Geological and Mineralogical Comparison of the F2 Zone/Phoenix Gold Project to the Cochenour/Gold Eagle, Red Lake/Campbell Gold systems.

Red Lake, Ontario, Canada

David W. Adamson, Ian C. Russell

2010 – Rubicon Minerals Corporation

The purpose of this document is to provide information regarding the similarities between Phoenix geology-mineralization and the geology-mineralization at Cochenour/Gold Eagle and, to a lesser extent, the Red Lake/Campbell Gold system.

Geology

All major gold deposits in the district occur within Balmer age rocks (2.8 Ga). Balmer age rocks are characterized by major development of ultramafic units. The distribution of Balmer age rocks can be determined from maps prepared by The Geological Survey of Canada (Figure 1) and, separately, the Ontario Geological Survey at various scales. Supplementing this work is the public domain airborne magnetic and electromagnetic datasets. The Cochenour/Gold Eagle, Red Lake/Campbell and Phoenix gold systems all lie on or adjacent to what has been interpreted as the same ultramafic unit within the Balmer sequence. Figure 1 shows the location of the F2 gold zone, in close proximity to the hinge of a major, regional F2 anticlinal fold axis. A subsidiary anticlinal fold to the southwest hosts the Red Lake Mine. The stratigraphic column in figure 2 shows that the F2 gold zone is hosted by the same package of rocks that host the Cochenour/Gold Eagle and Campbell/Red Lake gold systems.

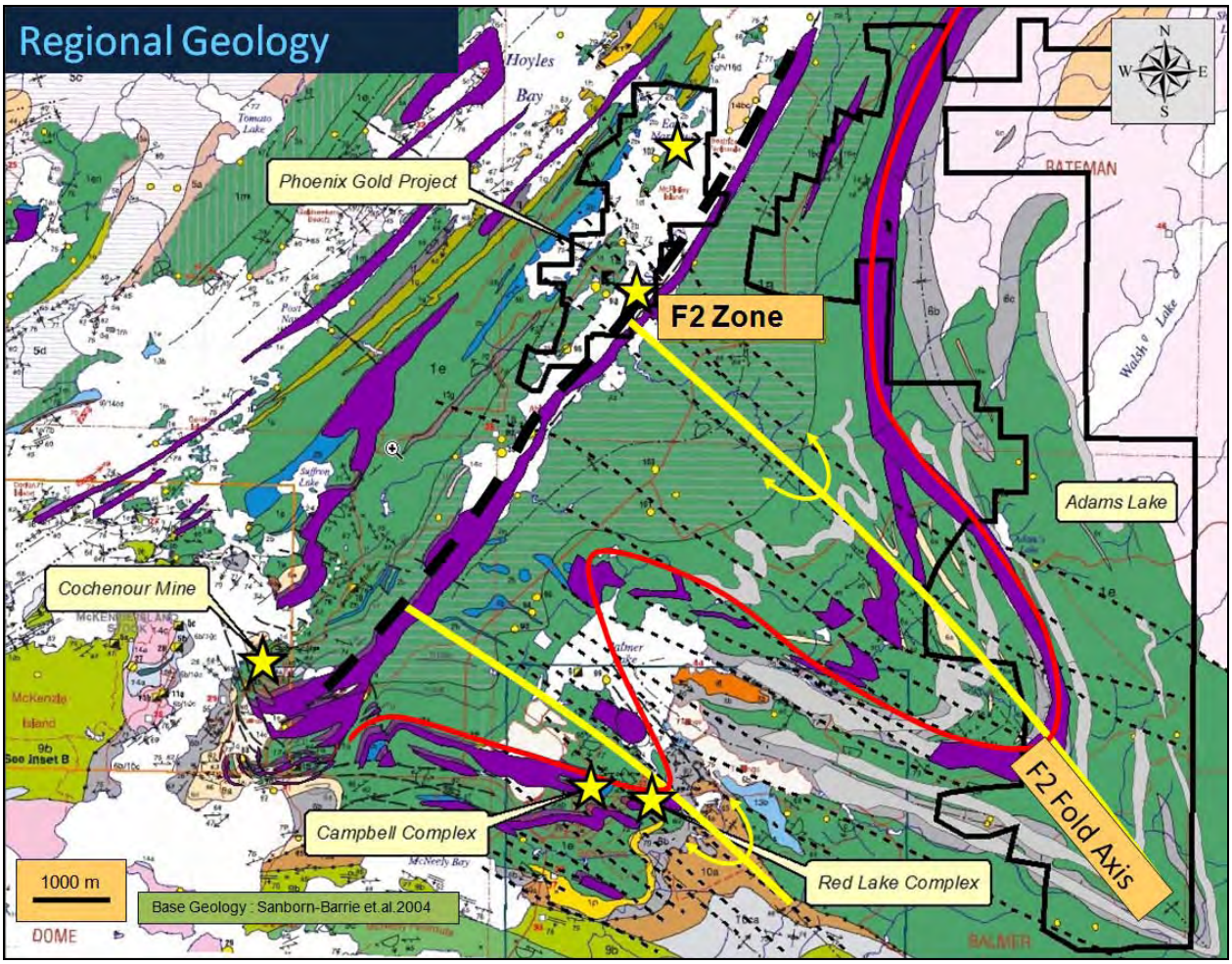

Figure 1: Regional GSC Geology, after Sanborn-Barrie *et al.*, 2004.

