



EXPLORATION LICENCE EL 21/2007  
SORELL PENINSULA REGION, WESTERN TASMANIA  
ANNUAL REPORT FOR THE YEAR ENDED  
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## **ABSTRACT**

EL21/2007, held in the name of Goldstock Mining Pty Ltd, is one of a number of licences held by MHM Metals Limited located south of Macquarie Harbour and forms part of the company's Western Tasmania Project. Prior to November 2010, MHM Metals Ltd. was formerly called Macquarie Harbour Mining Ltd., and has changed its name to more accurately reflect its core business, which is the recovery of aluminium from slag.

This report details work undertaken on exploration licence 21/2007 between 23<sup>rd</sup> July 2010 and 22<sup>nd</sup> July 2011, year 4 of the licence. The principal exploration targets sought within the licence area are identified copper, gold, zinc and nickel occurrences and hematite-magnetite mineralization.

Work completed during the reporting period included:

- Ground-truth verification and soil sampling of Level 3 (High Priority) VTEM anomalies at North Butler Creek Area and Birthday Bay Area.
- Field reconnaissance of the Birthday Bay Iron Ore Lens (also known as Fe Creek, Big Creek, Deep Creek, Anomaly 129 or 10/8).
- Review of previous drillholes at North Butler Creek Area.

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<i>212007_201106_App2.pdf</i>	North Butler and Birthday Bay Assay Results Certificates

## INTRODUCTION

This is the fourth annual report on EL21/2007 (113 sq km) which is held in the name of Goldstock Mining Pty Ltd, a wholly owned subsidiary of MHM Metals Ltd (“MHM”). The licence lies west and south west of Macquarie Harbour (Figure 1).

The EL21/2007 licence is underlain by a sequence of Pre-Cambrian to Cambrian sediments and volcanics overthrust by Proterozoic quartzites to the north and faulted against Proterozoic sediments to the south (Figure 2).

Following the receipt of the interpretation on the helicopter VTEM survey by Geoforce Pty Ltd. in April 2010, extensive ground-truth verification and soil sampling were conducted during the reporting period. Eight, high priority VTEM anomalies at the Birthday Bay North (Birthday Bay VTEM Prospect) and five Level 3 VTEM anomalies from North Butler Area have been ground checked and soil sampled. Each anomaly has been visited on the ground and sampled from the C horizon soil by hand auger. Soil samples were taken at 25m intervals in a “X” pattern over each anomaly, starting at the centre and working outwards.

## GEOLOGY

The regional geology of EL21/2007 is described in ‘A review of geology and exploration in the Macquarie Harbour–Elliott Bay area’ (Corbett, 2003/2004) and Macquarie Harbour Sheet 64 (McClenaghan *et. al.*, 1993). Detailed geology of the ground covered by this licence, known as the Double Cove Belt, is presented in Figure 2.

The tenement covers a prospective section of Neoproterozoic rocks striking SW across the Sorell Peninsula. Along the north-western boundary of the tenement and extending to the northwest of the Double Cove Belt are Proterozoic rocks of the Rocky Cape Group consisting of metamorphosed quartzite, mudstone/siltstone, and conglomerate. These rocks have been thrust over the top of the Neoproterozoic rocks to the southeast and lie on an almost level thrust plane. Proterozoic rocks previously covered the rocks now outcropping within the tenement but have since been largely eroded. Some inliers of thrust Proterozoic rocks can be found as remnants on higher ground within the tenement area.

Within the licence, a number of major faults strike NE-SW dividing the succession into a number of strips (Figure 2). The Double Cove rocks are considered to be correlates of the

