GEOLOGICAL ASSOCIATION OF CANADA
NEWFOUNDLAND and LABRADOR SECTION

2023 FALL FIELD TRIP

September 29–October 1, 2023

GOLD MINERALIZATION AT THE VALENTINE LAKE, MOOSEHEAD, QUEENSWAY AND KINGSWAY PROJECTS

H. Sandeman and I. Honsberger

Front Cover: Gerald Harris and Tim Froude (on the right) at the discovery outcrop near Leprechaun Pond (1986) as well as the discovery sample with a Newfoundland $2 gold coin for scale.

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September 29th–October 1st, 2023

DAY 1

Morning: Travel from St. John’s to New Found Gold Corp.’s drillcore facility in Appleton

Lunch: New Found Gold Corp. hosting BBQ lunch in Appleton

Afternoon: New Found Gold Corp. presentation and drillcore viewing of Queensway Project (Appleton)

DAY 2

Morning: Marathon Gold Corp. presentation and drillcore viewing of Valentine Project (Grand Falls)

Lunch: Bag lunch from Mount Peyton Hotel

Afternoon: Sokoman Minerals Corp. presentation and drillcore viewing of Moosehead Project (Grand Falls)

DAY 3

Morning: Regional geology stop on to way to Glenwood
Bishop’s Falls road cut; ca. <428 Ma tuffite in Botwood Basin siltstone–sandstone sequence

Labrador Gold Corp. presentation and drillcore viewing of Kingsway Project (Glenwood)

Lunch: Bag lunch from Mount Peyton Hotel

Afternoon: Regional geology stops Bowater Carodocian shale-Davidsville Group thrust contact Quarry near Appleton (UTM of turnoff 657650 E, 5426146 N, Zone 21, NAD27) (time permitting)

Return to St. John’s by ~8 pm

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SAFETY INFORMATION

GENERAL INFORMATION

The Geological Association of Canada (GAC) recognizes that its field trips may involve hazards to the leaders and participants. It is the policy of the Geological Association of Canada to provide for the safety of participants during field trips, and to take every precaution, reasonable in the circumstances, to ensure that field trips are run with due regard for the safety of leaders and participants. GAC recommends steel toed safety boots when working around road cuts, cliffs, or other locations where there is a potential hazard from falling objects. GAC will not supply safety boots to participants. Some field trip stops require sturdy hiking boots for safety. Field trip leaders are responsible for identifying any such stops, making participants aware well in advance that such footwear is required for the stop, and ensuring that participants do not go into areas for which their footwear is inadequate for safety. Field trip leaders should notify participants if some stops will require waterproof footwear.

Field trip participants are responsible for acting in a manner that is safe for themselves and their co-participants. This responsibility includes using personal protective equipment (PPE) when necessary (when recommended by the field trip leader or upon personal identification of a hazard requiring PPE use). It also includes informing the field trip leaders of any matters of which they have knowledge that may affect their health and safety or that of coparticipants. Field Trip participants should pay close attention to instructions from the trip leaders and GAC representatives at all field trip stops. Specific dangers and precautions will be reiterated at individual localities.

SPECIFIC HAZARDS

Some stops on this field trip are in coastal localities. Access to the coastal sections normally requires short hikes, in some cases over rough, stony or wet terrain. There is a strong possibility that participants will get their feet wet, and we recommend waterproof footwear. We also recommend footwear that provides sturdy ankle support, as localities may also involve traversing across beach boulders or uneven rock surfaces. Coastal localities present some specific hazards, and participants MUST behave appropriately for the safety of all. Participants must stay clear of the cliff edges at all times, stay with the field trip group, and follow instructions from leaders. Please stay away from any overhanging cliffs or steep faces, and do not hammer any locations immediately beneath the cliffs. In all coastal localities, participants must keep a safe distance from the ocean, and be aware of the magnitude and reach of ocean waves. If it is necessary to ascend from the shoreline, avoid unconsolidated material, and be aware that other participants may be below you. Take care descending to the shoreline from above.

Other field trip stops are located on or adjacent to roads. Participants should make sure that they stay off the roads, and pay careful attention to traffic, which may be distracted by the field trip group. Roadcut outcrops present hazards from loose material, and should be treated with the same caution as coastal cliffs. Other outcrops may be in disused quarries or excavations, or may require short hikes from roads across possibly uneven and/or wet terrain. Weather is unpredictable in this area and participants should be prepared for a wide range of temperatures and conditions. Always take suitable clothing. A rain suit, sweater, sturdy footwear are essential at almost any time of the year.

The hammering of rock outcrops, which is in most cases completely unnecessary, represents a significant “flying debris” hazard to the perpetrator and other participants. For this reason, we ask that outcrops not be assaulted in this way; if you have a genuine reason to collect a sample, inform the leaders, and then make sure that you do so safely and with concern for others. The trip visits some outcrops that have unusual features, and these should be preserved for future visitors. Frankly, our preference is that you leave hammers at home or in the field trip vans.

Subsequent sections of this guidebook contain the stop descriptions and outcrop information for the field trip. In addition to the general precautions and hazards noted above, the introductions for specific localities make note of specific safety concerns such as traffic, water, cliffs or loose ground. Field trip participants must read these cautions carefully and take appropriate precautions for their own safety and the safety of others.

COVID 19 PROTOCOLS

Although the mask mandate is over, please feel free to wear a mask and respect other field trip participants safety.

ARCHITECTURE OF THE NEWFOUNDLAND APPALACHIANS

After the seminal paper (Williams, 1964) recognizing the ancient opening and subsequent closing of the Iapetus Ocean in Newfoundland (Wilson Cycle), Williams *et al.* (1988) subdivided the Newfoundland Appalachians into four major pre-Silurian tectonic–stratigraphic domains. These include, from west to east, the Humber, Dunnage, (including the Notre Dame and Exploits subzones), Gander and Avalon zones. The Gander Zone was further divided into the Meelpaeg, Mount Cormack and Gander Lake subzones. These zones broadly correspond to (west to east): the Laurentian margin (Humber); the Dashwoods terrane (extended Laurentian margin and Notre Dame Subzone); Ganderia (peri-Gondwana terranes including all Gander subzones and overthrust intra-oceanic Exploits Subzone rocks) and; Avalonia (*e.g.*, van Staal *et al.*, 2009; van Staal and Barr, 2012; Figure 1). The Valentine Lake, Moosehead, Queensway and Kingsway gold projects occur within the Exploits Subzone of central Newfoundland.

The four pre-Silurian lithostratigraphic terranes are separated and transected by several major, long-lived polyphase fault zones. Progressing eastwards, the terrane-bounding fault zones include: the Baie Verte–Brompton Line separating the Laurentian margin from Dashwoods terrane; the Mekwe'jit Line (formerly Red Indian Line; *see* White and Waldron, 2022) separating Dashwoods terrane from arc and back arcs of the leading Ganderian margin; the Noel Paul's Line/Victoria Lake shear zone and Gander River Complex separating allochthonous blocks of composite Ganderia and; the Dover–Hermitage Bay Fault Zone separating Ganderia and Avalonia (*e,g.*, Blackwood and Kennedy, 1975; van Staal *et al.*, 2009; van Staal and Barr, 2012; van Staal *et al.*, 2014, and references therein).

Despite the abundance of terrane-bounding faults, orogenic gold mineralization in Newfoundland is associated with crustal-scale fault zones that transect the pre-Silurian terranes. In the west, for example, the Silurian to Carboniferous transcurrent Cabot–Doucers Valley fault system (Lock, 1969; Tuach, 1987) merges with the Baie Verte–Brompton Line (Figure 1; Waldron and van Staal, 2001), which must have been active post-Ordovician accretion to form Silurian vein-hosted gold mineralization (Dubé *et al.*, 1995; Poulsen *et al.*, 2000). In central Newfoundland, the approximately five million ounce orogenic gold deposit at Valentine Lake and numerous gold prospects along strike (*e.g.*, Wilding Lake prospect) are hosted along an Early Devonian thrust–backthrust system (Honsberger *et al.*, 2022a) that imbricated rocks of the Exploits Subzone and Gander Zone and uplifted the Meelpaeg nappe along the Victoria Lake shear zone/Noel Paul's Line. The Northern Arm fault is a distinct linear magnetic feature extending from Bay of Exploits in the northeast to Victoria Lake in the southwest. In the northeast, it cuts the Wenlock to Ludlow (*ca.* 429–427 Ma) Hodges Hill Intrusive Suite and dextrally offsets components of the Charles Lake volcanic belt (*ca.* 429 Ma). Farther east, the Reach Fault re-orients and disrupts in a dextral sense Ordovician through earliest Devonian rocks including the Uppermost Indian Islands Group, and possibly the Ten Mile Lake Formation. Other relatively young intra-terrane fault zones associated with orogenic gold mineralization include: the Day Cove thrust in the Baie D'Espoir area (Piasecki, 1988), the Salmon River Dam Fault (van der Velden *et al.*, 2004), the Appleton Fault Zone (AFZ) and the Joe Batts Pond (JPB) Fault Zone. Additional intra-terrane fault zones will likely be recognized, particularly those occurring under thick Quaternary cover in the Exploits Subzone and Gander Zone of central–eastern Newfoundland. Such structures are relatively easily discerned in recent 1:50 000-scale airborne geophysical surveys (*e.g.*, Kilfoil, 2020). A discussion of the orogenic gold-mineralized intra-terrane fault zones are presented in Honsberger *et al.* (2022b).

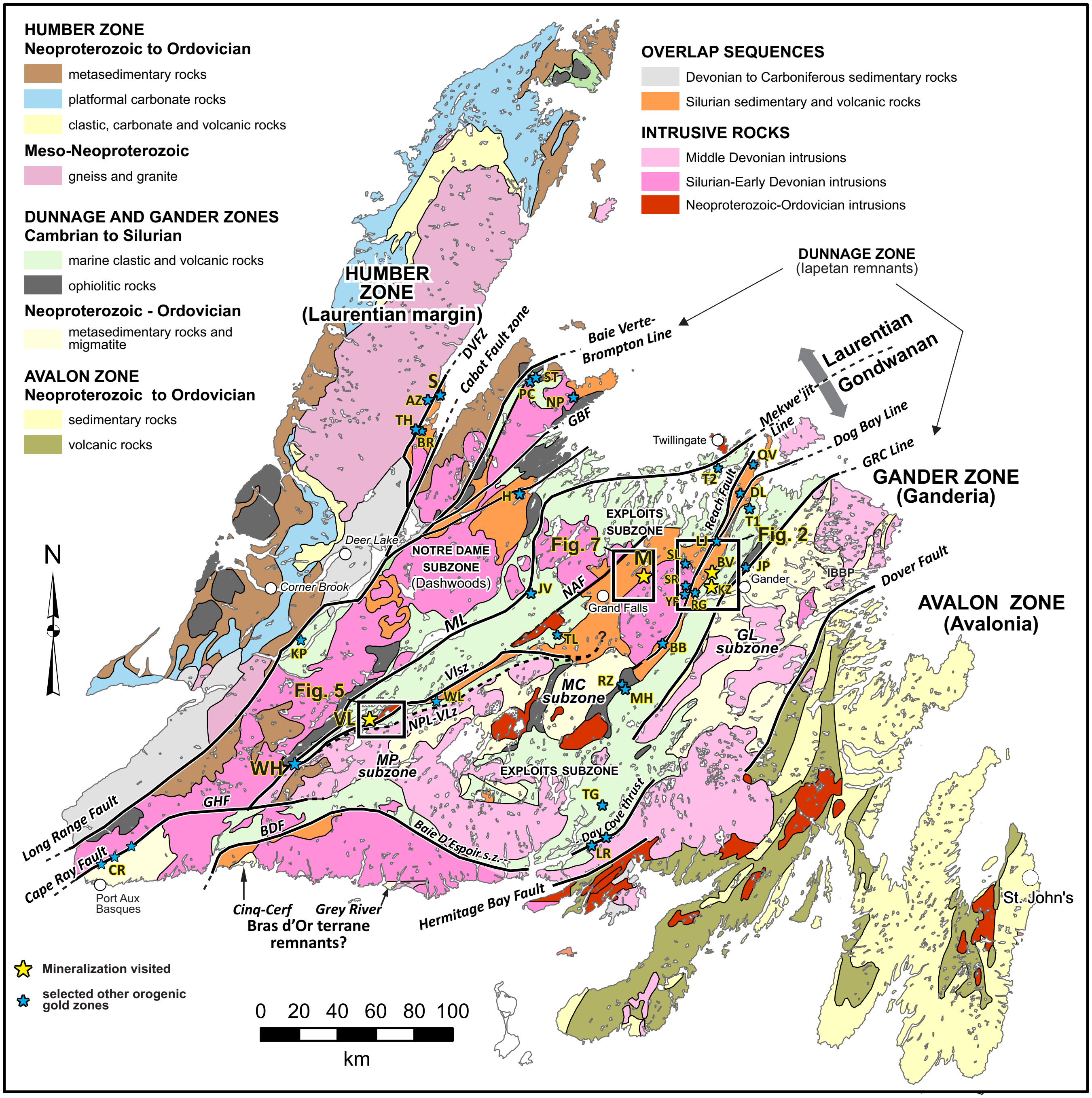

Figure 1. *Simplified geological map of the Island of Newfoundland showing the major geological terranes, tectonic boundaries and faults (modified after Colman-Sadd* et al.*, 2000) and the locations of the four gold projects discussed herein. Also shown are a number of other prominent gold mineralized zones. AZ–Apsy zone; BB–Beaverbrook; BR–Browning; BV–Big Vein; CR–Cape Ray; DL–Duder Lake; DVFZ–Doucers Valley Fault zone; GBF–Green Bay Fault; GHF–Gunflap Hills Fault; GL Subzone–Gander Lake Subzone; H–Hammerdown; IBBP–Indian Bay Big Pond; JP–Jonathons Pond; JV–Jaclyn Vein; KP –Kettle Pond; KZ–Keats Zone; LJ–Little Joanna; LP–Leprechaun Pond; LR–Little River; M– Moosehead; MC Subzone–Mount Cormack Subzone; MH–Mosquito Hill; MP Subzone–Meelpaeg Subzone; NAF–Northern Arm Fault; NP–Nugget Pond; NPL–Noel Paul's Line; PC–Pine Cove; QV–Quinlan Veins; RG–Road Gabbro; RZ–Reid Zone; S–Shrik; SL–The Slip; SR–Salmon River; ST–Stoger'tite; T1–Titan east; T2–Titan west; TG–True Grit; TH–Thor; TW–Twilite; VLsz–Valentine Lake shear zone; VLZ–Victoria lake shear zone; WH–Woods Lake and Hill Top; WL–Wilding Lake; YF–Yellow Fox.*

THE EXPLOITS SUBZONE

The Exploits Subzone is bounded by the Mekwe'jit Line in the west and extends southeast and eastward towards the Hermitage–Dover Fault system. The pre-Silurian rocks of the Exploits subzone comprise intra-oceanic arc and back-arc complexes of Ordovician age that were formed in the Iapetus Ocean proximal to the paleo-edge of Ganderia (Figure 1). The subzone structurally overlies older basement rocks of Ganderia and its affiliated Gondwana-derived crustal ribbons. Ophiolitic rocks of the Exploits Subzone, including the Pipestone Pond, Great Bend and Gander River complexes represent Late Cambrian to Early Ordovician "back arc?", mantle-derived rocks that were emplaced over the Gander margin in the Floian (late Early Ordovician; Cohen *et al.*, 2013_2023/v2) during the poorly understood Penobscot orogeny (Neuman, 1967; van Staal and Barr, 2012). Barr *et al.* (2014) suggested that the Neoproterozoic to Early Cambrian Bras d'Or terrane of Cape Breton Island may extend to the Cinq-Cerf and Grey River areas in southern Newfoundland and that the Bras d'Or basement may underlie all of the Exploits Subzone. Most of the post-Ordovician deformation in the Exploits Subzone, with the exception of the units exposed northwest of the composite Crippleback–Valentine lake Intrusive Suite, is associated with the Early Devonian Acadian, Middle Devonian NeoAcadian and the Middle Carboniferous to Permian Alleghenian orogenies (van Staal and Barr, 2012).

The geographic/aerial extent of the Exploits Subzone and its boundaries in northeast and central Newfoundland is misrepresented on most extant compilation maps, particularly its interpreted southeastern termination at the former GRUB Line, now known as the Gander River Complex (*cf.* O'Neill and Blackwood, 1989). The Exploits Subzone includes Ordovician volcanic and sedimentary rocks of the Baie Du Nord Group that are structurally interleaved with Ganderian basement in the Meelpaeg Subzone (*e.g.*, Valverde-Vaquero and van Staal, 2002). The correlative Ordovician Baie D'Espoir and Davidsville groups in central Newfoundland stratigraphically overlie and are imbricated and faulted with Cambrian ophiolites and Gander Zone basement (*e.g.*, Blackwood *et al.*, 1991; Colman-Sadd *et al.*, 1992). In the Gander Lake Subzone, brachiopod and trilobite-bearing strata of Late to Middle Ordovician (Darriwilian) age, comparable to other Exploits Subzone fauna, is exposed ~30 km east of the Gander River Complex at Indian Bay Big Pond (Figure 1; Wonderly and Neumann, 1984). These rocks are spatially accompanied by pillow basalt, siltstone, conglomerate and minor gabbro along northeast-trending curvilinear magnetic highs that likely represent remnant klippe of Exploits Subzone assemblages structurally above and interleaved with Ganderian margin sedimentary strata (Wonderly and Neumann, 1984; Miller and Weir, 1982; Miller, 1988; O'Neill, 1993). Exploits Subzone rocks occur sporadically across parts of the poorly exposed Gander Lake Subzone, and have faulted contacts with Gander Zone rocks. Emplacement of these Exploits Subzone klippes is constrained to the Middle Ordovician (Colman-Sadd *et al.*, 1992; Sandeman and Dickson, 2019); thus, the eastern Exploits Subzone and Gander Zone were amalgamated by that time and were no longer independent terranes after the Middle Ordovician. The Gander River Complex and other linear, strongly magnetic anomalies in the Gander Zone represent remnant overthrust Ordovician ophiolitic rocks, and Ordovician to Silurian cover rocks of Ganderia that were subsequently structurally modified during younger orogenic events.