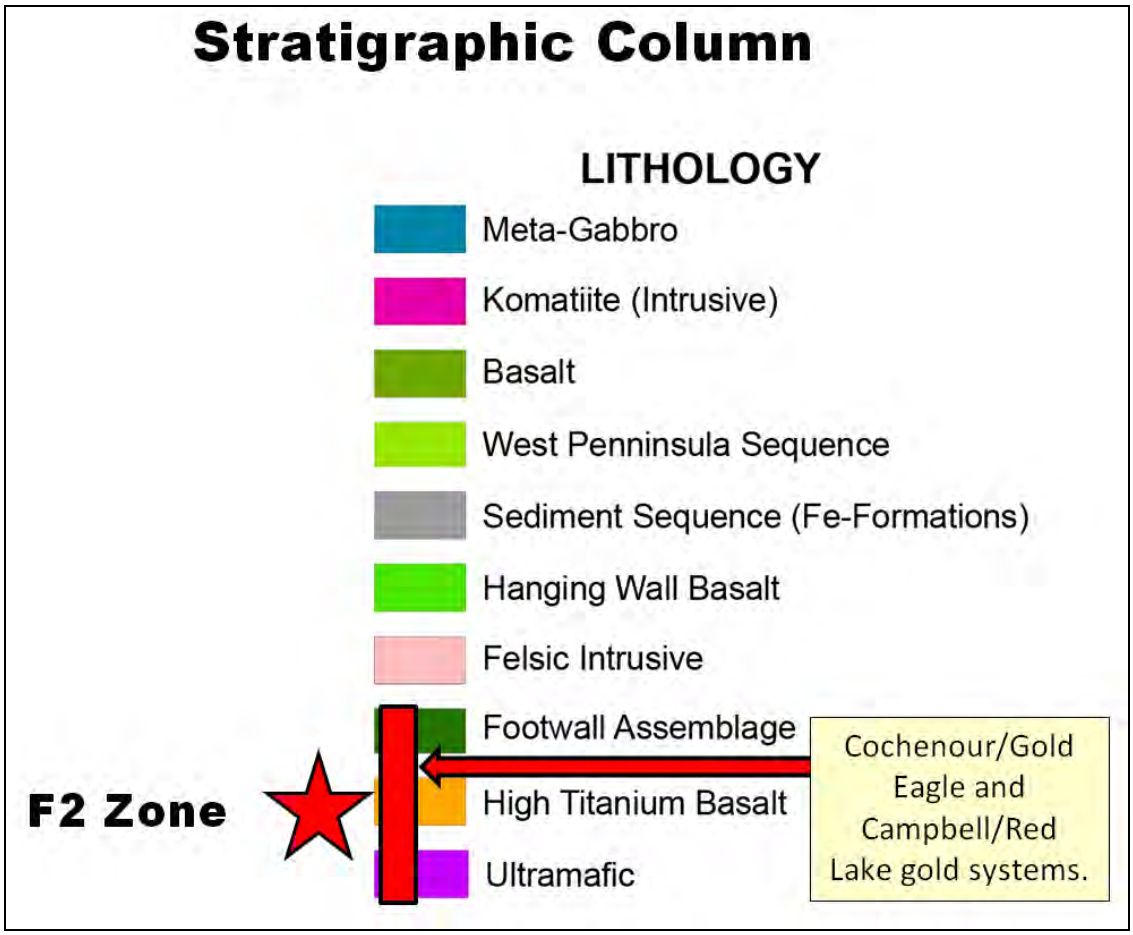

Figure 2: Stratigraphic column showing the location of the F2 Gold Zone in comparison with the Cochenour/Gold Eagle and Campbell/Red Lake gold systems.

Geochemistry

Rubicon has collected a large amount of geochemical data from the Red Lake gold camp. This data has been used to develop and aid in rock type classification, especially in areas of strong alteration. Figure 3 is a geochemical Al-Ti plot from the F2 zone and shows that various units form clearly identifiable trends. The Balmer sequence is seen to comprise a geochemical range of trends varying from ultramafic, though komatiitic to tholeiitic compositions.