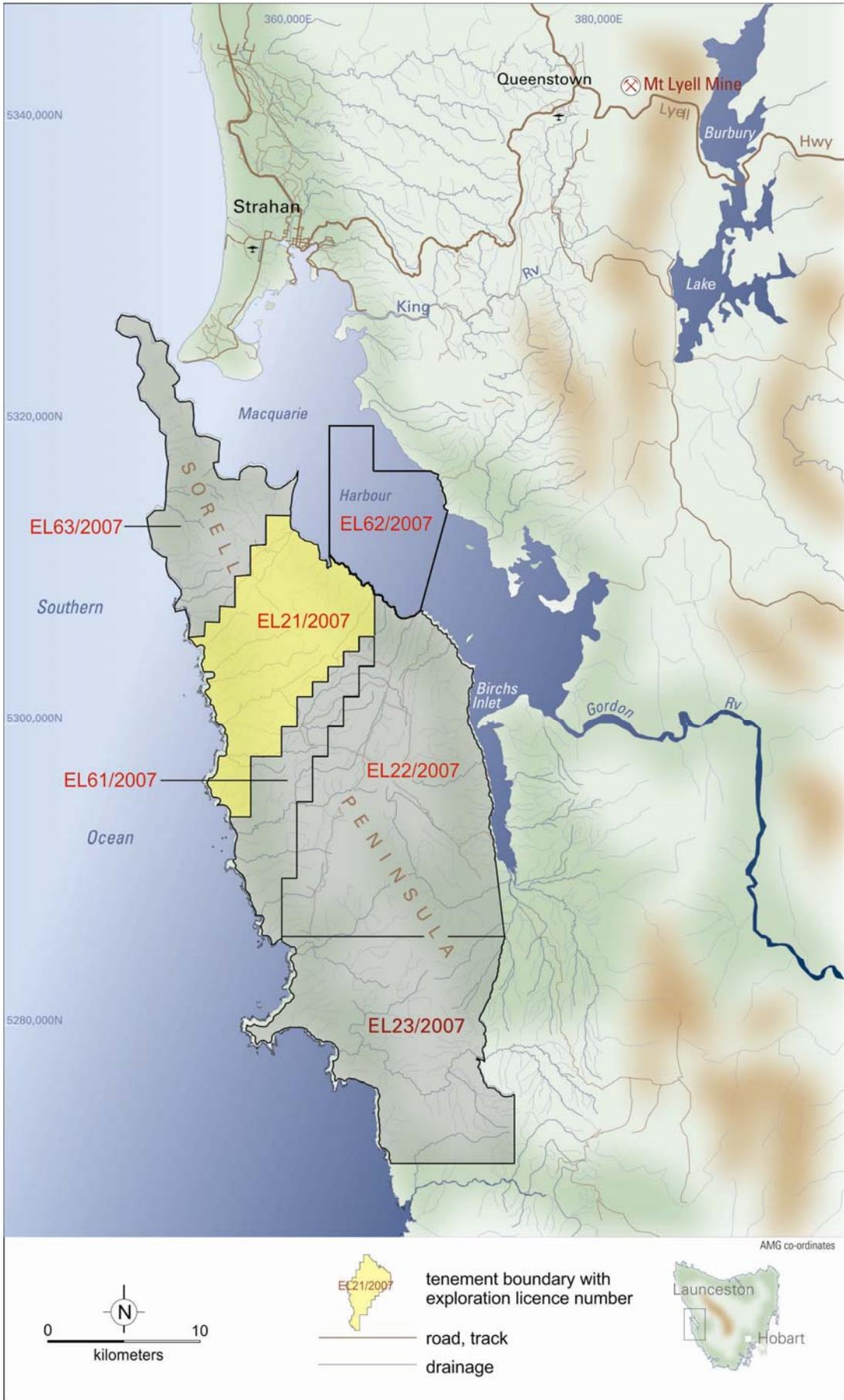


Figure 1. Tenement Map West Coast Tasmania

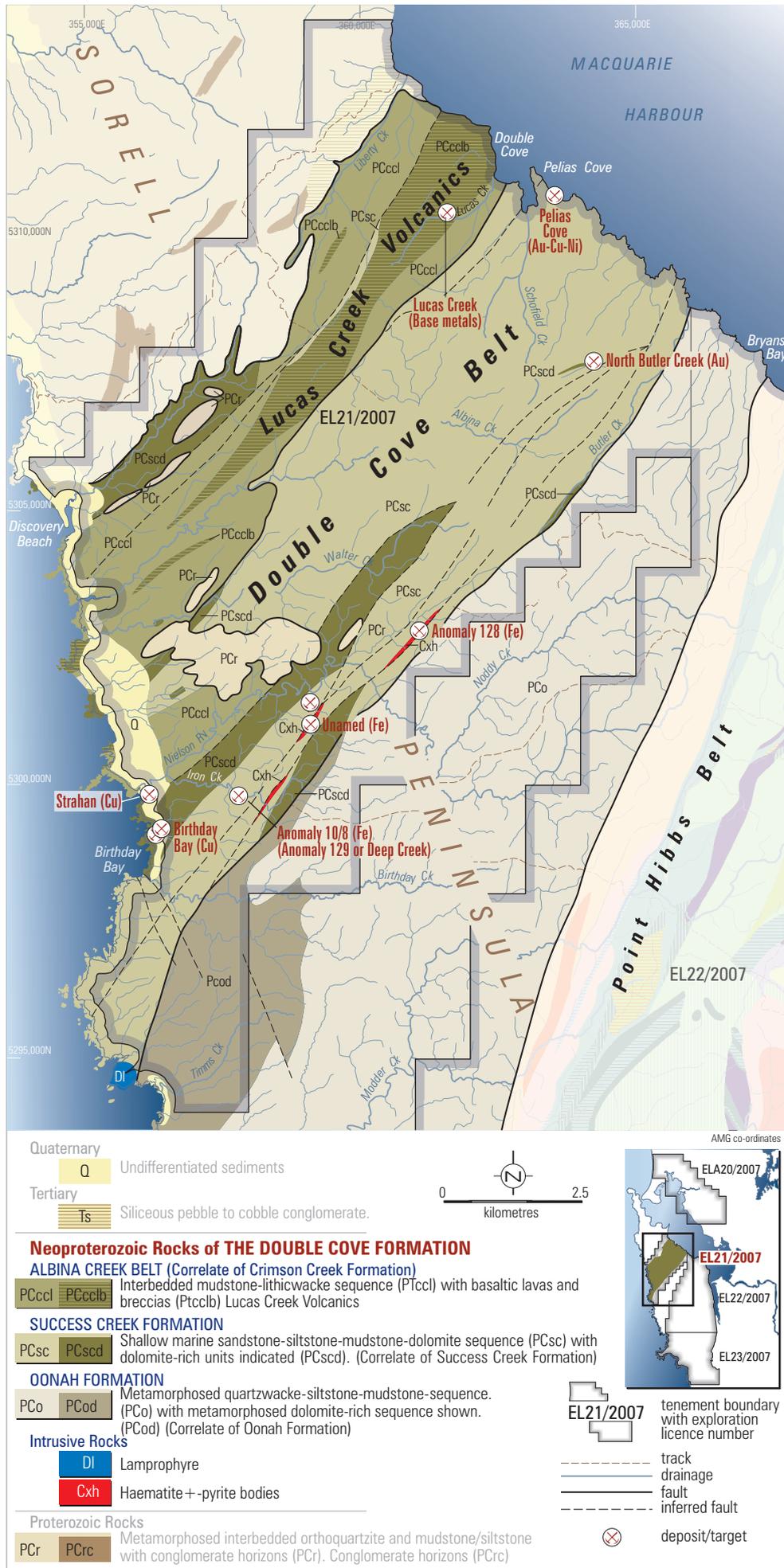


Figure 2: The Geology of EL21/2007

Crimson Creek Formation and the Success Creek Group which are hosts to a number of deposits southwest of Zeehan. In general the succession is sedimentary and youngs from the SE to the NW, with the correlates of the Success Creek Group mainly in the central and southeast. This group comprises metamorphosed mudstones, siltstones, and sandstones, which are often calcareous or dolomitic. The correlates of the Crimson Creek Formation are mainly in the northwest where they are referred to as the Albina Creek Belt and contain basaltic lavas and breccias. Some gabbro dykes of Cambrian age are present at the bottom of the succession. Lenticular haematite ( $\pm$  magnetite/pyrite) bodies of Cambrian age have been emplaced along some sections of the NE-SW faults in the middle of the succession (Figure 2).

## **REVIEW OF PREVIOUS WORK**

### **PREVIOUS EXPLORATION**

The area of EL21/2007 has a long history of ‘modern’ exploration, commencing in the 1950’s. Exploration of the area has been carried out intermittently since then, led by a relatively small number of companies which have expended considerable time and effort in an area with no existing infrastructure and a climate which limits concerted field programmes to the warmer months. All previous exploration is summarised on Table 1.

In 1902 Assistant Government Geologist G.A. Waller visited Birthday Bay and reported on a number of occurrences of low grade chalcopyrite mineralization. These were mostly located along the shore line. Three deposits that were prospected by the Birthday Copper Syndicate are currently identified by Mineral Resources Tasmania near the shore at Birthday Bay. High grade small patches of secondary copper minerals were present on the rock surfaces in places and the prospectors knocked these off, hand dressed them, and shipped out a couple of tons of concentrate.

From 1956 to 1962 a JV between The Electrolytic Zinc Company of Australasia Limited and Mt Lyell Mining and Railway Co Ltd (Lyell – EZ Explorations or the LEE JV) was formed to explore the Mount Read Volcanics in the southwest of Tasmania. The first programmes were mainly airborne geophysical surveys and aerial photography followed by photo geological interpretation and ground geophysical surveys (magnetometer, gravimeter and I.P.). This work was carried out on two Special Prospectors Licences but in 1959 these were

