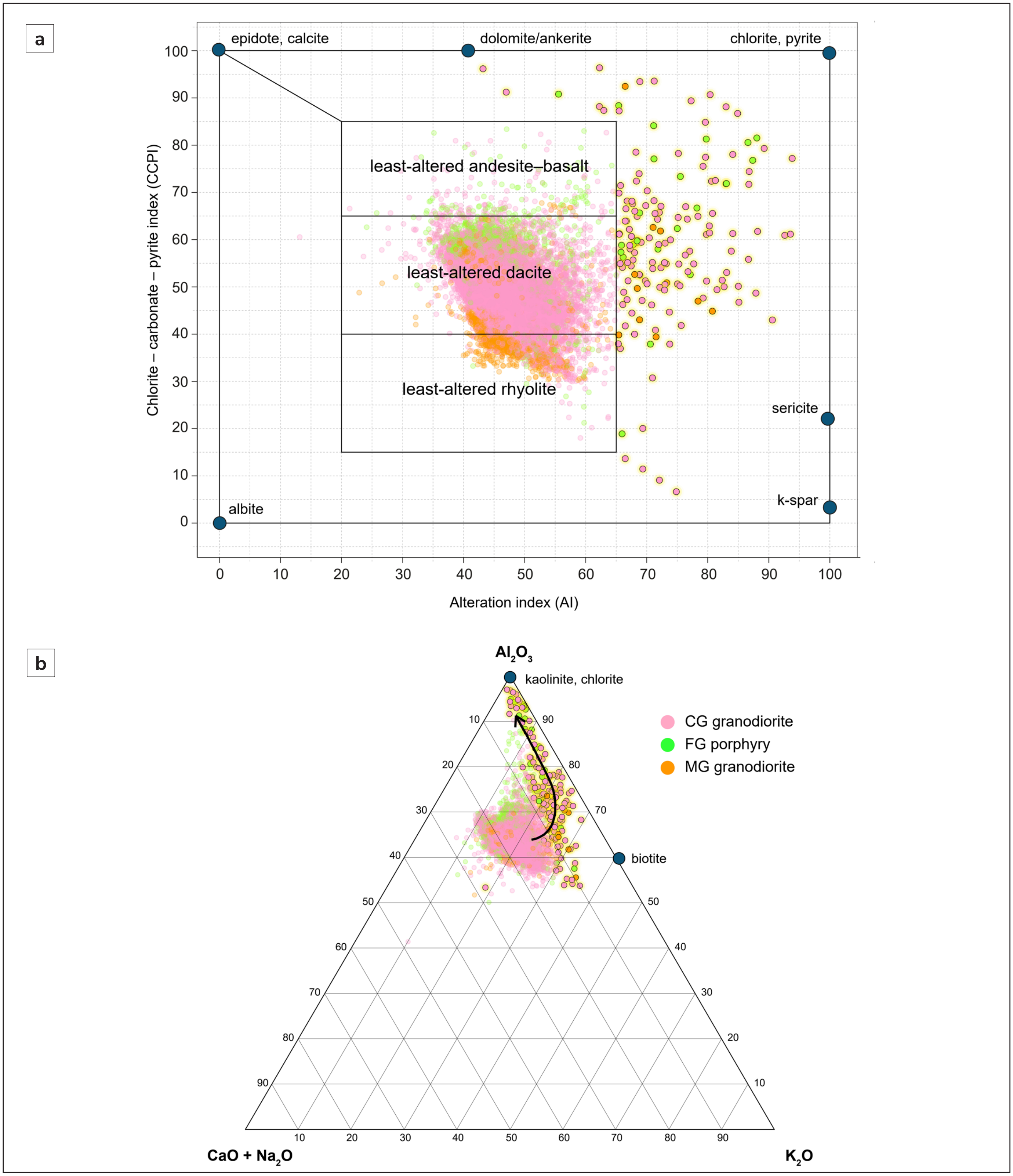

Figure 5. *Alteration box plot and ternary diagram illustrating alteration of different magma phases. The outliers are outlined in both charts.* ***(a)*** *Box plot of the three intrusive units displaying a dominant fresh rock with alteration toward chlorite, sericite and K-feldspar.* ***(b)*** *Ternary diagram illustrating a trend toward chlorite and kaolinite. CG: coarse grained, FG: fine grained, MG: medium grained*

Sericite is observed completely replacing medium-grained, subhedral crystals of plagioclase in the groundmass and as phenocrysts. Chlorite and rutile replace subhedral primary biotite and hornblende. Primary, dark brown titanium-hornblende averaging 1 mm in size displays deuteric alteration with a biotite rim and simple twinning. Anhedral, fine-grained, dark brown hydrothermal biotite is more common around alteration haloes (Hamel, 2023).