REGIONAL SETTING OF THE QUEENSWAY AND KINGSWAY PROJECTS

The Kingsway and Queensway gold projects occur in the northeastern Exploits Subzone, proximal to the proposed trace of the Dog Bay Line (Figures 1 and 2), a curvilinear, poorly understood fault zone rec-

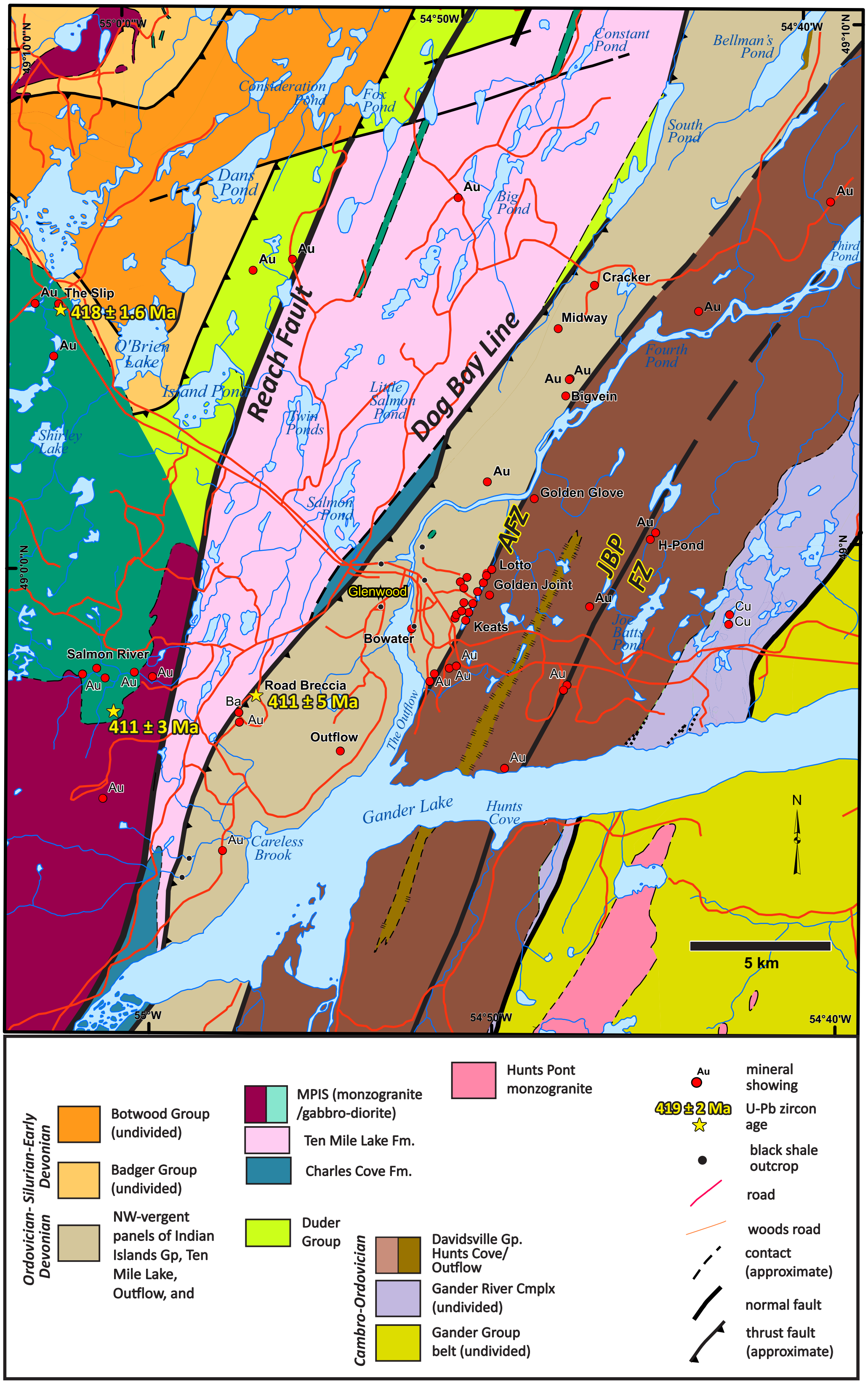

Figure 2. *Geological map of the northeastern Dunnage Zone and the setting of the Queensway and Kingsway projects (modified after https://geoatlas.gov.nl.ca/Default.htm; O'Brien, 2003). AFZ–Appleton fault zone; JBPFZ–Joe Batts Pond Fault Zone.*

ognized on the northeastern coast of Newfoundland in Dog Bay (Horwood area) and extrapolated to extend southwestward to the Mount Peyton Intrusive Suite (Currie, 1993; Williams 1993; Williams *et al.*, 1993; Currie, 1995; Pollock *et al.*, 2007). The Dog Bay Line (DBL) was interpreted to represent the terminal suture zone associated with closure of the Tetagouche–Exploits back-arc basin of Iapetus that closed in the Late Silurian at the end of the Salinic orogeny. There, Exploits Subzone rocks were subducted northwestward (present-day coordinates) beneath the Notre Dame Arc and the Laurentian margin. The line was delimited by the presence of the Duder Mélange or Group, a unit consisting of abundant gabbroic, volcanic and greywacke–sandstone blocks dispersed in a strongly deformed dark-shale matrix (Currie, 1993; Williams, 1993; Williams *et al.*, 1993; Currie, 1995a). Ordovician through Silurian rocks to the southeast of the DBL were proposed to have been deposited on the leading edge of Ganderia, whereas those to the northwest were deposited on Iapetan intra-oceanic rocks and their basement. Although very similar in appearance, the Silurian rocks on either side of the DBL were separated into the Botwood Group in the west and Indian Islands Group in the east. The Botwood Group lacks carbonate-rich sedimentary rocks and the Indian Islands Group lacks volcanic rocks. A thick-bedded, redbed subaerial sandstone (Ten Mile Lake Formation) was interpreted as an onlapping cover sequence of the DBL.

Presently, the rocks of the Queensway–Kingsway area along the proposed DBL have a very confusing and possibly overly complicated lithostratigraphic nomenclature with formational names that have been proposed and then modified in subsequent publications (*see* Figures 2 and 3; *see* Currie, 1995a *vs.* Williams *et al.*, 1993). The earliest publications on the Notre Dame Bay region (*e.g.*, Patrick, 1956; Williams, 1964; Dean, 1978) outline many of the different units proximal to the DBL, but the confusion surrounding the stratigraphy arose in the late 1980's and early 1990's. Working immediately west of the Gander River Complex, O'Neill and Blackwood (1989) and O'Neill (1991) proposed that the Ordovician Davidsville Group was deposited unconformably on the Gander River Complex and consisted of a basal unit termed the Weirs Pond Formation (Figures 2 and 3); a sequence of ophiolite detritus-bearing conglomerate and limey sandstone exposed in the east. This is stratigraphically overlain by the central Hunts Cove Formation (HCF), a thick and monotonous sequence of turbiditic shales and sparse sandstone. The HCF was considered to transition into the western lying Outflow Formation, interpreted to overlie the HCF and represented a coarsening-upward sequence of pebbly sandstone with shale intraclasts, shale and siltstone, and conglomerate (O'Neill and Blackwood, 1989; Figures 2 and 3). Williams *et al.* (1993) proposed a comparable stratigraphic column and unit nomenclature for the Davidsville Group near Gander Bay, however, both of the proposed stratigraphic sections lacked the recognition of the Main Point Formation, an aerially extensive black graphitic–pyritic shale of Sandbian–Katian (*ca.* 450 Ma) age that extends across the entirety of the Exploits Subzone and occurs on both sides of the DBL. Currie (1995a, b) further addressed the inland extent of the rocks that bound the DBL and revised the stratigraphy of the Davidsville Group by placing the Outflow Formation below the Hunts Cove Formation (Figures 2 and 3) and also recognizing the aerial extent and abundance of the Main Point Formation in the region. In addition, Currie (1995a, b) and Currie (1997) changed the nomenclature of not only the Davidsville Group rocks, but also those of the Indian Islands Group, and amalgamated a number of different units extending from Dog Bay to Mount Peyton into a new unit called the Duder Group, or Duder Mélange. Examples of units that were discontinued by Currie (1995a, b, 1997) after 1993 include the Dog Bay Formation and the Dog Bay Point Melange, whereas the constituents of the Indian Islands Group have confusingly varied and included the Charles Cove Formation, Horwood Formation, Seal Island Formation, Centennial Formation, Big Indian Pond Formation, and now also, the Ten Mile Lake Formation. The Ten Mile Lake Formation appears to represent the previously termed Big Indian Pond Formation.

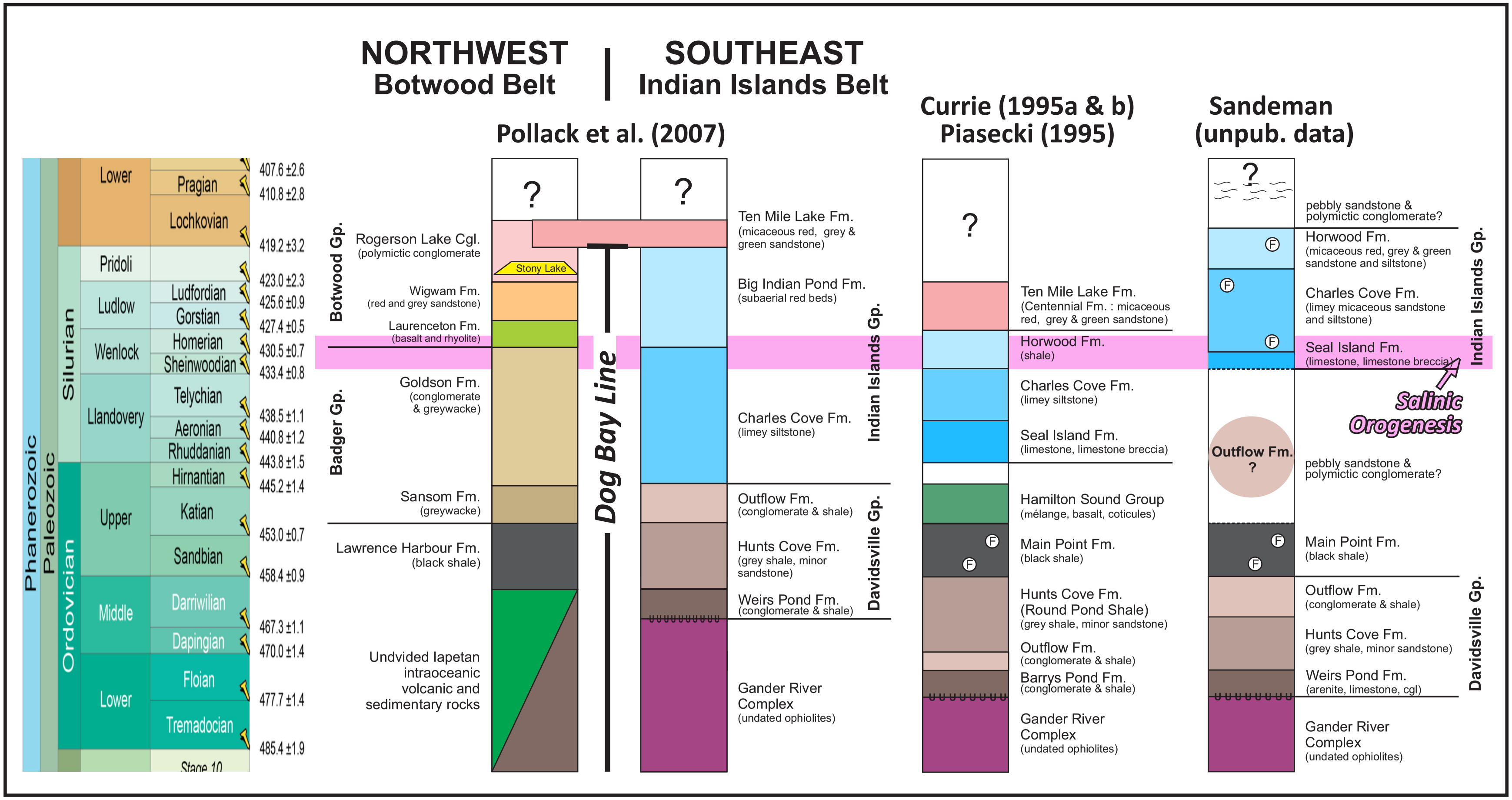

Figure 3. *Lithostratigraphic nomenclature of the rocks of the northeastern Exploits Subzone summarized in time-positioned stratigraphic columns for the Ordovician through Silurian rocks lying between the Gander River Complex and the Reach Fault.*

Recent modern, detailed airborne geophysical data, extensive mineral exploration in the area and diamond drilling have illustrated that what formerly was termed the Appleton Linear (Collins, 1991; Dimmell, 2000), is a ~020°-trending, moderately to steeply west-dipping high-strain zone characterized by intense mylonitization and brecciation (*e.g.*, Diamond-Drill Hole NFGC – 21-359; New Found Gold drillhole, 2021). Regional visitations to outcrop in the area and along the DBL illustrate that east of the AFZ the rocks are medium-grey siltstone and shale and sparse, brown sandstone beds strongly cleaved with a near vertical fabric. Metre- to 10's of metre-scale greywacke beds are also noted. These rocks are typical of the Hunts Cove and Outflow formations of the Davidsville Group (Figures 2 and 3). Rocks exposed west of the AFZ and extending to the Reach Fault are more variable and diverse, are typically less-cleaved and invariably dip to the southeast. These rocks include in assumed order of younging (Figures 2 and 3): minor green-grey shale-siltstone, locally with shale rip ups (Hunts Cove Formation?); abundant green-grey and black shale with shale rip-ups and brown pebbly sandstone (Outflow Formation?); graphitic and pyritic, locally chaotically folded black shale of Sandbian–Katian age (Main Point Formation and equivalents); cm- to decimetre-scale bedded muscovitic siltstone and sandstone with carbonate beds (Charles Cove Formation, Indian Islands Group); cm- to m-scale bedded muscovitic sandstone and lesser siltstone (Horwood Formation?–Ten Mile Lake Formation?). The rocks west of AFZ form a north- to northwest-directed, sinistral fold and thrust belt that must be as young as Lockovian (*ca.* 419–410 Ma; *see* Sandeman *et al.*, 2018). Most of the New Found Gold Corporation's Queensway North area of interest lies east of the AFZ, whereas Labrador Gold Corporation's Kingsway project interests lie west of the AFZ.

Three possible simplified cross-sections are presented in order to portray the geological and structural features observed in the Glenwood-Appleton, Queensway-Kingsway project areas. These preliminary interpretations are shown in Figure 4.

REGIONAL SETTING OF THE VALENTINE LAKE PROJECT

The Valentine Lake gold deposits in central–western Newfoundland occur within the Exploits Subzone near the boundary with the Meelpaeg Subzone (Figures 1 and 5). The Neoproterozoic to Silurian rocks of the Valentine Lake area trend northeasterly and are bisected by the Victoria Lake shear zone (Valverde-Vaquero *et al.*, 2006; van Staal *et al.*, 2006). This major northeast-trending, variably southeast-dipping, crustal-scale fault zone extends from the Gunflap Hills fault in the southwest, through central Newfoundland along the northern margin of the Meelpaeg nappe (Figures 1, 5 and 6). The northeastern trace of the Victoria Lake shear zone is poorly constrained and it may continue northeastward to the Bay of Exploits, or alternatively, it may bifurcate and verge to the east along the northern margin of the Mount Cormack Subzone (*e.g.*, Honsberger *et al.*, 2022a).

To the northwest, in the structural footwall of the Victoria Lake shear zone, Neoproterozoic (*ca.* 570 Ma) orogenic gold-mineralized basement granitoid rocks of the Valentine Lake Intrusive Suite (Evans and Kean, 2002; Rogers and van Staal, 2002; Rogers *et al.*, 2006), are uplifted and juxtaposed against the Rogerson Lake Conglomerate along the northwest-dipping Valentine Lake shear zone (Kean and Jayasinghe, 1980). The steeply northwest-dipping Valentine Lake shear zone hosts the approximately five million ounce orogenic gold resource, including the Leprechaun Pond deposit, where bleached and altered Neoproterozoic trondhjemite–tonalite and associated rocks contain a stacked array of fault-fill and extensional quartz–tourmaline–pyrite (QTP) vein sets (Lincoln *et al.*, 2018). The Rogerson Lake Conglomerate crops out southeast of the Valentine Lake shear zone, and is an aerially extensive latest

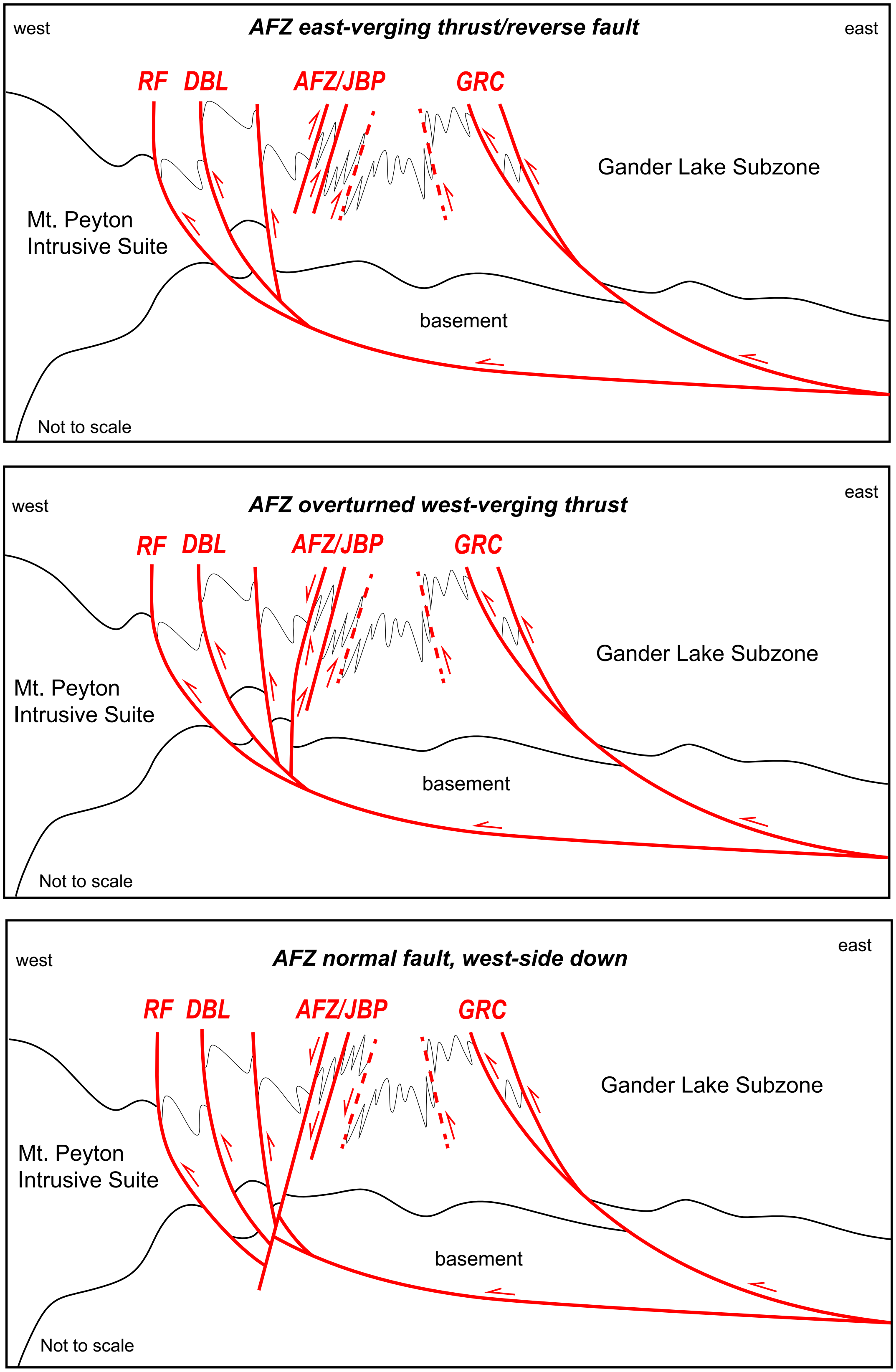

Figure 4. *Three plausible interpretive cross-sections (west-northwest–south-southeast) through the Queensway and Kingsway projects (modified from https://geoatlas.gov.nl.ca/Default.htm; Sandeman and Honsberger, unpublished data, 2022).*

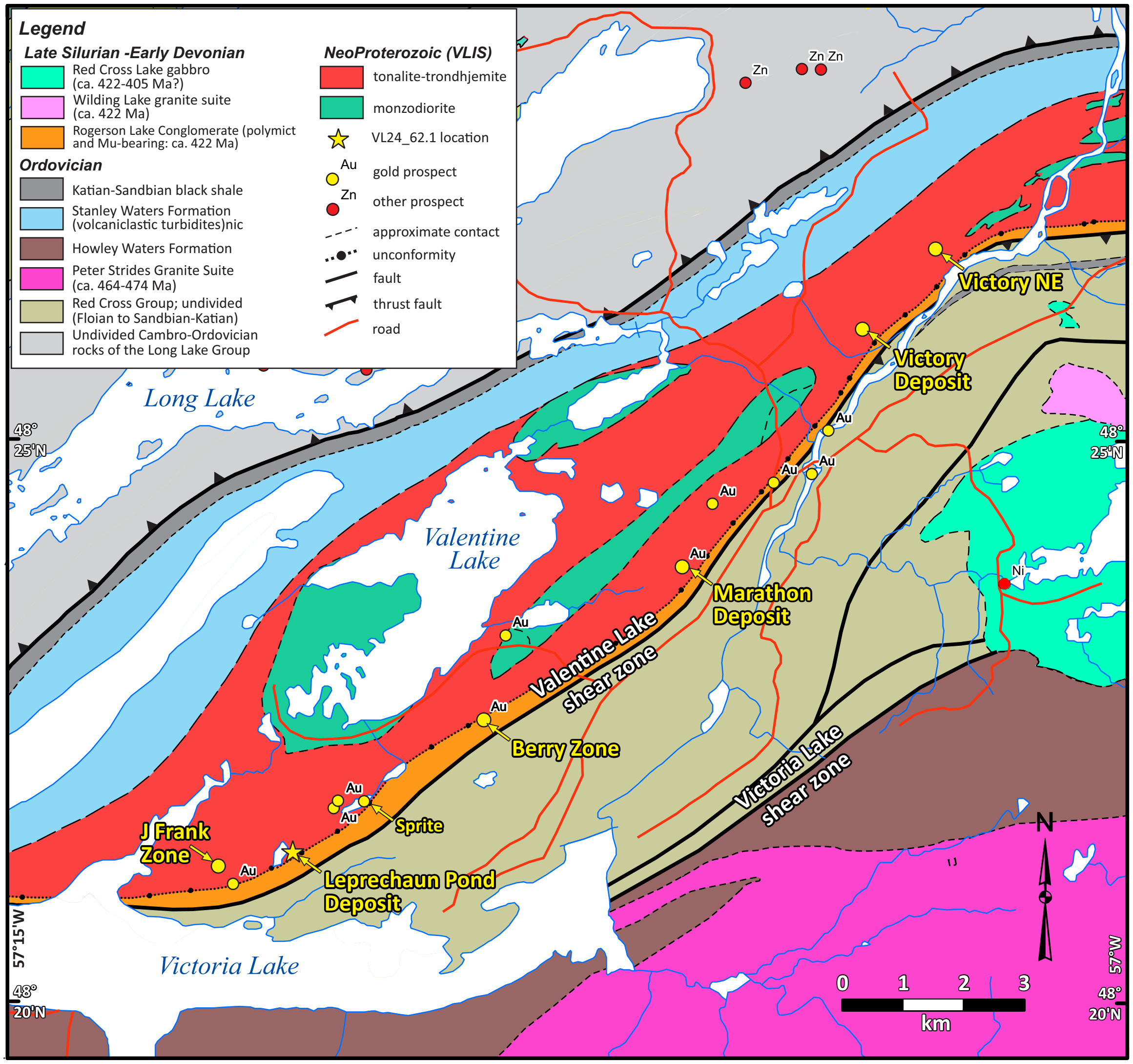

Figure 5. *Simplified geological map of the Valentine Lake area (modified after van Staal* et al.*, 2005) showing the locations of precious- and base-metal showings. https://geoatlas.gov.nl.ca/Default.htm)*

Silurian, syntectonic, clastic sedimentary unit of central Newfoundland that delineates the southwest–northeast-trending fault system that is host to many of the gold occurrences along the central Newfoundland gold belt (Honsberger *et al.*, 2022b).

