The Roberts Creek Project, Gold Bar District, Eureka County, Nevada

By Cortus Properties LLC

Introduction – Regional Tectonic Setting

• Outlined in brown in Figures 1 and 2 is a left-lateral pull-apart basin, active in Eocene time, and herein referred to as the Carlin pull-apart basin. This basin and its contained gold deposits developed in a relatively short period of time, from 42 to 35 million years ago (Late Eocene Epoch of the Tertiary Period). The gold deposits together, within a space of about 32,400 square km (12,500 square miles), with produced and remaining known gold resources of around half a billion ounces, constitute the second largest concentration of gold on Earth – after the Witwatersrand in South Africa.

• The Carlin pull-apart basin represents the earliest transtensional development of pull-apart basins that coalesced through Tertiary time to ultimately form the Great Basin (Newton, 2020). This Eocene period of intense magmatic and hydrothermal activity was also the first time that the lower crust in this region was cracked open after 80 million years of fertilization by fluids and magmas above a shallowly subducted oceanic slab that stretched from what is now California to Colorado, during the Laramide orogeny.

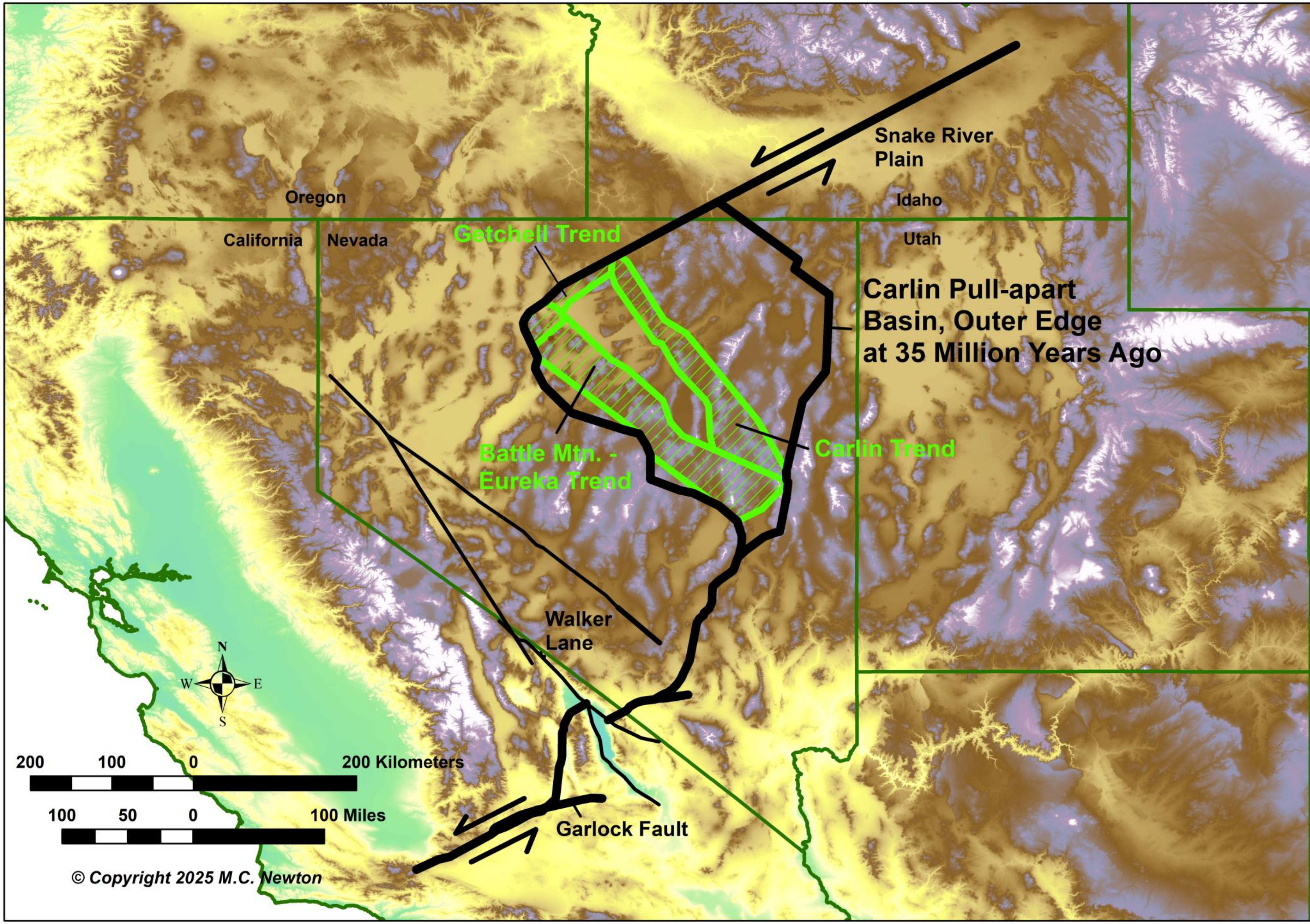

Figure 1. Carlin sinistral pull-apart basin (black outline) at 35 million years ago. Three famous gold trends in green stripes.

- The three major well-known gold trends in northern Nevada, the Carlin trend, the Battle Mtn.-Eureka trend and the Getchell trend are shown in green stripes in Figures 1 and 2. Each of these three trends is marked by Jurassic-Cretaceous and Eocene-aged igneous intrusive and volcanic rocks. These three magmatic trends were inherited from Mesozoic time and reactivated in Eocene time. They are deep-seated fault zones that periodically channeled magmas to shallow levels in the crust at the same locations. These intrusive centers are outlined with red ovals in Figure 2. They range from 44-62 km apart, with an average spacing of around 50 km.

- Eocene igneous intrusions commonly traveled up the same structures as the Mesozoic intrusions, and were the sources of metals and heat giving rise to gold-depositing hydrothermal systems. Within the red ovals in Figure 2, the red circles are individual gold deposits, which commonly show a N-S orientation to the clusters of deposits. This is due to the N-S trend of Tertiary-aged normal faults, the main conduits for mineralizing hydrothermal fluids.

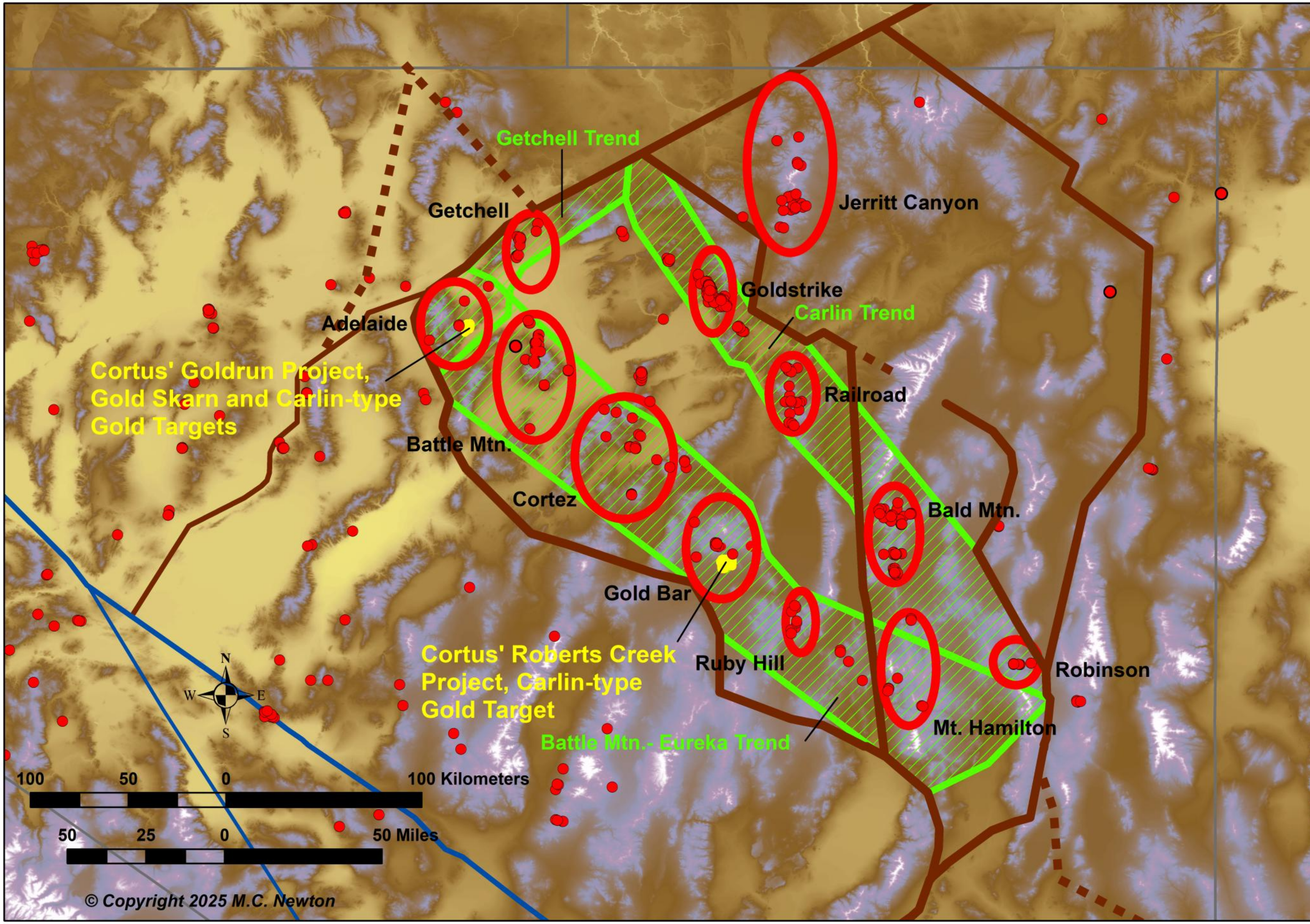

Figure 2. Three gold trends in green stripes within the Carlin pull-apart basin. Clusters of gold deposits (red circles) and intrusive centers in red ovals. Cortus projects in yellow.

• In Nevada, there is a well-known tectonic relationship between what are called Upper Plate rocks and Lower Plate rocks. Upper Plate refers to dominantly deep-water shales, cherts and mafic volcanic rocks that were thrust westward over top of shallow-water dominantly carbonate rocks (Lower Plate) around 350 million years ago, during the Antler Orogeny. The thrust fault separating Upper and Lower Plate rocks is called the Roberts Mountains Thrust. Most Carlin-type gold deposits are hosted in Lower Plate calcareous rocks.

• Carlin-type gold deposits are commonly found on the crests of N-S trending regional anticlines, where erosion has carved windows through Upper Plate rocks exposing Lower Plate carbonate rocks - the primary hosts of the gold deposits. An example of this is in the Cortez district (see Figure 3) where the Pipeline-Crossroads complex is on a SE-plunging anticline exposing Devonian carbonates (in dark blue) through Upper Plate clastic rocks (in green) in the Gold Acres window. Likewise, on the other side of the valley, the Cortez and Cortez Hills deposits are in the Cortez window. The red unit in the Cortez window in Figure 3 is a Jurassic intrusive body.