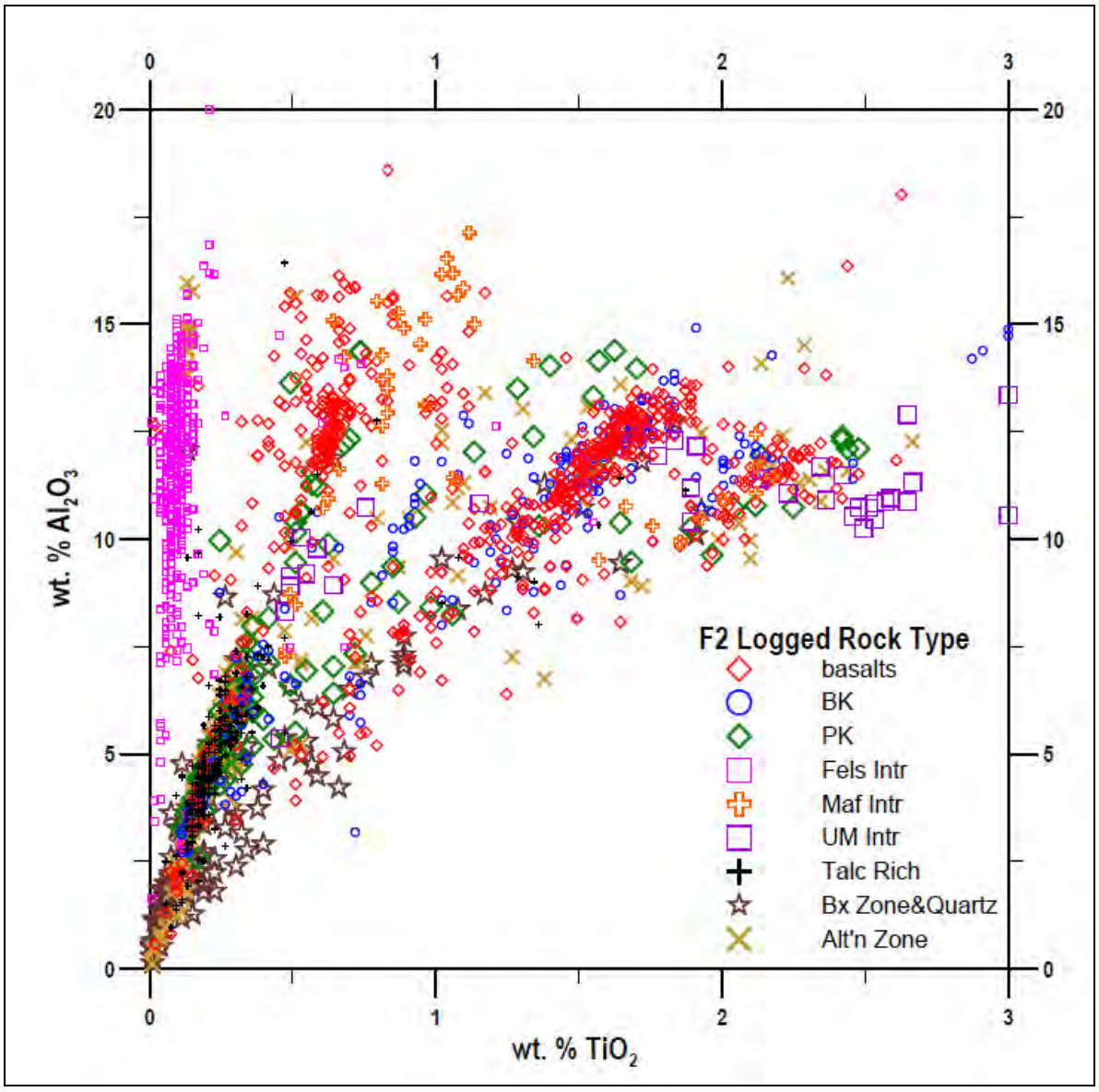

Figure 3 : Al - Ti plot

Figure 4 shows the geochemistry of units from Cochenour and Campbell from data available in the public domain (Hopson, 1994 and Penczak, 1996), plotted along with the F2 geochemical data set. It shows that, notwithstanding the paucity of data from the mines, the gold-bearing host rocks at F2 have similar compositions to those from both the Cochenour and Campbell deposits.

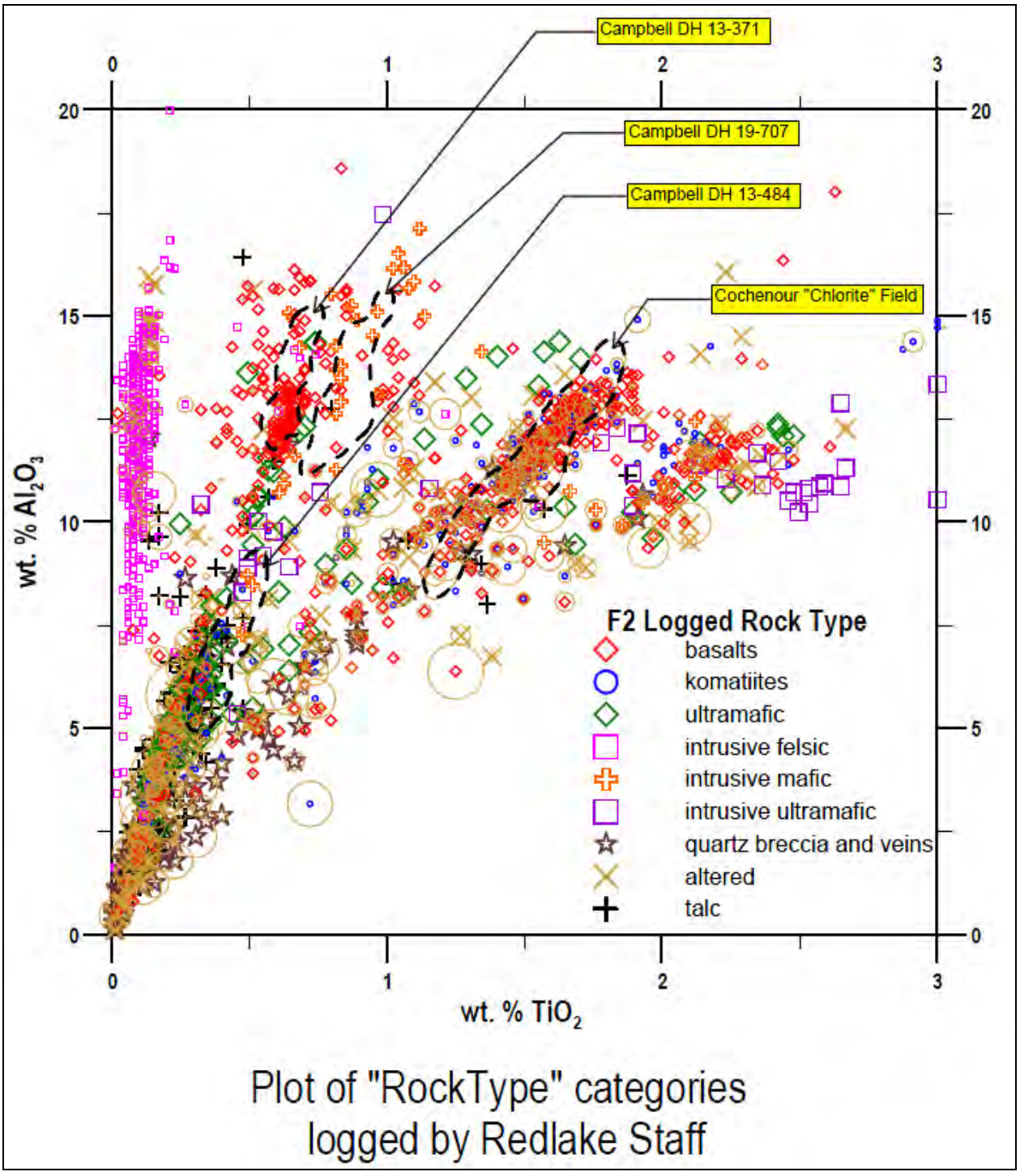

Figure 4: Al/Ti plot showing comparison with Campbell and Cochenour "Chlorite" Field

The F2 gold zone lies along a major trend of Balmer Ultramafic rocks known as the East Bay Trend. The East Bay Trend represents one of several major structural zones in the Red Lake District described as 'Deformation Zones' by Andrews *et al.,* 1986 (Figure 5).