Thirty-six kilometres northeast along strike of the Leprechaun Pond deposit, at Wilding Lake, orogenic gold mineralization is hosted within both the Rogerson Lake Conglomerate and the associated *ca.* 422 Ma felsic subvolcanic and volcanic rocks in the immediate footwall of the northeastern extension of the Valentine Lake shear zone (WL on Figure 1; Honsberger *et al.*, 2022a, b). Overlapping, *ca.* 410 Ma ID-TIMS U–Pb ages for hydrothermal rutile in quartz veins from both the Leprechaun Pond deposit and the Elm Prospect of the Wilding Lake property (Honsberger *et al.*, 2022a) indicate an Early Devonian (late Lochkovian) age for quartz vein emplacement associated with orogenic gold mineralization. However, recent geochronological constraints of *ca.* 380 Ma for an ID-TIMS U–Pb age for hydrothermal monazite in mineralized quartz from the Leprechaun Pond deposit (Layne *et al.*, 2022) and an $^{40}Ar/^{39}Ar$

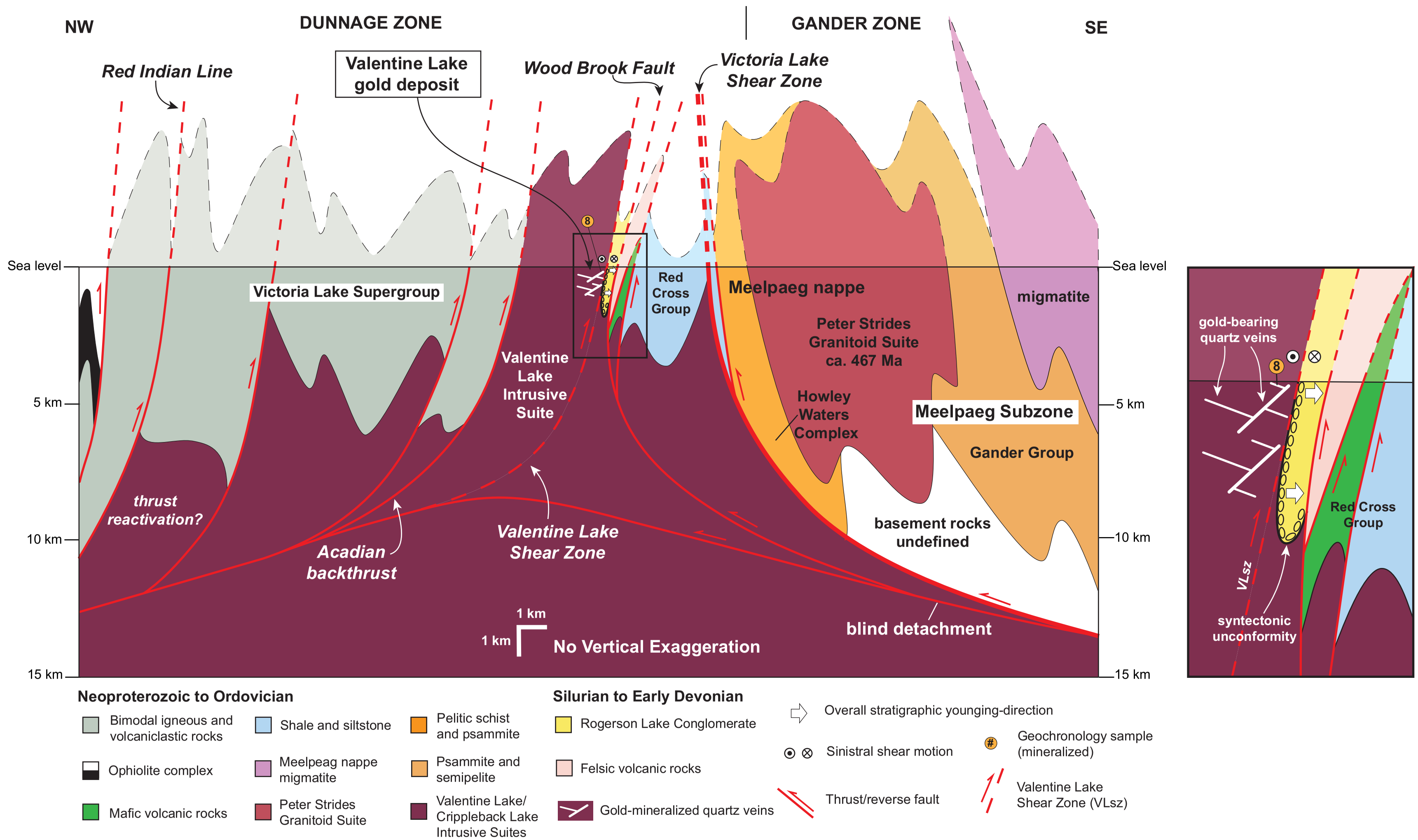

Figure 6. *Simplified interpreted cross-section through the south-central Newfoundland Gold belt (from Honsberger et al., 2022a).*

muscovite plateau age of 384.2 ± 1.6 Ma (Sandeman *et al.*, 2022), suggest either a single protracted alteration and mineralization event, or multiple discrete events. Nevertheless, gold mineralization occurred in the Devonian (Cohen *et al.*, 2013_v2023/6).

Initially explored by ASARCO Inc., the auriferous mineralization at the Leprechaun Pond deposit, Valentine Lake, was first uncovered by BP Canada Inc. in 1985 during follow-up work investigating gold-in-soil anomalies developed by prior property owner Abitibi Price Inc. (*e.g.*, Barbour *et al.*, 1990). BP Canada discovered zones of quartz-tourmaline-bearing quartz veins cutting bleached and altered trondhjemite of the Valentine Lake Intrusive Suite. During the period 1986 to 1991, BP Canada conducted extensive work on the project and drilled 47 diamond-drill holes (5974 m) into the Leprechaun Pond mineralized zone (Barbour *et al.*, 1990). Hole VL-24 intersected a number of gold- and quartz-tourmaline-bearing veined intervals that yielded 4.7 g/t Au over 3.7 m and 24.1 g/t over 3 m (Barbour *et al.*, 1990).

The property and the vein system was acquired by Noranda Exploration Inc. in 1992, but little progress other than further soil sampling was completed. In 1998, Mountain Lake Resources acquired the property and in 2003 joint ventured with Richmont Mines Inc. They conducted a number of exploration seasons on the property that included completing 58 diamond-drill holes. In 2008, Richmont and Mountain Lake reported a NI 43-101 compliant, inferred resources of 1 314 780 tonnes grading 10.5 grams per tonne (g/t) gold. Cutting assays to 58 g/t gold, the average grade is 8.5 g/t gold, for a total estimated mineral resource of 359 000 ounces of gold in the Leprechaun Pond area (Richmont Mines archives; https://www.sec.gov/Archives/edgar/data/1023996/000120445908000572/exh991.htm).

By 2011, through a number of business agreements, the property was then optioned by Marathon Precious Metals Corporation (now Marathon Gold Corporation) who, over the past decade, have diligently drilled off a number of proposed open-pit deposits along the strike length of the Valentine Lake shear zone (Tettelaar and Dunsworth, 2016). The property in 2022 collectively had a total Measured and Indicated Mineral Resource (inclusive of the Mineral Reserves) of 4.0 Moz of Au M&I (64.6 Mt at 1.90 g/t Au) and 1.1 Moz of Au Inferred (20.8 Mt at 1.65 g/t) (https://marathon-gold.com/site/uploads/2022/07/7-6-2022-Marathon-Announcement-Updated-Mineral-Resource-Estimate-vFinal.pdf).

REGIONAL SETTING OF THE MOOSEHEAD PROSPECT

The Moosehead Prospect occurs ~3 km southeast of the town of Bishops Falls, ~2 km south of the Trans-Canada Highway and ~4 km west of the *ca.* 425–418 Ma Mount Peyton Intrusive Suite in the north-central Exploits Subzone (Figures 1 and 7; Morgan, 2016; Froude, 2019, 2021). Vein-style mineralization is hosted by folded and likely imbricated Late Silurian sedimentary and volcanic rocks of the Wigwam and Laurenceton formations of the Botwood Group (Williams, 1969; Dickson *et al.*, 2000; O'Brien, 2003). Moosehead has been compared to the world class Fosterville gold deposit in Victoria, Australia, based on geology, structural style and mineralization types. Brief highlights are summarized here; much of the history of exploration at Moosehead has been extensively summarized by Morgan (2016).

The Moosehead Prospect was discovered in 1989 when prospectors working for Noranda Exploration Ltd. discovered a number of auriferous quartz boulders near North and South ponds. During 1989 and 1990, the company conducted till-soil sampling, ground magnetic, IP and VLF-EM surveys as well as one diamond-drill hole that did not intersect mineralization (Sparkes, 1990; Tallman and Sparkes, 1991).

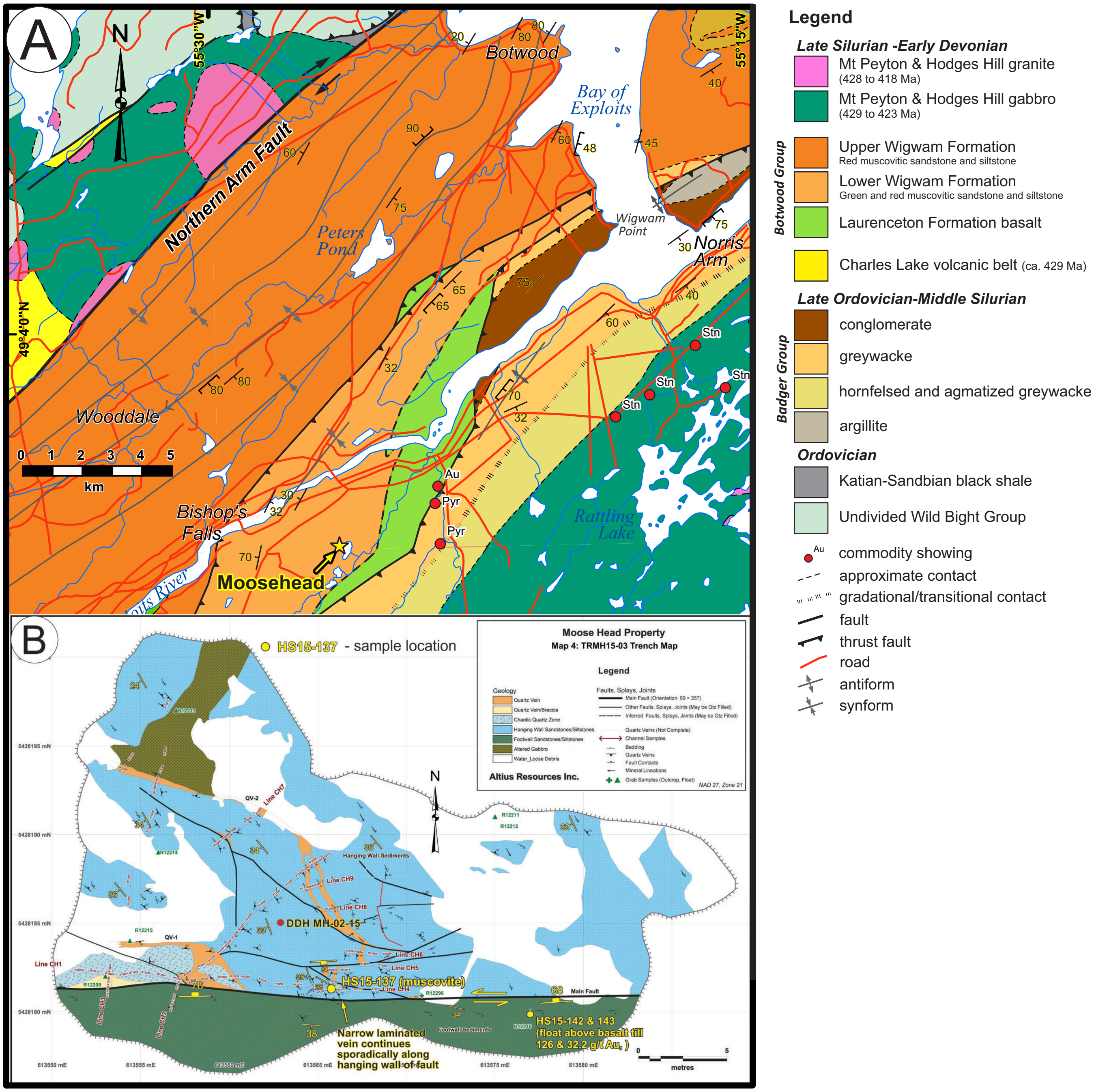

Figure 7. *A) Simplified geology of the northeastern Botwood Basin and the location of the Moosehead Prospect and other local mineral occurrences (modified after https://geoatlas.gov.nl.ca/Default.htm); B) Geological map of trench TRMH15-3 at the Moosehead Prospect and the location of DDH MH-02-15 (*see *Morgan, 2016).*

Noranda subsequently dropped the exploration licences. The ground was re-staked in 1994 by Cape Broyle Exploration [CBEX] Limited (Dalton and Scott, 1995). After conducting line-cutting, prospecting and mapping along with a reinterpretation of the existing Noranda geophysical data, CBEX optioned the property to Royal Oak Mines in 1995–1996. Royal Oak conducted additional soil and till surveys, prospecting, mechanical trenching, and 7 diamond-drill holes (Lendrum, 1996, 1997). Altius Resources

Inc. acquired the property in 1997 and conducted further prospecting, mapping, mechanical trenching, and till sampling for gold-grain analysis and, particular attention was focused on the glacial deposits and history of the area including recognition of 2 distinct tills (Hynes and Dalton, 1997). In 1998, Altius expanded the Moosehead grid and conducted an extensive program of ground magnetic, VLF-EM and IP-resistivity surveys (Hynes *et al.*, 1998).

Teck Exploration Ltd acquired the Moosehead Property in 1999, and conducted further line cutting, a re-interpretation of the existing geophysical data, an IP survey, and 756 m of diamond drilling in 7 short holes (Clark, 1999). Teck relinquished its joint venture partnership in the property in 2001.

Between 2001 and 2004, Altius then joint ventured with Sudbury Contact Mines (subsequently a subsidiary of Agnico Eagle Mines Ltd.) and the companies completed a series of exploration programs in the Moosehead area. Over this interval, they conducted extensive prospecting, rock sampling, soil sampling, geological mapping, geophysical surveys as well as numerous relatively short diamond-drill holes. The best results included drill hole MH-01-23 grading 170.3 g/t Au over 1.53 m; drillhole MH-02-38 grading 1154.3 g/t Au over 0.18 m and; drillhole MH-02-09 which returned a value of 222.8 g/t Au over 0.14 m (Barbour *et al.*, 2001, 2002, 2003). Drillhole MH-03-15, slightly deeper than most, intersected an interval of quartz veining and breccia between 244.3 and 257.7 m, and returned values of up to 278 g/t Au over 0.44 m from this zone (Barbour *et al.*, 2003). Exploration work in 2004 included further drilling and although some narrow low-grade intercepts (*e.g.*, 2.2 g/t Au over 0.27 m) were encountered, the program failed to generate high-grade gold intercepts (Barbour, 2004).

In 2004, the diamond-drilling program represented the last significant exploration work on the Moosehead Prospect until 2014, when Agnico Eagle Mines Ltd. terminated the joint venture with Altius Resources Inc. Altius immediately re-staked the Moosehead Gold Property and in 2015, carried out mechanical trenching, soil sampling, and till sampling on the property and, for the first time, exposed bedrock in trench TRMH-15 (Morgan, 2016; *see* below). Sokoman Minerals joint ventured with Altius Resources in 2018 and, after having spent a required minimum of $500 000 in exploration expenditures within the first year, gained 100% interest in the property (Froude, 2019). Sokoman is currently conducting an extensive 100 000 m drill program on the property (Froude, 2021).

The Moosehead mineralization consists of an array of extensional, moderately east dipping, auriferous, sulphide–sulphosalt-bearing quartz veins and quartz breccias that cut upright openly folded (gently north plunging axes) muscovite-bearing siltstone and sandstone of the Silurian Wigwam Formation of the Botwood Group (Williams, 1969; Dickson *et al.*, 2000; O'Brien, 2003; Morgan, 2016). Mafic volcanic rocks of the lower Botwood Group (Laurenceton Formation) occur immediately south and southeast of the prospect. Auriferous veining has been intersected over a 2 km strike with the bulk of the mineralization only tested in detail over approximately 500 to 700 m. Vein styles include vuggy (epizonal?) massive to highly stylolitic veins with locally abundant visible gold occurring with 5–7% accessory boulangerite and sphalerite with lesser chalcopyrite. Lower grade gold mineralization (from 1 to 5 g/t Au) characterized by a pyrite and arsenopyrite dominant assemblage, can occur for several metres up and down dip of high-grade vein intersections and is commonly associated with altered mafic dykes. The mafic dykes are locally bleached, silicified, and carbonate + pyrite ± sericite altered (*e.g.*, Clark, 1999; Morgan, 2016).

Thick glacial and fluvioglacial deposits cover the region and bedrock exposures are confined to rare outcrops, road-cuts and anthropomorphic disturbances. Hence, the mineralization and rocks at the

Moosehead Prospect are very poorly exposed and therefore, much of the early exploration and diamond drilling was undertaken largely on the basis of mineralized quartz boulder trains and float, some of which yielded assays of 19–149 g/t Au (Dalton and Scott, 1995; Morgan, 2016). Trenching in the area successfully uncovered the quartz veining and mineralization at only one locality, the North Pond trench (TRMH15-3: Morgan, 2016) which was exposed in 2015 after a LIDAR survey of the region demonstrated reasonably thin till cover at that locality. Trenching uncovered medium-bedded muscovitic sandstone, southwest-dipping in the north and south-dipping in the south, with weakly sulphidic, highly disrupted, quartz-veined, sandstone–quartz breccia in between (Figure 7). The muscovitic sandstone is variably mineralized, and quartz veins are more abundant in the north. Mineralization occurs in the hangingwall of a discrete east–west fault zone (Figure 7). Bedding and crosscutting quartz veins are deflected into the fault zone, consistent with dextral rotation and reverse(?) slip. Further description and assay information for the Moosehead prospect are presented in Morgan (2016).

$^{40}Ar/^{39}Ar$ step-heating analyses of detrital muscovite from a sample from the Moosehead trench yielded Middle Ordovician cooling ages (Sandeman *et al*., 2022) and although they do not provide constraints on the age of mineralization, they constrain the age of the source of the muscovite. The interpretative structure of the Botwood Basin in the area near the Moosehead Prospect is illustrated in Figure 8.