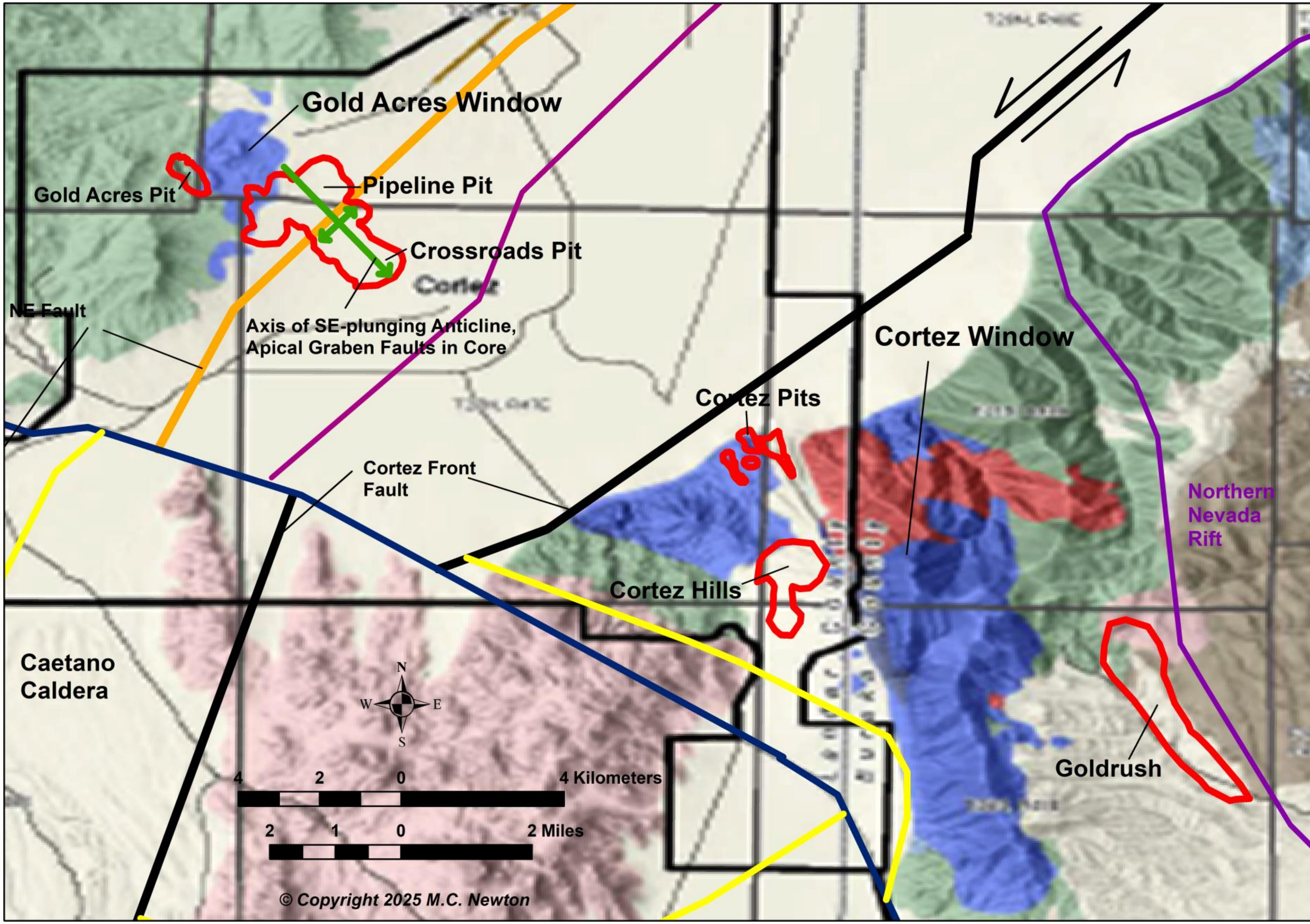

Figure 3. Cortez District - erosional windows on the crests of anticlines exposing Devonian carbonate units (in dark blue) hosting major Carlin-type gold deposits. After Barrick (2021).

- The reason there are gold deposits in anticlines is because fracture sets that formed during the course of folding (Paleozoic-Mesozoic time) were inward-dipping, forming V-shaped fracture patterns that converge at depth. If these fracture sets had the right orientation (striking roughly N-S) in Tertiary time, they would have reopened and, with enough extension across the fold, become normal faults, eventually forming apical grabens in the cores of the anticlines. Graben faults were important for channeling hydrothermal fluids and localizing Carlin-type gold deposits where the faults cut favorable stratigraphic units. An example is Pipeline. The left side of Figure 4 shows the outline of the Pipeline-Crossroads pits and the trace of the axis of the SE-plunging anticline determined by Nevada Gold Mines’ personnel. The right side of Figure 4 is a cross-section showing inward-dipping fault zones forming a V-shaped structural zone, coincident with the V-shaped gold resource shown in Figure 5. In the case of Pipeline, the down-dropping along the normal faults did not proceed to the point of forming a graben.

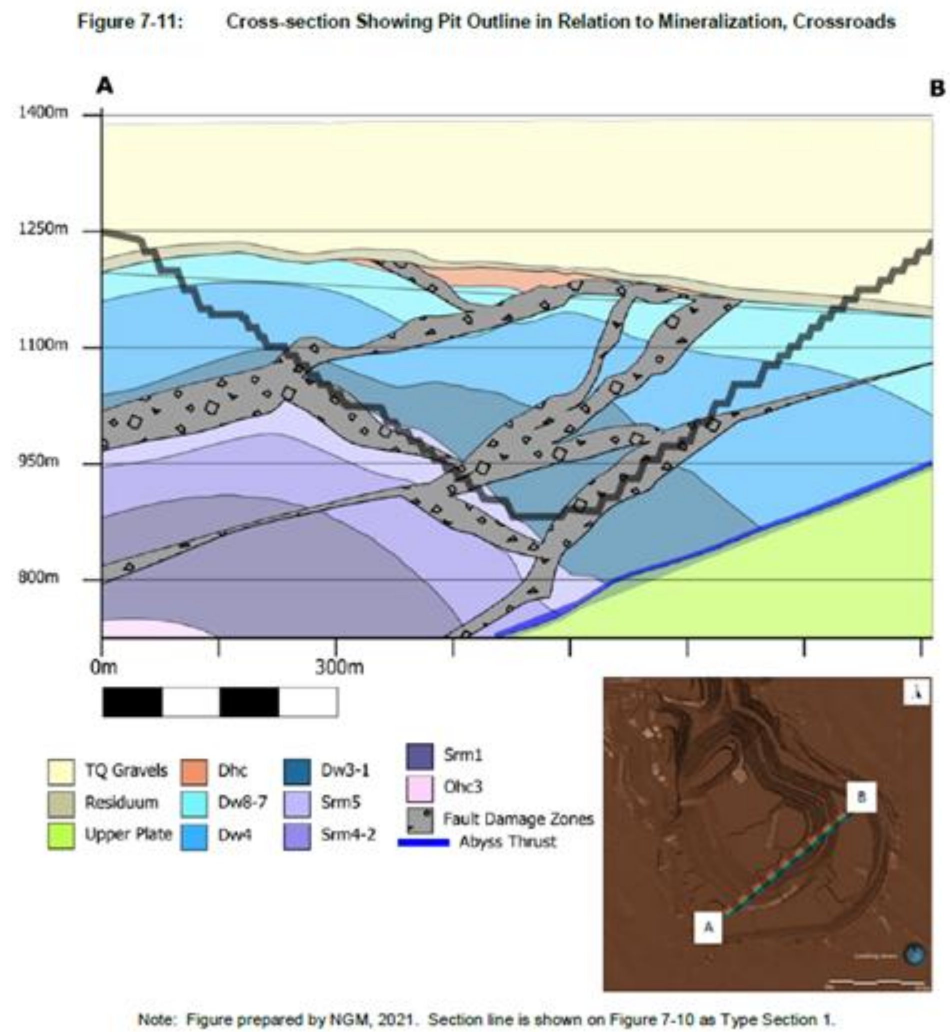

Figure 4A. Geologic map of Pipeline/Crossroads pits showing axial trace of SE-plunging anticline.

Figure 4B. Cross-section showing V-shaped fault pattern in Crossroads ore body.

After Nev. Gold Mines, 2021.

Figure 7-12: Cross-Section, Crossroads

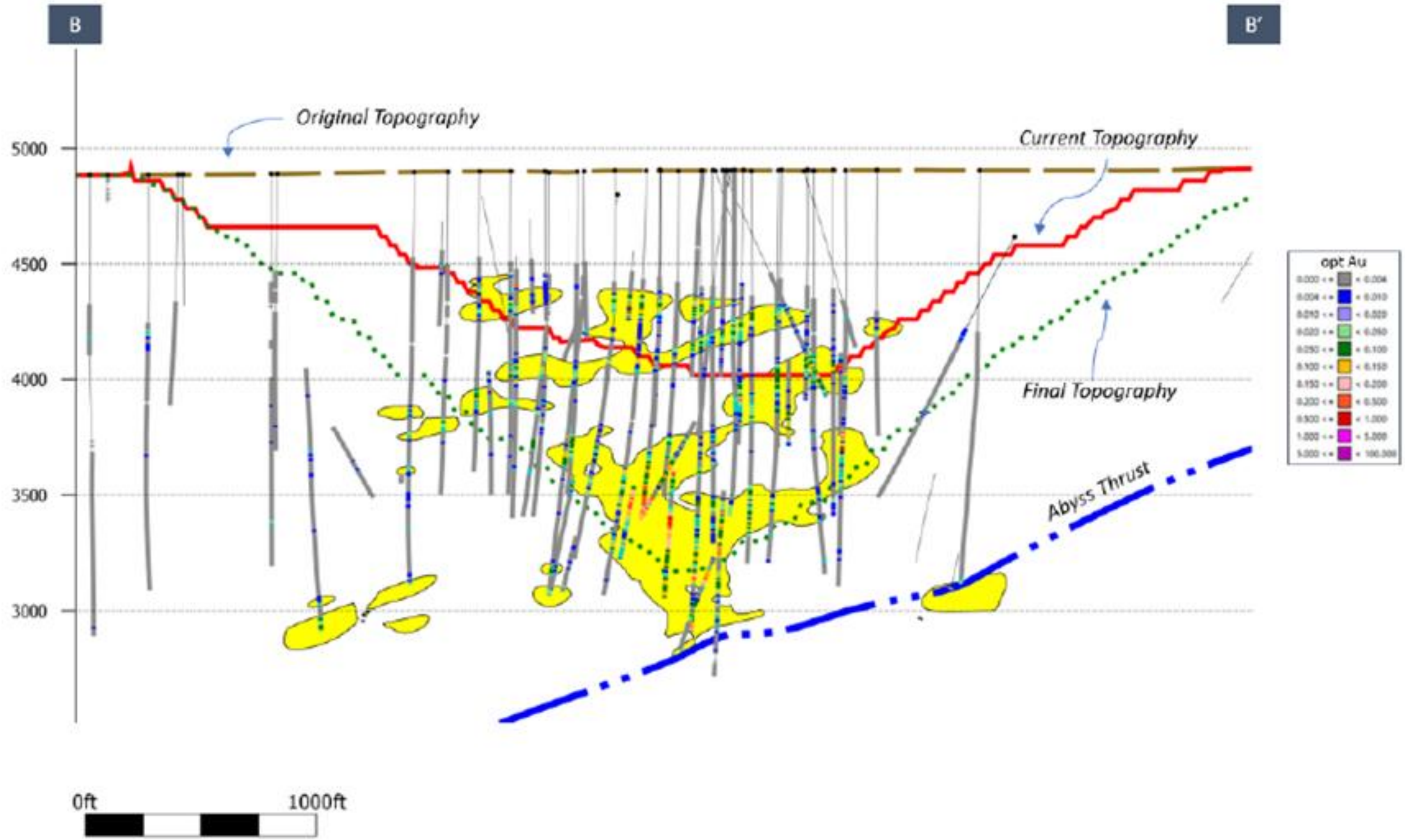

Figure 5. Cross-section showing V-shaped geometry of gold resource in Crossroads ore body. After Nev. Gold Mines, 2021.

- The Pipeline deposit is on an anticline plunging southeast beneath gravel, where 20 million ounces of gold lay buried with no surface exposure. What were known in the range were smaller deposits like Gold Acres and Robertson, which were satellite to the hidden goliathan gold deposit at the edge of the basin, 2,000 meters away from Gold Acres. In Figure 6, it is no accident that a line (in gold) through the axis of the Gold Acres pit projects through the heart of the Pipeline pit. Small satellite deposits in the range may be due to leakage of hydrothermal fluids from the basin, with most of the hydrothermal activity taking place at the edge of the basin. Projection of potential leakage structures from satellite deposits in the range may locate larger deposits in the basin.