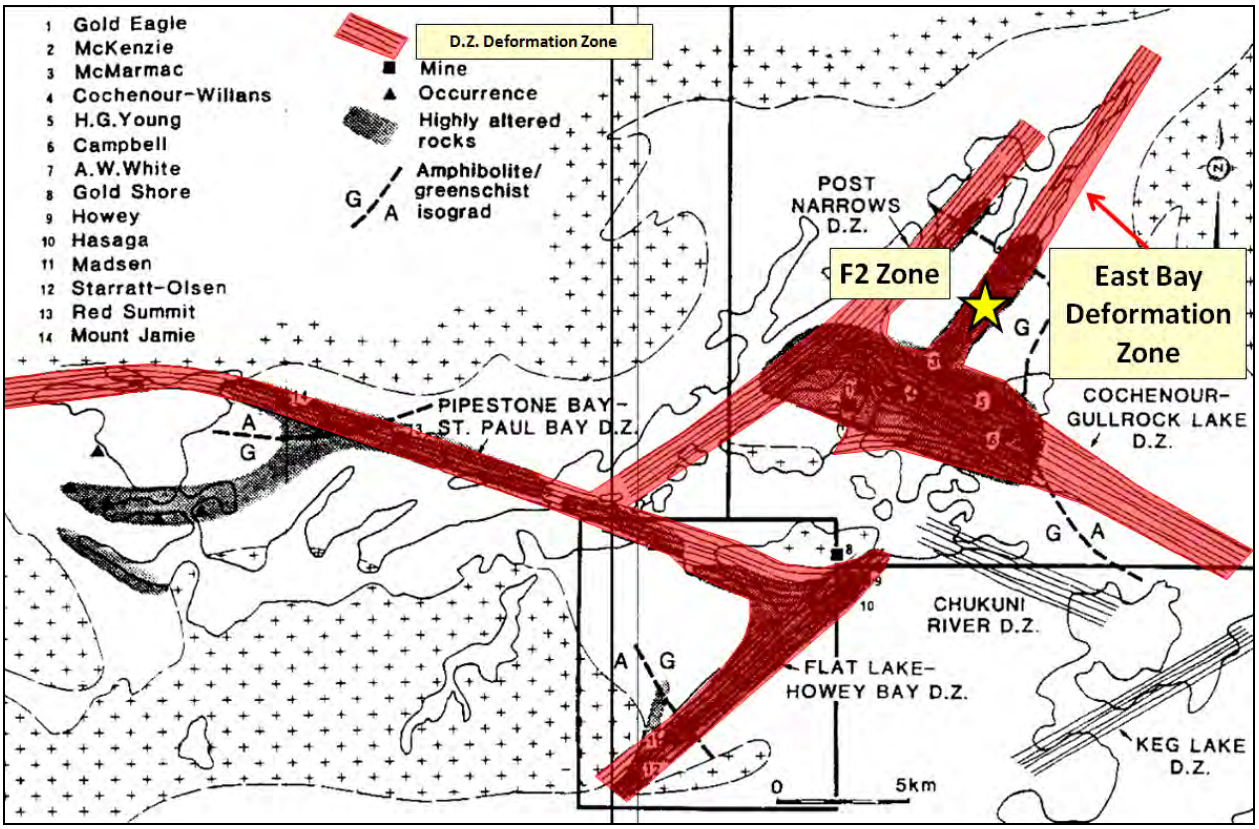

Figure 5: Red Lake Deformation Zones (after Andrews *et al.*, 1986)

Structure

Gold Deposits are known to occur in all of the major structural trends. In 2000, Goldcorp released their data to the public domain and it provided evidence of the importance of relatively late geological structures. Prior to this time it could only be inferred from historical maps of the deposit. These structures post date earlier F1 and S1 structural fabrics at the Red Lake Mine (Dube *et al.,* 2001) and at the Cochenour deposit (Dube *et al.*, 2003). Specifically at Cochenour, Dube *et al.,* (op.cit.) state "both the Cochenour and Red Lake mines are located on the limb of an F1 fold refolded by F2 folds" (Figure 6 and Figure 7).

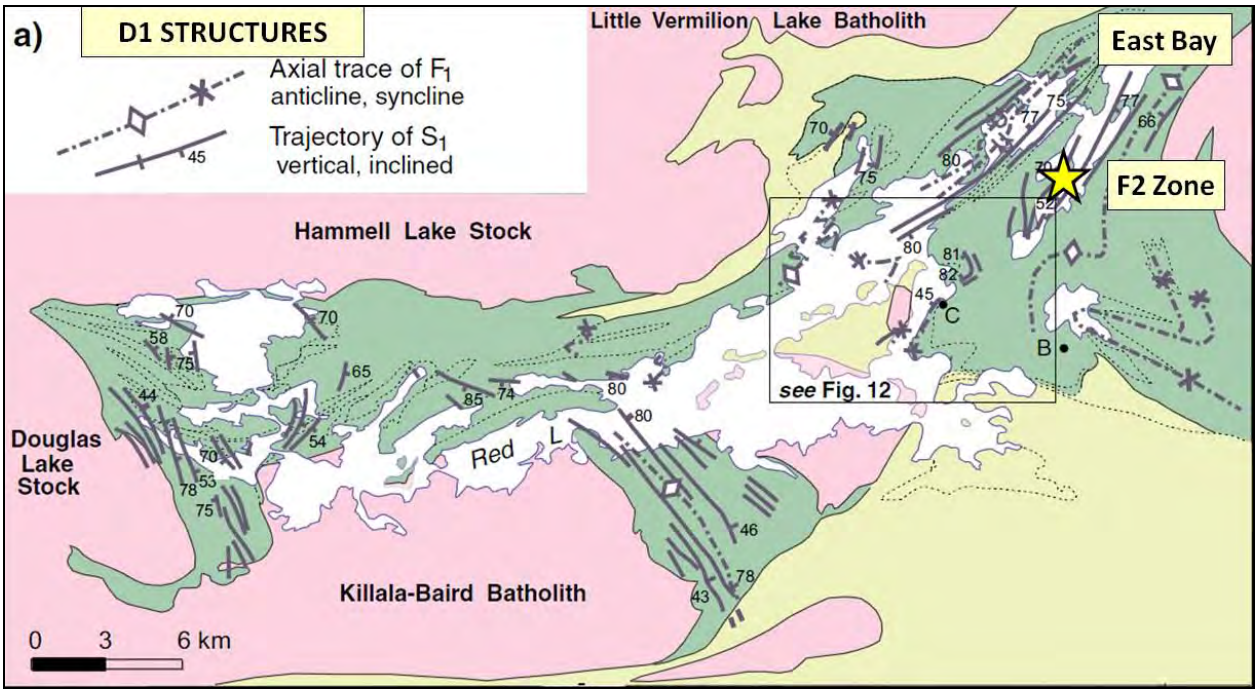

Figure 6: D1 Structures - Red Lake Greenstone Belt (after Sanborn-Barrie *et al.*, 2001). Note that D1 structures are parallel to East Bay.