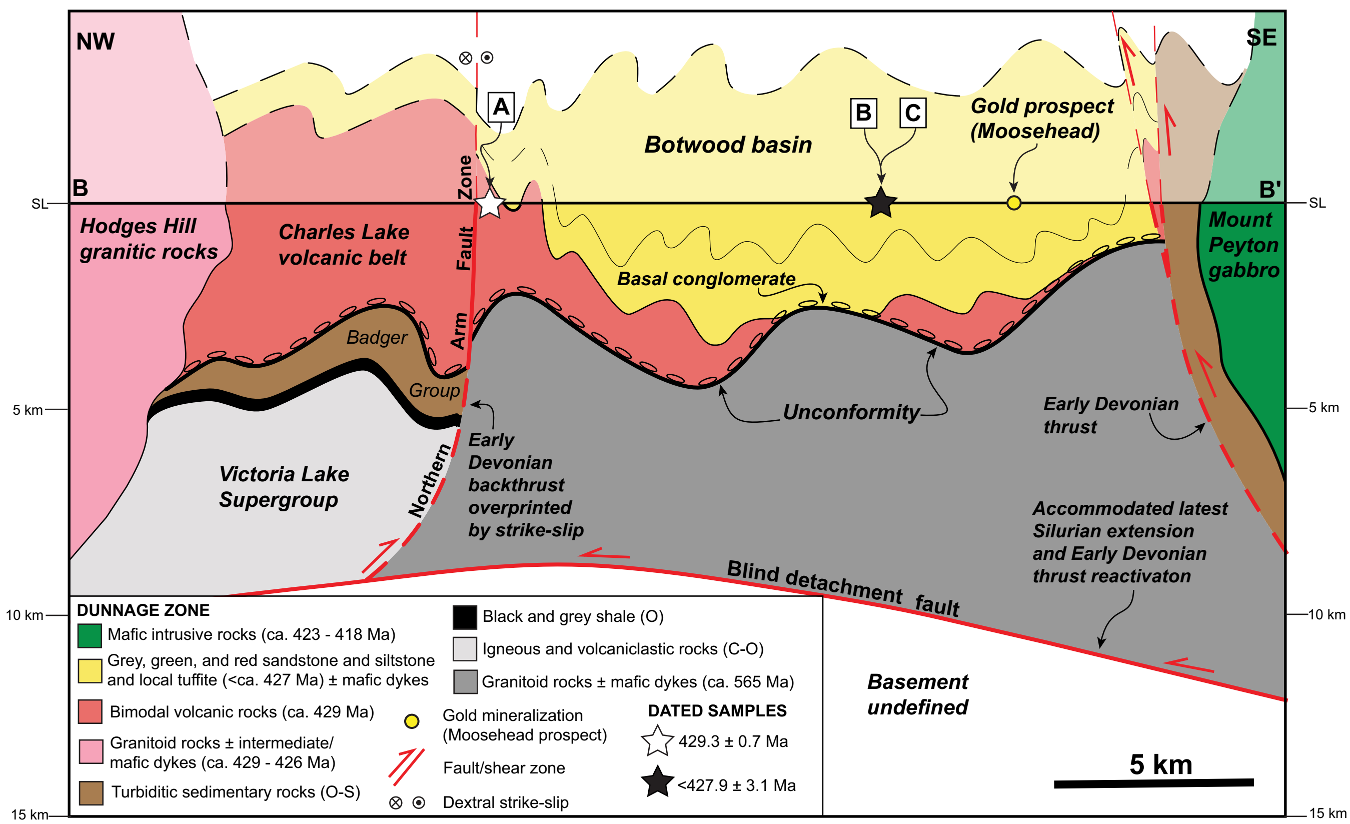

Figure 8. *Simplified interpreted cross-section through the north-central Newfoundland Gold belt (from Honsberger* et al.*, 2022b).*

FIELD TRIP ITINERARY

DAY 1: NEW FOUND GOLD CORPORATION'S QUEENSWAY PROJECT

The Queensway Project lies in the Exploits Subzone of the Dunnage Zone. The project area is bounded to the East by the Gander River Complex (GRC line) and ~5–10 km west of the interpreted expression of the Dog Bay Line (DBL). The property is transected by the regional-scale Appleton fault zone and the sub-parallel JBP fault zone (Figure 9). These structures host numerous gold prospects. Sedimentary rocks of the Davidsville Group host a variety of quartz veins which record a general sequence of early bedding-parallel barren veins and late sets of discordant gold-bearing veins showing distinct textures and orientations at each prospect. Gold mineralization occurs in structurally complex domains where quartz veins occupy second-order fault networks adjacent to the regional structures. Gold particles typically occur as coarse grains of free gold in quartz-carbonate veins that are brecciated, massive-vuggy, laminated, and stock-work style. Arsenopyrite is the most common sulphide mineral associated with gold. Boulangerite is often associated with very high-grade mineralization but is much less common than arsenopyrite. Fine- to coarse-grained disseminated pyrite occurs throughout the mineralized zones. High-grade gold mineralization typically occurs in closely spaced quartz veins associated with extensive fault zones. High-grade mineralization has not been observed outside of the vein arrays. Hydrothermal alteration is visually subtle. A weak discoloration of the host rock adjacent to the veins is locally noted to extend up to 2 m from the vein margins. The selected field stops of the Queensway Project illustrate the general structural-stratigraphic framework and the styles of vein-hosted gold mineralization present in the numerous gold prospects adjacent to the Appleton fault zone (AFZ).

Stop 1: Dome Prospect (UTM 658650 E, 5428550 N, Zone 21, NAD27)

An outstanding exposure of a large >2 m-wide gold-bearing quartz vein hosted in deformed siltstone ± greywacke of the Hunts Cove Formation ± Outflow Formation, Davidsville Group (*see* Figures 10 and 11). These rocks occur immediately to the east of the northwest-dipping Appleton fault zone. The dominant foliation is steeply-dipping to the northwest but is sheared and rotated along the margins of the quartz veins. The main Dome quartz vein dips moderately to steeply to the southwest, whereas an adjacent, thinner vein dips moderately to the southeast.

Features to observe:

- Deformed sedimentary rocks cut by multiple quartz veins.
- Sulphide mineralogy + visible gold in quartz veins.
- Light bright green soft clay/ammonium muscovite alteration around quartz veins.

Stop 2: Lotto vein (UTM 658760 E, 5428920 N, Zone 21, NAD27)

Numerous ridges of strongly cleaved, thinly interbedded dark to light-grey siltstone and shale of the Hunts Cove Formation, Davidsville Group cut by quartz veins immediately east of the Appleton fault

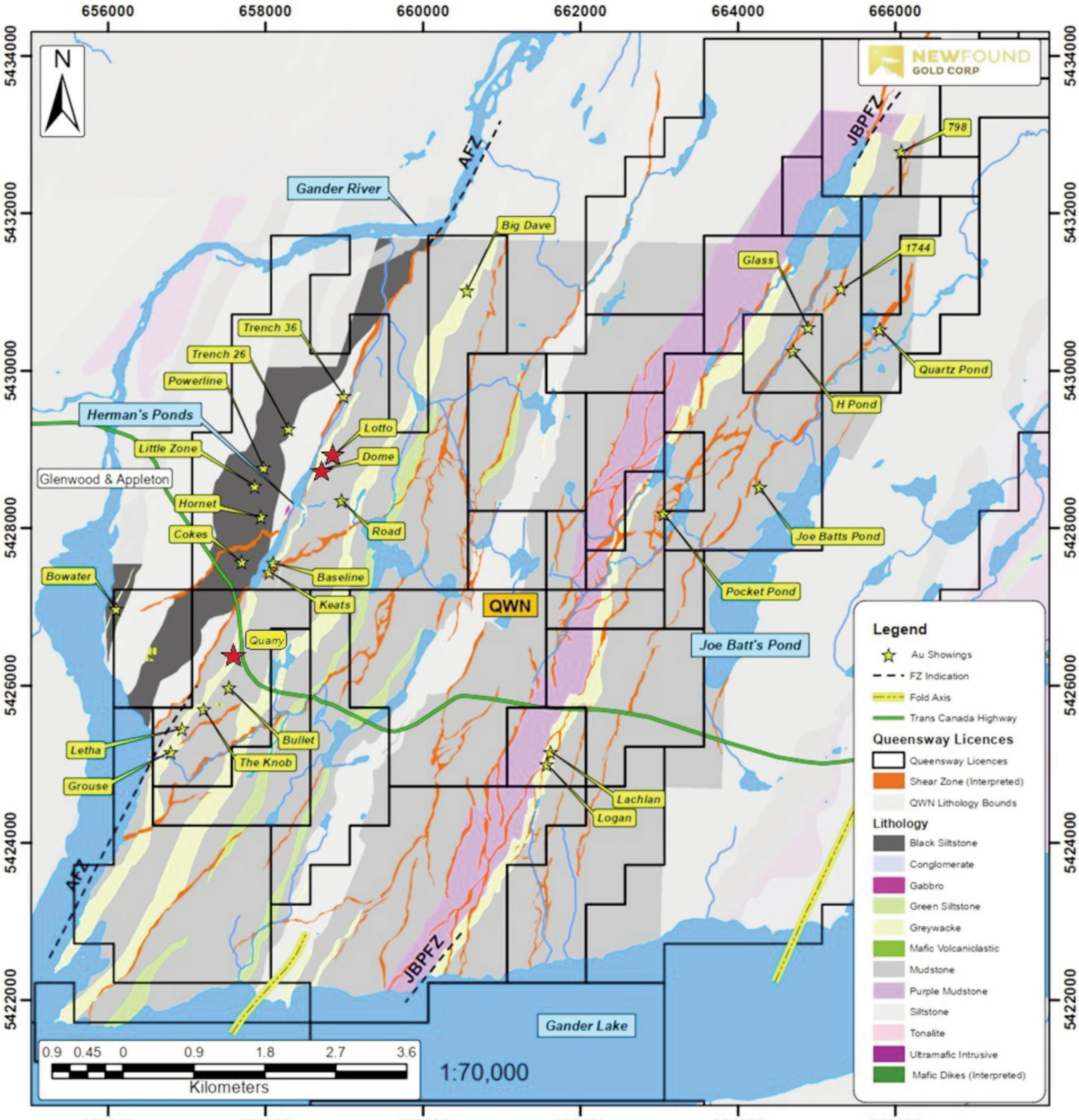

Figure 9. *Interpretive geological map of the Queensway North project indicating the locations of the 3 field stops (red stars). Map extracted from New Found Gold Corp 43-101.*

Figure 10. *Typical alteration style around gold bearing veins at the Dome Prospect.*

zone. The dominant foliation in the sedimentary rocks strikes north-northeast and dips steeply to the east-southeast. Outcrop shows distinct quartz vein styles and textures with early-deformed, bedding-parallel veins trending north-northeast, and a <1 m wide late discordant vein (the Lotto vein) trending north-north-west (*see* Figure 12).

Features to observe:

- >1-m wide boudinaged bedding-parallel barren quartz vein.
- ~20-m dextral offset on mineralized vein. Offset is parallel to the regional foliation.
- Sinistral shear sense indicators along regional foliation.

Figure 11. *Outcrop photo of the Dome Prospect.*

Stop 3: Quarry near Appleton (UTM of turnoff 657650 E, 5426146 N, Zone 21, NAD27)
(time permitting)

The quarry extends for almost 700 m south-southwest from the Trans-Canada Highway and lies immediately to the southeast of the Appleton fault zone. Exposures are dominated by interbedded dark-grey mudstones and siltstones of the Hunts Cove Formation as well as local greywacke beds. The local presence of greywacke may signify a transition to the Outflow Formation. The outcrop shows a pervasive, regional subvertical north-northeast-trending foliation and different generations of quartz veins (*see* Figure 13).

Features to observe:

- Crosscutting relationship between early bedding-parallel barren quartz veins and bedding-discordant mineralized veins (a grab sample of Bullet vein on the eastern side of the quarry yielded: 18400 ppb Au; 5.7 ppm Ag; 3358 ppm Cu; 5279 ppm Pb; 1580 ppm Sb; with anomalous Bi (1.4 ppm) and As (112 ppm) (Sandeman, unpublished data, 2023).
- Kink bands and bedding-cleavage intersection lineation indicating shallow plunge? of the fold hinges.
- Late sinistral displacement of mineralized vein along brittle-ductile faults.
- Contact between siltstone and greywacke.

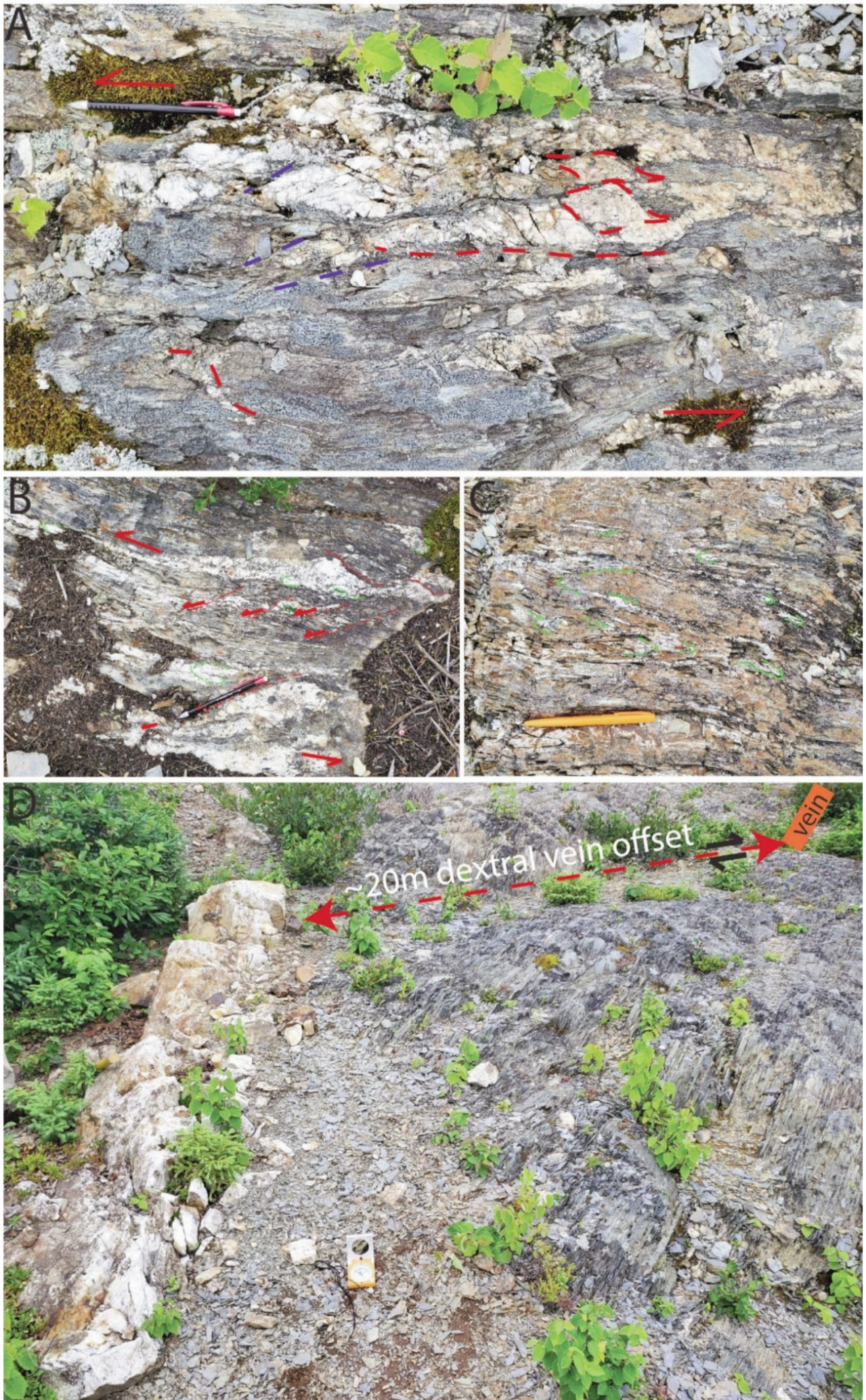

Figure 12. *Outcrop photo of the Lotto vein system. A/B) Sinistral sense of shear observed on early veins and regional fabric; C) Tight folding and dismembering of early veins; D) Dextral offset along mineralized vein.*

Figure 13. *Outcrop photos showing geological features of the Appleton quarry. A) General appearance of the Quarry exposure highlighting quartz veins (blue lines); B) Close up photo, indicated in "A", showing sinistral displacement of vein set; C) Bedding-discordant breccia style of quartz veins; D/E) Tight folding showing shallow plunge of fold hinges and crosscutting mineralized vein; F) Crosscutting relationship between early bedding-parallel veins and bedding-discordant veins.*

DAY 2 (AM): MARATHON GOLD CORPORATION'S VALENTINE PROJECT

The host rocks and mineralization will be viewed in drillcore because of mine construction.

Property Description

The Valentine Lake property is in the west-central region of the island of Newfoundland, Canada (Figure 14). The property is 100% owned by Marathon Gold and hosts five gold deposits, namely Leprechaun, Marathon, Sprite, Victory and Berry, and several other early-stage gold prospects. The collective deposits and occurrences occur within a 20 km long northeast-trending zone known as the Valentine Gold Project. A summary of the ownership history is given in Table 1.

Figure 14. *Island of Newfoundland and location of the Valentine Gold Project (Marathon Gold, 2020).*

Table 1. Summary of ownership history at Valentine Lake

Date	Operator	Date	Operator
1960s	ASARCO Inc.	1998-2003	Mountain Lake Resources Inc.
1970s to 1983	Hudson's Bay Oil and Gas Company	2003-2007	Richmont Mines Inc.
1983-1985	Abitibi Price Inc.	2007-2009	Mountain Lake Resources Inc.
1985-1992	BP Canada Inc.	2009-2010	Marathon PGM Corporation
1992-1998	Noranda Inc.	2010-Present	Marathon Gold Corporation

Accessibility, Climate, Local Resources, Infrastructure and Physiography

Access to the property is by existing roads, nominally the 84 km gravel road from the Town of Millertown. Using the Trans-Canada Highway and the Buchans Highway, Millertown can be accessed by paved road. The project is situated in between two major waterbodies, Valentine Lake and Victoria Reservoir.

Property Geology

The Valentine Lake property is underlain by five major lithological units including, from northwest to southeast, the Victoria Lake Supergroup (bimodal volcanic rocks, volcanogenic and siliciclastic sedimentary units), the Valentine Lake Intrusive Complex (VLIC), the Rogerson Lake Conglomerate, the Victoria Lake Supergroup metasedimentary units and lesser gabbroic and mafic volcanic rocks and the Red Cross lake intrusion (*see* Figure 15).

The Victoria Lake Supergroup outcropping along the northwest boundary of the Valentine Lake property area consists mainly of low-grade Cambro-Ordovician volcanic and sequences of clastic sedimentary

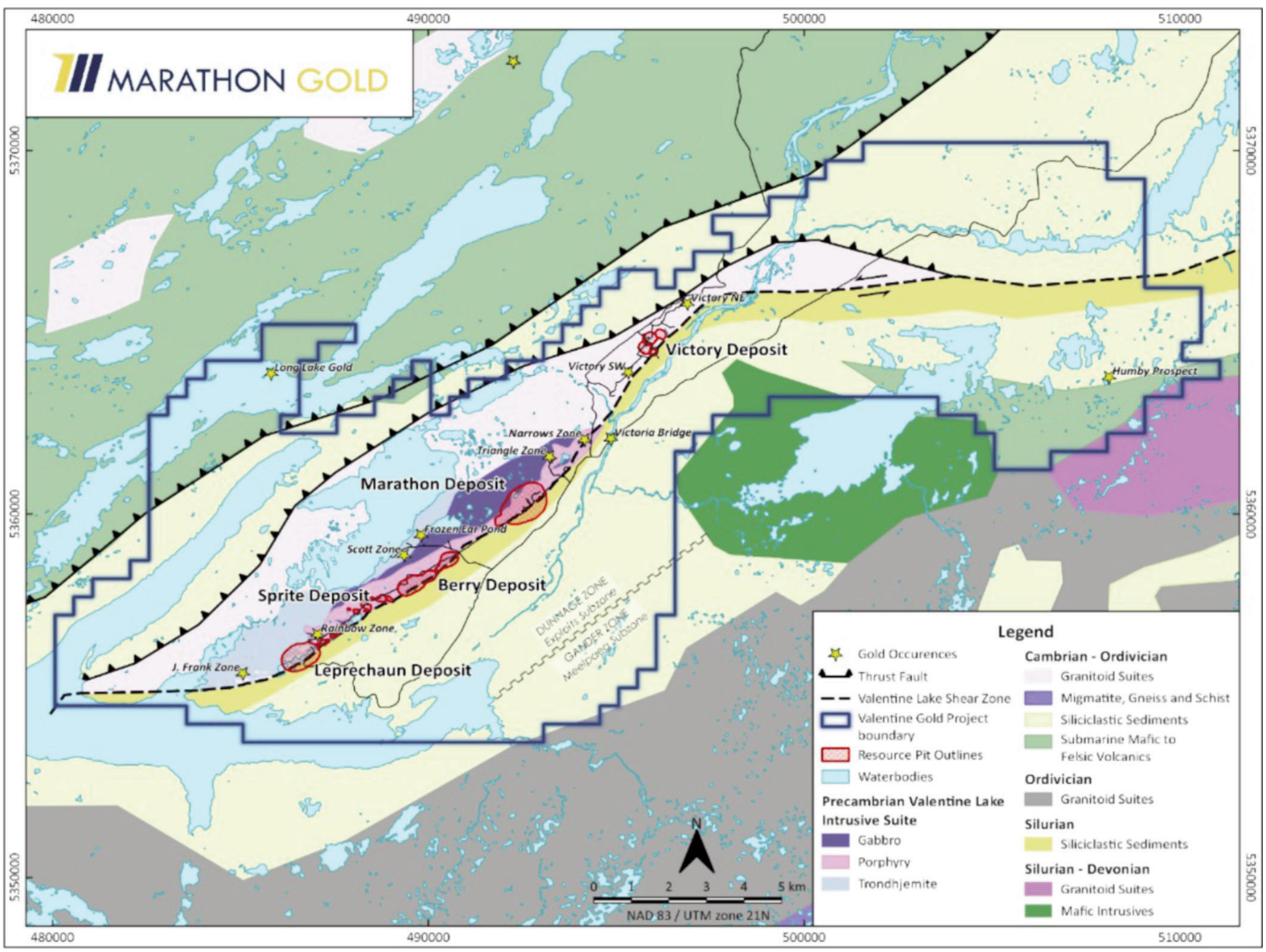

Figure 15. *Geology and gold deposits of the Valentine Gold Project (Marathon Gold, 2017).*

rocks of the Tulks Hill assemblage. This assemblage represents two packages of bimodal volcanic and clastic sedimentary rocks referred to as the Long Lake volcanic belt and the Tulks sequence of banded to finely laminated siltstone, argillite, and tuffaceous siltstone with minor intercalated mafic tuff. License 020482M covers a portion of the Long Lake volcanic belt and is dominantly underlain by felsic and mafic volcanic rocks. In this area, the Long Lake volcanic belt is underlain by a thick sequence of black graphitic shale which separates the Long Lake volcanic belt from volcaniclastic sedimentary units of the Stanley Waters Formation.