**Table 1. Exploration on the area of EL21/2007 prior to 2007**

Reporting Period	Work Completed
1957-62 Lyell E.Z. Explorations (Scott, <i>et al.</i> , 1957)	Pelias Cove: identified sulfide (pyrite) mineralization, trenched sampling, ground EM survey and drilling of six short holes. Drilling and EM survey results demonstrated mineralization did not persist along strike.  Gravelly Beach: Bulk sampling of alluvium for Cr
1967-68 Broken Hill Company Propriety Limited (Hall et al., 1969)	Stream sediment sampling, detailed magnetic and EM surveys; examined two magnetic anomalies. Soil sampling of Anomaly 128, high copper, nickel, cobalt, zinc values in soils were concluded to reflect rock geochemistry, and aeromagnetic anomaly was considered caused by narrow gabbroic dike  Magnetic anomaly 129 Deep Creek of hematite-magnetite body was tested with one drillhole, intersected 1m 70% pyrite and 30% hematite at depth. Recommended a follow up hole but not drilled
1968-69 Broken Hill Company Propriety Limited (McGregor, 1969)	Stream sediment, bank and ridge sampling in Lucas Creek Volcanics revealed anomalous values of copper, zinc and nickel Reassessment of Pelias Cove with soil sampling. Results confirmed LEE anomaly but of lower tenor. Recommended additional soils sampling inland to test extent of mineralization
1984 AMOCO (Ferris, 1984)	Airborne aeromagnetic survey, ground traverse and sampling to locate two DIGHEM anomalies. Concluded that high concentration of copper and nickel in soils correlate with Lucas Creek Volcanics
1985 AMOCO (Kary, 1985)	Ground EM survey, soil sampling. No significant geochemical results and recommended no further work is warranted
1997-98 Pacific Nevada (Reid, 1998)	Regional scale exploration followed by more focused geological mapping, rock chip, soil and panned concentrate sampling at Pelias Cove and North Butler areas. Pelias Cove Area: surface sampling resulted to gold anomalies up to 14ppb, and copper values up to 716ppm North Butler Creek Area: mapped outcrop with extensive pyrite dissemination. Soil sampling returned up to 564ppm Au, while rock chip sample yielded up to 447 ppb Au and 1060 ppm Cu
1998-99 Pacific-Nevada (Morritt, 1999a; Morritt, 1999b)	Pelias Cove: Drilled three diamond drillholes (PC01, PC02 and PC03) testing the gold anomaly from panned concentrates and outcropping massive sulfides and strong IP anomalies. The drilling program defined a 50m wide and highly silica flooded fault system North Butler Area: soil, rock chip sampling, detailed geologic mapping, ground based magnetic survey
1999 - 2000 (Newnham L.A., 2000)	North Butler Prospect: developed grid lines, mapping, rock chip and soil sampling of gridded lines; conducted ground magnetic surveys of gridded area; drilled six diamond drillholes testing geophysical IP and magnetic anomalies. Results showed that highly pyritic and graphitic carbonaceous shale were responsible for the IP and EM anomalies, while the volcanic and intrusive units produced the magnetic responses. The drilling program defined a major sulfide-rich alteration system within a deformed zone of Cambrian volcanics and sediments adjacent to a regional structure

replaced with EL3/1959 (the Gordon Concession). In 1957 three Special Prospectors Licences were granted and these were replaced with EL1/1959 (the Arthur Concession). These two licences were allowed to expire in 1961 and 1962.

From 1965 to 1972 The Broken Hill Propriety Company Ltd (BHP) explored EL13/1965. The part of the Double Cove Belt within this licence is covered by EL21/2007. Initially airborne radiometrics was flown to fill in some areas that had not been covered by previous work and a new helicopter aeromagnetic survey was flown. Geology was mapped using coastal outcrops and stream sections. Systematic stream sediment sampling was undertaken where anomalous copper, zinc, and nickel values were obtained in the Lucas Creek area. The country rocks in this area are andesitic and basaltic lavas and breccias which BHP termed the Lucas Creek Volcanics. The anomalous geochemical values were not considered to be due to the presence of mineralization but an indication of the high natural metal content of the rocks.

A limited diamond drilling programme was commenced at Deep Creek (Anomaly 129) in 1968 by BHP. A diamond core hole was drilled at an azimuth of 305° and declined 50° but had to be abandoned at 101m. This hole intersected massive pyrite (70%) and hematite (30%). A second hole was recommended but not drilled. The various recommendations for additional work in the area were later revised and no more work was done on the Double Cove Belt.

In 1983 three exploration licences (EL35, 36, & 37/1983) were granted to Placer Developments Ltd. A 50:50 joint venture was agreed between Amoco Minerals Australia Co. and Poseidon Ltd to fund exploration of the ground. Amoco 1984-1986 (later Cyprus Gold Australia Corp.) was mainly seeking volcanic hosted massive sulphide deposits of the Rosebery or Que River/Hellyer style. Aeromagnetic survey covering all the tenements was flown by Austirex International Ltd employing a Nomad aircraft flying at 70m on a line spacing of 150m for 4,204 line kilometres. These data sets were processed by Pitt Research Pty Ltd and analysed by Mitre Geophysics. EM anomalies identified by this work were then followed up in the field and the new data reviewed and compared with that obtained by BHP. The ground follow up included geology, the collection and assaying of stream and soil samples, and ground magnetics. Soil, rock chip, and stream sediment, sampling produced anomalous background values of gold with associated barium and a separate copper anomaly which it concluded was due to trace amounts of chalcopyrite in shales and siltstones.

In 1998 Pacific Nevada Mining Pty. Ltd. conducted regional scale exploration on the Sorell Peninsula. The area's prospectivity was assessed by geological mapping, rock chip, panned concentrates, bulk and stream sediment sampling. This work was primarily focused upon structurally controlled magnetite-hematite bodies and an alluvial gold bearing drainage located in and south of the Double Cove area. Alluvial gold, silicified rocks, and outcropping sulphides in the Pelias Cove area, were followed up with gridding and soil sampling. Gold anomalies are coincident with elevated Cu geochemistry. In 1999 the Pelias Cove targets were drilled with three diamond holes. North Butler Creek was drilled in January 2000 with six diamond drillholes.

### **PREVIOUS WORK BY MHM**

Two helicopter supported reconnaissance visits were made to the Iron Ore Prospect (Anomaly 129) near Birthday Bay between April and July 2008. A three day trip, based in Strahan, provided the company's Managing Director, Chief Geologist and Consulting Geologist with an overview of the whole tenement package with respect to existing tracks, vegetation and terrain limitations. Landings were made on the coast at Birthday Bay and near the iron ore lenses at the southern end of the Double Cove Belt.

Interest in the economic potential of the three iron ore lenses (Anomaly 129/Anomaly 128/Unnamed Fe; Figure 2) located inland from Birthday Bay prompted a five day trip to this area by MHM geologists in July 2008. Geologic mapping, sampling and NITON analysis of the hematite/magnetite outcrops were conducted to investigate the area as reported by the LEE joint venture and BHP in the 1950's and 1960's. All three lenses showed similar grades of between 59% and 69% Fe as reflected from the NITON reading, with minimal (typically <5%) visible sulphides (mainly pyrite).

A helicopter borne geophysical survey (VTEM) covering some areas of EL21/2007 were conducted in April 2010. The VTEM data from Geotech interpretation by Geoforce Pty Ltd resulted in the prioritisation of anomalies based according to the strength of the EM response and the likelihood of the anomaly being due to a localised bedrock conductor (as opposed to an extensive "stratigraphic" conductor) with anomalies ranked from 3 (best) to 1 (weakest). The locations of these anomalies are shown in Figure 3.