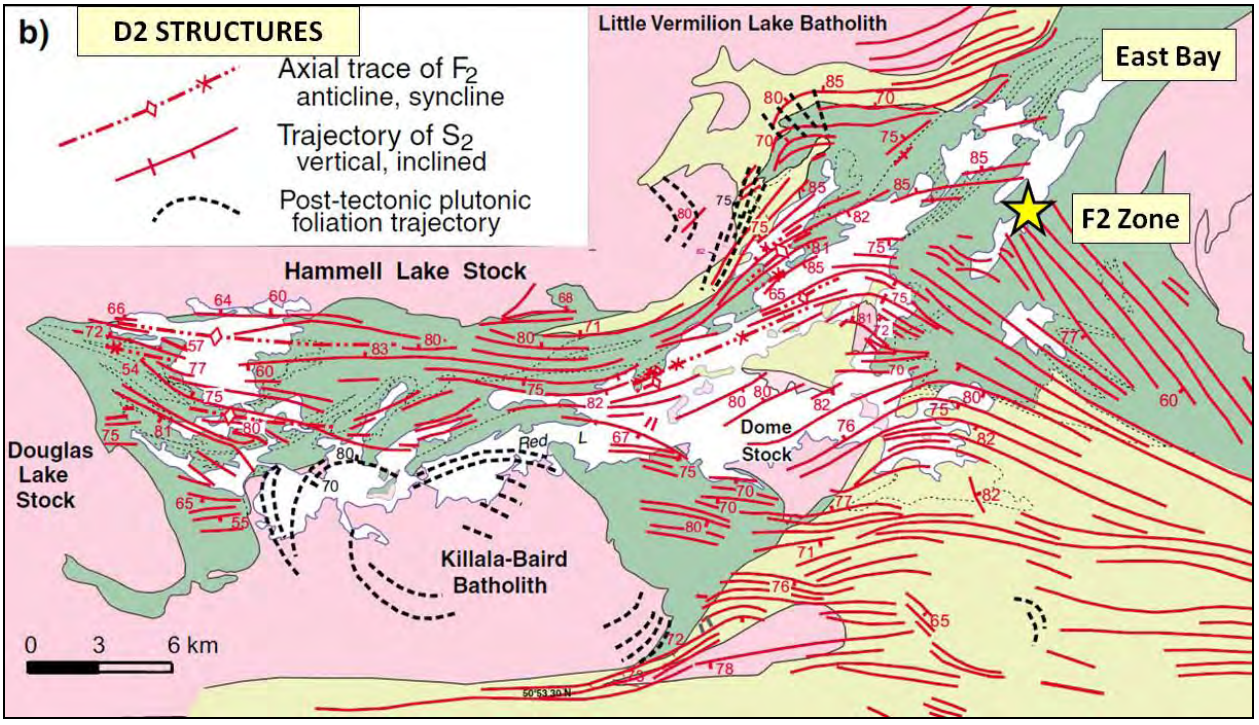

Figure 7: D2 Structures - Red Lake Greenstone Belt (after Sanborn-Barrie *et al.*, 2001). Note that D2 structures occur at high angle to D1 structures and the trend of East Bay.

As summarized above, there is considerable evidence supporting the importance of F2 structures (and F1 fold limbs) in relation to gold deposits in the Red Lake gold camp. Figure 2 shows that the F2 Zone on the Phoenix Gold Property is spatially located close to the hinge of a major F2 fold axis (the largest fold in the district). Figure 5, 6 and 7 show structural trends throughout the belt and in the area of the F2 Zone, the presence of S2 foliation measurements are at high angle to the East Bay (S1) structures. The Phoenix project lies in a structural position similar to that noted in other gold deposits in the district.

Intrusives

Gold mineralization is spatially associated with intrusive bodies: the McKenzie stock at Cochenour; the Brewis Porphyry at the Red Lake Mine; and, the Abino and Beatrice stocks at Phoenix. The porphyries are mineralized, weakly deformed and are of similar age to the major gold mineralizing events in Balmer age rocks. From a first order ore control point of view, intrusive rocks are 'mapping' areas of dilatancy and define areas with the potential for gold mineralization. Intrusives are an important component of the F2 Gold System.

Alteration

There is a well documented alteration assemblage associated with the major gold deposits in the camp. This includes iron carbonate, biotite (or chlorite at low metamorphic grades) and silica. Figure 8 shows the distribution of iron carbonate in the Red Lake District. It clearly shows that Phoenix lies within the favourable alteration area. Drilling at F2 confirms the presence of major (kilometre scale) iron carbonate, biotite and silica alteration in the F2 Gold System.