The VLIC hosts all five major gold deposits and numerous early-stage prospects and occurrences on the Valentine Lake property. The VLIC is an elongated northeast trending intrusion consisting dominantly of fine- to medium-grained trondhjemite and quartz-eye porphyry with lesser aphanitic quartz porphyry, gabbro and minor pyroxenite units of the Upper Precambrian (G.D. Layne *et al.*, pers. com.). All intrusive rocks demonstrate varying degrees of saussuritization of plagioclase and strong alteration of mafic minerals to chlorite and epidote. The east end of the VLIC consists of medium- to coarse-grained, equigranular quartz monzonite to monzonite. Abundant mafic dyke systems on the scale of tens of centimetres to tens of metres thick cut the trondhjemite and quartz porphyry units on a NE–SW orientation and exhibit strong ductile deformation and boudinage.

The Silurian Rogerson Lake Conglomerate forms a narrow linear unit extending NS–SW for 160 km through central Newfoundland, lies unconformably (overturned) on the southeast margin of the VLIC, and is interpreted to have infilled a fault bounded paleo-topographic depression (Kean, 1977; Kean *et al.*, 1982). An unsorted, pebble- to cobble-sized, polymictic conglomerate interbedded with coarse sandstone dominates the unit. A high percentage of the clasts are trondhjemite, quartz porphyry and mafic intrusive rocks of the VLIC. Also common are fine-grained foliated mafic, epidote-quartz, white and red chert, and black, fine-grained sedimentary clasts in a fine-grained, schistose matrix. The conglomerate has undergone penetrative ductile deformation resulting in a strong northeast striking and steep northwest dipping to subvertical S1 foliation, and most clasts showing strong elongation parallel to the regional penetrative L1 fabric and sinistral rotation.

Structure

The Valentine Gold Project is one of several structurally hosted gold deposits within the central Newfoundland Dunnage Zone that are associated with Appalachian orogenesis. At the Valentine Lake property, mineralization is associated with deformation across the Valentine Lake shear zone (VLSZ). This large-scale crustal structure is one of several, such as the Cape Ray Fault, the Dog Bay Line and the Mekwe'jit Line, which are currently the target of broad exploration programs across a large swath of central Newfoundland.

On a property scale, the Valentine gold deposits occur proximal to the unconformable contact between two structural domains, the Neoproterozoic VLIC, and the Silurian Rogerson Lake Conglomerate. The VLIC is generally characterized by lower strain, brittle-ductile deformation with the Rogerson Lake Conglomerate exhibiting more intense penetrative foliation and shearing. The competency contrast between these two domains and the crustal scale nature of the VLSZ provide an ideal environment for mesothermal fluid flow and the development of gold mineralization within local deformational traps.

On behalf of Marathon, Kruse (2020) developed a kinematic model and deformational history for the property that identified five phases of deformation (Figures 16 and 17). In this model, the Silurian Rogerson Lake Conglomerate is interpreted as forming in a sedimentary basin bounded to the northwest by a listric boundary fault. Onset of Salinic-aged crustal shortening reactivates the main boundary fault as a low angle reverse thrust, which is rotated into a steep orientation, during a transition to a pure shear dominated flattening phase. This phase of crustal shortening is correlated with the S1 fabrics that dominate the property. The Rogerson Lake Conglomerate exhibits strongly developed S1 penetrative foliation, tight F1 isoclinal folds, and locally preserved S0 bedding (Kruse, 2020). Flattened and stretched, primary conglomerate clasts are indicative of the pure shear regime. Within the intrusive rocks of the VLIC, S1 is manifested as a spaced fracture cleavage.

A period of relaxation during shortening and lithospheric extension (D2) is evidenced by the suite of mafic dykes intruded within the VLIC and locally within the Rogerson Lake Conglomerate. This extensional event is further evidenced by Late Silurian magmatism across central Newfoundland (Dubé *et al.*,

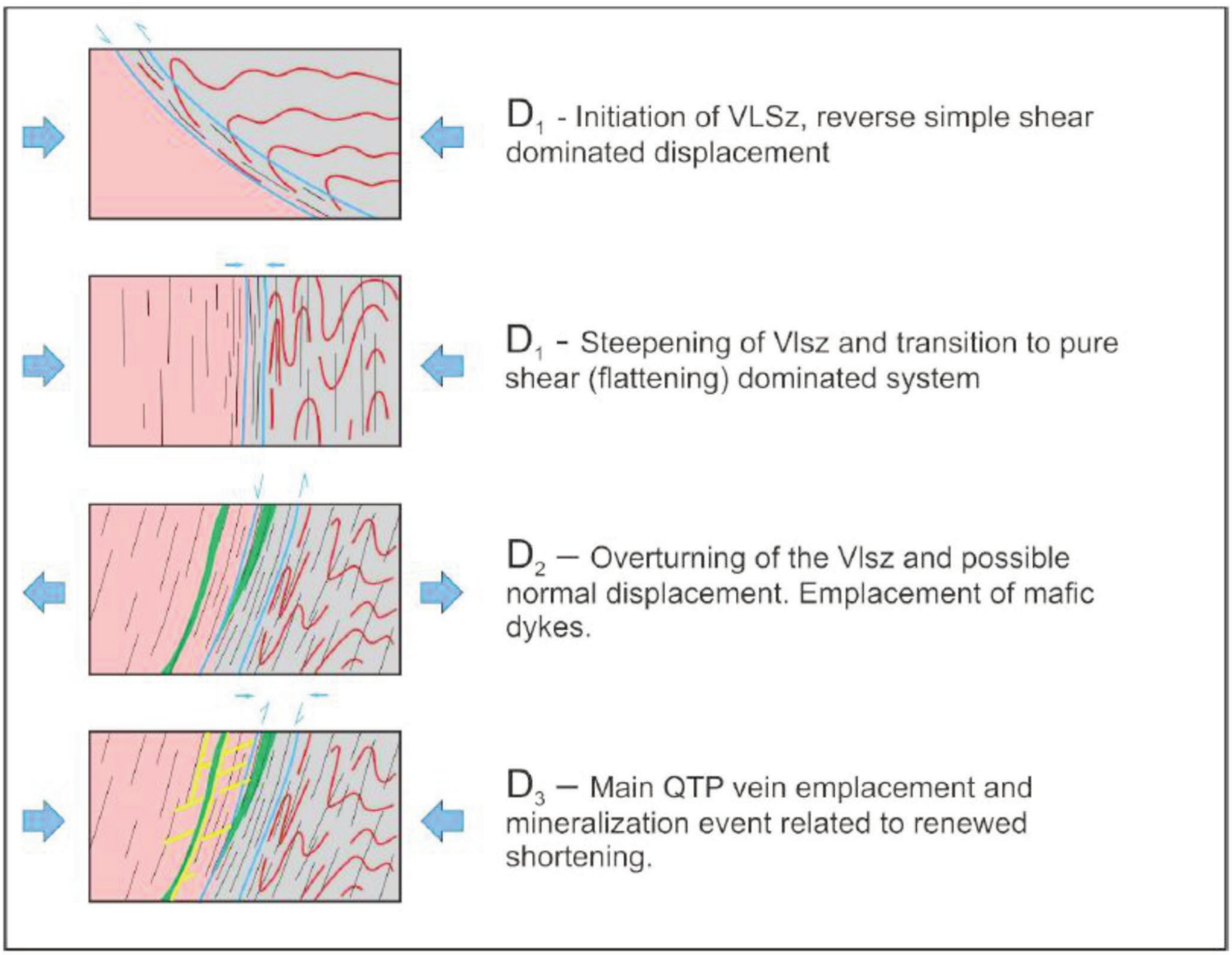

Figure 16. *Schematic northwest–southeast oriented cross sections illustrating the kinematic evolution of the VLSZ along the boundary of the VLIC (pink) and Rogerson Lake Conglomerate (grey). The red lines represent the trace of bedding (S0) and black lines represent the S1 foliation (Kruse, 2020).*

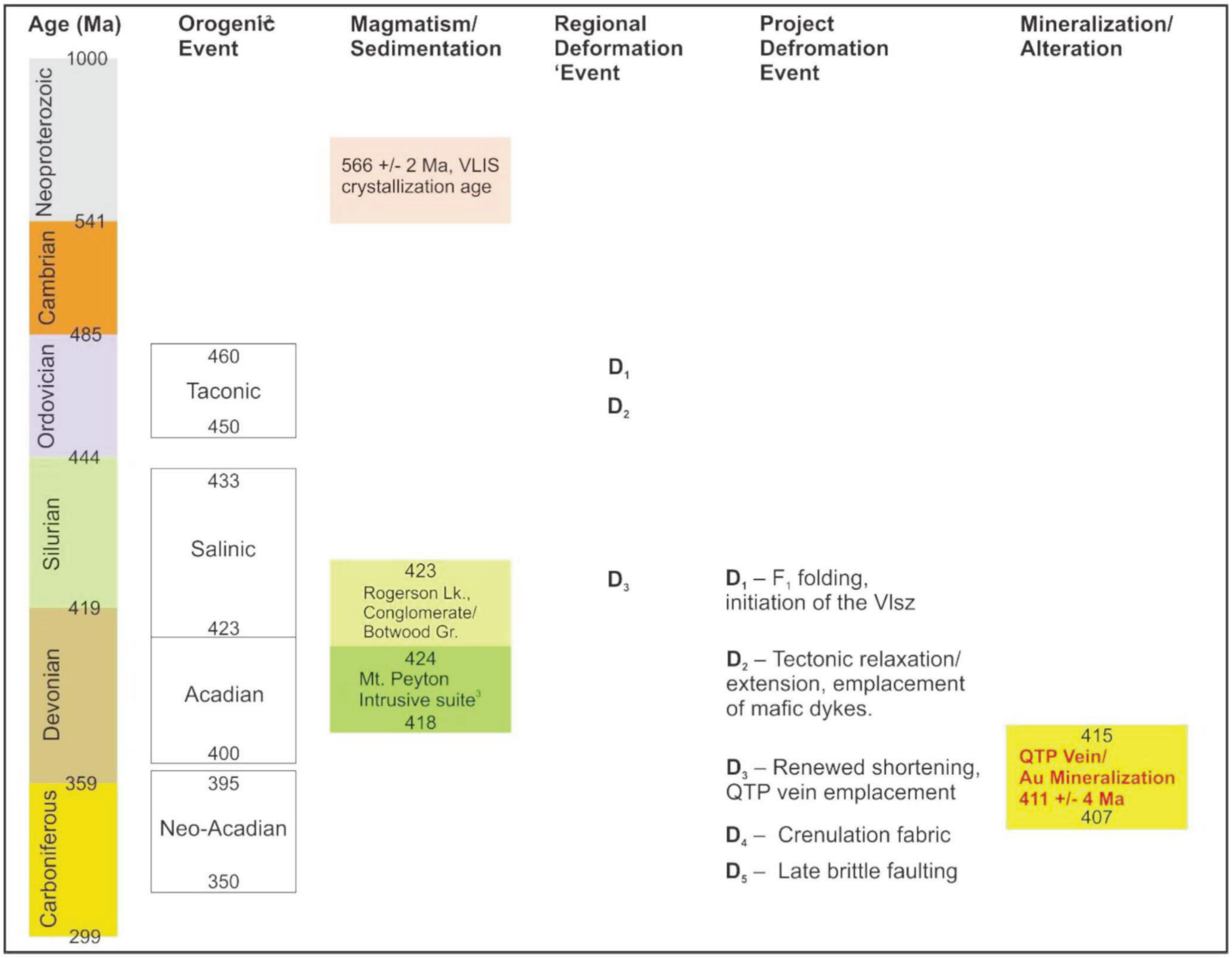

Figure 17. *Regional geochronology of the Dunnage Zone and Valentine Lake Property (Kruse, 2020) and incorporating Barbour (1990), Barrington* et al. *(2016), Dunning (2017), Honsberger* et al. *(2020), Sandeman* et al. *(2017) and van Staal et al. (2009).*

1995; Sandeman *et al.*, 2017; Honsberger *et al.*, 2022a, b). Accordingly, the D2 extensional event occurred before the Acadian Orogeny. At the Valentine Lake property, two sets of mafic dykes are associated with this event: a west-southwest–southwest striking main set parallel to the main S1 foliation and the VLSZ and dipping to the northwest. A second, subordinate set, oriented at a high angle to the first set in a "ladder rung" pattern, have shorter strike extent and are strongly folded. Larger (>1 m) dykes are commonly sheared at their contacts and undeformed internally. The dykes are rheologically weak compared to the host granitoid rocks of the VLIC.

Mineralization of quartz–tourmaline–pyrite–Au (QTP–Au) veins are associated with a renewed D3 shortening phase correlated with the late Acadian Orogeny. Recent geochronological studies by Honsberger *et al.* (2020) suggest a main pulse of hydrothermal gold mineralization between 415 and 407 Ma. Up to three separate QTP–Au vein sets are recognized at the Marathon and Leprechaun deposit areas. Previous descriptions of these vein sets (Robert and Poulsen, 2001) has described the first two as "extensional" and "shear" respectively based on the orientation of the veins to the S1 foliation and in the parlance of the classic shear zone hosted gold deposit model. All three vein sets are observable in outcrop and drillcore within the granitoid rocks of the VLIC, but the Set 1 extensional veins, dipping at a low-angle to the southwest, are the dominant set associated with the bulk of gold mineralization. These vein sets are described further in the following section.

Finally, additional brittle-ductile to fully brittle fabrics and structures (D4 and D5) occurred post-mineralization and are associated with late Acadian to Neo-Acadian deformation. The first of these is a broad crenulation fabric and the latter a brittle fault set. Neither of these later deformational events impact the deposit-scale development of gold mineralization, other than the potential for D5 structures to locally create fault offsets in areas of D3 vein development.

Mineralization

Gold mineralization at the Valentine Lake property is developed within QTP–Au vein sets associated with D3 extensional and shear deformation within granitoid rocks of the VLIC in contact with the Rogerson Lake Conglomerate across the northeast–southwest oriented VLSZ (Kruse, 2020). Mineralization occurs within *en echelon* stacked southwest dipping extensional vein sets (Set 1) and lesser shear parallel vein sets (Set 2) proximal to the VLSZ. This style of mineralization occurs intermittently along the defined strike length of the main gold zone in which a series of deposits and occurrences have been, and continue to be, discovered. Discoveries to date include the Marathon, Leprechaun, Sprite, Victory and Berry gold deposits, and the Frank, Rainbow, Steve, Scott, Triangle, Victoria Bridge, Narrows, Victory SW and Victory NE occurrences. The QTP–Au veins are identified in prospecting samples, outcrop, trenching and drilling at numerous locations long the 20 km strike extent of the VLIC and VLSZ within the Valentine Lake property. Significant QTP–Au veining occurs dominantly within the trondhjemite, quartz-eye porphyry and to a lesser degree, mafic dyke units along and proximal to the sheared contact with the Rogerson Lake Conglomerate. Minor amounts of gold-bearing QTP veining extend across the VLSZ contact and into the Rogerson Lake Conglomerate. Gold-bearing QTP veining is also exposed in the VLIC at 500 and 1000 m from the VLIC-conglomerate contact at the Steve Zone and Scott Zone, respectively. All the gold occurrences share similar general mineralogical characteristics, with coarse gold mineralization occurring predominantly within the quartz–tourmaline–pyrite veins, and lesser amounts in alteration selvages. Visible gold is common.

At the deposit scale, a pervasively altered, intensely QTP veined core complex, which is referred to by Marathon Gold as the “Main Zone”, has been delineated at the Marathon, Leprechaun and Berry deposits. The Main Zones of the Marathon and Leprechaun deposits are well defined by thorough outcrop investigation and densely spaced subsurface drillhole information. At Leprechaun, the Main Zone transitions into the associated hanging wall and footwall mineralization. Further exploration work is required at the other deposits and occurrences to determine if the Main Zone model is present at these locales. A field based structural study (Kruse, 2020) followed by a program of optical televiewer analysis of oriented drill core (Kruse and Bartsch, 2021) has provided recent, comprehensive structural data on the orientation and frequency of up to three vein sets at the Leprechaun and Marathon gold deposits and up to four vein sets at the Berry deposit.

Individual QTP–Au veins range in thickness from a few millimetres and centimetres to metres but are typically 2 to 30 cm thick. QTP–Au veins developed within brittle extensional fractures and dipping at a low angle to the southwest (Set 1 veins) represent the dominant structural control on mineralization at the property and inform the mineral resource models for each of the Marathon, Leprechaun, Sprite, Victory and Berry deposits. Set 1 QTP–Au veins occur as uniformly shallow southwest dipping, *en echelon* arrays orientated at high angle to the regional penetrative S1 foliation and cleavage fracture, (Figure 18). Lesser Set 2 QTP–Au veins are steeply northwest dipping to subvertical, parallel the regional S1 shear fabric, and commonly developed at contacts with mafic dykes or as localized zones of intense stockwork veining. Rare Set 3 QTP–Au veins are steeply dipping with a northwest–southeast orientation orthogonal to the strike of the S1 foliation (Kruse, 2020). At the Berry deposit, a fourth vein set has been identified with a very low angle dip to the north-northeast (Kruse and Bartsch, 2021). Each vein set is mineralized, with a strong dominance in frequency of occurrence and gold content exhibited by Set 1. The Set 1 extensional and Set 2 shear-parallel QTP–Au veins have been traced in trenched outcrop exposures for over 280 m of continuous strike length; however, the observed strike length of individual veins is typically in the range of metres to tens of centimetres (*see* Figures 18 to 22).