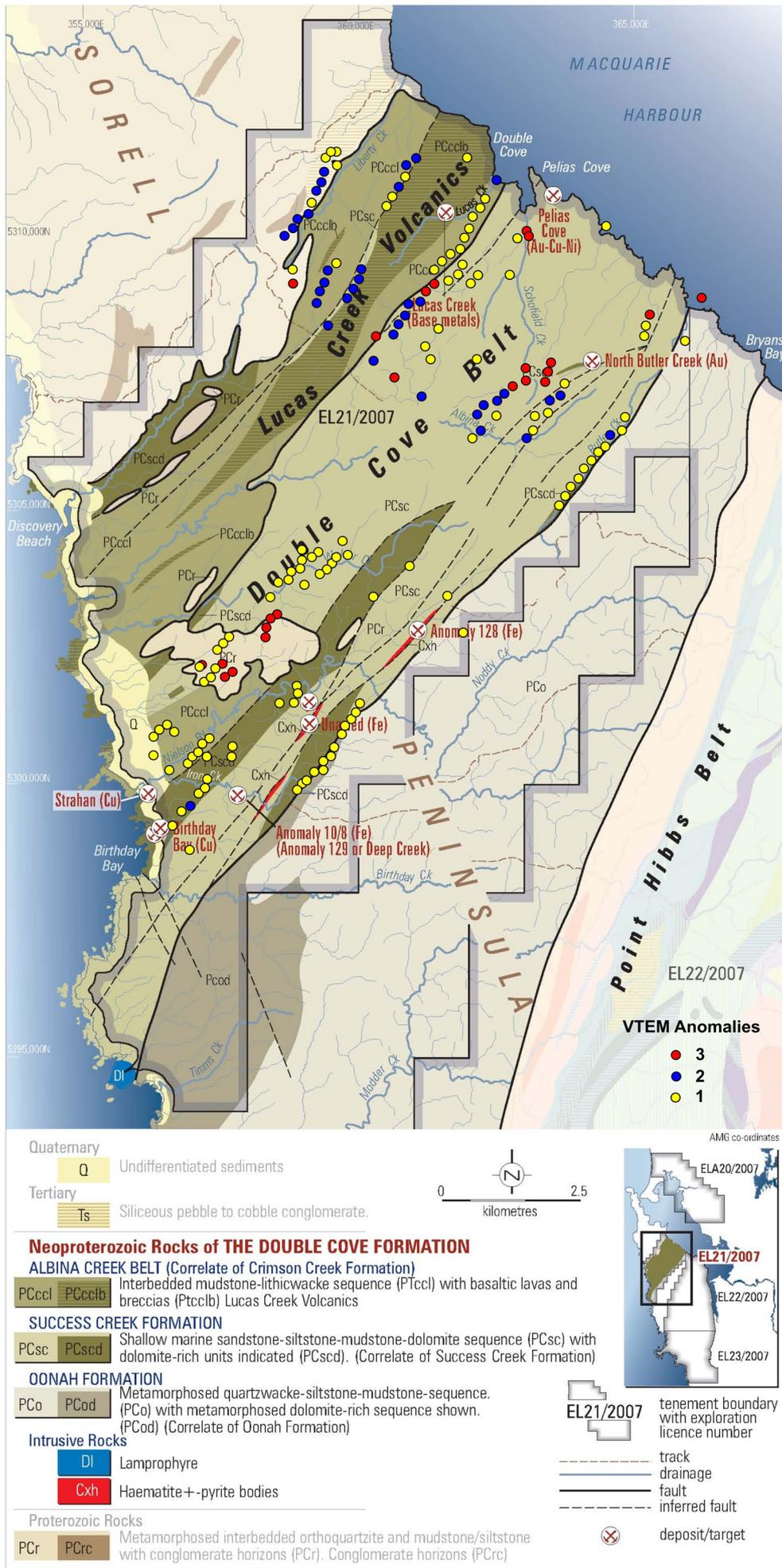


Figure 3: VTEM Anomalies in EL21/2007

A full report from Geoforce, which includes a description of the methodology used and a detailed section on interpretation, was provided as an Appendices in the 2010 Annual report.

## **WORK COMPLETED 2010-2011 REPORTING PERIOD**

Activities in the fourth year of tenure have focussed on two prospective zones within EL21/2007. Two, major high ranking (Level 3) anomaly clusters were delineated by Geoforce.

### **North Butler Creek Area (VTEM Anomaly)**

The North Butler area lies adjacent to a ‘splay’ structure close to the northern end of the NE-SW structural zone (Figure 2; Figure 4). The VTEM anomalies lie about 1km WSW of the North Butler Creek drilling and roughly along strike (Figure 4).

Soil sampling over five (5) Level 3 VTEM anomalies from North Butler was completed, using a hand-held auger. Samples were taken at 25m intervals in a ‘+’ centred on the VTEM anomaly (Figure 4). The bedrock (C horizon) unit is characterized by gray to brown sand-sized grains, with fragments of white quartz veins and silicified clasts. Localized samples were composed of black, clayey soil with pyrite, taken from stations of VTEM anomalies.

A total of 35 soil samples were taken from North Butler area. These were sent to ALS-Chemex Laboratory, Brisbane and analysed for Cu, Pb, Zn, Ni, Ag and other elements included in the package ME-MS41 by ICPMS, and Au by aqua regia extraction with ICPMS finish (up to 25g). Sample details and results are included in Appendix 1. Assay certificates are in Appendix 2.

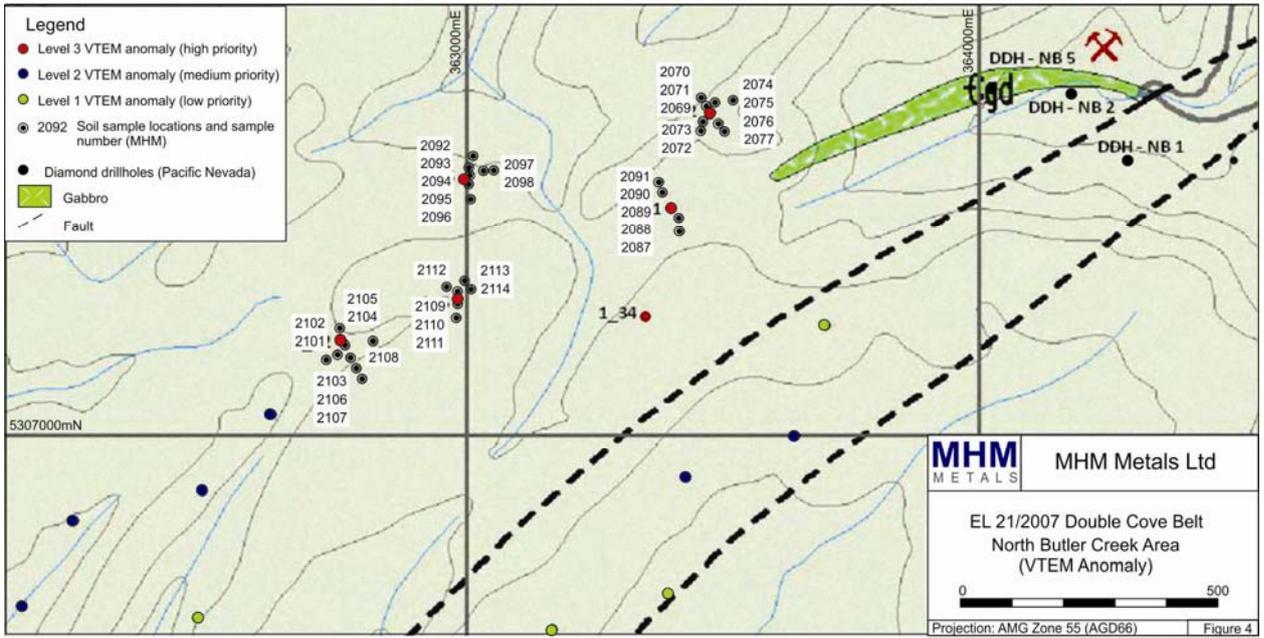


Figure 4. North Butler Creek area showing the locations of VTEM anomalies and soil samples.