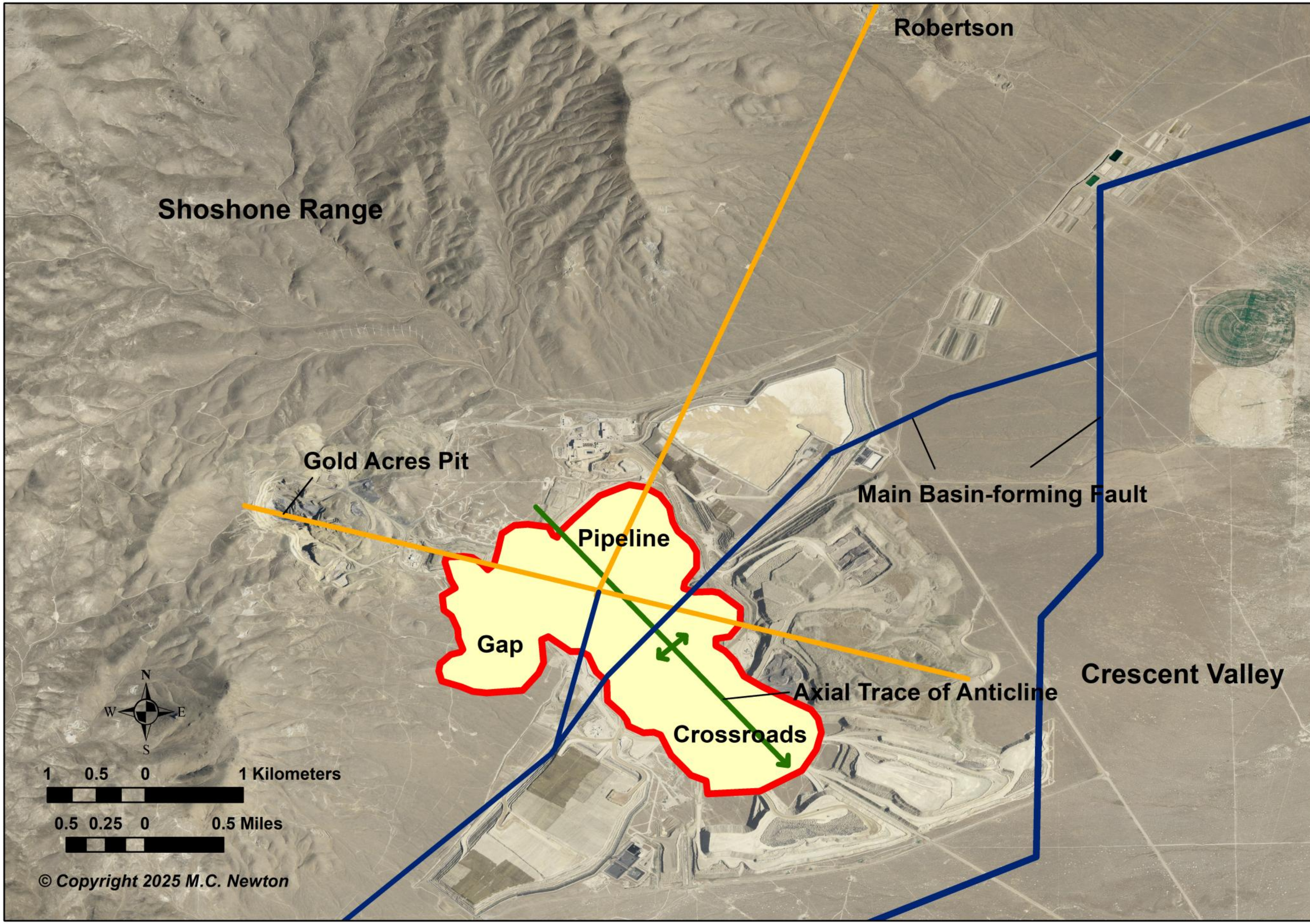

Figure 6. The 20-million ounces of gold Pipeline/Crossroads open pit complex in a SE-plunging anticline (after Nev. Gold Mines, 2021). Note satellite smaller gold deposits in the range. At Gold Acres a line (in gold) through the axis of the pit projects through the middle of the concealed Pipeline deposit.

• Like the Gold Acres-Pipeline scenario, the Gold Bar deposits (in red in Figure 7) are a set of small Carlin-type deposits, cumulatively around 1 million ounces of gold, spread out in an arc peripheral to the Roberts Creek project at the edge of the basin.

• As shown in Figure 7, the Gold Bar North deposits are in an arcuate E-W zone around the nose of a SSE-plunging regional anticline that exposes Lower Plate Devonian carbonate rocks (in purple) in an erosional window through Upper Plate clastic rocks (in gray-green). The axial trace of this anticline is shown as a green line in Figure 7 and subsequent figures.

• NNW-SSE faults that control gold mineralization at the Gold Pick and Cabin Creek deposits, in McEwen Mining's Gold Bar North mine, project to the south along the core of the anticline. These faults are analogous to the fault projected between the Gold Acres satellite deposit and the mammoth Pipeline deposit shown in Figure 6.

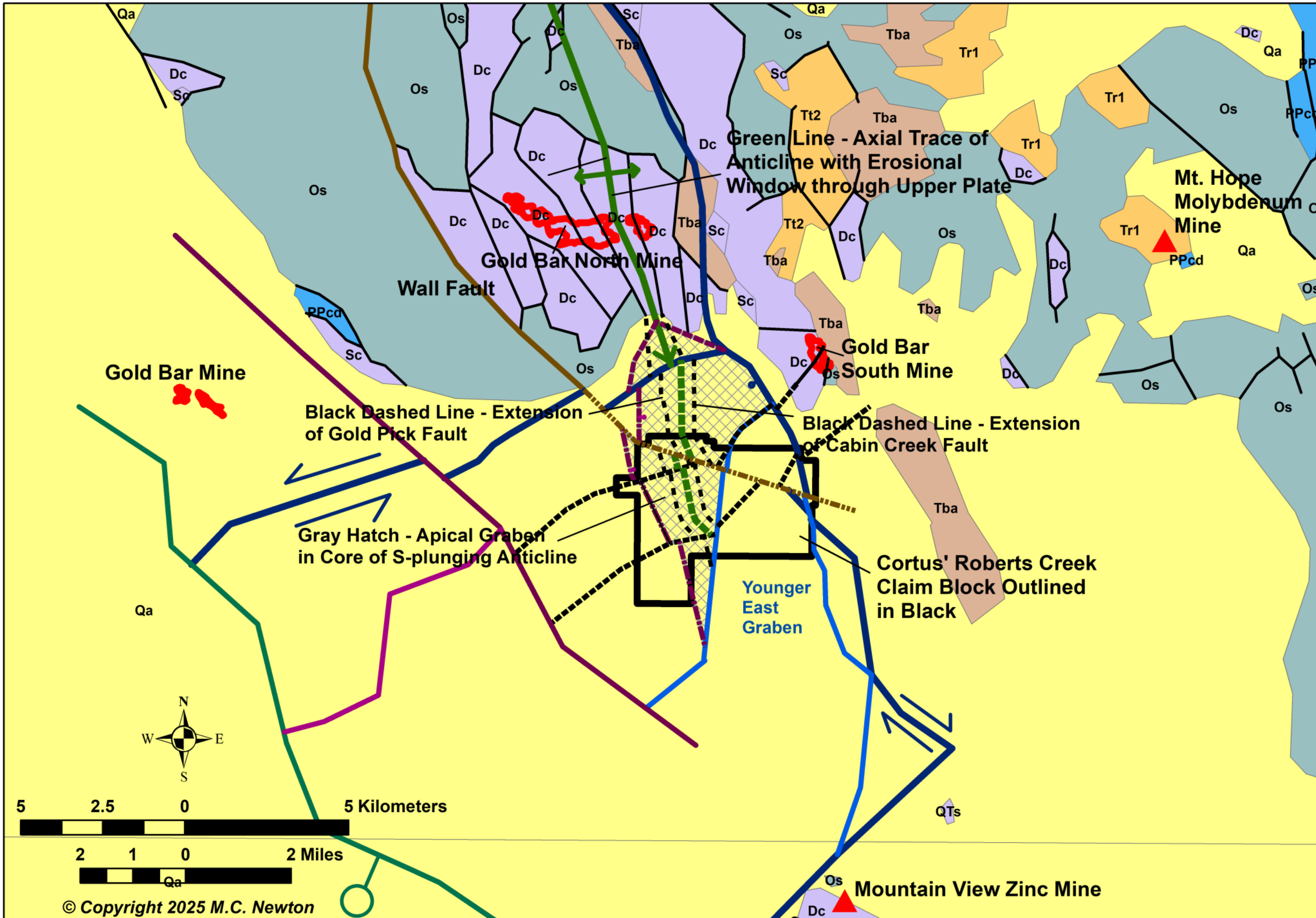

Figure 7. General geology of the Roberts Creek project area (after Stewart and Carlson, 1978). Note the axial trace of the SSE-plunging anticline becomes the axis of an apical graben at the edge of the basin. The project area is surrounded by satellite gold deposits in the range (in red) similar to Pipeline.

• There was some down-dropping of the core of the anticline in the range, but an apical graben developed where the anticline entered the basin (gray hatched pattern in Figures 7-9). This is indicated by the regional and detailed Bouguer gravity anomalies respectively in Figures 8 and 9. Both show NNW-SSE trending troughs of gravity lows, in the core of the anticline, due to a combination of dense bedrock having been dropped down deeper than the ridges of bedrock both west and east of the trough (in darker orange and red colors) and to the trough being filled with lighter volcanic and alluvial material.

• NNW-SSE faults projected from the range became graben faults at the edge of the basin. In particular, a fault on the west side, projecting from the Gold Pick deposit, and a fault on the east side, projecting from the Cabin Creek deposit, became inward-dipping graben faults. Strong soil geochemical anomalies, presented below, suggest that hydrothermal activity in the basin was concentrated where the Gold Pick and Cabin Creek faults intersected the NW-trending right-lateral Wall fault and a NE-trending left-lateral fault projected from the Gold Bar South deposit.