The visible gold in QTP veining occurs as grains, ranging in size from <0.1 mm and up to 1-2 mm, hosted by quartz, tourmaline masses, within and along the margins of pyrite, or associated with minor tellurides. Highest gold grades are commonly associated with large (1–3 cm), euhedral and occasionally subhedral pyrite in QTP veining. In weathered surfaces, the gold is observed in limonite patches derived

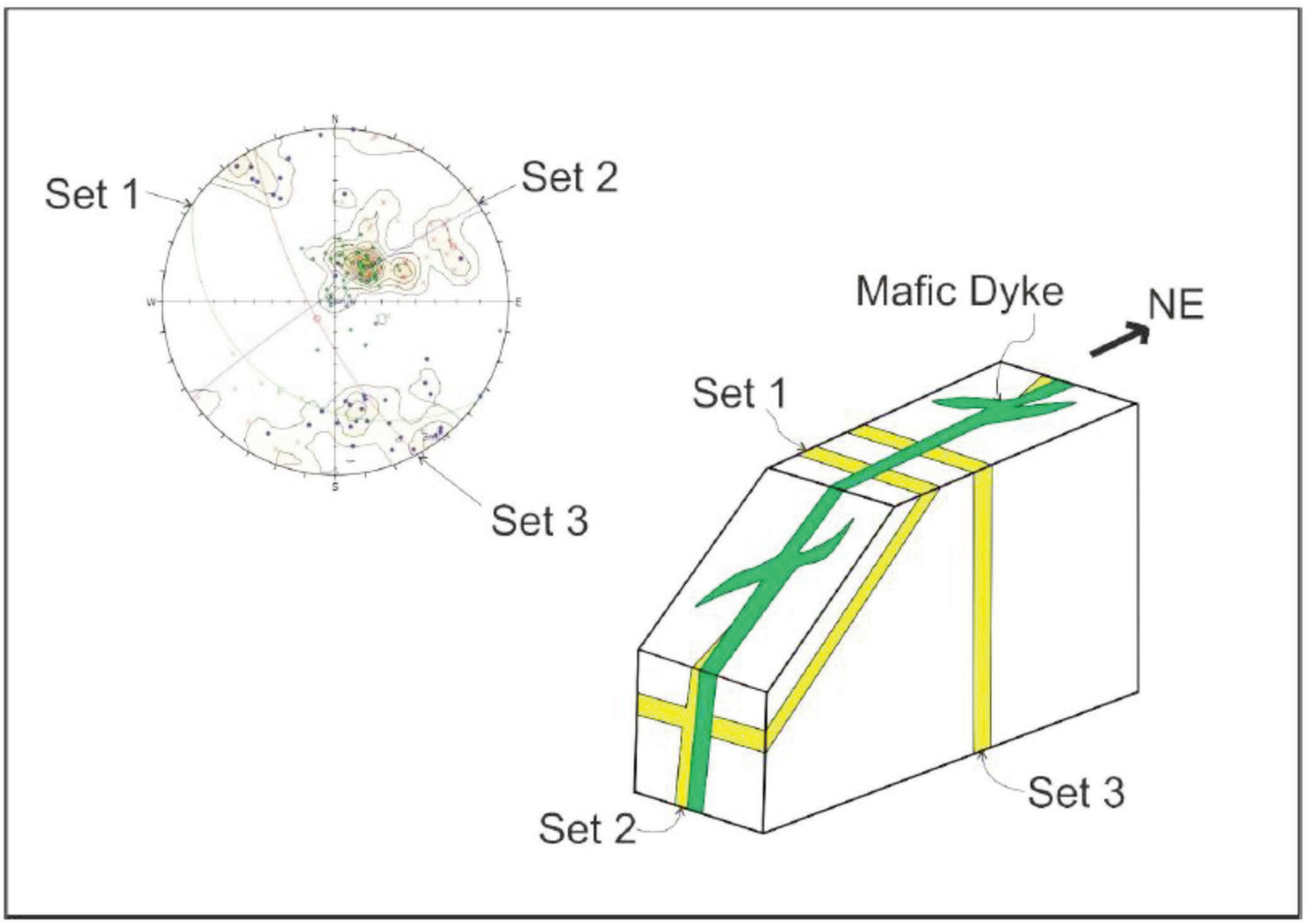

Figure 18. *Schematic illustration of the geometrical relationship between mafic dykes and veins (Marathon and Leprechaun deposits; Kruse, 2020).*

Figure 19. *Sheeted, shallow southwest-dipping quartz–tourmaline–pyrite vein array (Set 1), Marathon Deposit.*

Figure 20. *Gold-bearing quartz–tourmaline–pyrite veins at the Frank Zone.*

Figure 21. *Stockwork quartz–tourmaline–pyrite veins hosted in strongly sericite–silica altered quartz porphyry, Marathon Deposit. Source for the photos: Marathon Gold, 2021.*

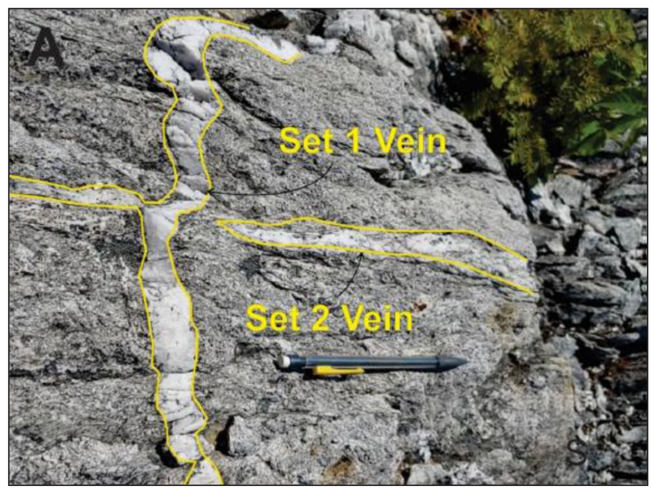

Figure 22. *Field relationship between Set 1 (extensional) and Set 2 (shear parallel) veins, Leprechaun Deposit.*

from weathering of the pyrite (Barbour, 1999). Other sporadically observed sulphides, in decreasing order of abundance, include chalcopyrite, pyrrhotite, sphalerite and galena. These minerals form minor components to the overall mineralization.

In addition to structural studies, the relationship between high-grade gold mineralization and the location of the dykes supports the theory that the mafic dykes provide a rheologic contrast that, 1) promotes brittle fracturing of the granitoid unit and therefore, acts as a controlling factor of mineralized fluid flow, and 2) incites the eventual emplacement of zones of gold enrichment.

The individual characteristics of mineralization at the Marathon, Leprechaun and Berry deposits are described below. The information in the following sections is summarized from Murahwi (2017), Dunsworth *et al.* (2017), and Capps and Dunsworth (2020). Downhole surveys were conducted on all drillholes, and the azimuth and dip were measured at varying intervals such that the drillholes could be plotted in real space. Measurements were typically taken every 25 m for holes drilled prior to 2019 and every 2 to 5 m for anything drilled during 2019 or later. Consequently, the relationship between the sample length and the true thickness of the mineralization is well documented and all assay sample intervals are given as core length unless noted as true thickness.

Marathon Deposit

The Marathon deposit is located 6 km northeast of the Leprechaun deposit and consists dominantly of shallow, southwest-dipping *en echelon* stacked QTP gold veins that intrude dominantly quartz–porphyry and lesser aphanitic quartz–porphyry and mafic dykes of the VLIC. The gold-bearing QTP veining occurs up to 250 m to the northwest of the VLSZ. The Main Zone of gold-bearing QTP veining forms a northeast-trending subvertical mineralized corridor of intense QTP gold veining that ranges between 50 to 200 m in width, occurs over a strike length of more than 1.5 km, and has been observed in outcrop and drill-observed to a depth of 1000 m (Dunsworth *et al.*, 2017).

The Main Zone contains a lenticular series of shallow, southwest-dipping, gold-bearing QTP veining and is open at depth. Figure 23 highlights select gold grade intervals within the gold-bearing QTP veining.

At present, the peripheries of the Marathon deposit mineralized zone are relatively poorly defined, with a preliminarily observed outward gradational decrease in quartz vein density northwest and southeast from the central, dense vein zone. Limited drilling on the northeast and southwest margins suggest that deposit is cut-off at surface in these directions, but with high grade intercepts at depth suggesting potential continuity of mineralization below surface.

Leprechaun Deposit

The Leprechaun deposit consists of QTP gold-bearing extensional and lesser shear parallel veins that intrude the variably sheared and fractured trondhjemite, as well as sheared mafic dykes of the VLIC. Mineralization at Leprechaun occurs over a strike length of greater than 900 m and has been identified at surface in outcrop in drilling at depths of up to 400 m. The Leprechaun deposit differs from the Marathon deposit in the relatively tight concentration of mineralization in Main Zone type configurations of *en echelon* stacked QTP–Au vein sets. These Main Zones range from 30 to 120 m wide, dip to the northwest, and are located proximal to the VLSZ contact within the VLIC trondhjemite. In the characteristic fashion, the dominant *en echelon* stacked, southwest-dipping extensional QTP–Au (Set 1) veins occur at high angle to the penetrative regional L1 stretching lineation, while the lesser shear parallel QTP–Au veins strike sub-parallel to slightly oblique to the VLSZ (Dunsworth, 2011; Dunsworth *et al.*, 2017; Lincoln *et al.,* 2018). Set 1 extensional QTP–Au veins at Leprechaun appear to have a moderately steeper southwest dip than at Marathon (Kruse and Bartsch, 2021).

The QTP–Au mineralization at Leprechaun has been modelled in three zones from west to east: Hanging Wall Zone, Main Zone and Footwall Zone (Lincoln *et al.*, 2018; Figure 24). The Main Zone is

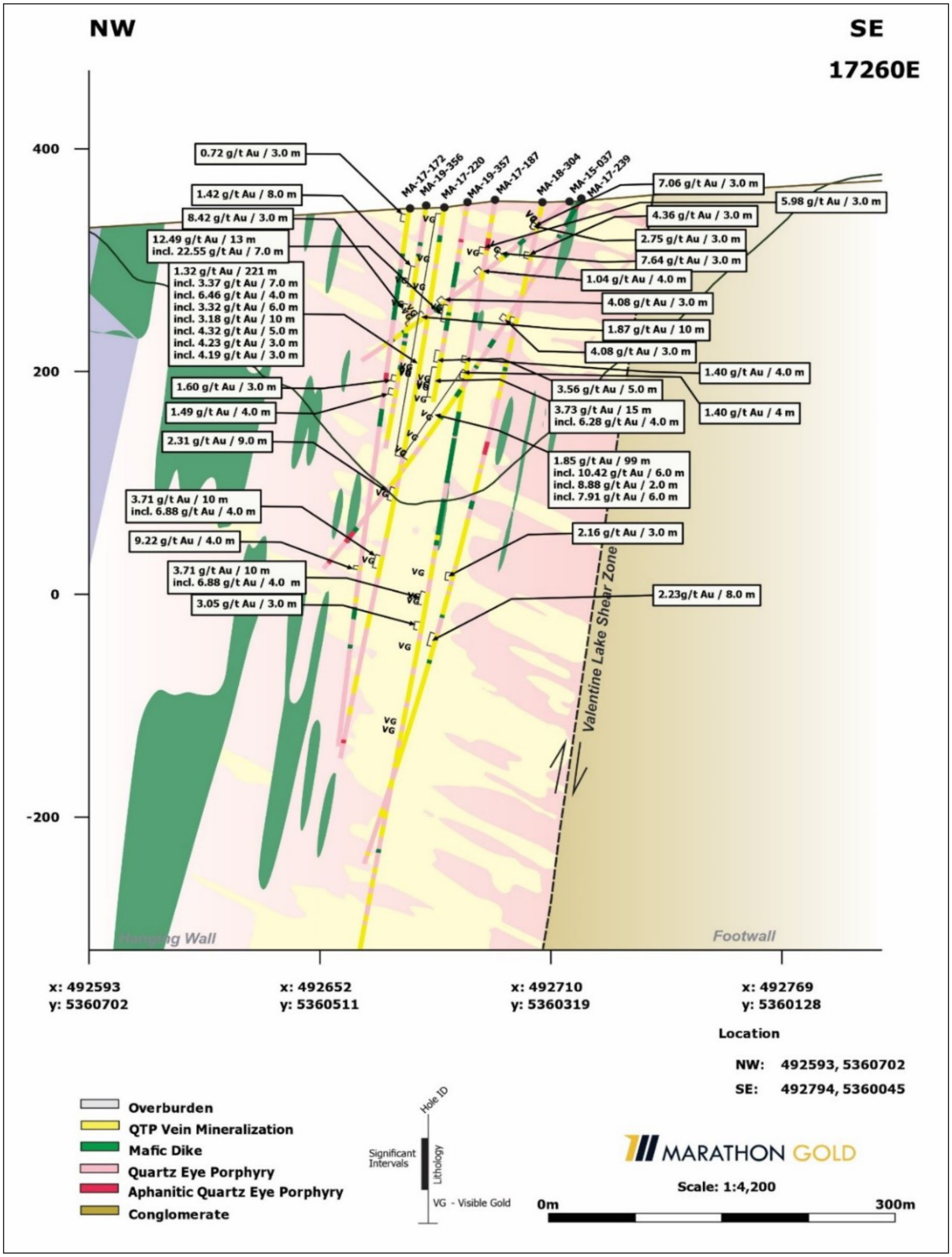

Figure 23. *Section 17260 E showing the geology and mineralized zones of quartz–tourmaline–pyrite–gold-bearing veins at the Marathon Deposit with selected core length gold assay intervals (Marathon Gold, 2021).*

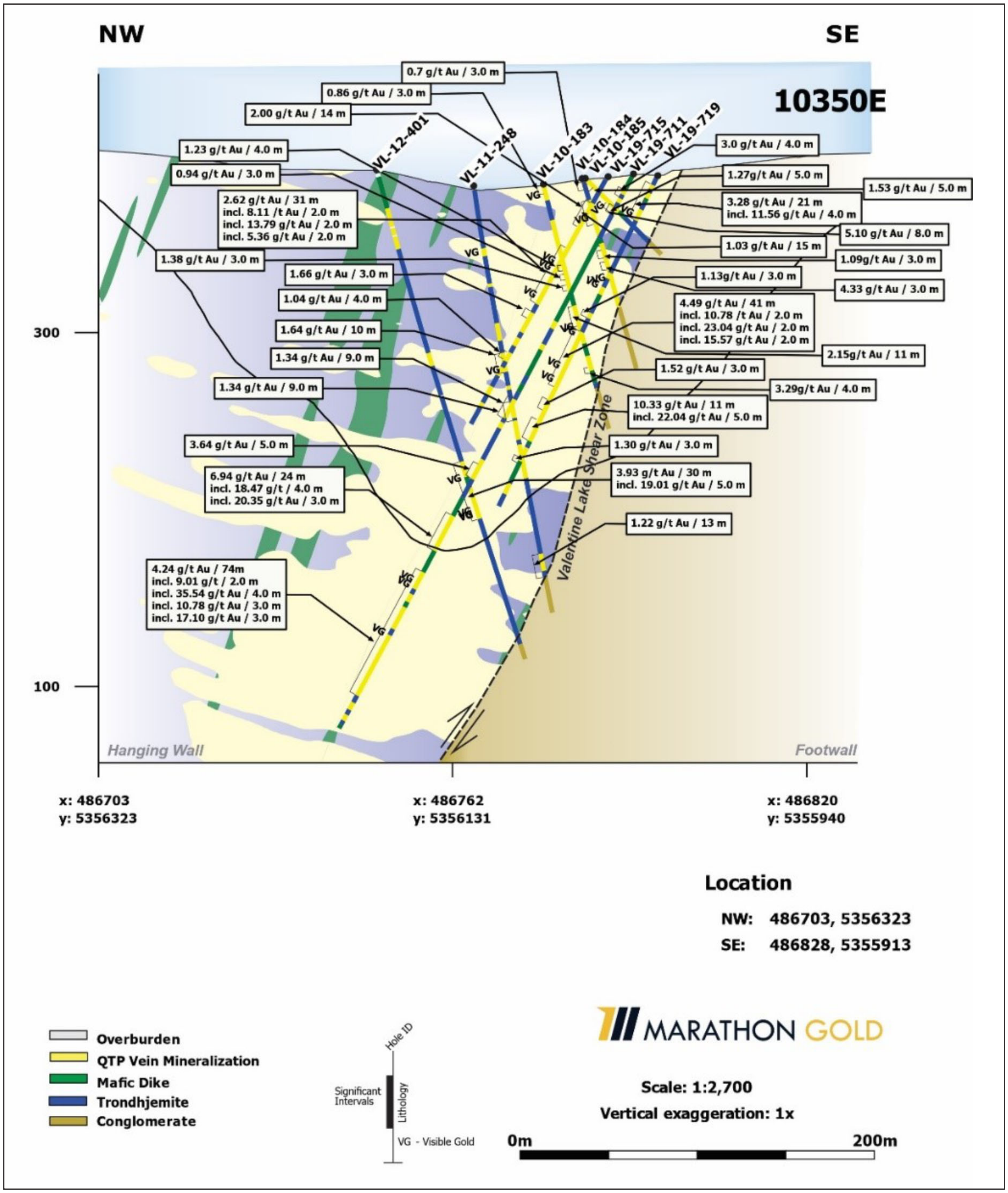

Figure 24. *Section 10350 E showing the geology and mineralized zones of quartz–tourmaline–pyrite–gold-bearing veins at the Leprechaun Deposit with selected core length gold assay intervals (Marathon Gold, 2021).*

open at depth and is constrained to the southeast by the VLSZ (Figure 24) with a gradational transition to the Hanging Wall Zone to the northwest. A high-grade central core exists within the Main Zone, bounded by mafic dykes to the northwest and the Rogerson Lake Conglomerate to the southeast, forming a lenticular body of dense QTP veining open at depth. The Hanging Wall Zone occurs transitionally west of the Main Zone and consists of a series of variably shallow to moderately dipping, stacked *en echelon* extensional QTP tension gashes with minor steeper-dipping QTP veins that extend up to 350 m northwest into the hanging wall. The vein density and concentration of vein arrays increases toward the east, proximal to the Main Zone, and remains open to the northwest.

The Footwall Zone is a minor component of the Leprechaun deposit and comprises localized extensional QTP veins that extend into the structurally underlying Rogerson Lake Conglomerate. Toward the southern part of the deposit, the Main Zone appears to peel slightly further away from the fault contact which spatially coincides with a marked increase in the volume of wide, discontinuous mafic dykes observed near the contact in this area. The gold-bearing mineralizing fluids appear to have localized flooding along the mafic dyke contacts and regular breaching and brecciation within. The QTP–Au mineralization at Leprechaun occurs as visible gold grains, up to 2 mm in size, occurring in quartz and along the margins as well as within tourmaline masses and pyrite.

Berry Zone

The Berry deposit is located approximately 3 km northeast of the Leprechaun deposit and 2 km southwest of the Marathon deposit and spans a strike length of 1.5 km. This recently discovered area consists of dominantly shallowly southwest-dipping, *en echelon*, extensional QTP veining hosted in quartz-eye porphyry and lesser mafic dykes and aphanitic quartz porphyry. The mineralized corridors are generally 20 to 60 m wide and have been traced to depths of over 350 m. In localized zones, mineralization penetrates across the VLSZ and is found up to 20 m into the Rogerson Lake Conglomerate. Mineralization at the Berry deposit is found in tight packages bounded to the southeast by the VLSZ and the northwest by a series of mafic dykes oriented sub-parallel to the shear zone (Figure 25). This style and configuration of mineralization is reminiscent of the tightly concentrated mineralized packages of the Leprechaun deposit.

The dominant vein orientation in the Berry deposit was found to be the extensional Set 1 veining dipping shallowly to the southwest, like that found in Leprechaun and Marathon deposits. In addition to the three vein sets found in Leprechaun and Marathon, Kruse (2020) documented a fourth orientation of mineralized veining at Berry which dips shallowly to the north-northeast. This vein set, referred to as “Set 3” of the four, appears unique to Berry, appears to have a moderate (yet secondary) association with gold mineralization, and has been integrated along with Set 1 veins in the Berry mineral resource estimate. Drilling at the Berry deposit has defined multiple intervals of high-grade gold, with visible gold throughout up to 3 mm in diameter.

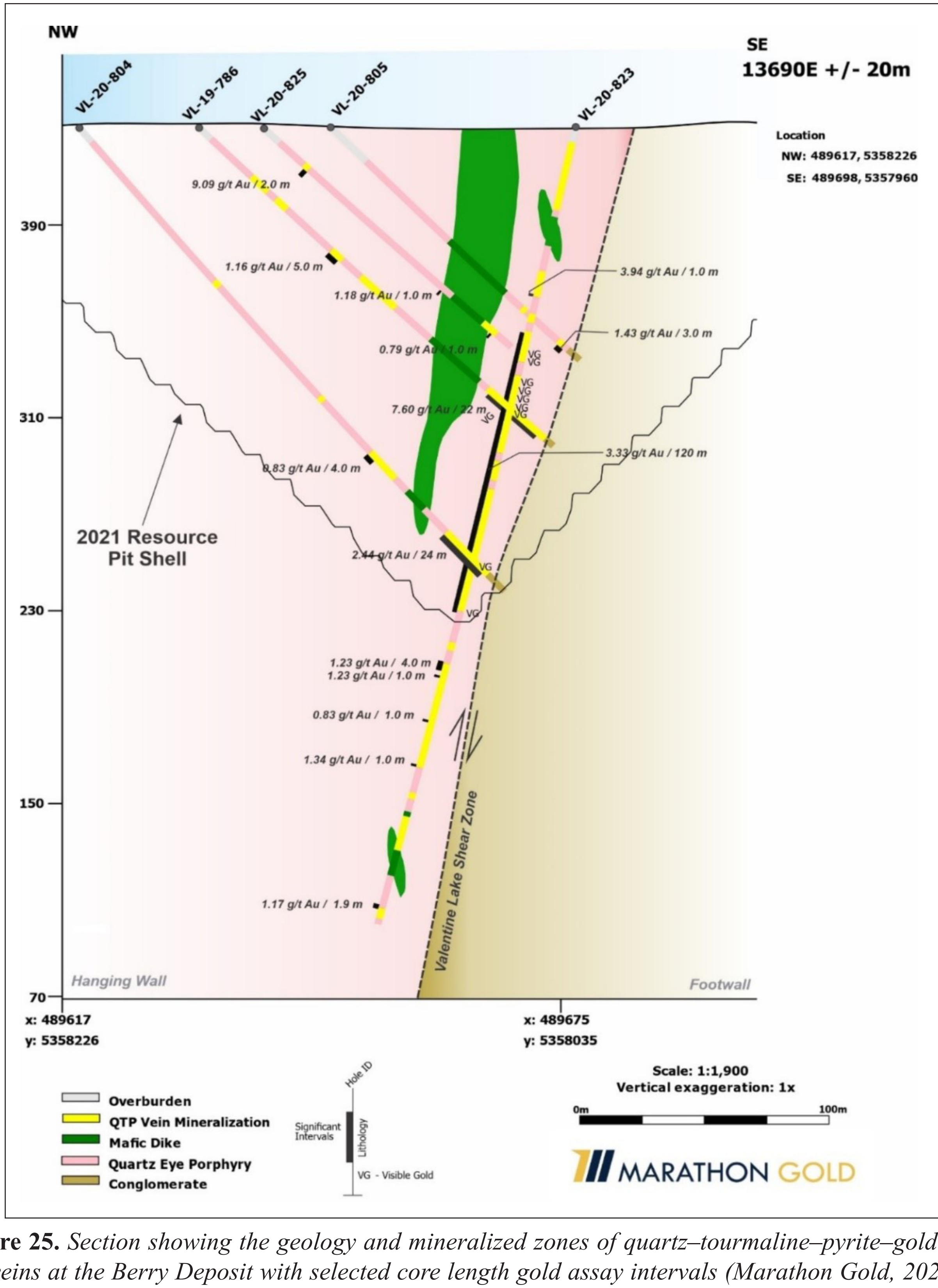

Figure 25. *Section showing the geology and mineralized zones of quartz–tourmaline–pyrite–gold-bearing veins at the Berry Deposit with selected core length gold assay intervals (Marathon Gold, 2021).*

DAY 2 (PM): SOKOMAN MINERALS MOOSEHEAD PROSPECT

The host rocks and mineralization will be viewed in drillcore at the Sokoman Minerals Core facility in Grand Falls because there are no exposures of bedrock in the Moosehead Prospect immediate area.