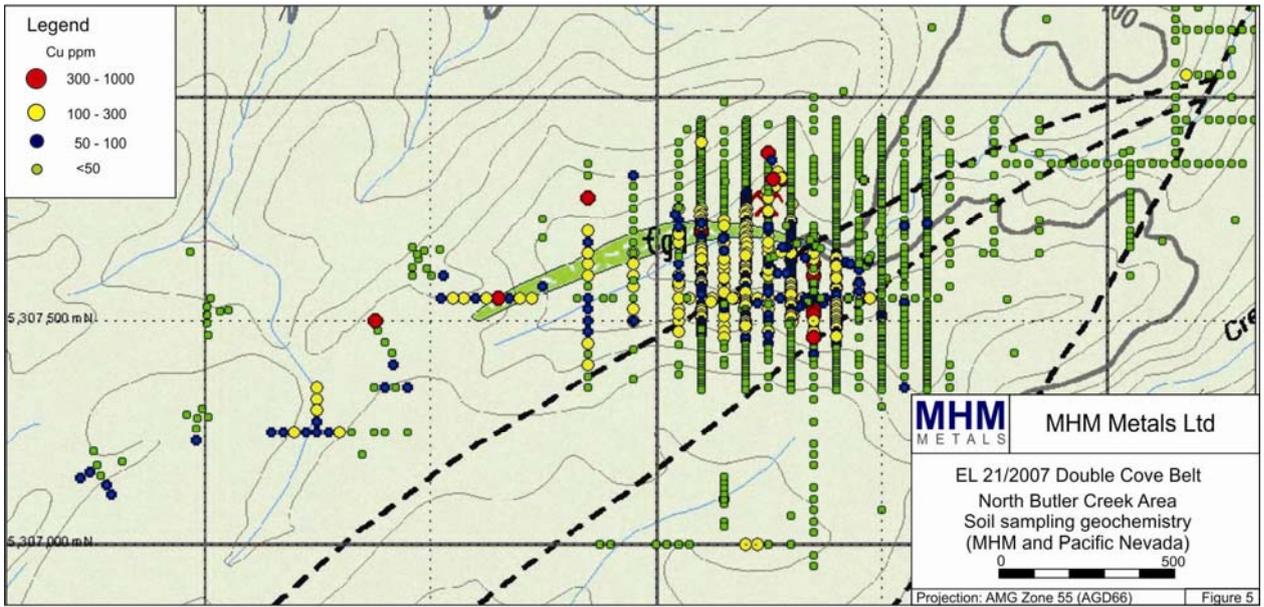
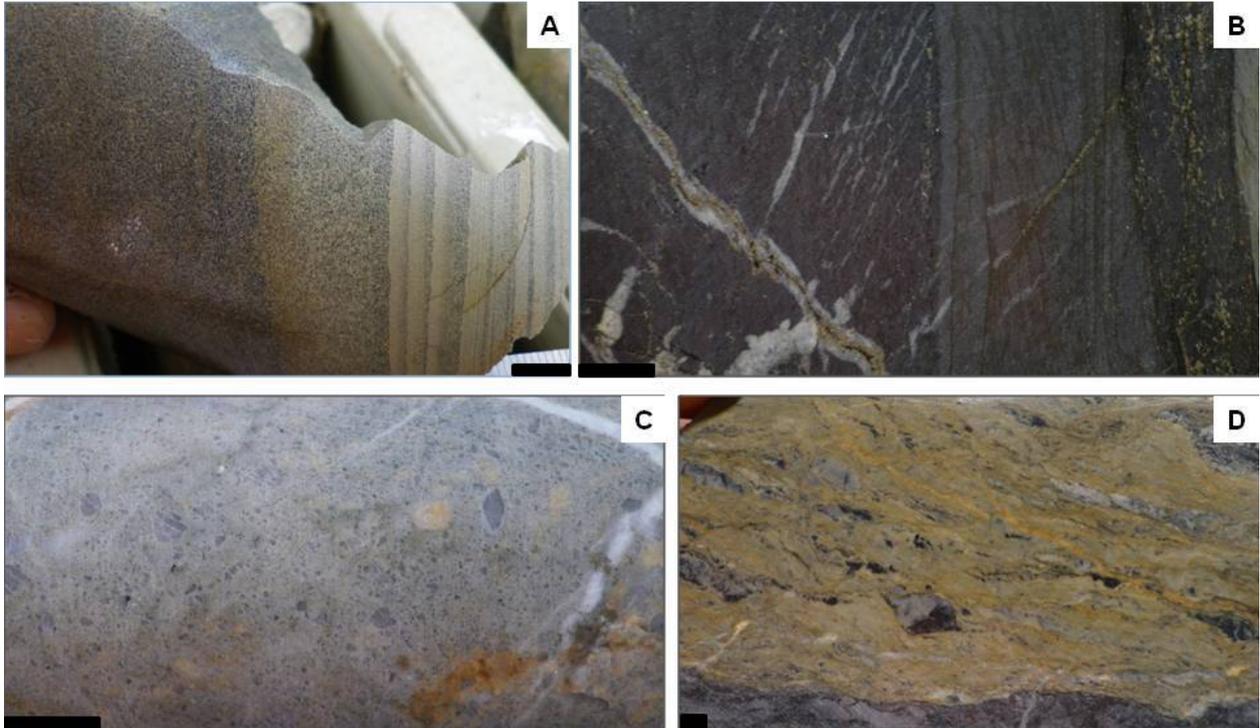


Figure 5. North Butler Creek area showing the geochemical results of surface samples.



**Figure 6.** Photographs of rock units from North Butler diamond drilling by Pacific Nevada. **A)** Medium-grained sandstone interbedded with siltstone showing normal grading (NB-03, 70m). **B)** Banded pyrite on fine- to medium-grained sandstone (NB-06, 175.3m). The rock is cut by later pyrite  $\pm$  chalcopyrite vein and quartz - pyrite veinlet. **C)** Selective pervasive quartz-carbonate alteration (NB-06, 127m). **D)** Wispy sericite overprinting an earlier quartz alteration (NB-06, 351m) Scale in black line, equivalent to 1cm.