The predominant alteration assemblage in the fine-grained porphyritic granodiorite is biotite and chlorite. Both are observed replacing mafic minerals. Weak to moderate secondary biotite developed as anhedral grains in the groundmass of the fine-grained porphyritic phase. Minor intervals of argillic alteration are associated with faults and fracture structures. Moderate sericitic alteration is observed along the contact between the finer grained and coarser grained granodiorite.

Hornfelsing around the Valley stock of the interbedded, sedimentary country rock resulted in an alternating sequence of silica and biotite replacement with minor sericite. Fine-grained quartz replacement is predominantly observed in sandstone units, whereas biotite and sericite replacement is more common in siltstones and mudstones. A spatial zonation is observed, and silica replacement was mainly noted along the northwestern margin. Biotite and sericite become increasingly predominant toward the central and southern margins of the intrusion.

Several granodioritic dikes crosscut the hornfelsed sedimentary rocks and exhibit varying degrees of alteration. The dikes are commonly altered to chlorite and sericite, and have a clear spatial relationship to the intrusion. Sericite alteration is typically observed proximal to the intrusion, whereas chlorite alteration is more distal.

Vein selvage

The dominant vein assemblage hosted in the Valley stock consists of quartz-carbonate veins. These veins are characterized by an envelope of moderate to strong vein halos of sericite and chlorite alteration, and relicts of an early event of potassic alteration represented by K-feldspar. The vein envelopes vary in thickness; most measure between 2 and 5 cm, but some can be up to 10 cm. Alteration intensity is strongest in the north-central part of the intrusion, and gradually weakens toward the south. Vertically, the alteration is most pronounced from the surface down to approximately 250 m, and is particularly intense along the contact between the intrusion and the surrounding hornfels.

Mineralization

Gold mineralization within the Valley deposit is almost entirely hosted in quartz-carbonate veins; however, a few instances of visible gold are observed in vein selvages. The mineralization envelope with gold grades >1 g/t Au is consistent and continuous, and is characterized by intense sheeted veins. The mineralization envelope has an approximate volume that extends over 700 m in length, 400 m in width and 400 m in depth.

Veins

Gold mineralization is hosted in quartz-carbonate veins. There are several vein types in the Valley stock that are identified by vein assemblage (Table 3); however, not all of these host significant gold mineralization. The mineralized quartz-carbonate veins are generally narrow (0.2–2 cm), planar and crystalline, and have mineral growth that ranges from euhedral to subhedral. Vein density in the high grade (>2 g/t Au) core of the deposit is generally >15 veins per metre and decreases gradually to <5 veins per metre in the distal, low-grade (<0.4 g/t Au) zones of the intrusion. Mineralization is generally confined to the intrusive units; however, in the northwest part of the deposit, hornfelsed sedimentary rocks host moderate mineralization where they are in contact with a series of dikes.

The predominant orientation of the sheeted gold-bearing veins strikes northwest (320°) and has a consistent steep dip (80°). However, there is a spread of vein orientations ranging from north to west (dipping to the northeast), and south to east (dipping to the southwest; Fig. 6). The high-grade mineralized core of the deposit is associated with the interaction of multiple vein orientations. Northwest and north-striking vein orientations also correspond with the orientations of the two dominant fault trends within the deposit, having implications for the timing of deformation and mineralization relative to the intrusion.

Mineral assemblages

Gangue minerals within the mineralized veins include quartz, calcite, K-feldspar (often resembling plagioclase due to the reduced nature of the deposit), adularia and minor scheelite. Sulphide mineralization within the veins is low, generally <10% of the vein content, and consists

Table 3. *Summary of vein assemblages identified by diamond drilling in the Valley target area.*

Mineralogy	Location	Orientation style	Morphology
quartz-carbonate-arsenopyrite-galena	northwest margin and interior of the intrusion	strong northwest spread, steeply dipping	singular, planar (<1 cm)
arsenopyrite	northeast part of the intrusion	flat lying	singular, planar (<1 cm)
quartz-chlorite	consistent distribution	northwest, flat and east-striking	singular, planar or irregular (0.1–2 cm)
chlorite-pyrrhotite	consistent distribution	northwest, north and west-striking, steeply dipping	singular, planar or irregular (<0.5 cm)
quartz	consistent distribution	variable	variable
quartz-carbonate	consistent distribution	strike spread north to west, steeply dipping	sheeted, planar (0.1–2 cm)

