

NEWHAM EXPLORATION & MINING SERVICES

**GRIEVES SIDING PROJECT
(ZEEHAN)**

EL 38/89

**REPORT IN SUPPORT OF
RETENTION LICENCE APPLICATION**

MICROFILMED
FICHE No. 014691-93

GENERAL RESOURCES
EL 38/89
13 AUG 1998
See folio 1

Prepared For:

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30 June, 1998

98-4193

RPT. IN SUPPORT OF RL APPLICATION
EL 38/89 - ALLEGIANCE - RIO TINTO
L A NEWNHAM

CONTENTS**TEXT**

1. **SUMMARY**
2. **TENURE, GEOGRAPHY, LAND CLASSIFICATION**
3. **WORK COMPLETED**
4. **GEOLOGY**
5. **RESOURCE POTENTIAL**
6. **FUTURE INVESTIGATIONS**
7. **PROPOSED AREA REDUCTION**
8. **REFERENCES**

MAPS:

Map 1: \	Location Plan (In Text)	
Map 2: \	Geology and Drilling Plan	1:2,500
Map 3: \	Primary Resource Plan and Longitudinal Projection	1:1,000
Map 4: \	Secondary (Surficial) Resource Plan and Sections	1:1,000
Map 5: x	Helimag Vertical Derivative	1:10,000
Map 6: \	Sections (7)	1:1,000

1. SUMMARY

EL 38/89 south of Zeehan is explored under a joint venture agreement by Rio Tinto Exploration Pty Limited and Allegiance Mining NL.

To date \$1,040,287 has been spent on the licence, principally exploring for stratabound zinc deposits.

This work has focused on the Grieves siding area where drilling has located a deposit of zinc mineralisation replacing a deeply weathered and leached member of the basal section of the Gordon Limestone.

The prospect is assessed as having a resource potential of approximately 650,000-750,000 t 7-9% Zn as primary mineralisation and a further 150,000-200,000 t 4-6% Zn as secondary mineralisation in surficial clays.

The zinc mineralisation is present as zinc rich siderite, smithsonite (zinc carbonate), sphalerite and zinc aluminosilicates. This presents a barrier to concentration into a saleable product by conventional means, and the deposit is considered too small to support non-conventional concentration methods.

It is, therefore, proposed that the resource be retained within a one (1) sq km Retention Licence whilst options for its longer term development are further investigated.

2. TENURE, GEOGRAPHY, LAND CLASSIFICATION

EL 38/89 of nine (9) sq km lies across the Zeehan-Strahan Highway, 10 km south of Zeehan (Map 1).

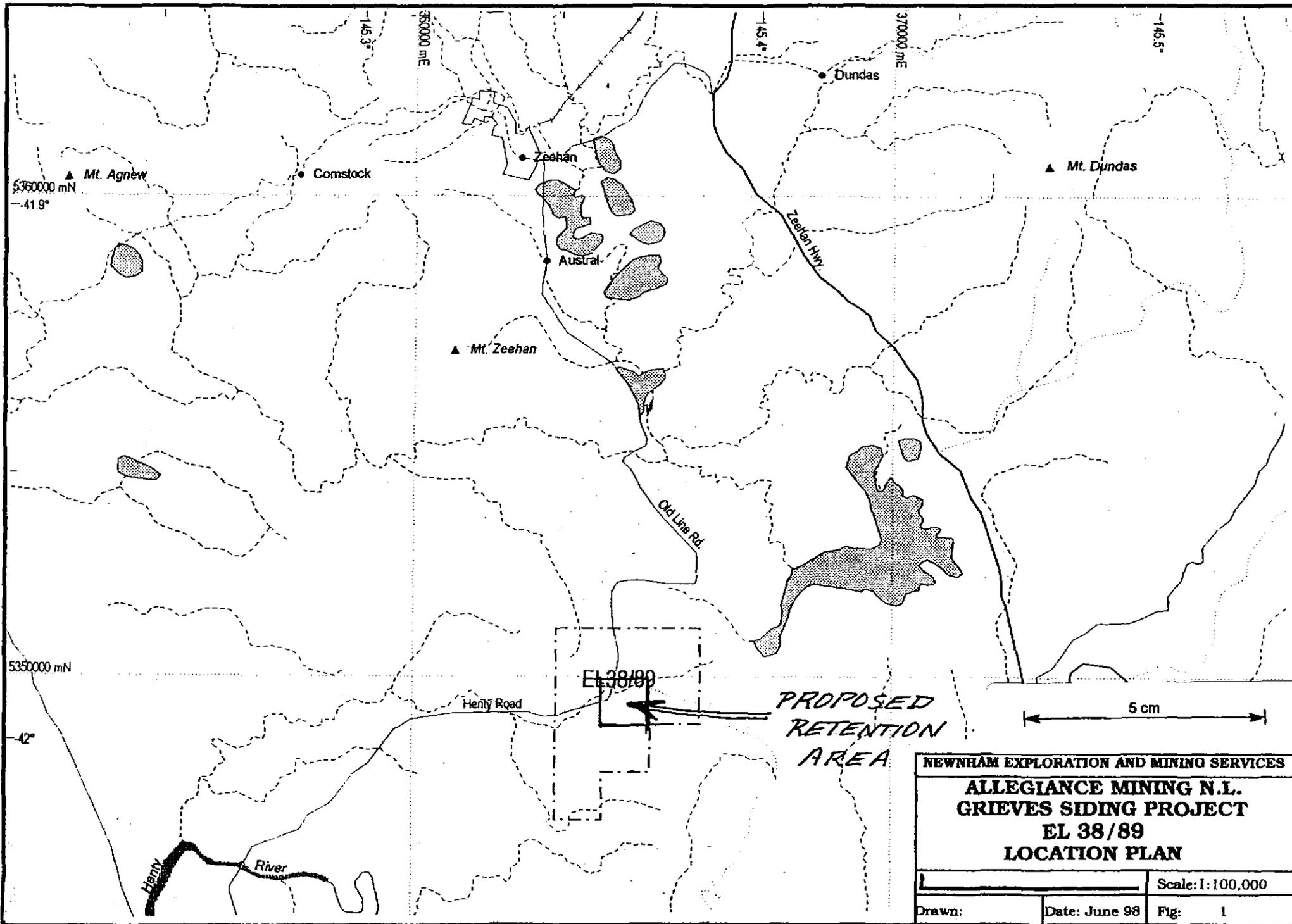
Most of the area is open button grass plains with low eucalypt scrub in gullies and along base of slopes. The button grass is underlain by either a thin veneer of gravels or peat.