Assays results have peaks values of 731ppm Cu, with 0.01 ppb Au, 0.03 ppm Ag, 5.9 ppm As and 6 ppm Pb. The greatest concentration of >100 ppm Cu values (including previous samples from Pacific Nevada) lies along a NE-SW trend (Figure 5). All gold values are below 0.01ppb. The high copper anomalism in some soil samples corresponds with black, euxinic clay that has visible pyrite crystals in the clay. It is surmised that the anaerobic conditions in these clay rich samples is conducive for metal scavenging and may not necessarily be associated with primary geochemical anomalism.

A review of previous drillholes at North Butler was also conducted. Six (6) drillholes totalling 1955m were drilled by Pacific-Nevada from 1999-2000 to test the IP anomalies and gold anomalies in stream sediment, soil and rock samples (Newham, 2000; Figure 4). The rock sequence intersected mostly consists of interbedded medium-grained sandstone and siltstone exhibiting normal grading, coarse quartz-phyric sandstone (lithic wacke?) and polymictic, matrix-supported volcanoclastic turbidite/debris flow (Figure 6A). Localized horizons of black, laminated to thinly bedded mudstone up to ~10m thick occurred in some holes. A selective to pervasive quartz-carbonate-pyrite-sericite alteration assemblage characterized the holes, becoming pervasive in the most eastern hole (NB-06; Figures 6C and 6D) with increasing intensity at depth. Short Wavelength Infra-Red (SWIR) spectral analysis

revealed that carbonate alteration minerals are mostly dolomite, ankerite, phengite while the sericite showed an illite to muscovite composition.

Highly pyritic and graphitic black shale units were noted and these were found to correspond with responses from earlier airborne EM surveys. The most significant mineralized interval (~6m) yielded a grade of 0.14 g/t Au hosted in dark gray to black interbedded siltstone and fine grained sandstone, with disseminated pyrite-chalcopyrite locally along beds (Figure 6B). The highest grade at of 0.24 g/t Au over a 1m interval is composed of ~80% thick (~2cm) quartz-dolomite-pyrite veins.

Pacific Nevada concluded that, while assay results from drillholes did not replicate the anomalous gold values from surface and rock-chip samples, the alteration assemblage however defined a rich sulfide alteration zone within the Late Neoproterozoic to Early Cambrian volcanics and sedimentary rocks adjacent to a regional structure (Newham, 2000).

### **Birthday Bay (VTEM Anomaly)**

About 3 km NE of Birthday Bay, eight (8) high priority VTEM anomalies (Level 3) fall within the unit of Precambrian rocks, consisting of orthoquartzite, mudstone/siltstone, with conglomerate horizons (Figure 3; Figure 7). In this area, no soil and/or stream sediment sampling has been conducted by previous workers.

The sampling interval was at 25m spacing in a “+” pattern and centred over each VTEM anomaly giving a total of 9 soil auger samples collected from each anomaly. The C soil horizon is characterized by greyish to light brown, silt to sand-size particles (1/16 – 2mm), commonly accompanied by weathered clasts of angular, white to light gray quartz vein (?) fragments (Figure 9A), silicified pumiceous (?) rock (Figure 9B), and sub-rounded siliceous rocks (Figure 9C), Some dark grey, possibly carbonaceous shale outcrops (Figure 9D) were noted near the VTEM anomalies which could be a potential source of the VTEM anomalies.

A total of 66 soil samples were taken from Birthday Bay (VTEM Anomaly) area. These were sent to ALS-Chemex Laboratory, Brisbane and analysed for Cu, Pb, Zn, Ni, Ag and other elements included in the package ME-MS41 by ICPMS, and Au by aqua regia extraction, with ICPMS finish (up to 25g). Sample details and results are included in Appendix 1. Assay certificates are in Appendix 2.

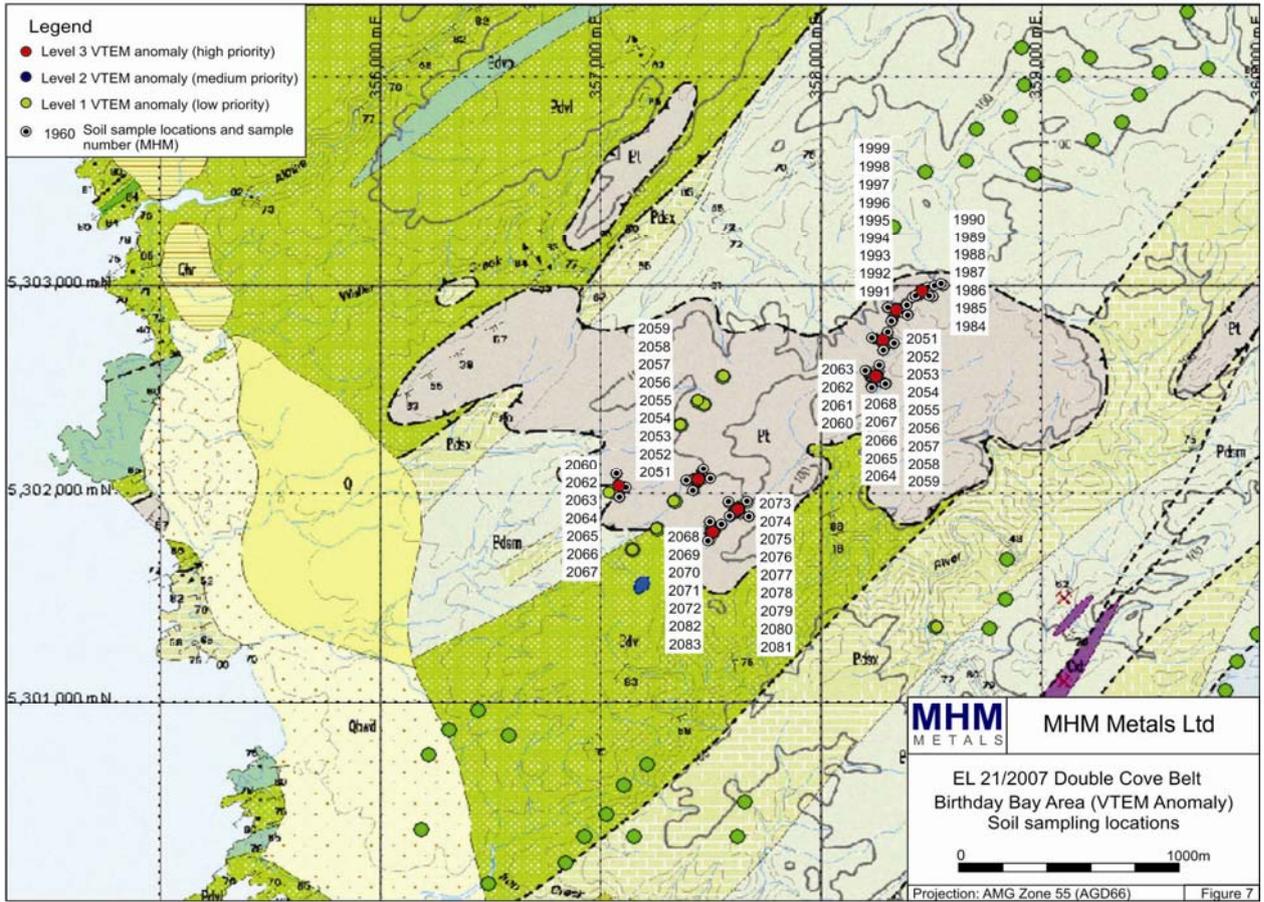


Figure 7. Birthday Bay VTEM Anomaly Area showing the locations of VTEM anomalies and soil samples.