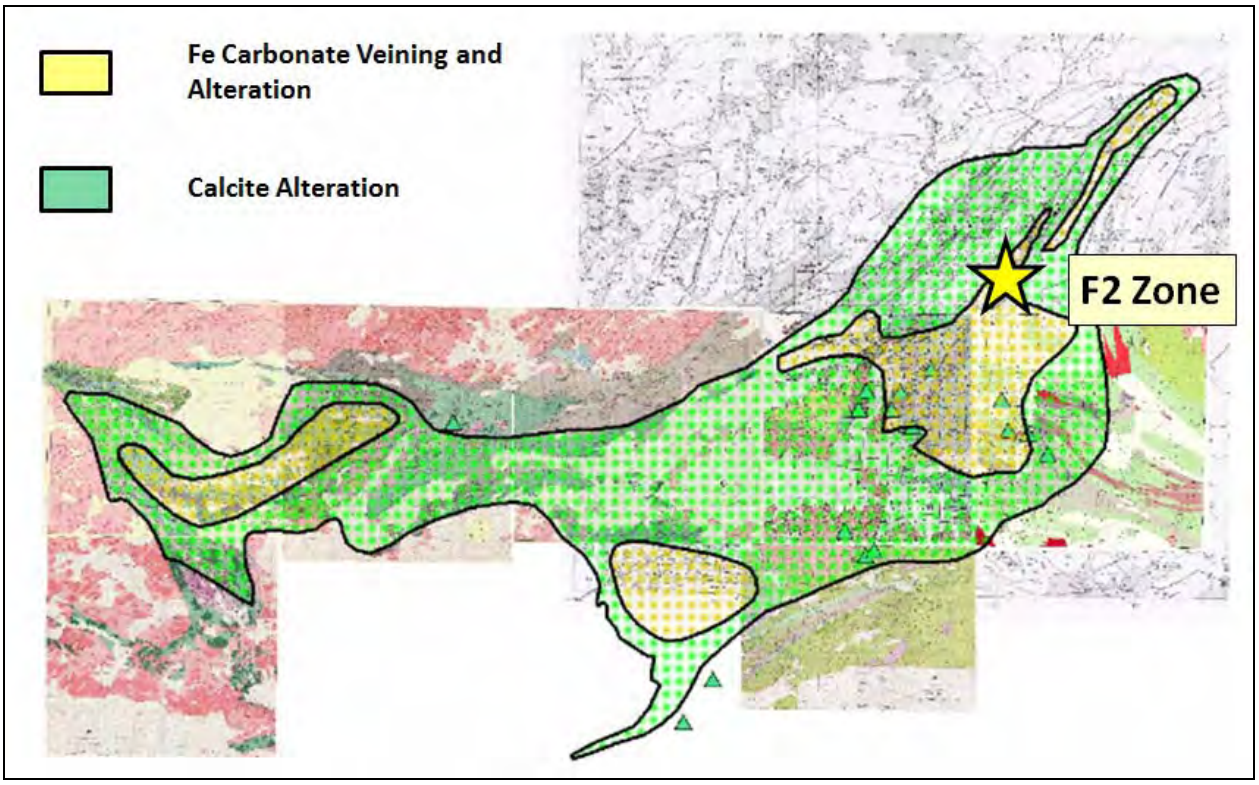

Figure 8: Distribution of Fe Carbonate veining (yellow) and Calcite alteration (green). Freeman *et al.*, 2001, after Parker 2001.

Mineralization

Gold mineralization at Phoenix comprises vein and breccia hosted high-grade gold (often with visible gold), high-grade gold within narrow structures and gold-bearing sulphide replacement zones. Gold is associated with pyrrhotite, pyrite and lesser chalcopyrite and local arsenopyrite. The gold mineralization observed at Phoenix is spatially associated with an intense potassic alteration assemblage, typically manifested by pervasive bioitite or sericite alteration. This style of mineralization and alteration is observed at both the Cochenour/Gold Eagle and Red Lake/Campbell gold systems (Horwood 1945, Hobson 1994, Dube *et al.,* 2002; Dube *et al.,* 2003). One specific example of the similar style of mineralization is the Phoenix Breccia zone when compared with breccia zones from the High Grade Zone at the Red Lake mine (Figure 9). The textures and mineralogy of the two areas are almost identical (quartz, actinolite, carbonate, gold and minor sulphides).

Figure 9: Comparison of Breccia Zones from Goldcorp's High Grade Zone and the F2 Gold Zone

The Bruce Channel Deposit, discovered by Gold Eagle and now owned by Goldcorp is a useful benchmark for gold tenor comparison. The average gold content of the Bruce Channel Deposit (11.8 g/t gold) is similar to that documented from Phoenix (11.7 g/t gold). When data less than 6.85 g/t gold are excluded, the Bruce Channel average is 18.9 g/t and the Phoenix average is 28.9 g/t gold. Both deposits suggest the presence of a significant high-grade component, similar to the average production grade from the Red Lake Mine of 20 g/t gold. Figure 10 shows the grade distribution between the F2 Gold Zone and the Bruce Channel Deposit and indicates that there is a similar grade distribution between the two.