Sokoman Minerals Progress at the Moosehead Prospect

1) Acquired project in June of 2018 from Altius Resources Inc.

2) Completed extensive exploration including 120 000 m drilling completed to date in 550 holes utilizing 2–4 diamond drills including a barge based rig.

3) Defined multiple sub-parallel moderately east dipping zones of mineralization in the East Trend over a strike length of approximately 500 m with a down-dip extent of over 400 m. Widths vary from less than 1 m to locally up to 40 m thick.

4) Locally extremely high grades are encountered in what have been described as "Fosterville Type" mineralized quartz veins.

5) Currently in midst of a 100 000 m diamond drilling program with 95 000 m complete.

East Trend

One of the objectives of Sokoman's 2018 *Phase 1* program was to follow up on selected results from historical drilling (*see* Figure 26). Altius completed borehole MH-02-06 from the eastern shore of North Pond intersecting an 8 cm vein assaying 3.22 g/t Au as well as low-grade values in shears below the vein with maximum value of 442 ppb Au. Borehole MH-03-15 was completed by Altius in 2003 and was also from the eastern shore of North Pond. It undercut MH-02-06 and intersected 2.35 m grading 53.36 g/t Au including 0.45 m grading 277.96 g/t Au at a down hole depth of 255.36 m. When viewed from above in plan, both intersections plot on top of each other suggesting a possible vertical structure. The first hole of the Sokoman program was drilled from the western shore of North Pond with a target to pierce the interpreted vertical structure. Borehole MH-18-01 intersected a variably sheared mineralized zone that returned 44.96 g/t Au over 11.90 m from 109.00 to 120.90 m. MH-18-01 cut a second zone 40 m further down the hole that returned assays of 8.95 m grading 4.20 g/t Au including 1.33 m grading 19.72 g/t Au. This new vein was encountered at a down-hole depth of 115.25 m (vertical depth of 80 m) and approximately 80 m up-hole from the intended target of the vertical structure joining MH-02-06 and MH-03-15. Additional drilling in *Phase 2* confirmed the moderately east-dipping structure now known as the East Trend.

Phase 3 was successful in extending the strike of the East Trend and helped better define the controls of higher-grade mineralization with most of the higher grade intercepts occurring as trends or shoots spatially associated with the strong northeast trending, moderately east dipping shear zone. Hole MH-20-86 cut the lower high-grade shoot, returning 16.85 g/t Au over 5.20 m. At the upper main zone, hole MH-20-92 returned 7.85 g/t Au over 3.00 m, including 26.99 g/t Au over 0.85 m. High-grade veining up-dip from the main shear zone at shallow depths (32.70 m downhole) in MH-19-55 that returned 0.50 m @

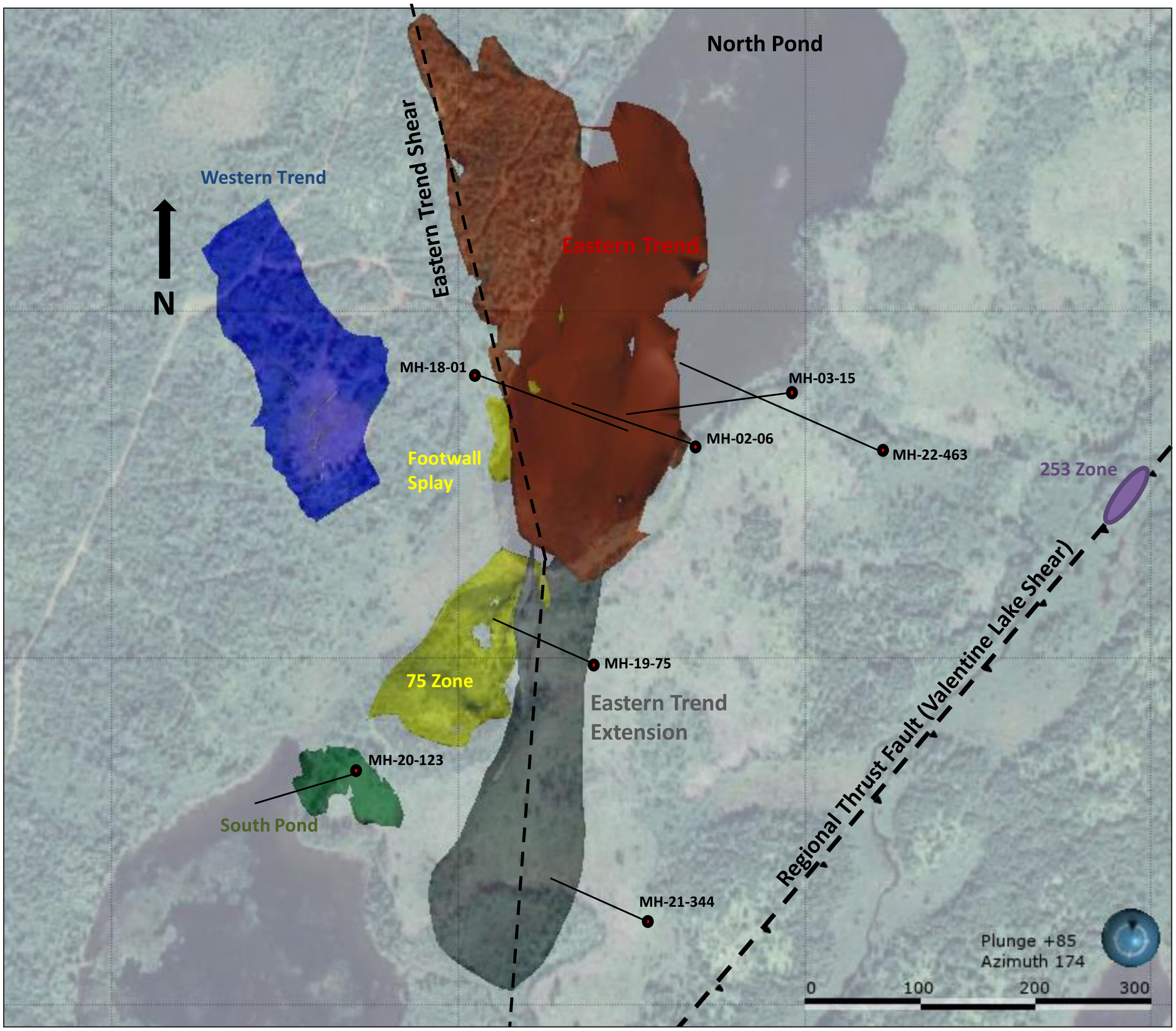

Figure 26. *Moosehead Prospect plan map with outlined mineralized trends.*

17.94 g/t Au supports parallel or splays off the main structure. *Phase 6* drilling is an ongoing aggressive program designed to both expand known resources and explore for new zones. It was originally announced at 10 000 m, expanded to 50 000 m in April and finally to 100 000 m in November 2021.

Recently completed borehole MH-22-463 (July 2022), located approximately 100 m below the limits of the modelled Eastern Trend has intersected a 39.6 m intercept grading 12.50 g/t Au including 10.25 m grading 41.97 g/t from the Lower Eastern Trend (*see* Figure 27). The mineralization has a different vein style and geometry from other drill intersections in the vicinity. The intercept is thicker than any other intercept to date outside the modelled mineralized envelope and includes the "typical" very high-grade vuggy-type veining with abundant visible gold and 5–7% accessory boulangerite and sphalerite, as well as a brecciated style of veining with specks of visible gold with minor boulangerite and sphalerite. This

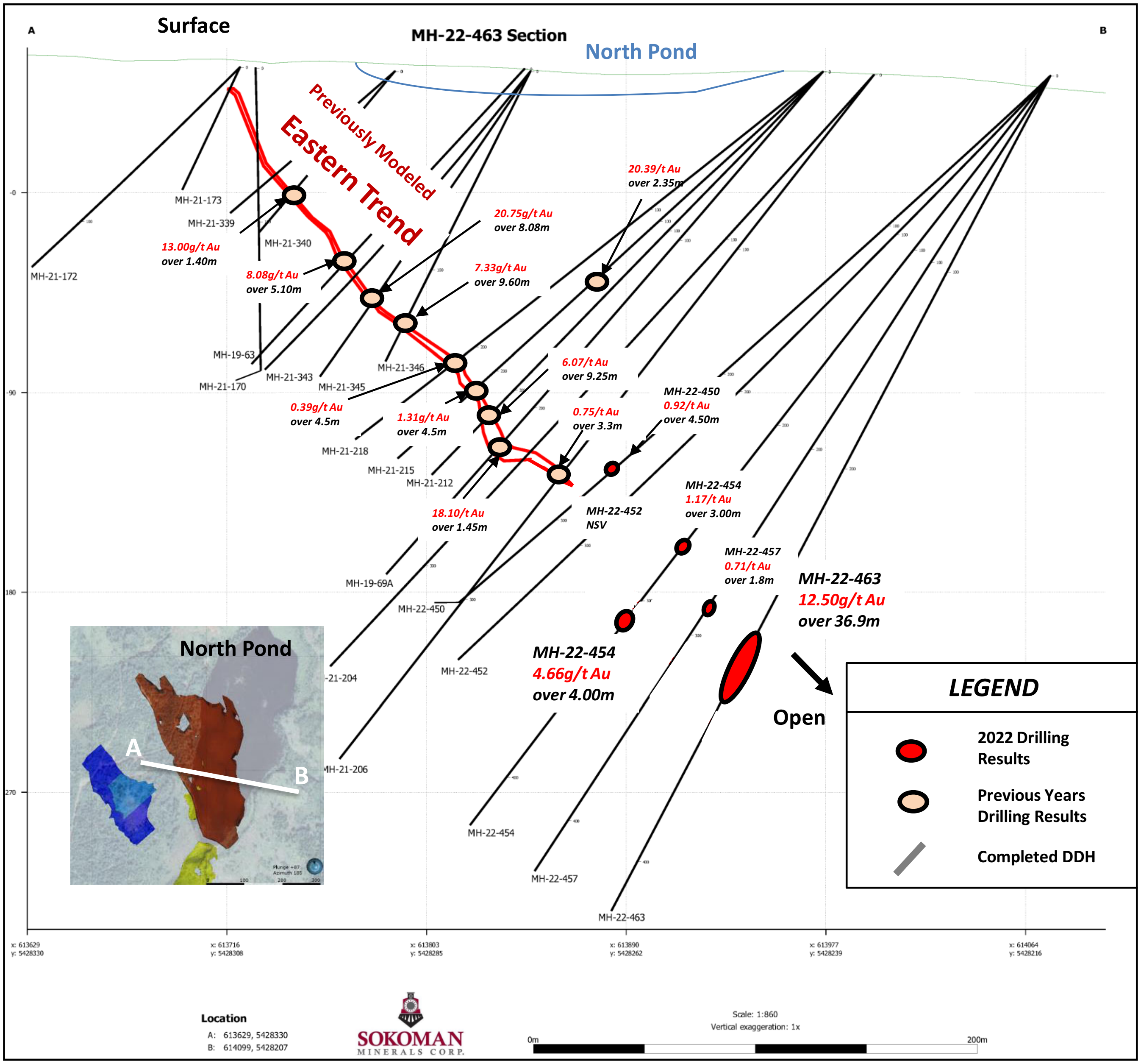

Figure 27. *Moosehead Prospect cross-section.*

could suggest a changing structural setting within the Lower Eastern Trend and bodes well for continued exploration in this area.

Eastern Footwall Splay

The Eastern Footwall Splay was recognized while targeting one of the upper high-grade shoots within the east dipping East Trend Structure. The drill was completing a series of east oriented drillholes to assess the area close to the western shore of North Pond. Although not the best orientation for drilling the east-dipping East Trend, it was ideal for intersecting structures coming off the East Trend towards the west. Borehole MH-20-115 was collared to the south of discovery hole MH-18-01 and intersected three discreet, high-grade zones that returned 4.60 m @ 47.20 g/t Au from 64.0 m downhole, 8.10 m @ 68.25 g/t Au from 111.2 m downhole and a third zone returning 10.4 m @ 3.09 g/t Au from 159.0 m along the hole.

The upper zone in MH-20-115 is interpreted to be a splay off the East Trend Structure while both lower zones correlate to the East Trend proper. The upper intersection in MH-20-115 correlates with an intercept in MH-18-01, located tens of metres to the north, that assayed 7.11 g/t Au over 1.25 m. This pattern of an upper "splay" and lower East Trend intersection is repeated in many of the holes drilled in this area. But there are examples of boreholes intersecting just the upper or lower zones. This is typical for these types of structurally complex deposits.

Drilling has demonstrated consistency in vein location and average grade at the Footwall Splay. Where removed from the strong deformation associated with the Eastern Trend Structure, the splay veins tend to be much less deformed with massive spotted textures developed in the base metals associated with the auriferous veins. Fracture stylolitic textures and laminated vein textures also can occur. Traces of chalcopyrite enrichment were noted in many of the splay holes.

The Footwall Splay can be summarized as a north–south striking, moderately east-dipping zone, lying less than 50 m below surface. At Fosterville in Australia, offsets or splays off the main structures, such as the Swan Zone, carry high-grade gold mineralization. The Footwall Splay has been intersected over a strike length of 175 m, a minimum width of 25 m and at least 2.5 m in thickness.

South Pond

Prospecting at South Pond, 240 m to the southeast of the West Trend resulted in a cluster of angular quartz float with high-grade grab sample assay results ranging from 0.318 g/t Au to 157.04 g/t Au, with enriched silver values up to 36.2 g/t Ag. They were found on the northern end of South Pond, near where previous operators had found two clusters of mineralized float, which assayed from 0.20 to 1.03 g/t Au, and from 5.4 to 17.5 g/t Au. The boulders located by Sokoman are of higher average tenor than the historical values with several boulders of similar grade to the highest grades from the Eastern Trend.

Borehole MH-20-123 intersected high-grade near-surface gold values approximately 25 m vertically below the mineralized boulders described above and is considered to be the *in-situ* source of the boulder cluster. The intersection returned 5.0 m averaging 26.88 g/t Au, including 2.15 m at 60.59 g/t Au from 47.0 m downhole. MH-20-123 correlates with historic hole MH-02-34 drilled in 2002, approximately 30 m down section, which intersected 5.0 m at 4.16 g/t Au, including 1.05 m at 18.31 g/t Au with visible gold noted.

The first step out at South Pond was collared 15 m to the north of MH-20-123. Borehole MH-21-141 returned 4.20 m of 64 g/t Au, including 1.20 m at 223.63 g/t Au from 47.90 m. Reported lengths are believed to be 80 to 90% of true thickness. The results from MH-20-123 confirm the Company's belief that additional high-grade gold shoots or splays are likely associated with the main structures that extend through the Moosehead property. Modelling suggests that the South Pond zone is possibly the southern extension of the Western Trend, located 240 m to the north.

Mineralization at South Pond occurs in a 3–7 m wide zone of shearing and quartz veining, with 2–5% disseminated sulphides (pyrite ± sphalerite ± boulangerite). The high-grade veins are typically banded and/or stylolitic, locally vuggy and up to one metre thick, with multiple 1 to 5 mm blebs of visible gold in a zone of moderately sheared siltstones. The auriferous veins are generally associated with the margins of altered mafic dykes cutting altered (iron carbonated) siltstones.

As of July 2021, the South Pond Zone has been traced 65 m along strike and from surface to 95 m down dip. It has a steeply-plunging, high-grade core within a moderately to steeply east-northeast dipping mineralized zone. Modelling of the area suggests that South Pond is possibly a continuation of the West Trend 250 m to the northwest.

253 Zone

Prospecting in the fall of 2020 discovered a cluster of angular quartz boulders, 300 m to the east of North Pond with trace pyrite and arsenopyrite assaying <1 g/t Au. Follow-up prospecting during the summer of 2021, taking advantage of low-water levels, located quartz boulders 20 m east-southeast of the original cluster. The new boulders carry arsenopyrite and lesser boulangerite and sphalerite, with multiple sights of fine visible gold. Two samples submitted for total pulp metallics and gravimetric finish analysis gave 14.81 g/t Au and 9.36 g/t Au. The boulders occur along a prominent northeast-trending structural lineament in the east-central portion of the property coinciding with strong linear magnetic and possibly associated VLF-EM anomalies.

Reconnaissance drilling testing for the source of the gold-bearing boulders, intersected a significant structure roughly parallel to the Eastern Trend (named the 253 Zone), featuring strong quartz veining and variable sulphide mineralization, mainly pyrite and arsenopyrite. Borehole MH-21-253 cut two zones of Au mineralization including 7.5 m of 0.31 g/t, 32 m downhole, and 1.78 g/t Au over 1.40 m, 54.8 m downhole. Additional boreholes were drilled proximal to MH-21-253 but due to logistical issues (streams and wetlands), were not able to properly test the zone. The westernmost hole (MH-20-273) intersected quartz veining on the contact with a mafic dyke with two specks of visible gold grading 590 ppb Au over 0.35 m from 101.25 m along the hole.

The 253 Zone is considered highly prospective as only 75 m of strike length has been tested, but most likely not tested properly as the drilling was to the east with an east-dipping structure. Geophysics (VLF-EM) suggests a strike length of the structure, hosting the mineralized veins, of several kilometres and aligns with the trace of the regional thrust fault associated with the Valentine Lake shear zone.

75 Zone

Borehole MH-19-75 was drilled in the fall of 2019 to assess the southern extension of the East Trend. It returned a 5.80 m intersection grading 6.93 g/t Au starting at 87.50 m downhole, including two visible gold-bearing veins that assayed 30.42 g/t Au over 0.30 m (from 88.95 m), and 32.99 g/t Au over 0.80 m (from 92.50 m). The initial follow-up program around MH-19-75 was based on 25 m step-outs that are less than ideal for evaluating these complex shear systems. MH-21-203 returned 13.67 g/t Au over 2.85 m from 98.15 m downhole – a 10 m step out to the south from MH-19-75. MH-21-205 – a 15 m step out from MH-19-75 (and up-dip from MH-21-203) intersected four veins with visible gold, returning 2.88 g/t Au over 4.25 m including 7.89 g/t Au over 1.25 m. These intersections are for the most part within the main deformation corridor of the East Trend.

MH-21-234, collared 60 m northwest of MH-19-75, gave 30.59 g/t Au over 2.75 m (within 4.80 m of 17.56 g/t Au). MH-21-243, collared 80 m south-southwest of MH-19-75, gave 32.72 g/t Au over 1.70 m (within 9.20 m of 6.70 g/t Au). Both intersections as well as additional drilling in the immediate are lesser deformed and interpreted to be a splay west off the main structural corridor.

Figure 26 shows the latest model for the 75 Zone. Note that the grey is the main east-dipping structural deformation corridor that strikes to the north and joins with the Eastern Trend. MH-21-344 was drilled in the southern portion of the East Trend Extension and intersected 1.93 g/t Au over 5.25 m including 0.50 m at 9.74 g/t Au. This extends the mineralized East Trend to 800 m in strike. The yellow represents the lesser deformed auriferous splay off the main structure – a similar feature as the Footwall Splay off the Eastern Trend near the west shore of North Pond.