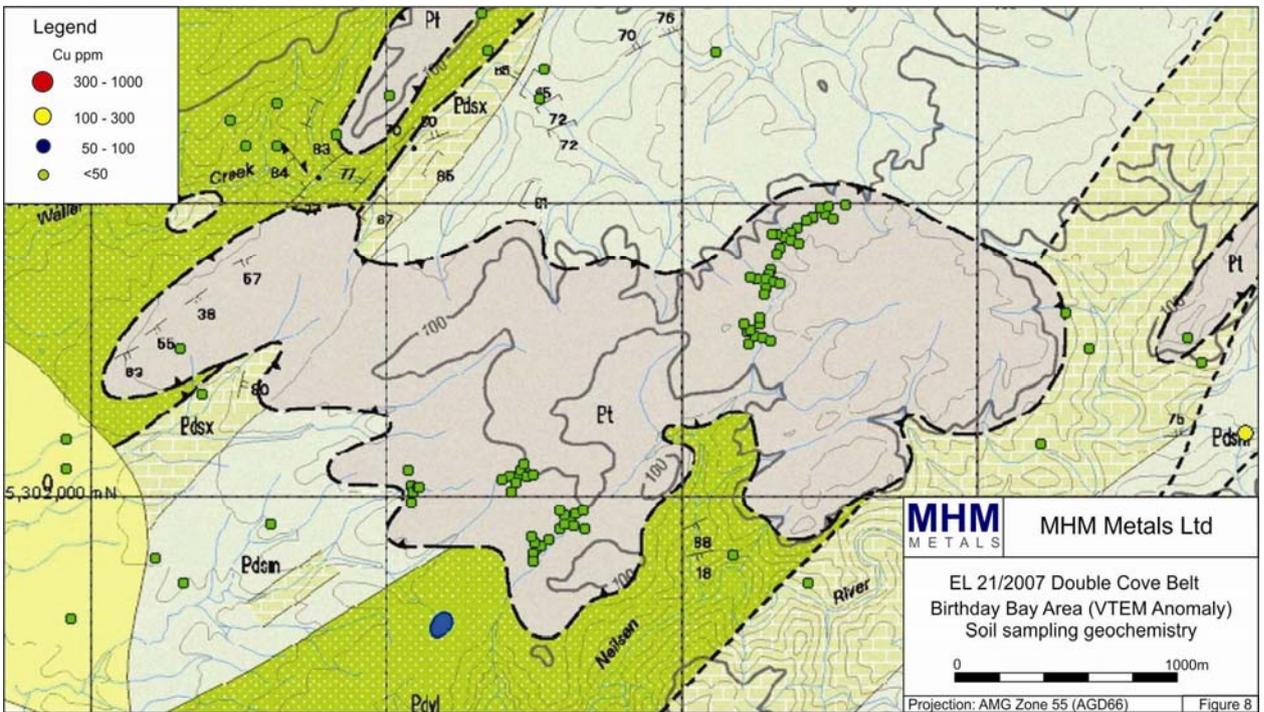
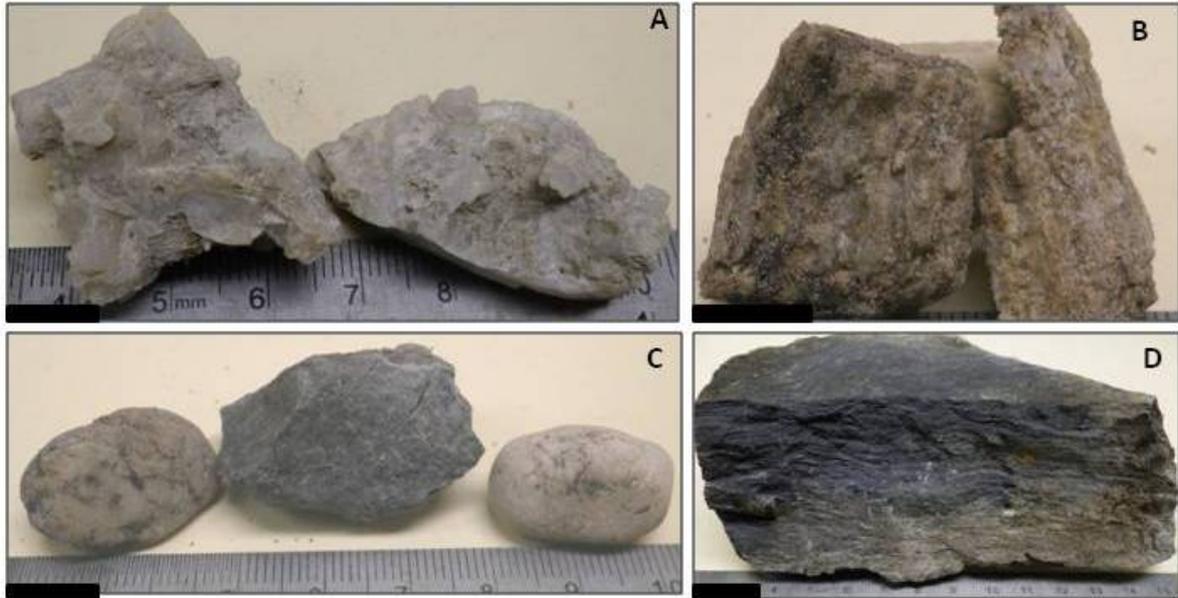


Figure 8. Birthday Bay VTEM Anomaly Area showing the geochemical results of soil samples.



**Figure 9.** Birthday Bay VTEM Anomaly Area rock and mineral fragments from surface sampling. **A)** Angular light gray quartz fragments. **B)** Angular, selectively silicified pumiceous fragments. **C)** Sub-rounded siliceous and sub-angular sandstone rock fragments. **D)** Thinly bedded cross-bedded siltstone and sandstone. Scale in black line, equivalent to 1 cm.

### **Birthday Bay Iron Ore Prospect**

Two field visits were conducted for the reported period. The first trip were conducted by MHM's Exploration Manager and a Director on October 4<sup>th</sup>, 2010 to iron ore lens (Anomaly 129; Figure 2) to clear a track and locate the outcrop in preparation for guests from an interested company.

The second trip was lead by MHM's Exploration Manager on October 11<sup>th</sup> 2010 with two guests from South East Investment Holdings/Hongyun Group for the possibility to joint-venture the mineral rights of the iron ore and other minerals on EL21/2007.