The Grieves Siding prospect area, which is subject to this Retention Licence application, lies approximately 500 m south of the highway. The prospective Gordon Limestone is represented by button grass flats, flanked to the north and south by low relief sandstone and quartzite hills.

Under the recently signed Regional Forest Agreement, the Zeehan-Strahan highway marks the boundary between Multiple Use Forest Land to the north and the Henty Reserve to the south. The management plan for the Henty Reserve is currently under review by the Resource Planning and Development Commission. Their recommendations to government should be available in the near future, and will provide for appropriate access for exploration and mining.

EL 38/89 was granted to Major Mining Limited on 30 March, 1990. CRAE Pty Limited entered into a joint venture with Major Mining on 23 April, 1991, and the latter divested its interest to Allegiance Mining NL in 1993.

CRAE (90%) and Allegiance (10%) became co-holders of the licence on 22 January, 1994.



NEWNHAM EXPLORATION AND MINING SERVICES		
ALLEGIANCE MINING N.L. GRIEVES SIDING PROJECT EL 38/89 LOCATION PLAN		
		Scale: 1:100,000
Drawn:	Date: June 98	Fig: 1

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3. WORK COMPLETED

The J/V partners have to date spent \$1,040,287 exploring for zinc on EL 38/89. Reports on this work are listed as Section 9 in this report.

In summary, the principal activities were as follows:

(a) Data Collation:

All previous mapping and geochemical sampling (mainly by Amoco-EZ) was collated and evaluated. Significant Zn anomalous zones were identified near the top, middle and lower sections of the Gordon Limestone. These were considered worthy of further evaluation by aircore drilling.

(b) Aircore Drilling 1992-1993:

In order to evaluate the zinc potential of the surficial black clay (pug), 103 aircore holes, totalling 1070 m, were completed at 25 m intervals along nine (9) traverse lines each 300 m long.

Initial mineralogical studies on high grade zinc samples indicated the zinc was present as both sphalerite and smithsonite, (Fe-Mg) Zn CO₃.

(c) Aircore Drilling 1993-1994:

Two programs of aircore drilling were completed in this year - 284 holes totalling 4115 m.

The first program of 249 holes totalling 3803 m was drilled on a 50 m x 10 m grid along a 500 m zone over the basal section of the limestone near its contact with the Moira Sandstone.

The second program of 35 holes totalling 312 m further tested this basal zone together with other zones in the middle of the limestone and the upper section close to its contact with Crotty Quartzite.

This aircore drilling confirmed that:

- most interest lay along the basal section of the limestone in an area known as Grieves Siding
- Zn was present in the surficial black pug as sphalerite
- Zn was present in underlying primary stratabound deposits associated both with a zone of ankerite

alteration of the carbonate and a clay zone adjacent to the ankerite alteration zone.