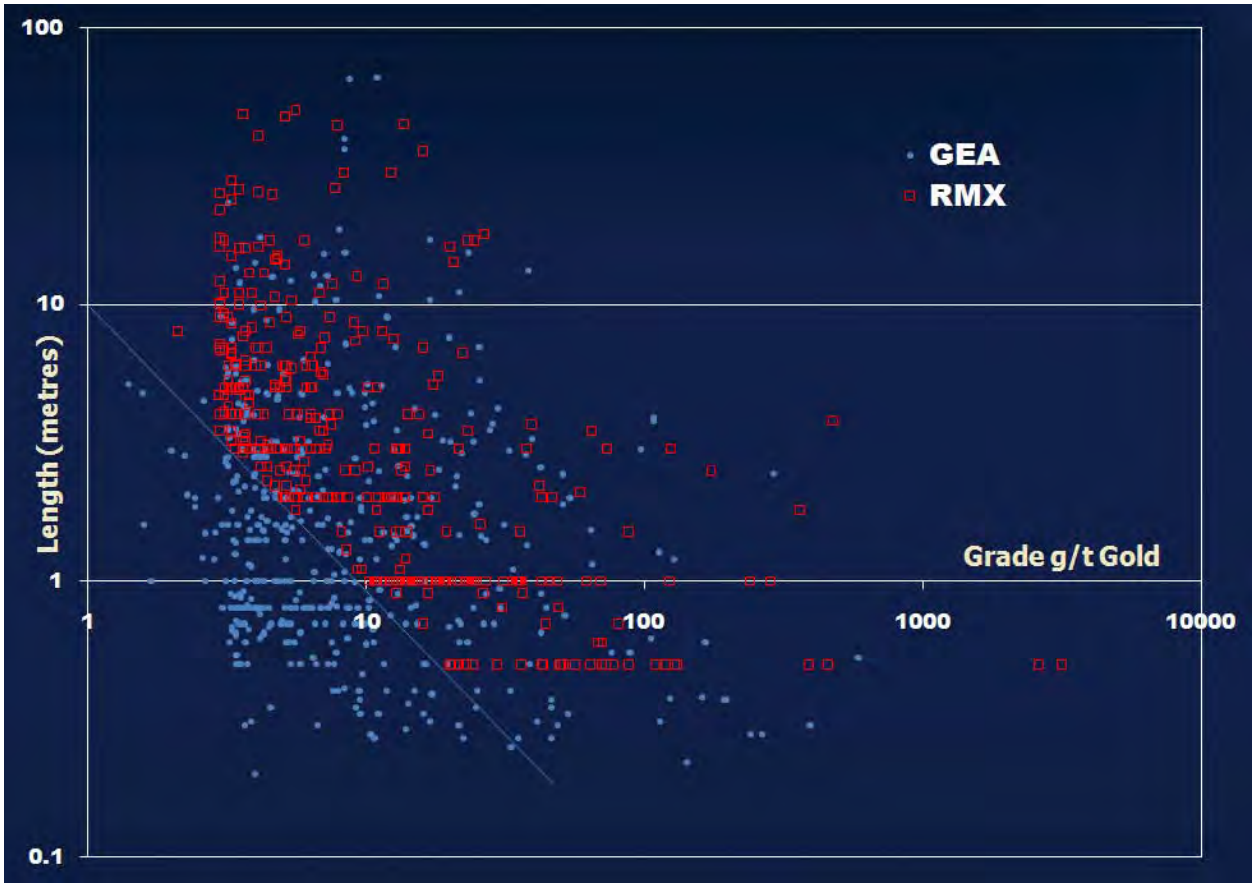

Figure 10: GEA data derived from published news releases. RMX data from published news releases up to August 1, 2010. RMX data with less than 10 g * m product not plotted. These are reported as 'anomalous' in news releases and are not considered economically significant.

Scale of Mineralizing System

At this time, the F2 gold system has an overall strike length of 1025 m, a vertical depth of 1437 m, is hosted within a mineralized corridor approximately 300 m wide and is open in all directions. In terms of the overall size of the alteration and mineralizing envelope it is similar to the world class Campbell gold mine. Figure 12 shows a long section through the F2 gold zone. The figure highlights some of the high-grade gold intercepts and shows the targeted '9X' exploration blocks (CN Tower for scale). Figure 11 again shows the F2 long section, now with the Campbell System and part of the Red Lake Mine system superimposed at the same scale. The blue and red overlays are taken from a long section through the Campbell and part of the Red Lake Mine gold system to show the relative distribution of the gold zones.