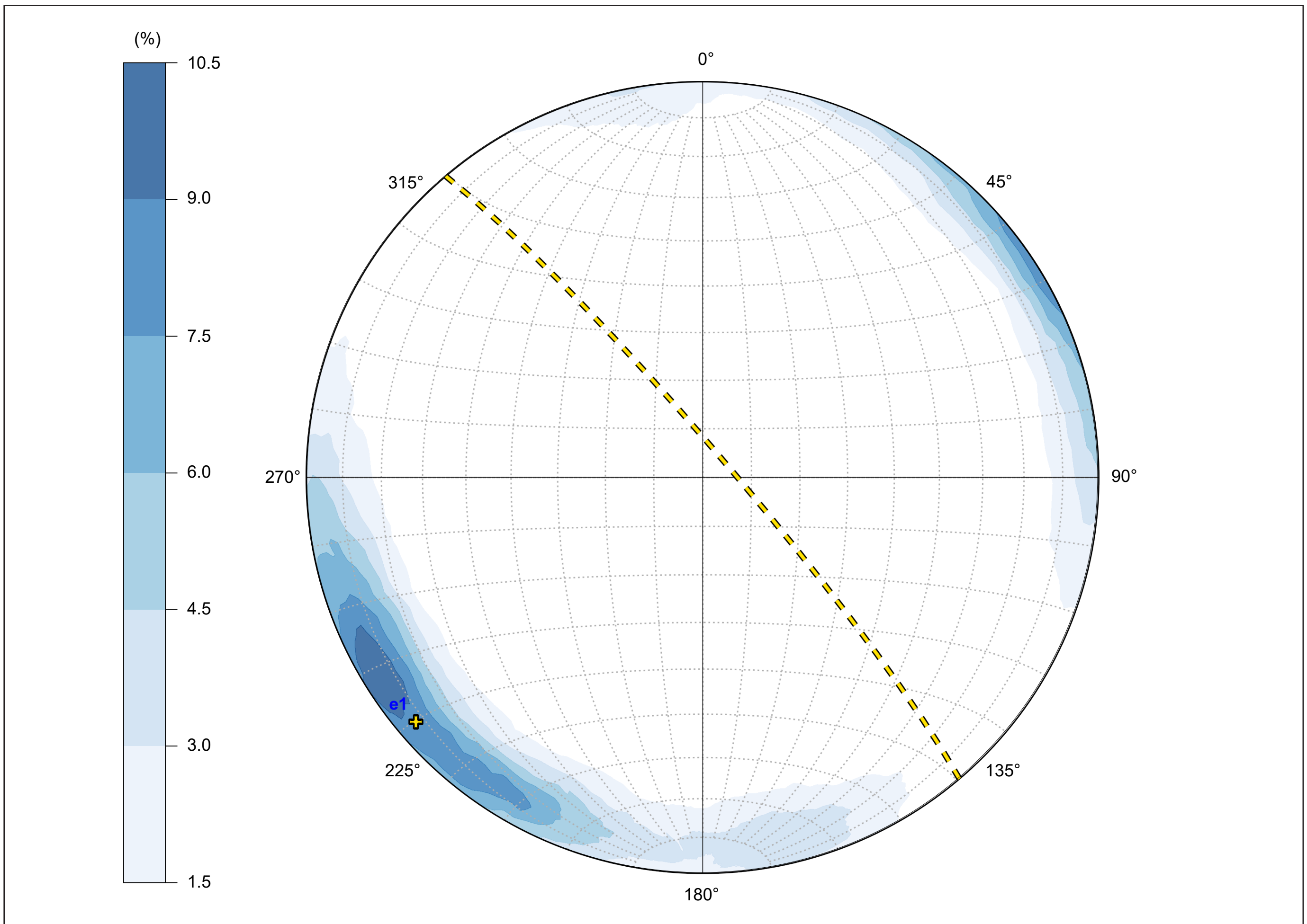

Figure 6. *Stereonet of the quartz-carbonate vein orientations with a heat map showing the spread of poles to planes. Yellow dashed line is the average plane of the veins, and the yellow cross is the average pole to the plane.*

of scheelite (1%), pyrrhotite (2%), chalcopyrite (0.3%), pyrite (0.3%), arsenopyrite (0.3%), molybdenite (0.1%) and marcasite (0.1%), as well as variable lead-bismuth-tellurium sulphides (0.1%; Hamel, 2023). Common lead-bismuth-tellurium sulphides include, bismuthinite (Bi_2S_3), lillianite ($Pb_3Bi_2S_6$), baksanite ($Bi_6Te_2S_3$), hedleyite (Bi_7Te_3), and tetradymite (Bi_2Te_2S; Fig. 7; Hamel, 2023). Arsenopyrite ± galena ± stibnite veins are also present within the Valley stock (Table 3); however, these postdate mineralization and are not interpreted to be associated with the main mineralization event.

Gold in the Valley stock is found as native particles, and has a purity up to 96.84 wt.% (Hamel, 2023). Gold commonly occurs adjacent to, or within lead-bismuth-tellurium sulphide minerals. It is also observed as free gold within the quartz veins and adjacent to other sulphides such as pyrrhotite. Element correlations using all drill data at Valley prior to 2024 demonstrates tellurium (R^2=0.86) and bismuth (R^2=0.71) and to a lesser extent, tungsten (R^2=0.43) and lead (R^2=0.25) having the strongest association with gold. Additionally, antimony, arsenic and silver are also present in the deposit and are useful pathfinders as they form a broad halo around the intrusion but are not directly associated with gold mineralization (Fig. 8).