## **DISCUSSION AND CONCLUSION**

### **North Butler Creek Area (VTEM Anomaly)**

The locations of the Cu anomalies from soil sampling and review from previous drillholes suggests that the mineralisation is likely to be structurally controlled and appears to lie within a NE-SW trending corridor, similar to the elongation of gabbro dike exposed towards the NE (Figure 5). Parallel, major fault structures west and adjacent to North Butler extend SW for about ~10 km, where the hematite-magnetite outcrops suggest the occurrence of an iron skarn associated with the margins of the gabbro dyke and hydrothermal activity along the

bounding structures (Figure 10). These parallel structures represent an attractive exploration target. It is recommended that mapping, rock sampling and stream sediment sampling are programmed in this gap which will provide a basis for further more focused exploration target (Au, Fe and/or Cu)

### **Birthday Bay (VTEM Anomaly)**

No significant assays were obtained from 66 soil samples collected from Birthday Bay prospect. Au, Cu, Ni and Zn are all below detection limit (Figure 8). The VTEM anomalies are most likely associated with the graphitic shale exposed on the surface, as noted close to the stations (Figure 9D). Although the soil sample results are not significant, it may be that these assays represent the background values of the Pre-Cambrian rock units. To further test the VTEM model, it is recommended to conduct soil sampling programme outside of the Pre-Cambrian units and concentrate on the Cambrian rocks on the NE and SW where several low priority VTEM anomalies were identified (J.Reid and K.Godber, 2010, Figures 3 and 7). Results from this exercise will be assessed if a possible target exists concealed below the Pre-Cambrian rock units, and if drilling is warranted.

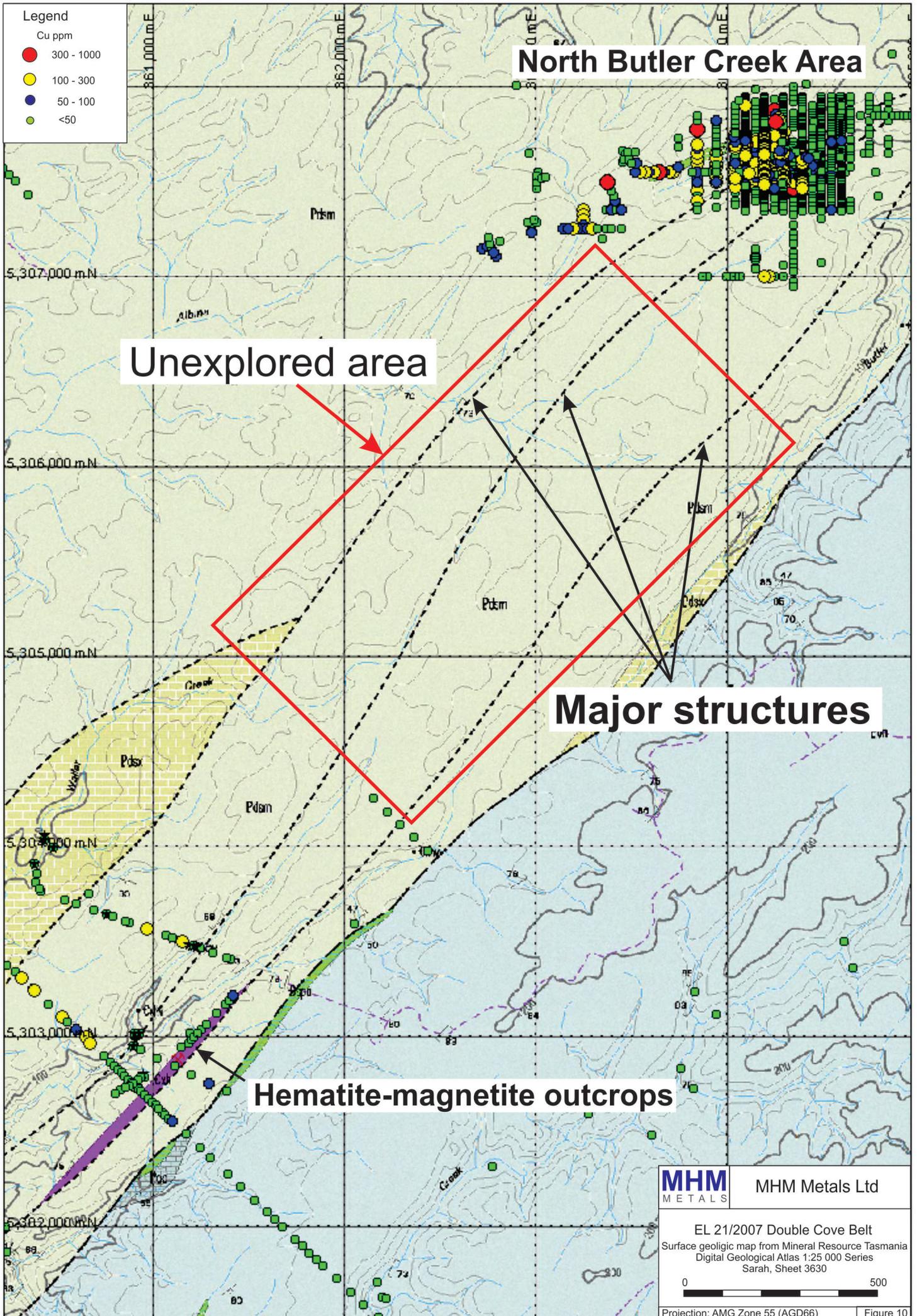
## **FUTURE EXPLORATION**

### **Pelias Cove**

Three drillholes were drilled by Pacific Nevada to test two IP anomalies, the soil geochemical anomaly and an outcropping massive copper sulfide at the shoreline. The source of gold which is confined to a solitary drainage 1.5km in length and 500m wide has not been identified, while the source of the outcropping massive copper sulfide gossan is indeterminate (Morritt, 1999).

The presence of Tertiary gravel on the topographically higher southeast margin of the anomalous drainage is believed to be a possible source of the gold (Vanzino, 2009). However, microscopic study of gold grains from Pelias Cove showed that most are angular and Morritt (1999) suggested that the gold is not from a Tertiary placer, and might have come from a nearby source that has significant nugget effect.

The Pelias Cove prospect warrants another examination. The first task would be to review all available historical data, i.e. conduct research using current technology to gain a new perspective of the area, and conduct a reconnaissance field investigation of reported outcrops.



Future work recommended for EL21/2007 includes the evaluation of other cost-effective exploration techniques, such as heli-borne tree top (vegetation) sampling.

## **EXPENDITURES**

Total annual expenditure for all work undertaken by MHM Metals Ltd within EL21/2007, for the period 01/07/2010 to 30/06/2011 was \$186,428.61. A detailed expenditures statement is given below:

Computing	149.28
Geochemical Assays	5,894.15
Geoscience Consultants	4,207.14
Legal Fees and Other Contractors	77,929.91
Personnel Costs	64,762.47
Field Supplies	3,370.64
Travel & Accommodation	1,672.71
Vehicles, Plant & Maintenance	1,550.59
Helicopter charge	26,891.72
<b>TOTAL</b>	<b>186,428.61</b>

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## **KEYWORDS**

Double Cave Belt, VTEM, North Butler, Birthday Bay, Pelias Cove, Lucas Creek Volcanics, Anomaly 129