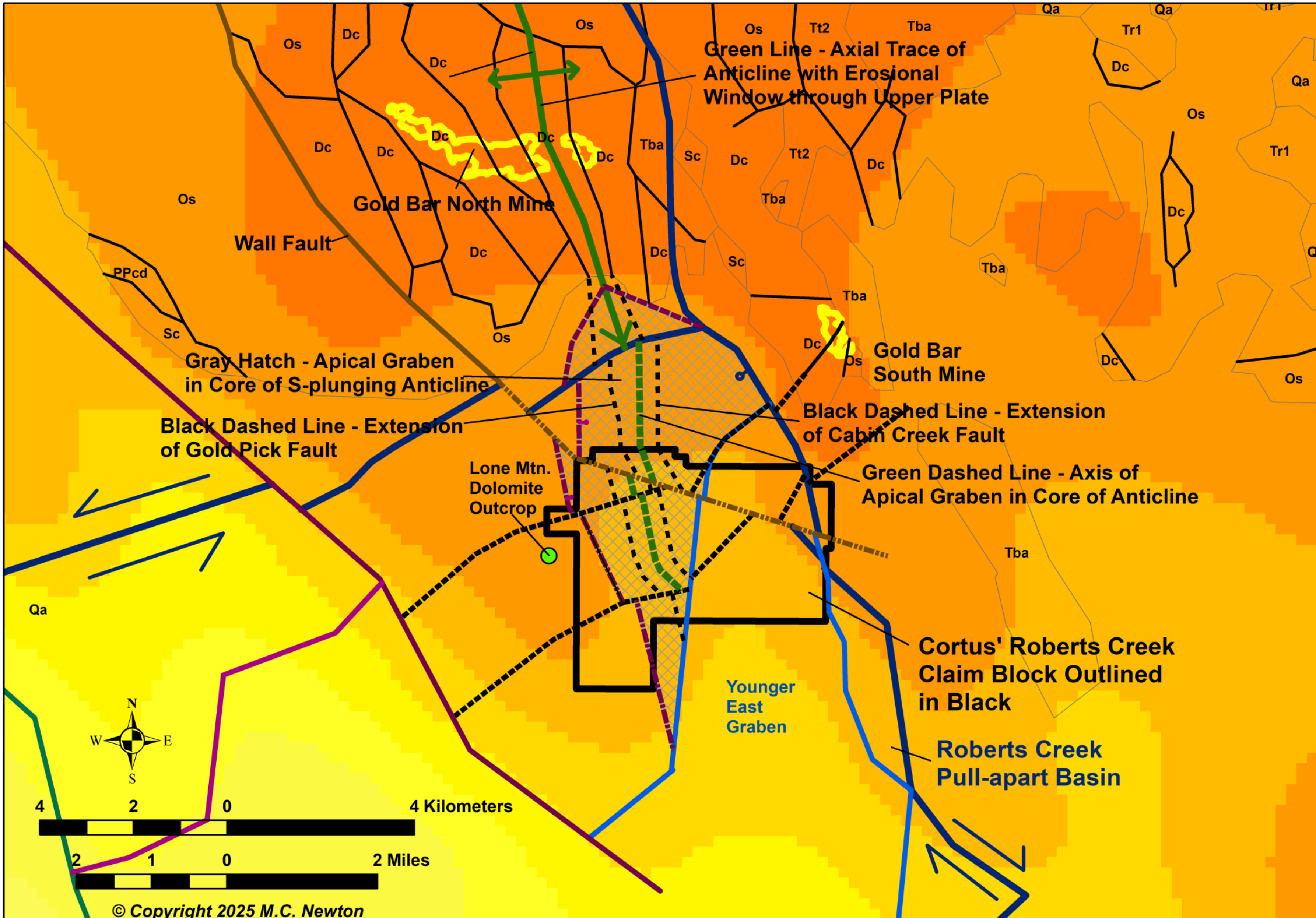

Figure 8. Regional complete Bouguer gravity anomaly. Orange - gravity highs (shallow bedrock), yellow – gravity lows (deep alluvium). Note two gravity highs in the basin, bedrock extensions from range, flank a trough of lower gravity indicating a graben in the core region of a SSE-plunging anticline.

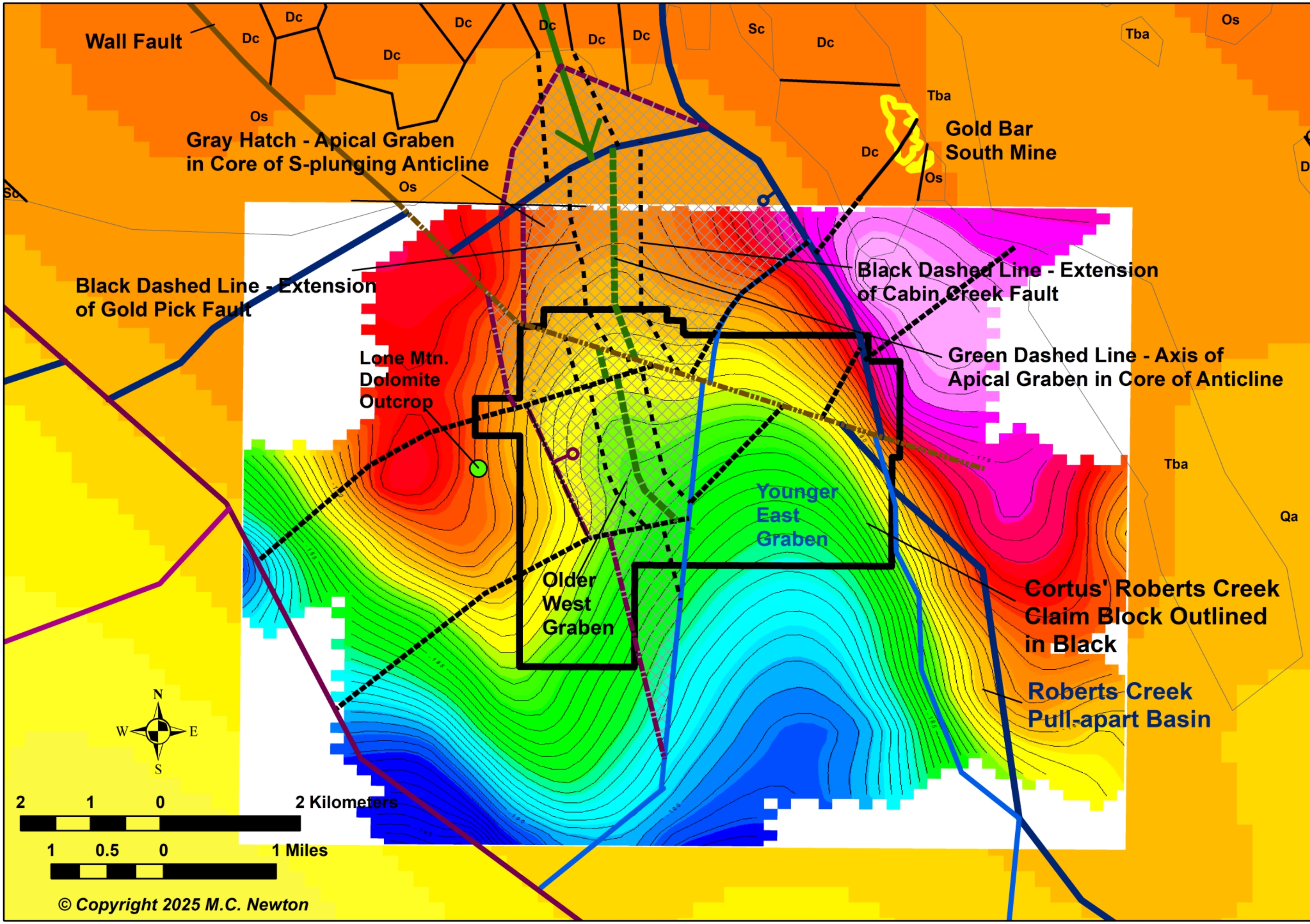

Figure 9. Overlay of detailed complete Bouguer gravity anomaly, from Cortus survey, on regional gravity map of figure 8. Red/purple – gravity highs, blue – gravity lows. Note that two gravity highs in the basin are extensions of range bedrock and flank a trough of lower gravity which marks older apical graben to the west cut off by younger graben to the east.

- In Figures 8-12, the location of a small hill with outcropping Upper Silurian-Lower Devonian Lone Mountain Dolomite is marked with a green circle on the western gravity high (buried ridge). Figure 10 is a stratigraphic column for the Gold Bar area prepared by McEwen Mining geologists. The main soil anomalies, presented below, are over the inferred heart of the apical graben and the stratigraphic units there would have been dropped down relative to the units on the flanking ridges. It is likely that hydrothermally altered/mineralized rocks in the graben are limestones of the Early Devonian McColley Canyon Formation, which sits on top of the Lone Mountain Dolomite and hosts gold mineralization at the Gold Ridge, Gold Pick and Cabin Creek deposits.

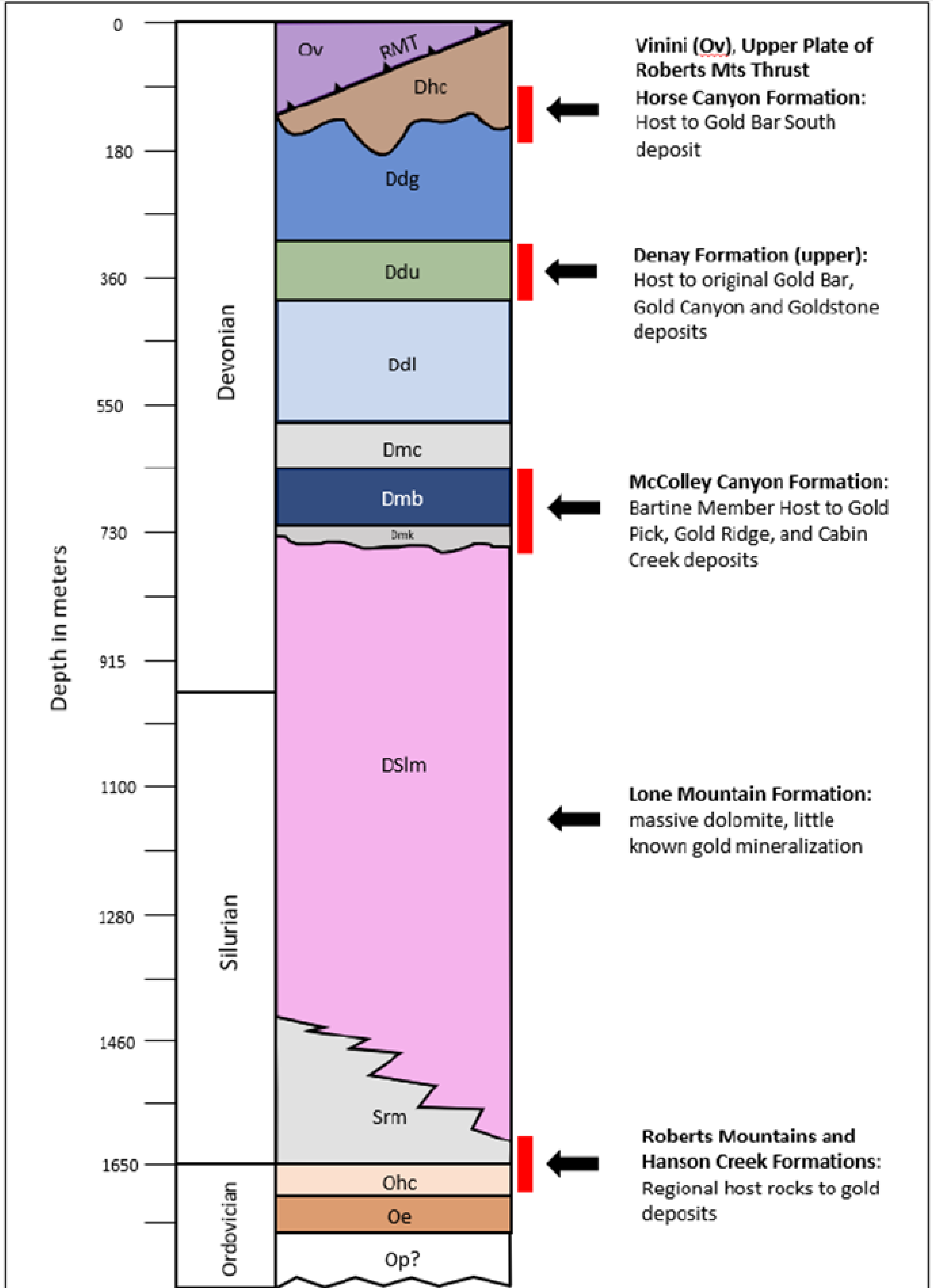

Figure 10. Stratigraphic column for Gold Bar area showing known positions of gold mineralization as red bars. After Kastelic, et al., 2020.

• Figure 11 shows the results of a ground magnetic survey by Cortus. A ground survey records magnetic signatures at a shallow level. Red/purple colors are shallow magnetic highs, probably due to Miocene-aged cover volcanic rocks, the green colors are probably due to the same volcanic rocks, but they are either deeper down or thinner (giving a weaker signal). The dark blue zones are shallow magnetic lows and, coupled with gravity highs, suggest shallow non-magnetic bedrock, such as carbonate rock.

• An aerial magnetic survey sees deeper than a ground magnetic survey. The regional aeromagnetic survey (see Figure 12) shows magnetic highs in green that suggest there are Eocene igneous bodies deeply buried in the northeast corner of the Roberts Creek pull-apart basin. These intrusive bodies would have provided heat and metals to the hydrothermal fluids that may have produced gold deposits in the project area.