Resource

The initial mineral resource estimate (MRE) for the Valley deposit was published in June 2024 and was completed using 27 911 m of diamond drill data collected between 2021 and 2023. Based on a preliminary pit optimization, a pit shell with a 0.72 revenue factor contains an Indicated Mineral Resource of 76 Mt at 1.66 g/t Au for 4.05 Moz Au in addition to an Inferred Mineral Resource of 81 Mt at 1.25 g/t Au for 3.26 Moz Au using a cut-off grade of 0.4 g/t Au (Table 4).

Valley drill core in Yukon Geological Survey collection

Diamond drill core from holes V-22-012 and V-23-047 (Figs. 9, 10 and 11) within the Valley deposit area have been donated to Yukon Geological Survey by Snowline Gold Corp. Hole V-22-012 is from the eastern part of the deposit, collaring in the medium-grained intrusive unit, and intersecting the coarser grained granodiorite. This drillhole is predominantly within the low grade (0.1–0.4 g/t Au) part of the initial MRE. Located in the core of the deposit,

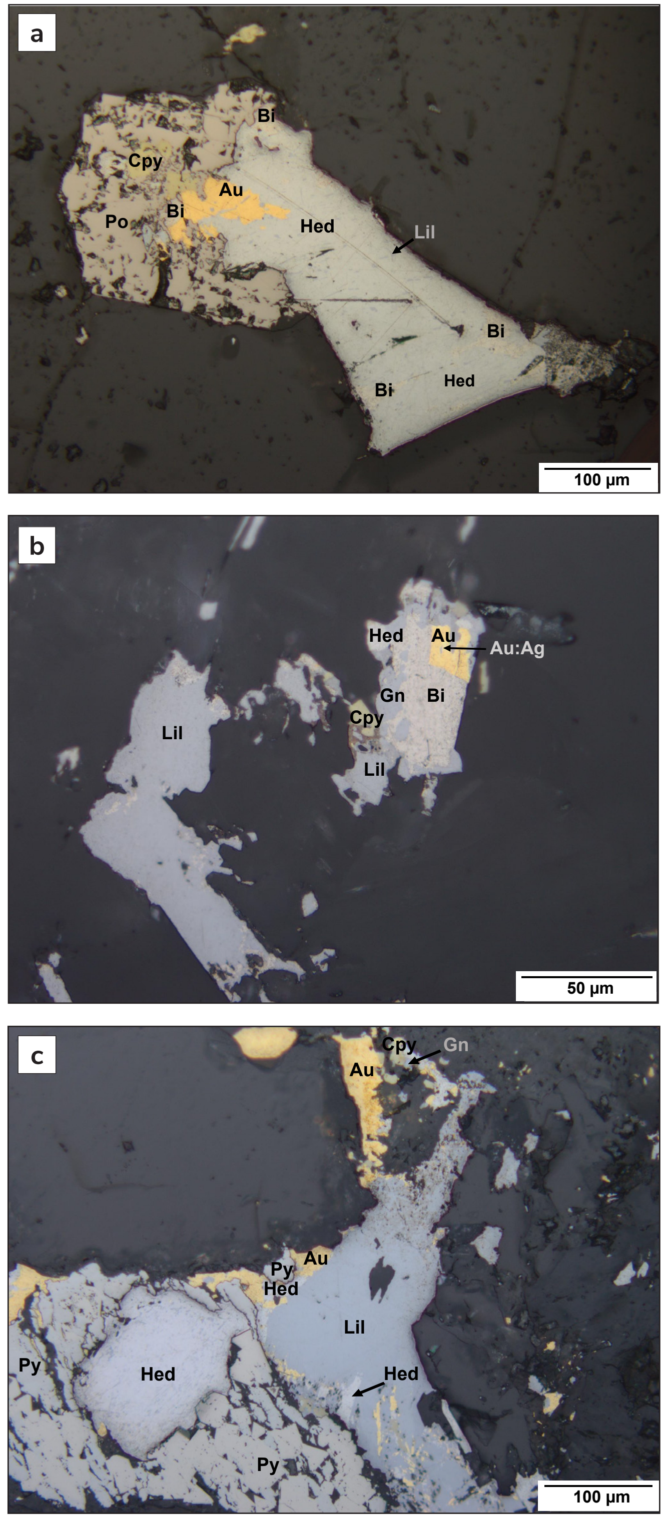

Figure 7. *Reflected light photomicrographs of gold occurrences with associated Pb-Bi-Te-sulphides from quartz-carbonate veins (Hamel, 2023). Figures* ***(a)*** *to* ***(c)****: Au: gold, Bi: bismuth, Cpy: chalcopyrite, Gn: galena, Hed: hedleyite, Lil: lillianite, Po: pyrrhotite, Py: pyrite. Figure* ***(b)*** *Au:Ag: gold with silver (1:4 ratio).*