Summary

We have been successful in establishing a working exploration model for the Moosehead property. We recognize that high-grade, gold-bearing veins and plunging shoots exist in the main structural corridors like the East Trend Fault. We now recognize the lesser deformed auriferous intersections off the main structures as "splays" with their own independent geometries that can be very different from the main structures.

DAY 2: REGIONAL GEOLOGY STOPS

Stop 1: Sandbian-Katian Lawrence Harbour Formation shale – Badger Group wacke transition zone, Red Cliff Road – Trans-Canada Highway (589069 E, 5422143 N, Zone 21, WGS84)

Location: Approximately 5 km west along the Trans-Canada Highway from Exit 17 in Grand Falls turn right on Red Cliff Road. Park at the end of Red Cliff road. Outcrops are exposed along the Trans-Canada Highway.

Description: Deformed Sandbian-Katian black shale of the Lawrence Harbour Formation interbedded with Late Ordovician wacke of the Badger Group. The sedimentary sequence is cut by multiple felsic to mafic dykes (Silurian??) up to >1 m thick. This outcrop represents the transition between the Lawrence Harbour Formation and stratigraphically overlying Badger Group.

Stop 2: Contact of Laurenceton Formation basalt with Wigwam Formation sandstone (Botwood Group), Canadian Tire parking lot, Grand Falls (598492 E, 5421737 N, Zone 21, WGS84)

Location: Road cut along the north side of the Trans-Canada Highway immediately before the Exit 18B off-ramp in Grand Falls. Take Exit 18B and park at the Canadian Tire immediately above the outcrop exposed along the Trans-Canada Highway.

Description: Contact in the Botwood Group between medium-grained, amygdale-bearing basalt of the Laurenceton Formation and overlying, steeply southeast-dipping, reddish sandstone of the Wigwam Formation. Near the contact zone, sandstone dykes occur in the basalt. These rocks are part of the Botwood Basin.

DAY 3: LABRADOR GOLD CORPORATION'S KINGSWAY PROJECT

There are few exposures of bedrock in the immediate area of Big Vein and because of the distance to the property and restrictions of time, the host rocks and mineralization will be viewed via ***drillcore at the Labrador Gold Corporations core facility in Glenwood.***

The Kingsway project area is located in central Newfoundland, approximately 18 km northwest of Gander (Figure 28). The Gander area has excellent infrastructure including an international airport capable of serving jet aircraft. Access to the project area is by gravel road from the Trans-Canada Highway and within the licenses a network of forestry roads gives good access to most parts of the property.

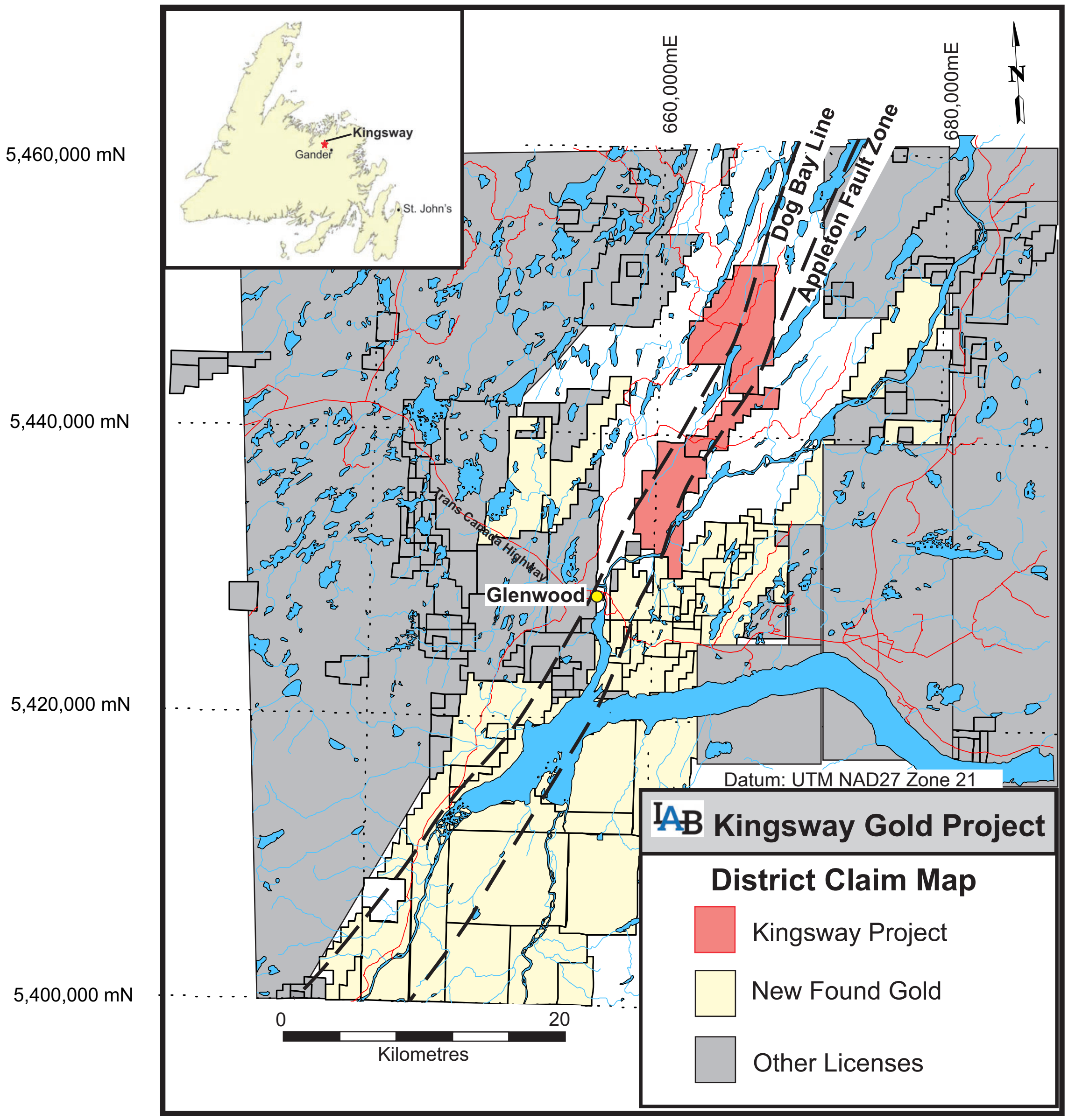

Figure 28. *Location of the Kingsway Property.*

Exploration

Over the past two years Labrador Gold has been systematically exploring the property using geochemistry and geophysics followed up by prospecting and RAB (rotary air blast) drilling to define targets for diamond drilling. This work has resulted in the discovery of two gold occurrences (Big Vein and Golden Glove) by prospecting and two others undercover (Midway and Pristine) by drilling (Figure 29).

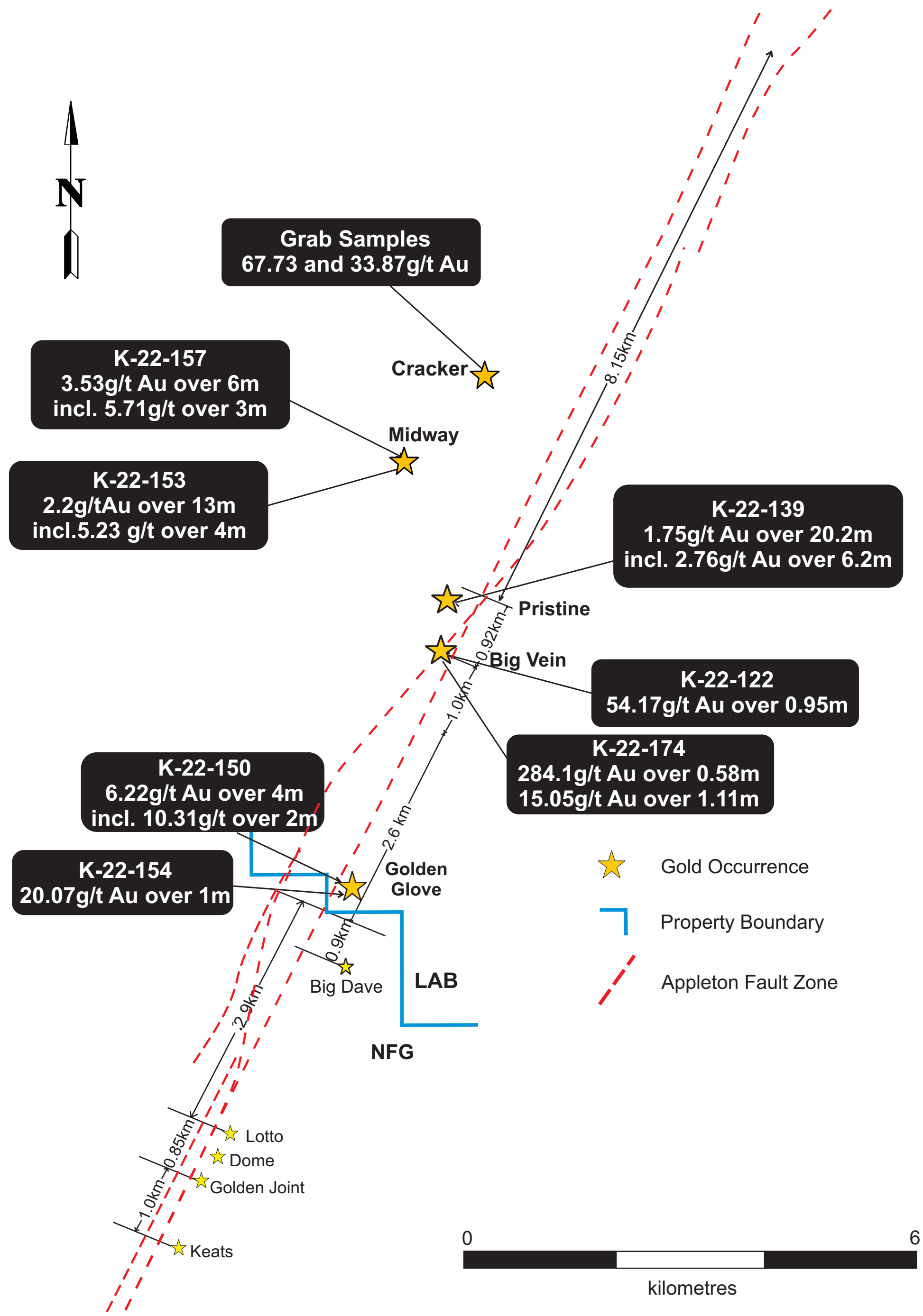

Figure 29. *Mineral occurrences on the Kingsway Project.*

The only previously identified mineralization in the immediate area was the Cracker showing (Pollett and Saunders, 2002).

Structure

Three main phases of deformation have been identified at Kingsway:

- D1 associated with west-northwest directed shortening responsible for the formation of a penetrative, north-northeast-trending S1 foliation, the formation/reactivation of east-northeast trending regional scale faults (*e.g.*, the Appleton Fault Zone) and possibly early north-northeast trending breccia veins (along regional faults).

- D2 corresponds to a late phase of progressive D1 deformation, associated with complex V2 veining, including northwest-trending extensional veins and moderately to steeply dipping north-northeast-trending extensional shear and shear veins slightly oblique to sub-parallel to S1 foliation.

- D3 is associated with north-northeast-trending shortening responsible for the formation of a brittle cleavage S3 and kink bands, all west-northwest-trending. D3 is responsible for the local refolding of S1 and V2 veins, and the development of northeast to north-northeast trending V3 extensional veins (and possibly breccia veins).

D1 structures appear to be highlighted by an olistostrome/molasse like polymict conglomerate. Gold mineralization is interpreted to have occurred during D2 and to be associated with reverse-sinistral kinematics along the east-northeast-trending D1 faults and their splays.

Mineralization

Two different styles of mineralization have been identified to date on the Kingsway property. The first is associated with sulphides hosted by altered gabbro as at the Midway Prospect (Figure 30) discovered by Labrador Gold's RAB drilling in 2021, and at the historical Cracker showing discovered in 2001. Results of 2022 diamond drilling at Midway have produced near surface (<40 m) intersections of 2.2 g/t Au over 13 m including 5.23 g/t Au over 4 m and 3.53 g/t Au over 6 m including 5.71 g/t Au over 3 m. Grab samples taken from the Cracker showing in 2001/02 returned gold values up to 33.87 g/t Au.

The second style of mineralization observed at Kingsway is gold mineralization in quartz veins hosted in grey-black shales of the Davidsville Group. This style of mineralization was discovered by Labrador Gold during the initial 2020 exploration program. The quartz veining is typically bright white, massive to vuggy, locally stylolitic with carbonate and sericite alteration. Vugs often contain euhedral quartz infilling. Prospecting has revealed that quartz veins locally contain pyrite, chalcopyrite, and arsenopyrite. Fine-grained visible gold has been observed in annealed quartz and vuggy grey quartz in outcrop and in drillcore (Figure 31).

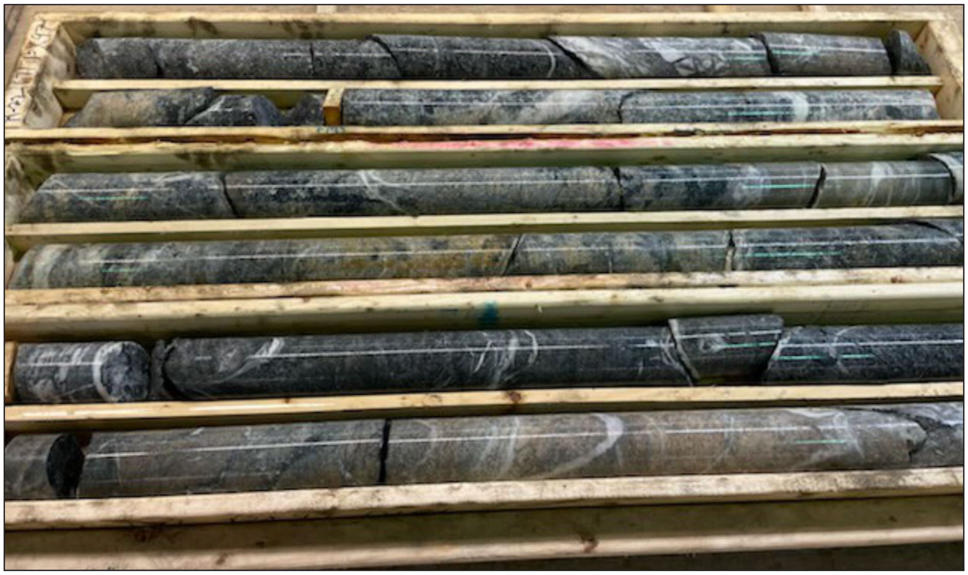

Figure 30. *Carbonate and potassic alteration in mineralized gabbro from the Midway Prospect.*

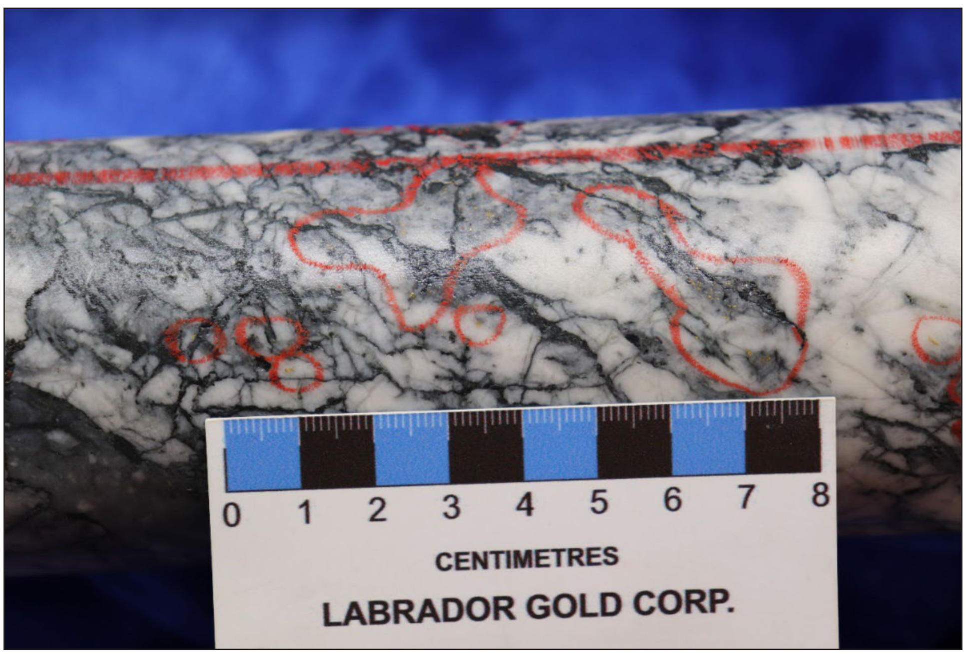

Figure 31. *Visible gold in quartz vein from the Big Vein Prospect.*

DAY 3: REGIONAL GEOLOGY STOPS

Stop 1: Lower Wigwam Formation, Botwood Group, Bishops Falls–Botwood on- and off-ramps (612844 E, 5431548 N, Zone 21, WGS84)

Location: Road cuts along the Bishops Falls–Botwood on- and off-ramps at the intersection of the Trans-Canada Highway with Route 350, just north of the Exploits River. Park in parking lot on the north side of the Trans-Canada Highway.

Description: Medium-bedded muscovitic sandstone and siltstone of the lower Wigwam Formation, Botwood Group display shallowly south-plunging, >5 m wavelength chevron-style folds. A thin (<10 cm) tuffite horizon along the eastern off-ramp yielded a U–Pb zircon maximum depositional age of 427.9 ± 3.1 Ma using combined laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) and chemical abrasion-isotope dilution-thermal ionization mass spectrometry (CA-ID-TIMS; Honsberger *et al.*, 2022b). The age places the first firm constraint on the timing of syn-volcanic sedimentation within the Botwood Basin.

Stop 2: Sandbian-Katian Main Point Formation shale – Ordovician Outflow Formation, Davidsville Group pebbly sandstone thrust contact, southeast of Bowater boat launch/beach, Appleton (656103 E, 5427045 N, Zone 21, WGS84)

Location: Access from River Road in Appleton, ~500 m south of Bowater Road–River Road intersection. Park across from the boat launch/beach and walk ~200 m southeast to quarry.

Description: Quarry exposing a southeast-dipping thrust contact between deformed Sandbian-Katian Main Point Formation graphitic-pyritic black shale in the footwall and brown-black pebbly sandstone varying to wacke in the hanging wall. The hanging wall rocks probably belong to the Ordovician Outflow Formation, Davidsville Group.

ALTERNATIVE REGIONAL STOPS (TIME PERMITTING)

Here we include a few suggested regional field trip stops that we will visit if possible, or you can visit at your own leisure at another time. From west to east these are:

Stop A: Nyles Brook road materials quarry; mineralized miarolitic monzogranite, Mount Peyton Intrusive Suite – off the TCH and inaccessible with a large field trip (643500 E, 5438500 N, NAD27)

Cupolas of 419 Ma, monzogranite intrude diorite–gabbro of the Mount Peyton Intrusive Suite. The monzogranite cupolas contain Au–Cu–Pb–Zn–Ag mineralized miarolitic cavities (*see* Sandeman *et al.*, 2017).

Stop B: Horwood Formation, Indian Islands Group – use Salmon River Access Road South, immediately west of Glenwood (652842 E, 5427069 N, NAD27)

Medium-bedded reddish weathering fine-grained muscovitic sandstone and siltstone of the Horwood Formation, Indian Islands Group (Currie, 1995b). Carbonate-fossil debris beds occur in these rocks and contain Late Silurian fauna (Boyce and Dickson, 2006).

Stop C: Main Point Formation – South of the Town of Glenwood, access from Main Street then Trailor Court Road (655011 E, 5427617 N, NAD27)

Sandbian–Katian (Caradocian) graphitic and locally pyritic cm-scale-bedded black shale.

Stop D: Repeated units of southeast-dipping diverse stratigraphy immediately west of Appleton Fault Zone – ditch on north side of the Trans-Canada Highway, Appleton (656604 E, 5428490 N west to 656318 E, 5428906 N)

The cross-section exposed in the ditch along the north side of the highway from the old grocery store, downhill to the final street on the north side, exhibits an overall southeast-dipping imbricated sequence starting with brown-black pebbly sandstone at the top, then black graphitic shale, more brown-black pebbly sandstone, then muscovitic grey fine-grained sandstone and siltstone and finally, at the base, brown-black pebbly sandstone. About a kilometre north of the highway along the small road, black graphitic shale outcrops structurally below the basal brown-black pebbly sandstone. *Please note that the ditch has recently been "cleaned-up" and bedrock exposures are presently less common than previously.*

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