• In Figure 12, the igneous body outlined in purple appears to have intruded into the east graben along the Wall fault and continued beneath the older west graben. The pink outline is the gold-in-soil envelope discussed below. The proximity of a probable buried Eocene igneous intrusion to a zone of strong soil anomalies bodes well for the presence of a Carlin-type gold deposit.

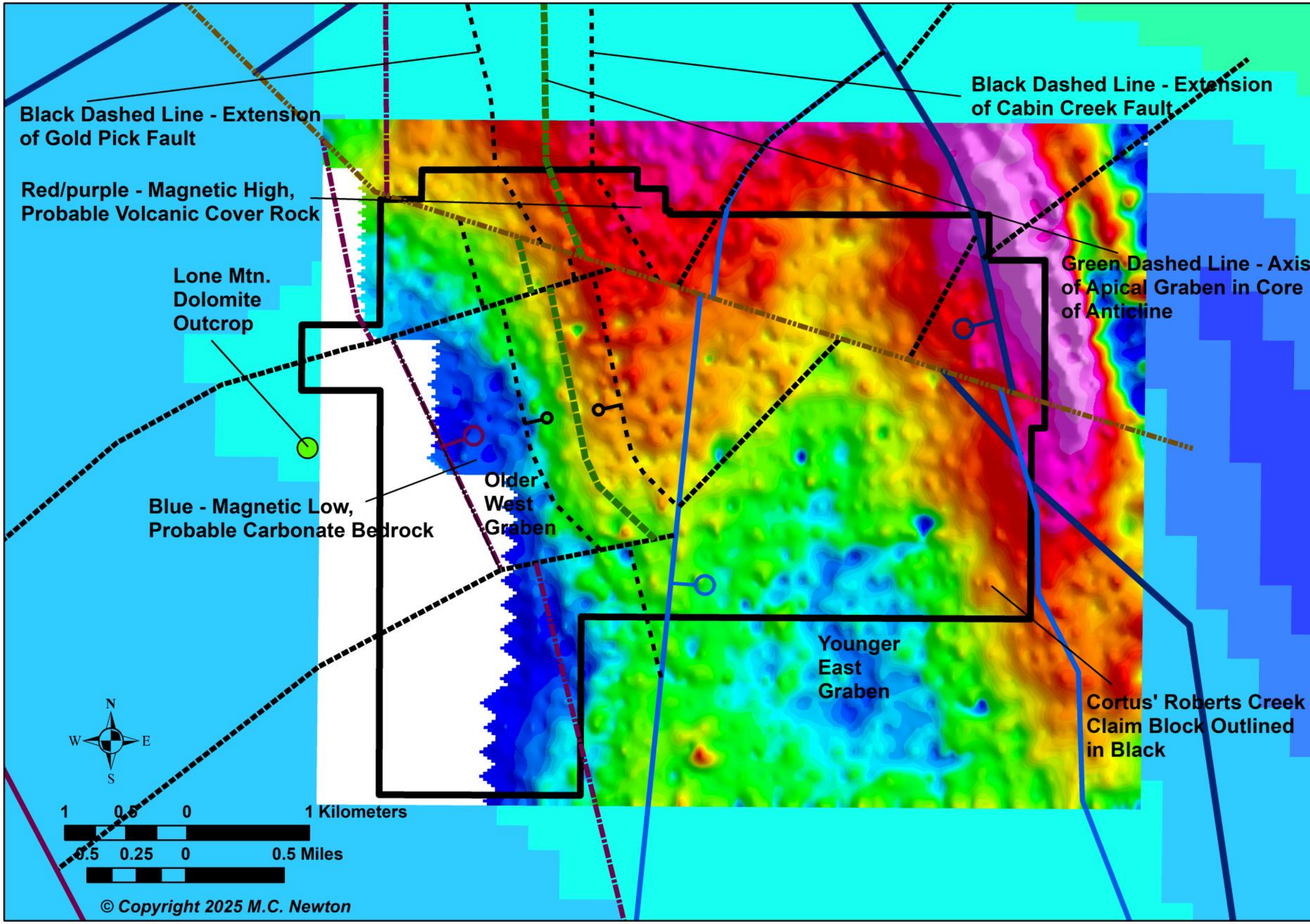

Figure 11. Overlay of ground residual magnetic intensity (reduced to pole) on regional aeromagnetic map. Red/purple - magnetic highs, blue - magnetic lows. The ground magnetics are seeing shallow bedrock and cover. Red to green regions are probably volcanic cover rocks, possibly Miocene basalt, thinning to west and dropped down in the south.

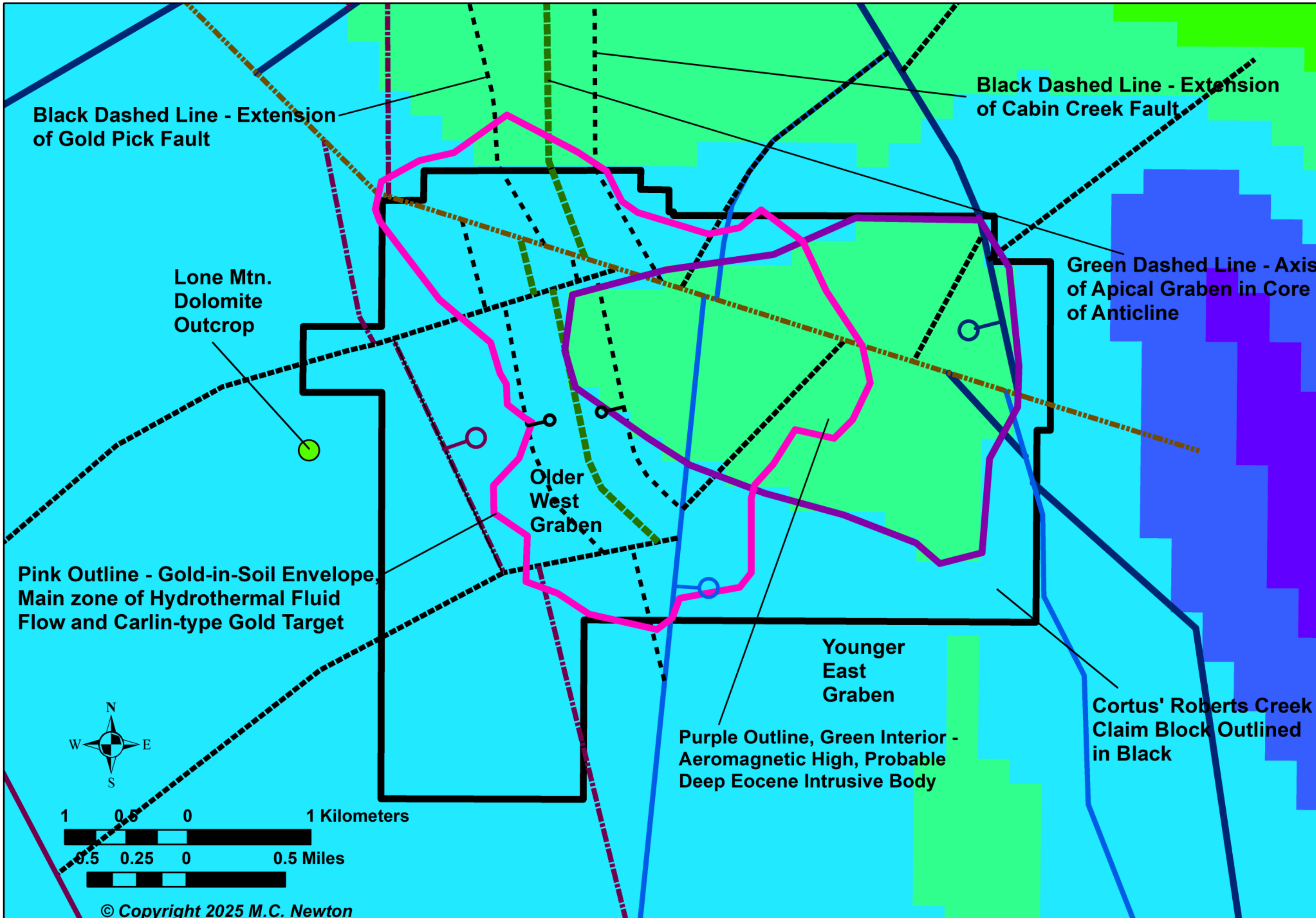

Figure 12. Aeromagnetic map. Green – magnetic highs, blue - magnetic lows. The magnetic high (in green outlined in purple) is probably a buried igneous intrusion of Eocene age. This body would have provided heat and metals to hydrothermal fluids that would have flowed upward into fractured bedrock (in pink outline).

Results of Soil Geochemical Survey

• Soil samples were taken at 1-3 feet (0.3-1 meter) depths at sites 400 feet (120 meters) apart along E-W lines 1,000 feet (300 meters) apart. The soils were analyzed by the Ionic Leach method at ALS laboratories in Reno and Vancouver. This method uses a variety of weak leach reagents to optimize extraction of a multitude of trace elements, which are analyzed by ICP-MS (inductively coupled plasma – mass spectrometry). In theory, the reagents are so weak that they only strip ions off the outside of soil grains and not the inside, so they may reflect elements rising upward from buried mineralization rather than the source of the rock material that weathered into soil.

• In the analytical results, the absolute values of the elements are very small, parts per billion, and do not quantify the amount of a given element in the soil. It is the patterns of highs and lows that are important, and the most common pattern is a halo or doughnut of high values surrounding a core of low values (the doughnut hole) directly over mineralization. The reason for this pattern is that in an oxide or sulfide ore body, any metallic atom released by weathering is quickly reabsorbed by a nearby oxide or sulfide mineral, so that the only place the elements can escape is at the edge of the ore body, hence at the surface a doughnut or halo signature. Molybdenum (Mo) is an excellent element to show this zonation because at low pH, such as in a sulfide ore body, it is very insoluble and stays put, but at higher pH, like in the alkaline near-surface arid environment, it is very soluble and spreads out forming a nice halo around buried mineralization. Figure 13 shows Mo in soil at Roberts Creek and the red line outlines a central area of lower values inside a halo of higher values.