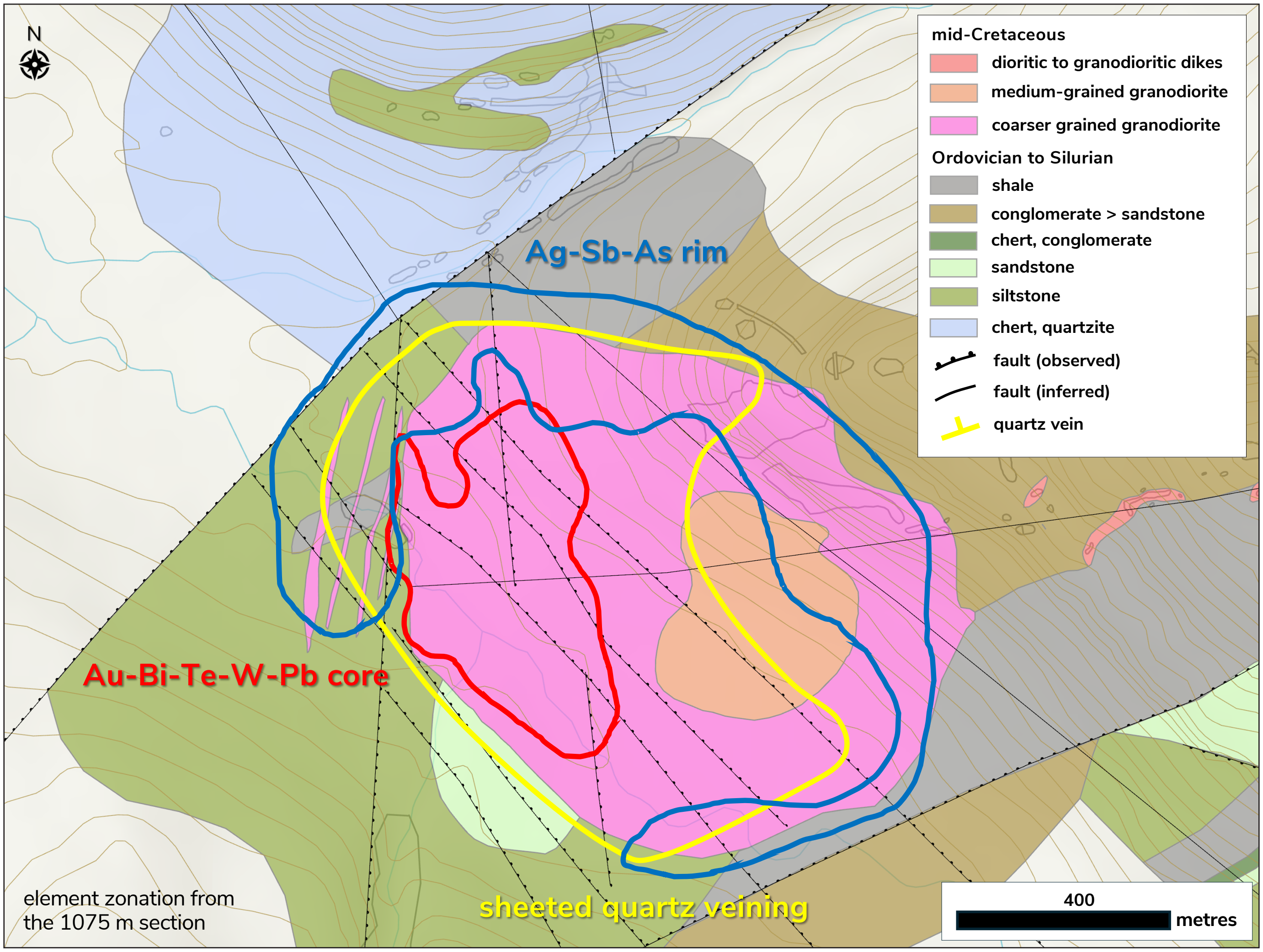

Figure 8. *Zonation of pathfinder elements of the Valley deposit. The 1075 m elevation is approximately 100 m below the surface. Au: gold, Bi: bismuth, Te: tellurium, W: tungsten, Pb: lead, Ag: silver, Sb: antimony, As: arsenic.*

Table 4. *Valley deposit mineral resource summary showing entire resource estimation as published in the NI 43-101 technical report released in June 2024 and based on a cut-off grade of 0.4 g/t Au (Burrell et al., 2024).*

Mineral resource category	Tonnage (t × 1000)	Grade (Au g/t)	Contained gold (ounces × 1000)
Indicated Resource	75 836	1.66	4052
Inferred Resource	81 039	1.25	3260
Waste material	140 124		

hole V-23-047 is collared in the high-grade (>2 g/t Au), northwest side of the intrusion. The drillhole begins in strong mineralization hosted within the coarser grained granodiorite until intersecting the hornfels where the grade abruptly decreases to <0.1 g/t Au. Both drillholes are examples of typical Valley deposit mineralization where gold is hosted within quartz-carbonate veins. Vein density and lead-bismuth-tellurium mineralization are strong controlling factors on the gold grades.