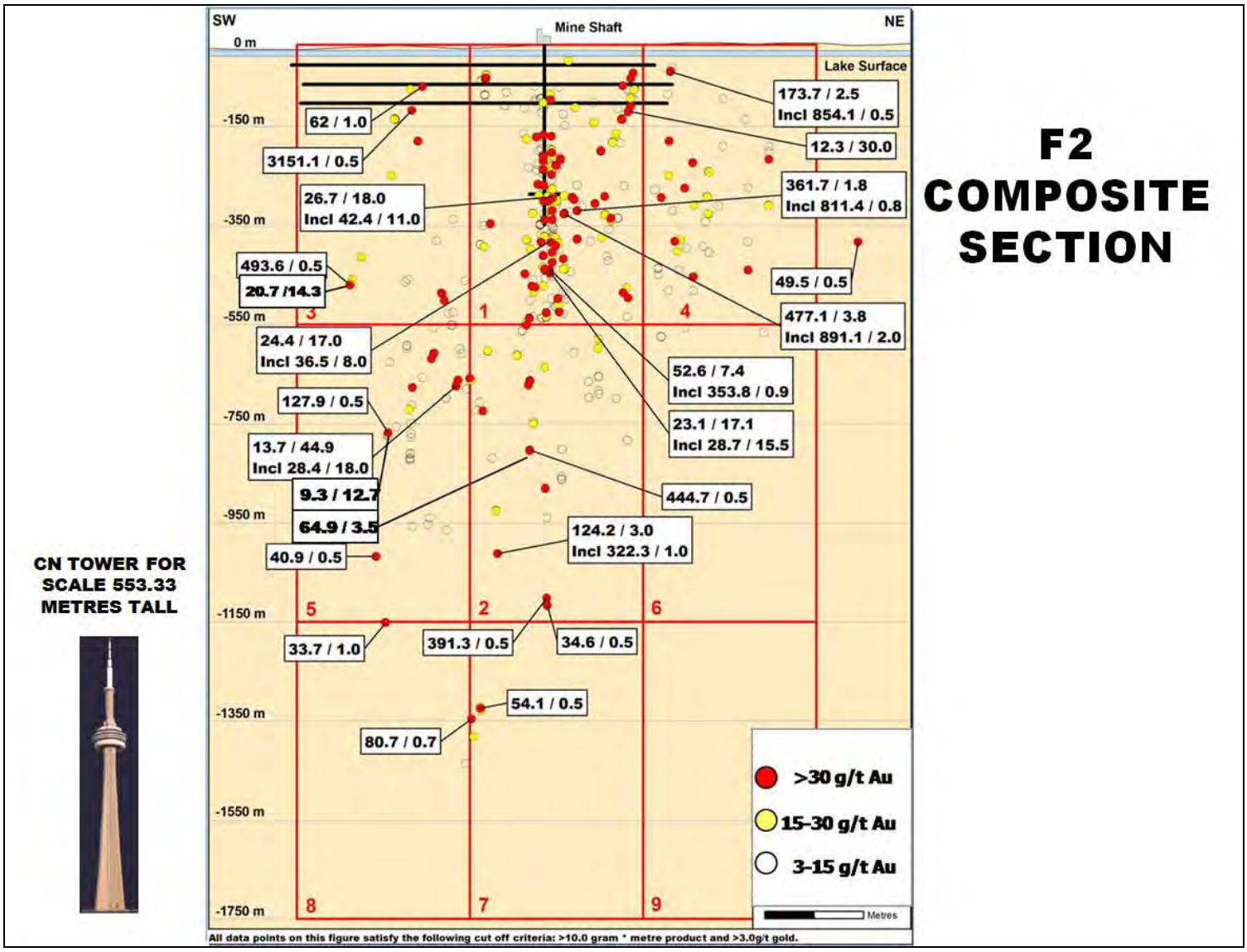

Figure 11: F2 9X long section, showing key gold intercepts

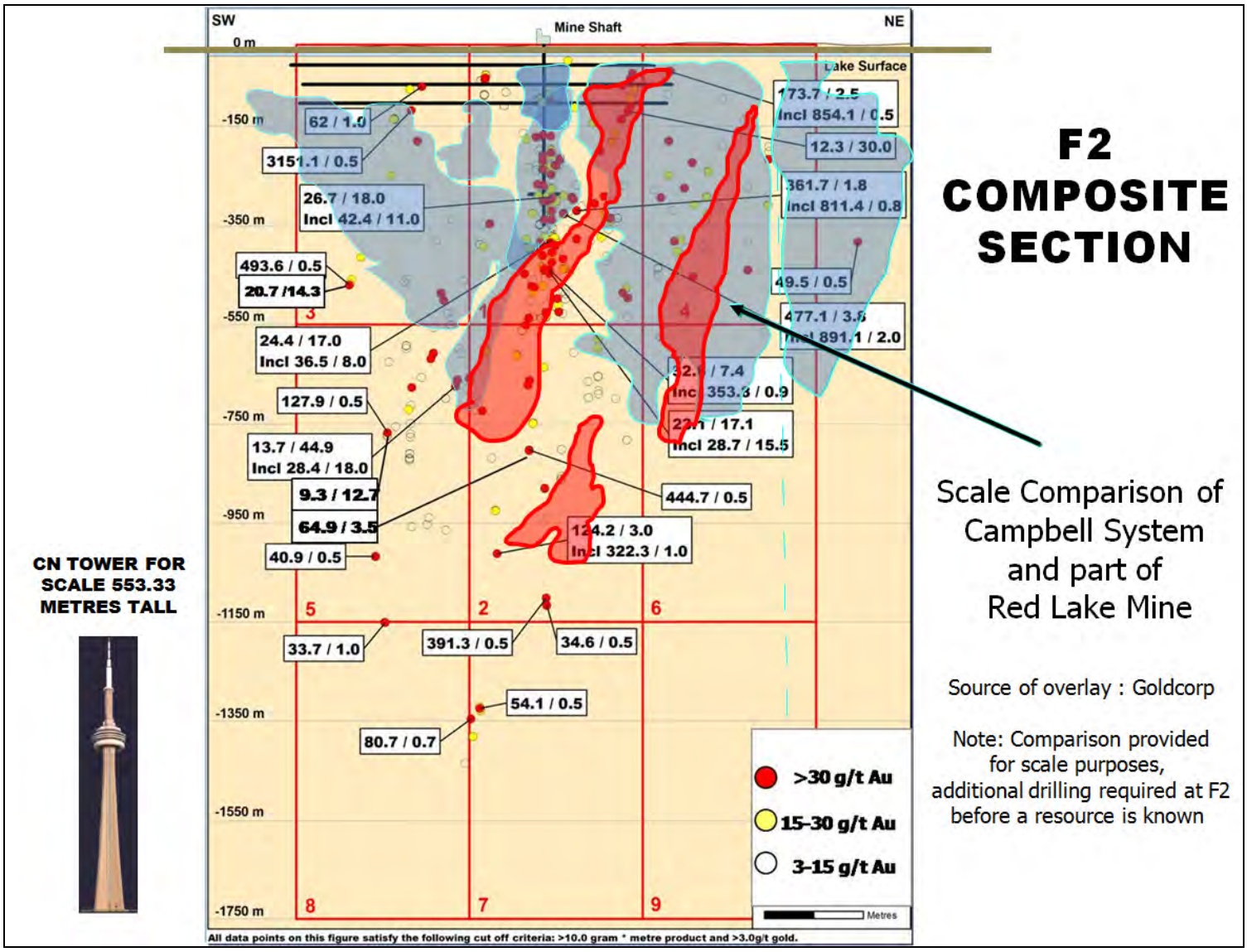

Figure 12: F2 9X long section, showing key gold intercepts and a scaled comparison of with the Campbell System and part of the Red Lake Mine. The blue and red overlay are taken from a long section through the Campbell and part of the Red Lake gold system and show the distribution of the gold zones

Summary

Phoenix, Cochenour/Gold Eagle and the Campbell/Red Lake mines all share similar characteristics in terms of geological setting, lithogeochemical composition, structural setting, alteration assemblages, mineralization styles, grades and the overall scale of the mineralizing/alteration envelope.

References

Andrews, A. J., Hugon, H., Durocher, M., Corfu, F., and Lavigne, M.J. 1986. The anatomy of a gold-bearing greenstone belt: Red Lake, northwestern Ontario, Canada; *in* Proceedings of Gold .86, an International Symposium on the Geology of Gold Deposits, Konsult International Inc., Toronto, p.3-22.

Dube, B., Williamson, K., and Malo, M., 2002. Geology of the Goldcorp Inc. High Grade zone, Red lake mine, Ontario: an update. Geological Survey of Canada, Current Research 2002-C26, 13p.

Dube, B., Williamson, K., and Malo, M., 2003. Gold mineralization within the Red Lake mine trend: example from the Cochenour-Willans mine area, Red lake, Ontario, with new key information from the Red Lake mine and potential analogy with the Timmins camp. Geological Survey of Canada, Current Research 2003-C21, 15p.

Freeman, S., Barnicoat, A., 2001. Gold Mineralisation at Red Lake – Strucutral Geology and Mineralisation Model, Rock Deformation Research Group, Leeds University. Rubicon Internal Report.

Hopson, R.N., 1994. Alteration and Mineralization in the '04' Ore Zone, Cochenour-Willans Mine, Red Lake District, Ontario. University of Western Ontario, M.Sc. Thesis, unpubl., 231p.

Horwood, H.C., 1940. Geology and Mineral Deposits of the Red Lake Area. Ontario Department of Mines Annual Report, V.49, pt.2.

Parker, J.R., 2000 Gold mineralization and wall-rock alteration in the Red Lake greenstone belt: a regional perspective; *in* Summary of Field Work and Other Activities; Ontario Geological Survey, Open File Report 6032, p.22-1 – 22-28.

Penczak, R.S., 1996. The geological context of alteration and gold mineralization at the Campbell mine, Red Lake district, Ontario. Unpulbished M.Sc. thesis, Kingston, Ontario, Canada, Queen's University. 334p.

Sanborn-Barrie, M., Skulski, T. and Parker J., 2001. Three hundred million years of tectonic history recorded by the Red Lake greenstone belt, Ontario. Geological Survey of Canada, Current Research 2001-C19, 19p.

Sanborn-Barrie, M., Skulski, T. and Parker J., 2004. Geology, Red Lake greenstone belt western Superior Province, Ontario; Geological Survey of Canada, Open File 4594, scale 1:50 000.