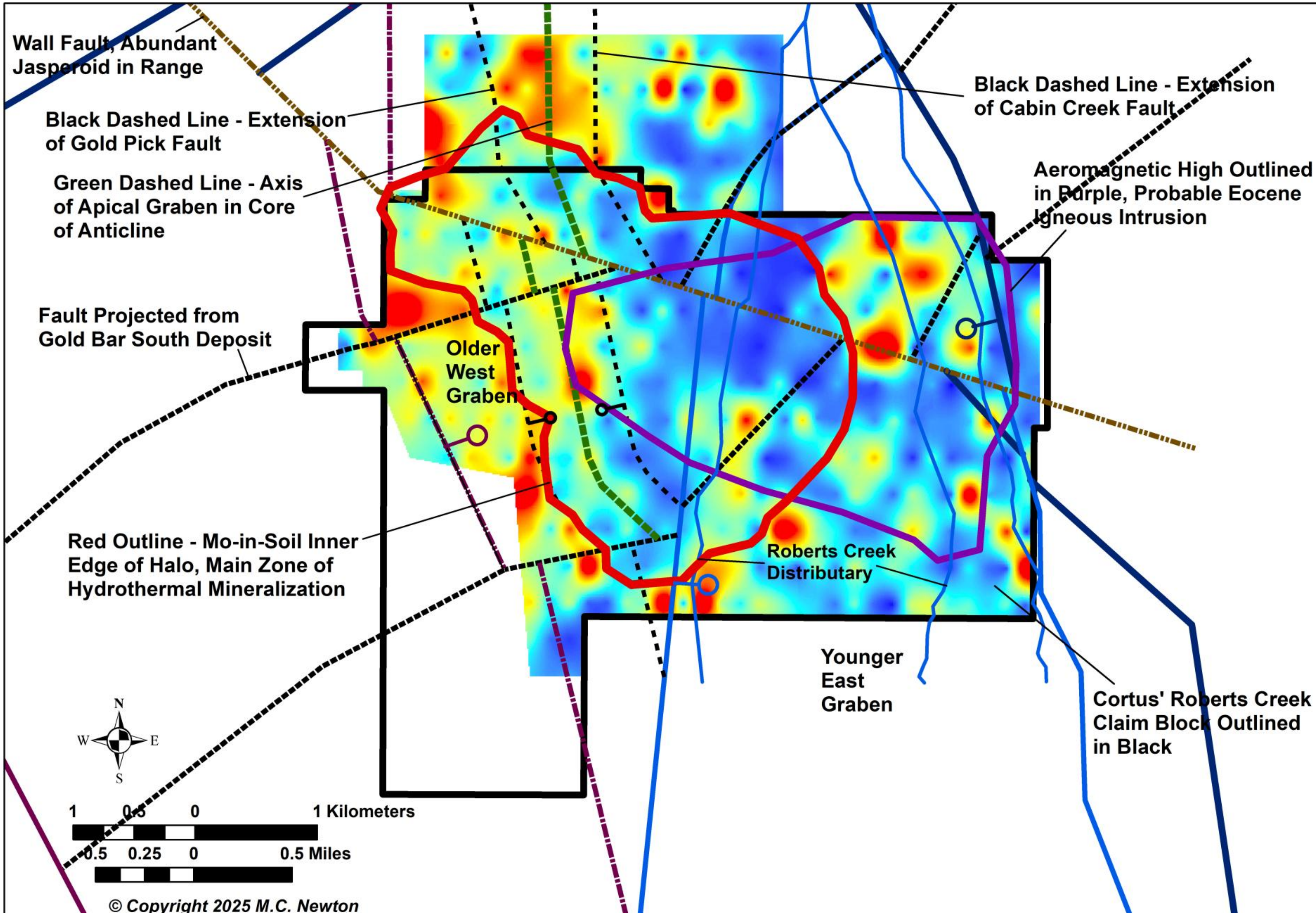

Figure 13. Molybdenum (Mo) in soil by Ionic Leach – red highs, blue lows. Note halo of scattered strong Mo highs outside red outline. This may be defining the outside of the main hydrothermal alteration system.

- Interpretation of the pattern of soil anomalies can be complicated by several factors. One is that, rather than being associated with buried mineralization, the anomalies may be due to stream sediment deposition. This appears to be the case in the central and east sides of the project area, where Roberts Creek flowed into the younger graben, creating a wide distributary network. Gold, silver, arsenic, mercury, thallium and base metals appear to be strongly related to the streams.

- However, so as not to outsmart ourselves, until drilling proves otherwise, the anomalies near stream courses will be interpreted as representing buried mineralization. This is particularly important with the gold-in-soil anomaly shown in Figure 14. Gold can have either apical or halo anomalies, so the pink outline in the figure marks an envelope around gold highs and outlines the main Carlin-type gold target area. It includes some gold highs along the Roberts Creek stream course, but these are also in a position to be related to buried mineralization along the west border fault of the younger east graben.

- Note that in Figure 13, Mo-in-soil does not appear to be affected by Roberts Creek and may be faithfully showing the underlying zone of hydrothermal mineralization, outlined in red, which also mimics the Au-in-soil envelope outlined in pink in Figure 14. Arsenic and antimony show patterns similar to molybdenum.

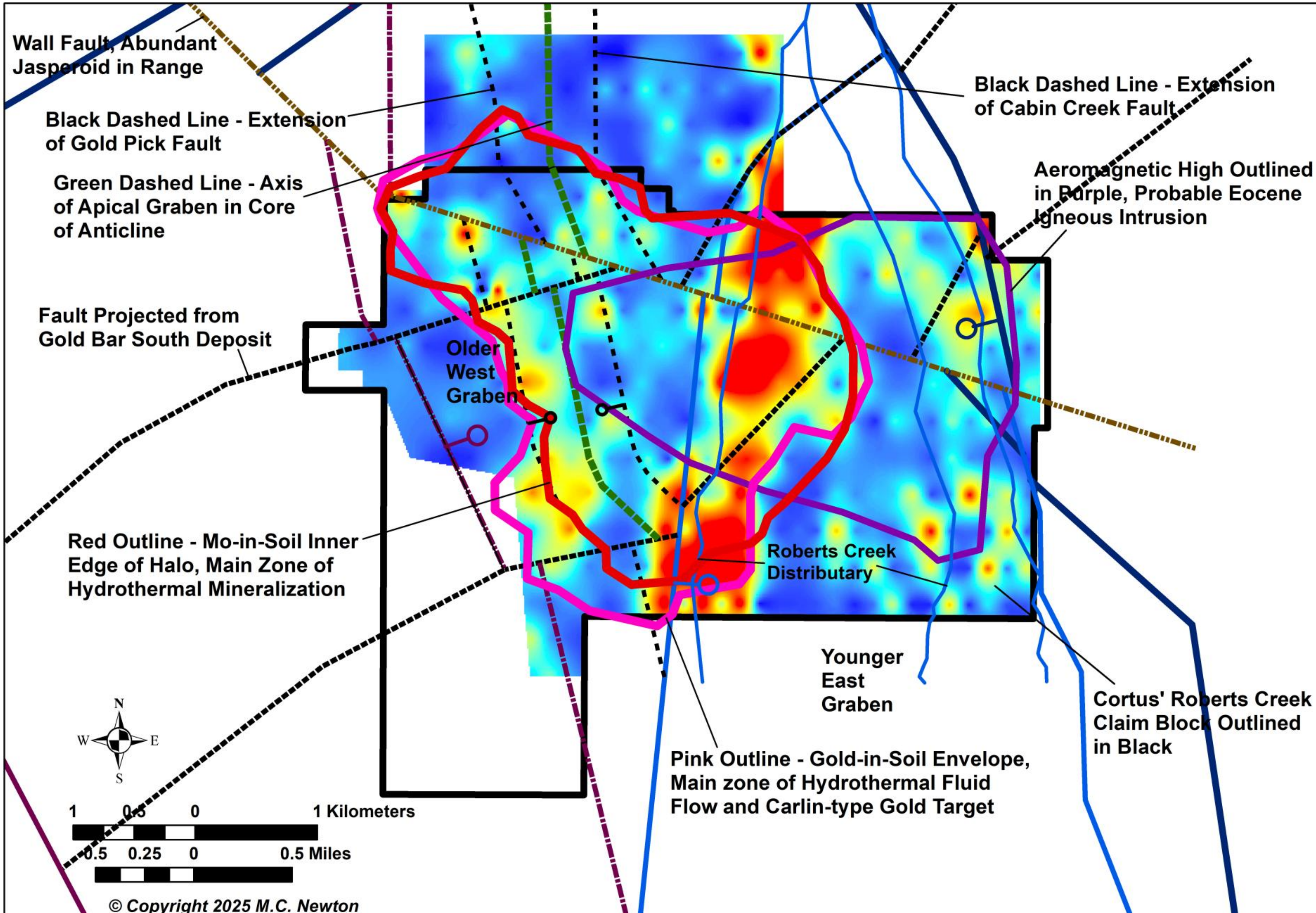

Figure 14. Gold (Au) in soil by Ionic Leach – red highs, blue lows. Pink line is envelope around gold highs – roughly coincident with Mo halo (red line). Western Au high anomaly along projected faults from Gold Bar North and South deposits. Central strong linear anomaly probably mainly due to stream sediment with contribution of gold from below.

• Some elements are associated with hydrothermal alteration, and the halo patterns may additionally be due to zonation of elements around an ore body. Niobium (Nb), for example, is known to be enriched in the wall rocks surrounding Carlin-type gold deposits, so the inner edge of its halo may be more related to zonation associated with the gold deposit rather than mineral trapping during weathering. In Figure 15, the brown outline marks the inner edge of the Nb halo and may mark the contact between Nb-enriched wall rock and Carlin-type gold mineralization. Note that there is a well-defined smaller internal halo with an apical Nb high in the east part of the larger Nb halo that could be defining a Carlin-type gold deposit.

• Some elements are not trapped during weathering, such as strontium (Sr), which is associated with calcium and released by hydrothermal dissolution of carbonate rocks. Rather than halos, they may show apical high anomalies, directly over mineralization. The combination of an apical Sr high anomaly within a Nb halo is a priority Carlin-type gold target (see Figure 16).

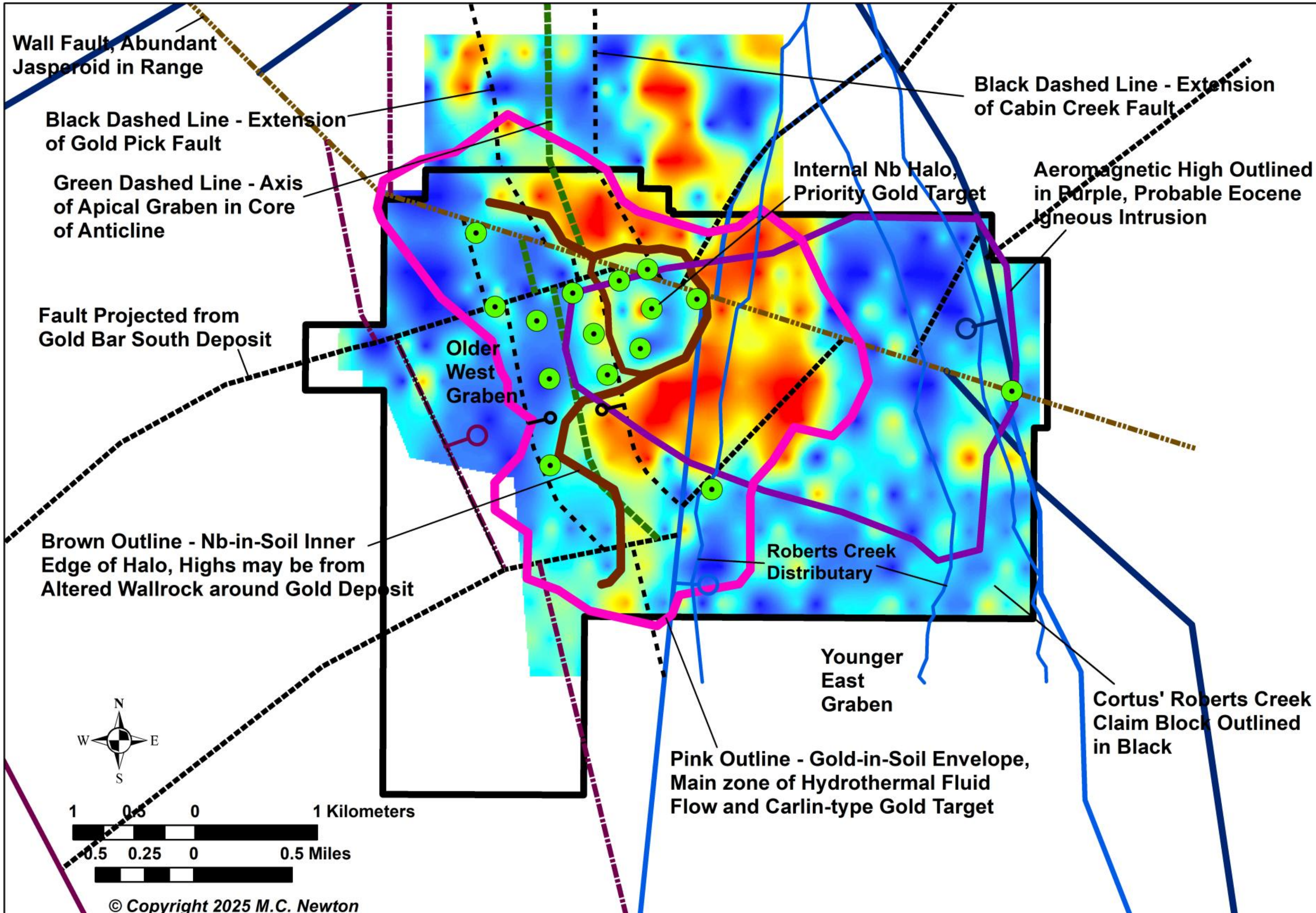

Figure 15. Niobium (Nb) in soil by Ionic Leach – red highs, blue lows. Note halo of strong Nb highs outside brown outline - may be indicating Nb alteration in wall rock around a Carlin-type gold deposit. Smaller interior halo on east side of anomaly, with an apical high, is a priority drill target. First 15 planned drill holes in green circles.