Interpretation

The Valley stock is part of a post-collisional, mid-Cretaceous magmatic event that constitutes the youngest rocks observed in the eastern Selwyn basin, exemplified by multiple stocks, plutons and dikes belonging to the Mayo, Tombstone and Tungsten suites.

The style of gold mineralization observed in the Valley deposit indicates a magmatic-hydrothermal system where intense fracturing associated with the

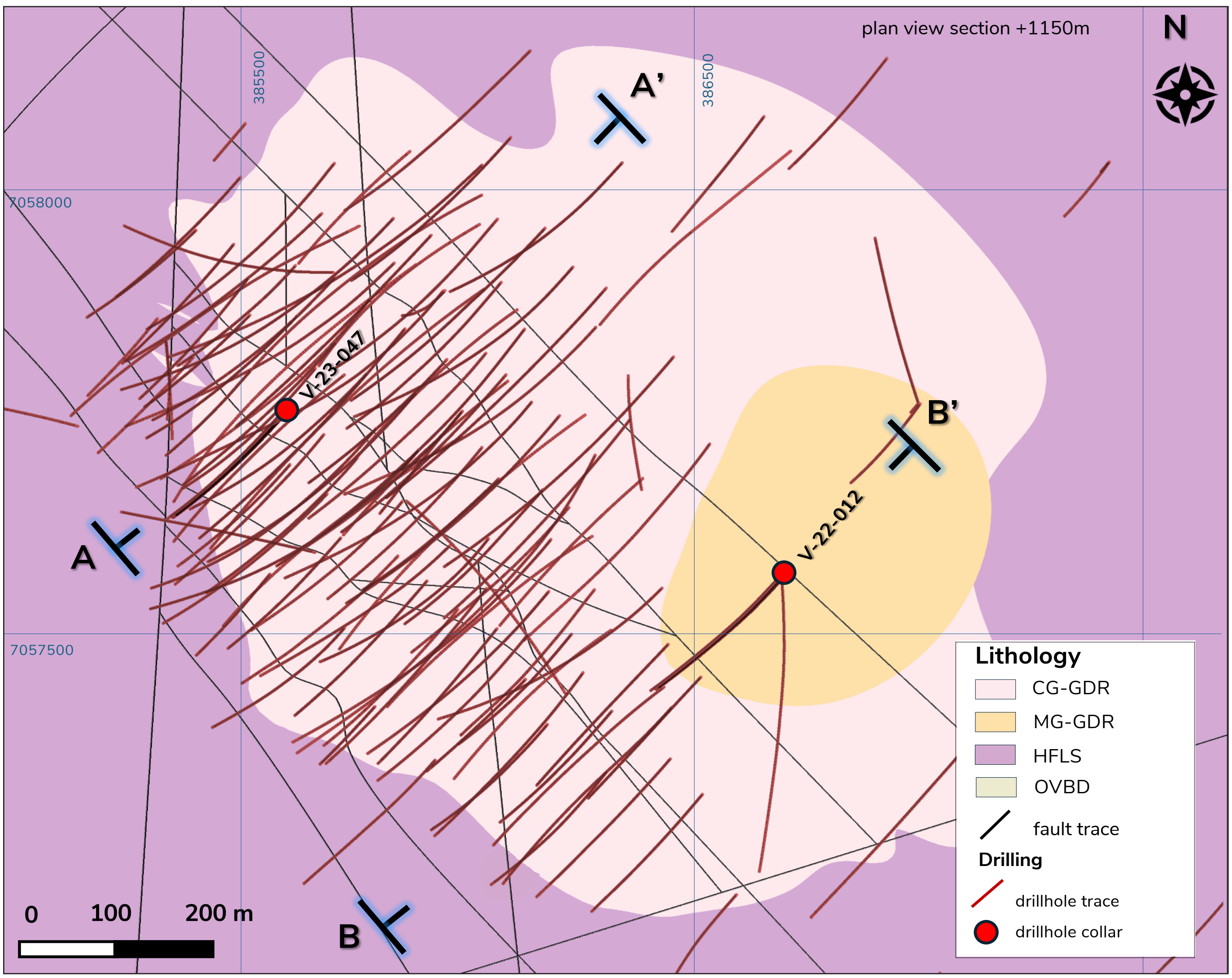

Figure 9. *Plan view map on the 1150 m elevation section illustrating drill trace locations for V-22-012 and V-23-047. CG-GDR: coarser grained granodiorite, MG-GDR: medium-grained granodiorite, HFLS: hornfels, OVBD: overburden.*

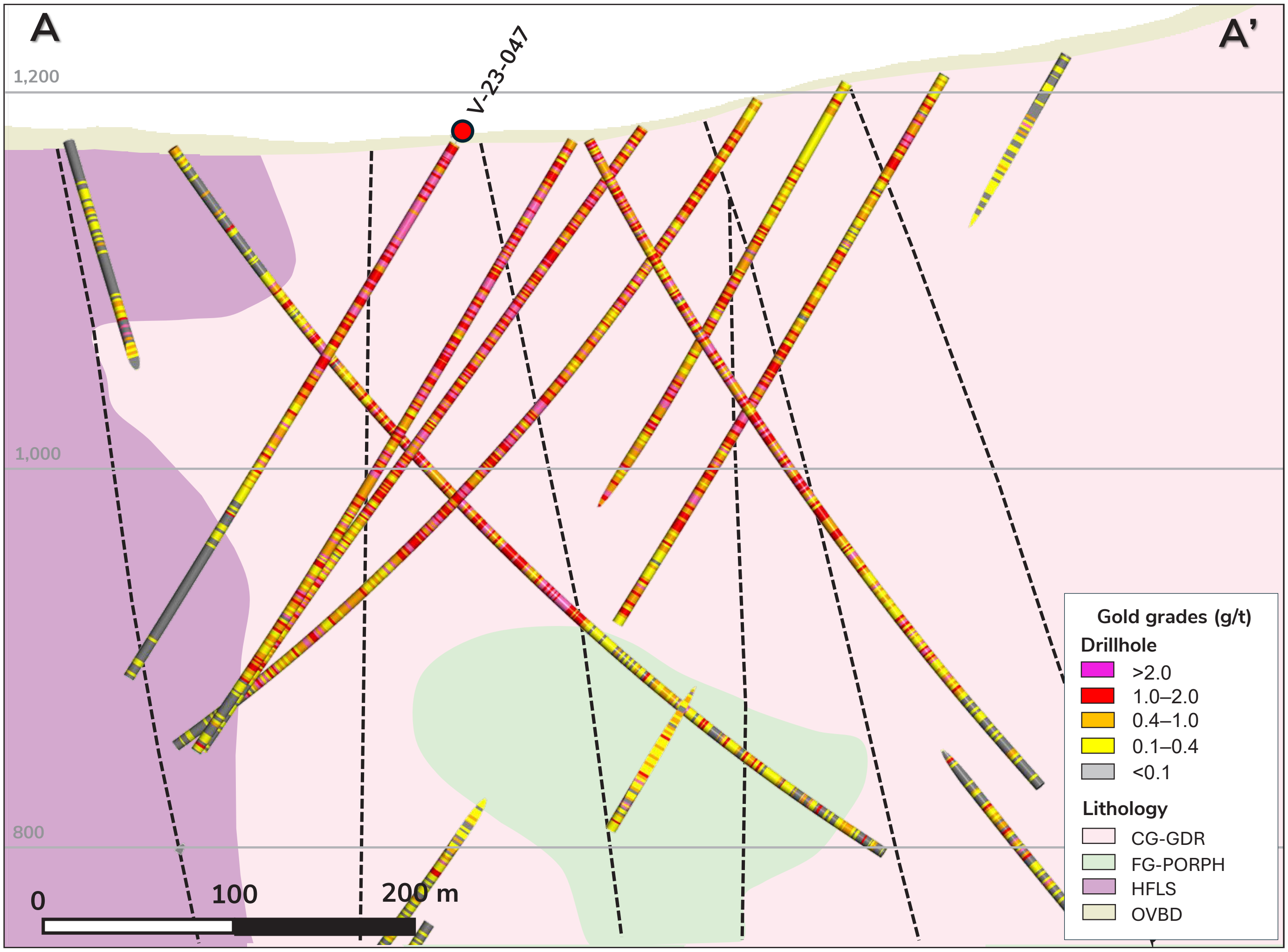

Figure 10. *Cross section (50 m width) displaying V-23-047 and surrounding drilling including gold grades along the drill traces. CG-GDR: coarser grained granodiorite, FG-PORPH: fine-grained porphyry, HFLS: hornfels, OVBD: overburden.*

cooling of the upper part of the Valley stock, allowed for the formation of quartz-carbonate veins and the precipitation of gold-bearing hydrothermal fluids with bismuth-tellurium sulphides acting as collectors of gold particles within the veins. Based on the metallogenic characteristics, pathfinder element associations, and gold mineralization hosted within an ilmenite-dominant reduced intrusion, the Valley deposit is classified as a reduced intrusion-related gold system, similar to other deposits within the Tombstone-Tungsten belt such as Fort Knox and Dublin Gulch.