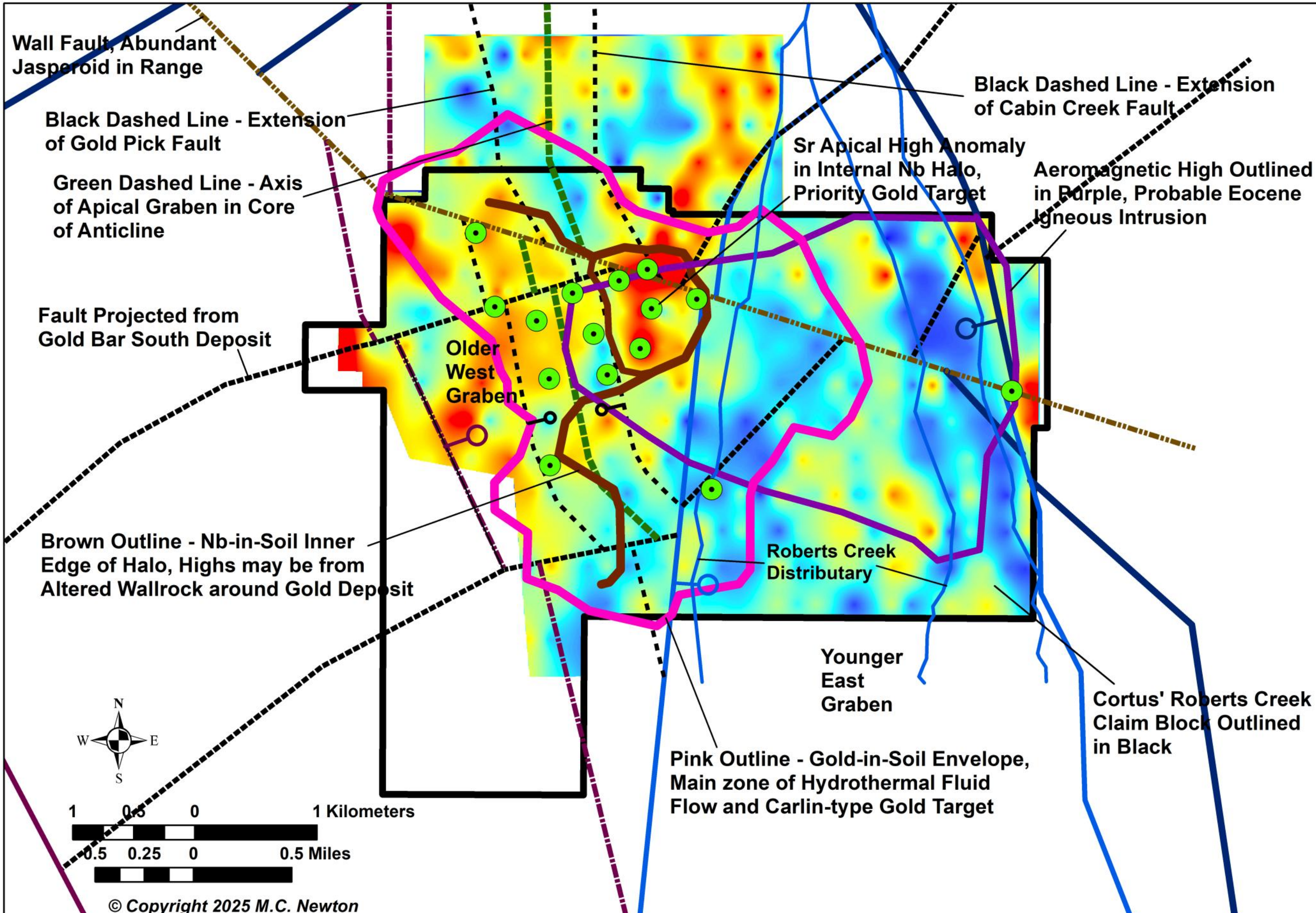

Figure 16. Strontium (Sr) in soil by Ionic Leach – red highs, blue lows. Note strong Sr high anomaly inside inner Nb halo (brown) – possible Sr apical anomaly suggesting carbonate dissolution. First 15 planned drill holes in green circles.

• Figures 17-19 show zinc, cadmium and barium respectively in soil by Ionic Leach. Note there are strong high anomalies in all three of these elements in the northwest part of the claim block, particularly within the perched older west graben, along the faults projected from the Gold Bar North and South deposits in the range and along the Wall fault. These anomalies are associated with faults and may also, in part, be apical anomalies, above mineralized zones.

• All of the elements mentioned above can be associated with Carlin-type gold deposits, particularly the deeper parts, and they also can be associated with Mississippi Valley-type zinc deposits, such as at the Mountain View mine at Lone Mountain, 12 km south of the Roberts Creek project (see Figure 7). However, as lead (Pb) is a minor component of the soil anomalies, it seems more likely that the Zn, Cd and Ba anomalies are reflecting deep Carlin-type mineralization. The eastern internal halo of the Nb anomaly may represent the shallower part of the same deposit.

• Figure 20 shows the detailed gravity map with the gold envelope outlined in pink and the two priority shallower and deeper gold targets respectively outlined in red and white . The gravity model suggests that the shallower target is on a small ridge and that the deeper target is in the heart of the older west graben. The proposed first 15 drill sites are in blue circles.

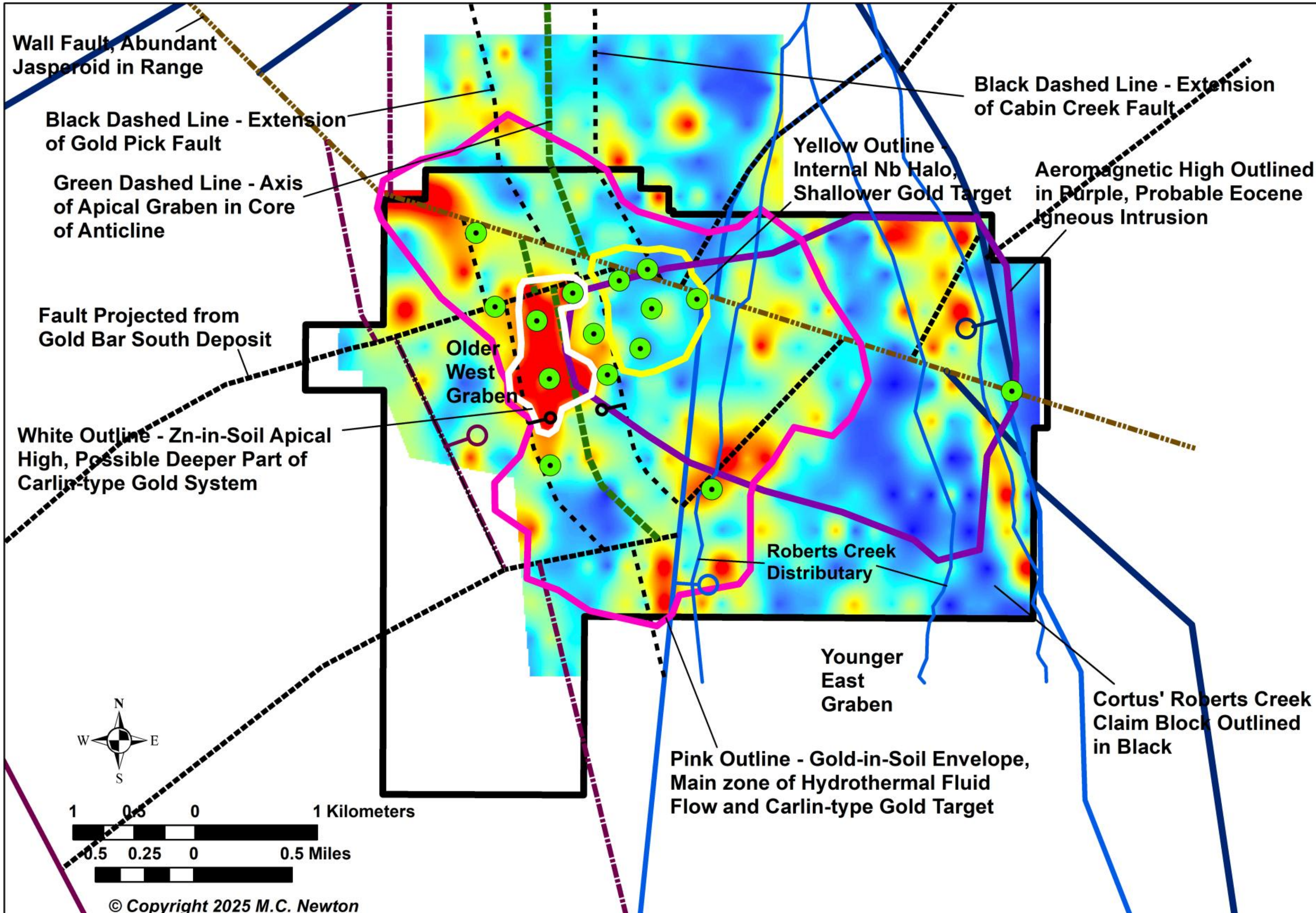

Figure 17. Zinc (Zn) in soil by Ionic Leach – red highs, blue lows. Strong Zn high anomaly (outlined in white) is probably apical – directly above mineralization that is deeper than target outlined in yellow. First 15 planned drill holes in green circles.