Conclusions

The discovery of the Valley deposit has opened a new frontier in the eastern segment of the Tombstone gold belt, previously considered less prospective compared to the western segment of the belt, which host systems such as Dublin Gulch and Brewery Creek. Ongoing exploration of the Valley deposit aims to improve our knowledge of the orebody and this world-class system.

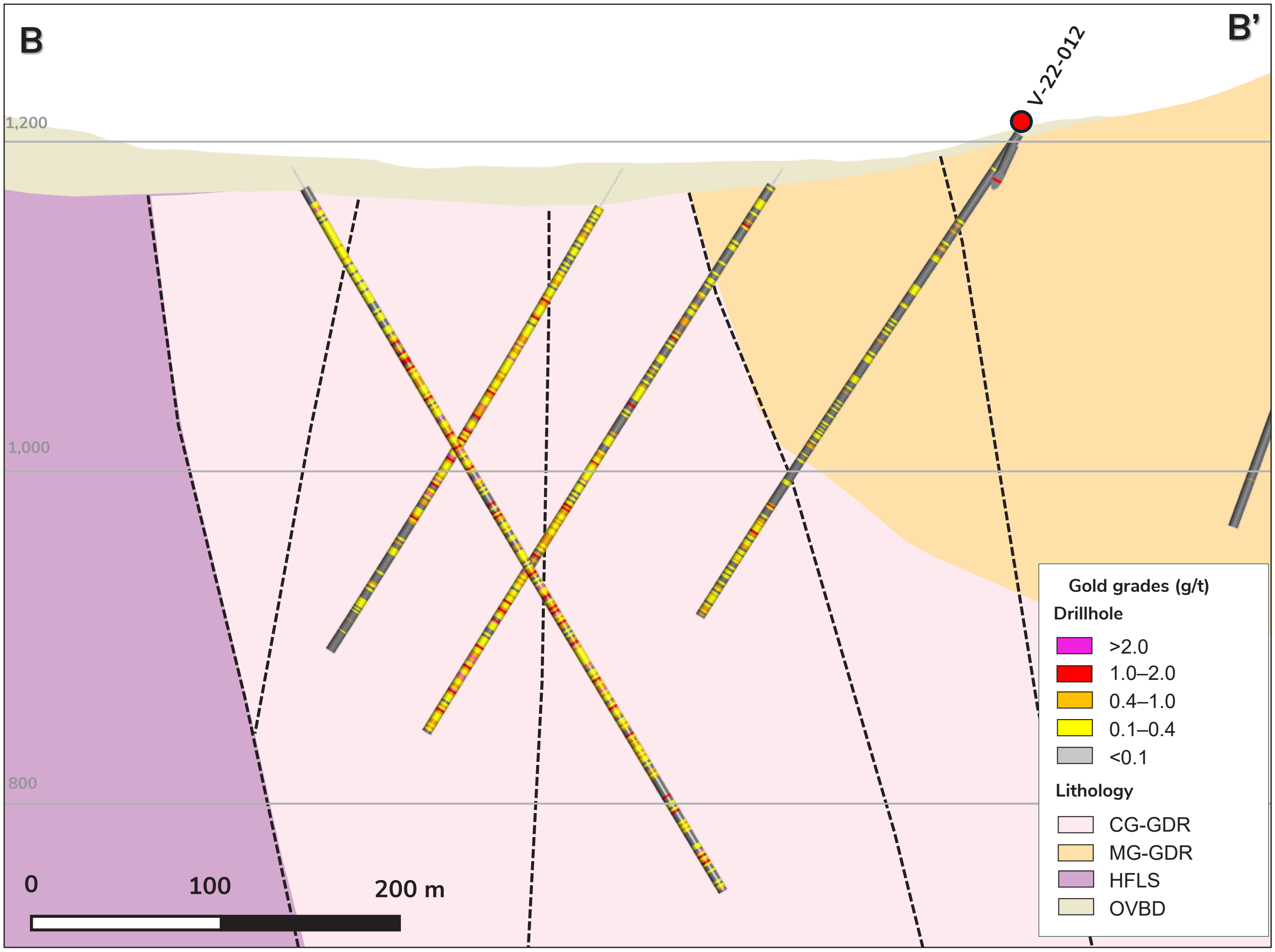

Figure 11. *Cross section (50 m width) displaying V-22-012 and surrounding drilling including gold grades along the drill traces. CG-GDR: coarser grained granodiorite, MG-GDR: medium-grained granodiorite, HFLS: hornfels, OVBD: overburden.*

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