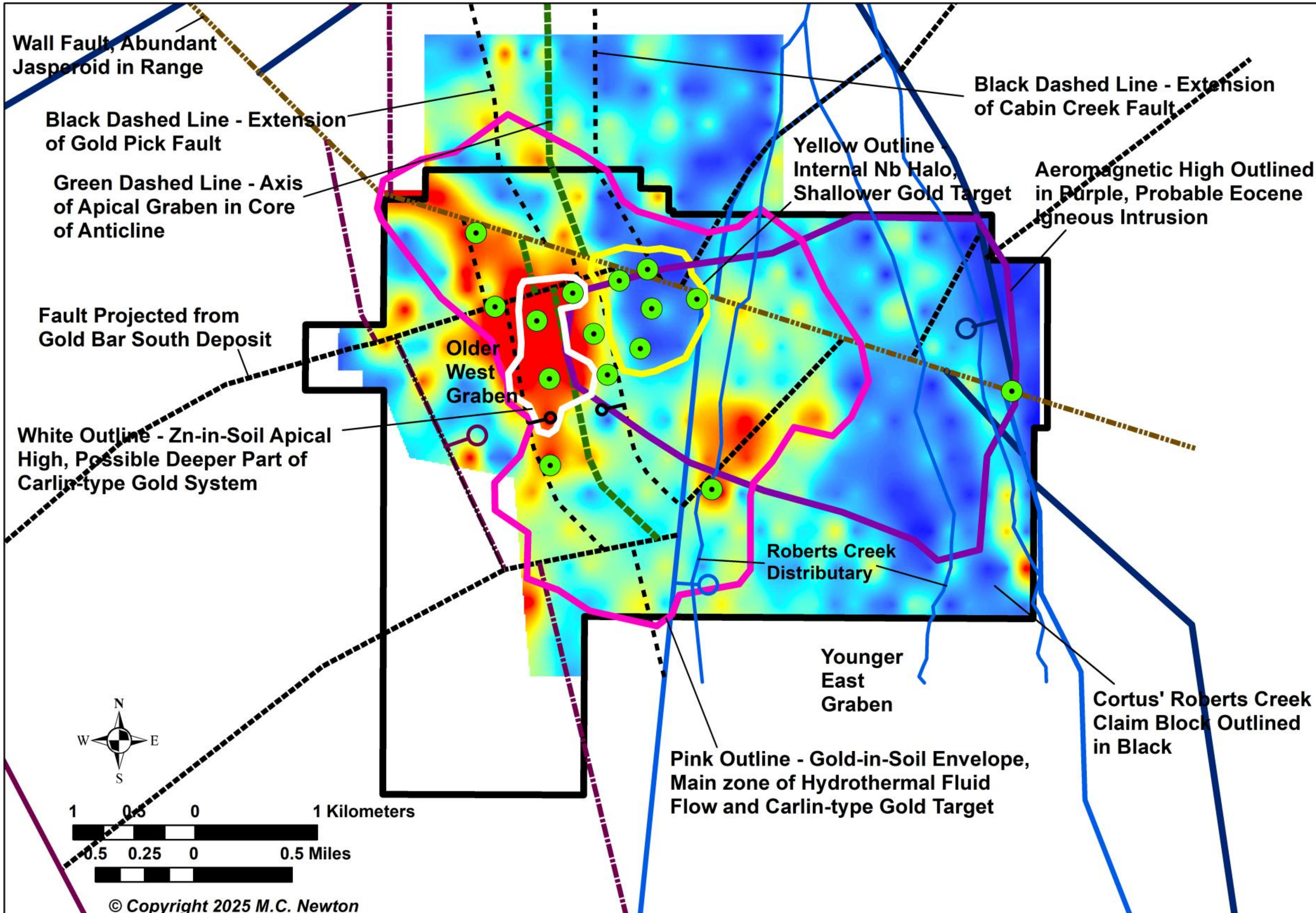

Figure 18. Cadmium (Cd) in soil by Ionic Leach – red highs, blue lows. Strong Cd high anomalies are probably directly above mineralization along faults and deeper part of gold system outlined in white. Shallower Au target outlined in yellow, which may also be a Cd halo. First 15 planned drill holes in green circles.

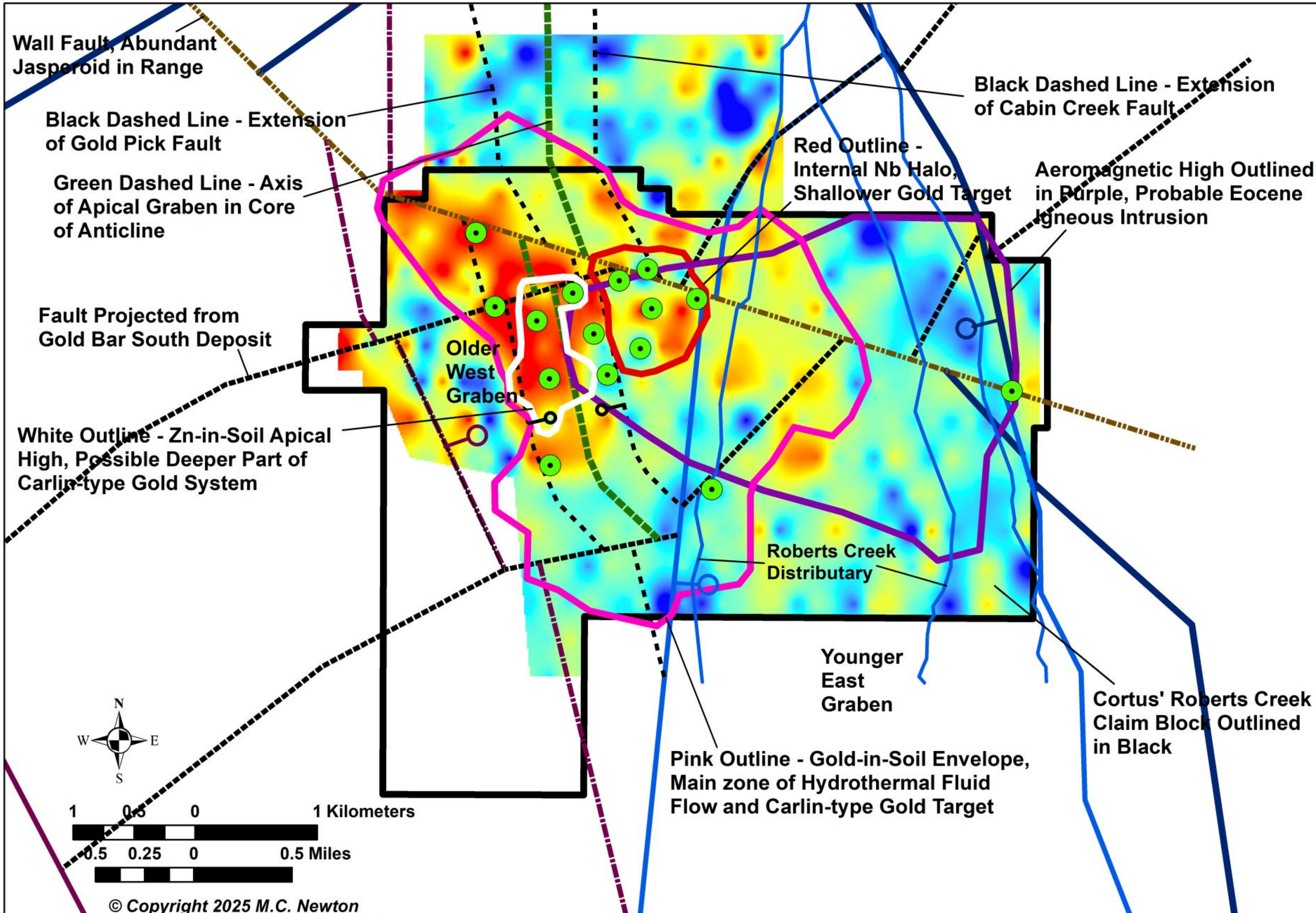

Figure 19. Barium (Ba) in soil by Ionic Leach – red highs, blue lows. Strong Ba high anomalies are probably apical – directly above mineralization and faults. White Zn outline may be deeper part of same Carlin-type gold deposit inside red Nb halo. First 15 planned drill holes in green circles.

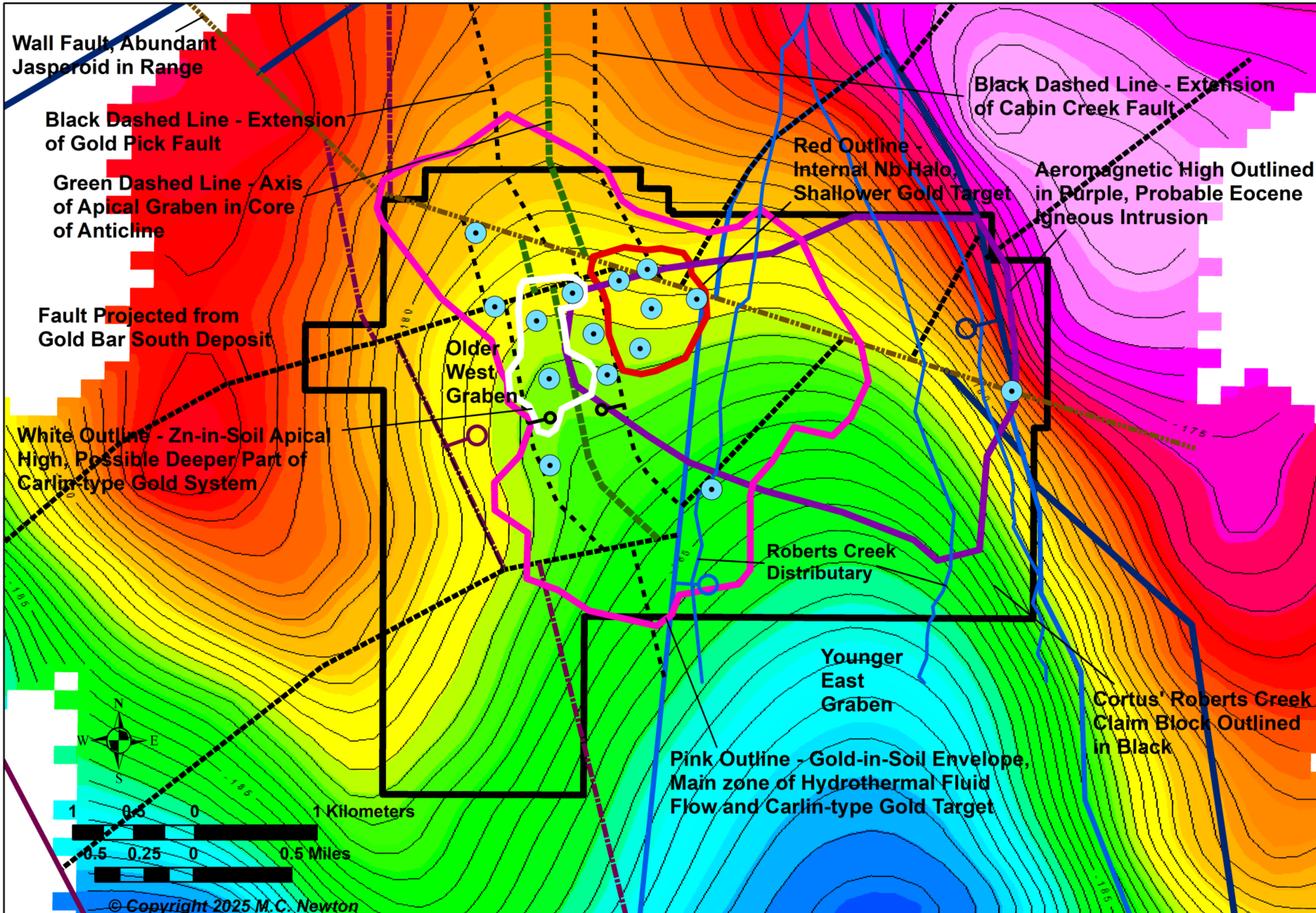

Figure 20. Detailed gravity – Red/purple highs, blue lows. Zones of high gravity anomalies are probably buried ridges of shallower bedrock. Shallower gold target on a ridge outlined in red, deeper gold target outlined in white. First 15 planned drill holes in blue circles.

Conclusions

• The Roberts Creek project area, in the Gold Bar mining district along the Battle Mtn.-Eureka gold trend, lies within the large Eocene Carlin pull-apart basin, that is one of the most prolific gold-producing tectonic features on Earth.

• The project contains a buried apical graben in a SSE-plunging anticline that hosts Carlin-type gold deposits in its core in the range. These small peripheral deposits may be satellite to a larger deposit in the project area. The setting is remarkably similar to the 20-million ounces of gold Pipeline deposit in the Cortez district, which was concealed beneath alluvium at the edge of a basin, on a SE-plunging anticline with gold ore forming along graben faults and with smaller satellite gold deposits, such as Gold Acres, surrounding it.

• At Roberts Creek, an aeromagnetic high anomaly in the graben may mark an Eocene intrusive body that would have provided metals and heat to hydrothermal fluids, which would have risen along faults and into permeable stratigraphic units in the graben. These units likely are carbonate members of the Early Devonian McColley Canyon Formation, which hosts gold deposits in the range at McEwen Mining’s Gold Bar North mine.

• The magnitude and extent of the soil anomalies at the Roberts Creek project suggests that there was extensive strong hydrothermal alteration and mineralization in bedrock now completely concealed beneath gravel.

• The Cortus claim block outlined in black in the preceding figures consists of 136 recorded unpatented mining claims, plus another 63 claims that have been staked. Cortus' Roberts Creek claim holdings total approximately 4,100 acres (1,659 hectares) on BLM ground. There is an underlying 2% NSR that can be bought down.

• The anomalous soil zone outlined in pink in the preceding figures has never been drilled. Cortus is looking for partners to participate in the maiden exploration drilling program.

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