(d) Core Drilling 1993-1994:

Eighteen (18) cored holes were completed to test the lower limestone zone shown to be zinc anomalous by the aircore drilling.

These holes confirmed that most zinc mineralisation was confined to a 50 m wide zone of altered limestones adjacent to the Gordon Limestone-Moina sandstone contact.

(e) Core Drilling 1994-1995:

A further two (2) cored holes were completed into Grieves prospect and confirmed the Grieves zone as extending over a 550 m strike length.

(f) Mineralogical Studies 1994-1995:

Further mineralogical studies were undertaken on drill samples and confirmed that most of the zinc in the clays was present as sphalerite and in the primary zone as a mixture of sphalerite, zinc carbonates and zinc silicates.

(g) Development Studies 1994-1995:

CRAE undertook various indicative ("back of envelope") studies to gain an idea of the commercial potential of Grieves Siding. Their views were that a sulfide deposit of 10 Mt 10% Zn or 16 Mt 8% Zn would be a minimum requirement for them at Grieves. Alternatively, a 1 Mt pa 4% Zn operation in clays might be feasible.

(h) Core Drilling 1995-1996:

A total of 15 cored holes totalling 2245 m were completed to test firstly the main footwall zones at Grieves (8 holes) and, secondly, the middle zone at Grieves South (7 holes). These holes were designed in such a way as to investigate the potential of the area to meet CRAE's minimum resource requirements.

(i) Mineralogical Studies 1995-1996:

Further mineralogical studies were conducted on cores from ZG 406 and showed the zinc was present as silicates and carbonates.

(j) Helimag Survey:

A high resolution helimag survey was flown in early 1997, with the intention of defining the extent of sideritic alteration associated with

the zinc mineralisation. Results of this survey are illustrated on Map 5, attached.

(k) Basin Analysis Study:

A comprehensive analysis of the depositional environment of the Gordon Limestone was undertaken in 1996-1997.

(l) Honours Mapping Project:

An honours project was undertaken in 1996-1997 to assist, firstly, with stratigraphic correlations at Grieves Siding and, secondly, with an understanding of the mineralisation paragenesis.

This study suggested most of the zinc mineralisation was of Cambrian origin, but extensively mobilised and remobilised by later processes.

(m) Core Drilling 1996-1997:

One 243 m cored hole (ZG 416) was completed to test the down-dip extension of previously intersected zinc mineralisation. Only modest intersections were obtained, and it was interpreted that the Zn was present as sphalerite, Zn siderite and silicate.

(n) Metallurgical Test Work 1996-1997:

Further Zn recovery test work was undertaken on drill cores with results indicating poor recoveries due to:

- oxidation coating of sulfide grains
- fine grain size of sphalerite
- presence of smithsonite and Zn rich siderite
- presence of zinc silicates

It was suggested that Zn carbonates (smithsonite and siderite) may be weathering products of sphalerite.

4. GEOLOGY

The Grieves Siding mineralisation occurs within the basal 50 m of the Gordon Limestone formation over a strike length of 700-800 m.

The limestone in this area is approximately 500-600 m thick. It is conformably underlain and overlain by the Moina Sandstone and Crotty Quartzite respectively, and dips generally north to north-west at 45°.

The stratigraphic column is illustrated in Table 1.

This package of Ordovician-Silurian sediments has been regionally folded along north-west trending axes and the Grieves Siding prospect occurs on the eastern limb of a north-west plunging syncline.

The prospect is bisected by the Grieves Fault, which trends west-north-west and is interpreted by this writer as a normal fault dipping south-west at 45° with the western block downthrown approximately 50-80 m. It probably represents a strain adjustment fault on this stressed section of the syncline.

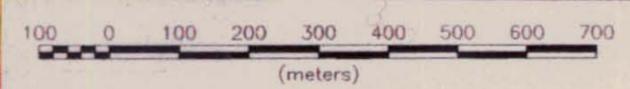
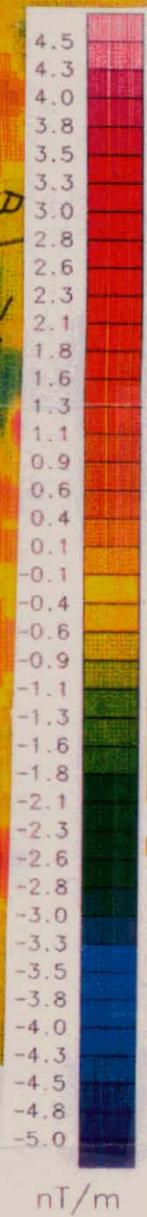
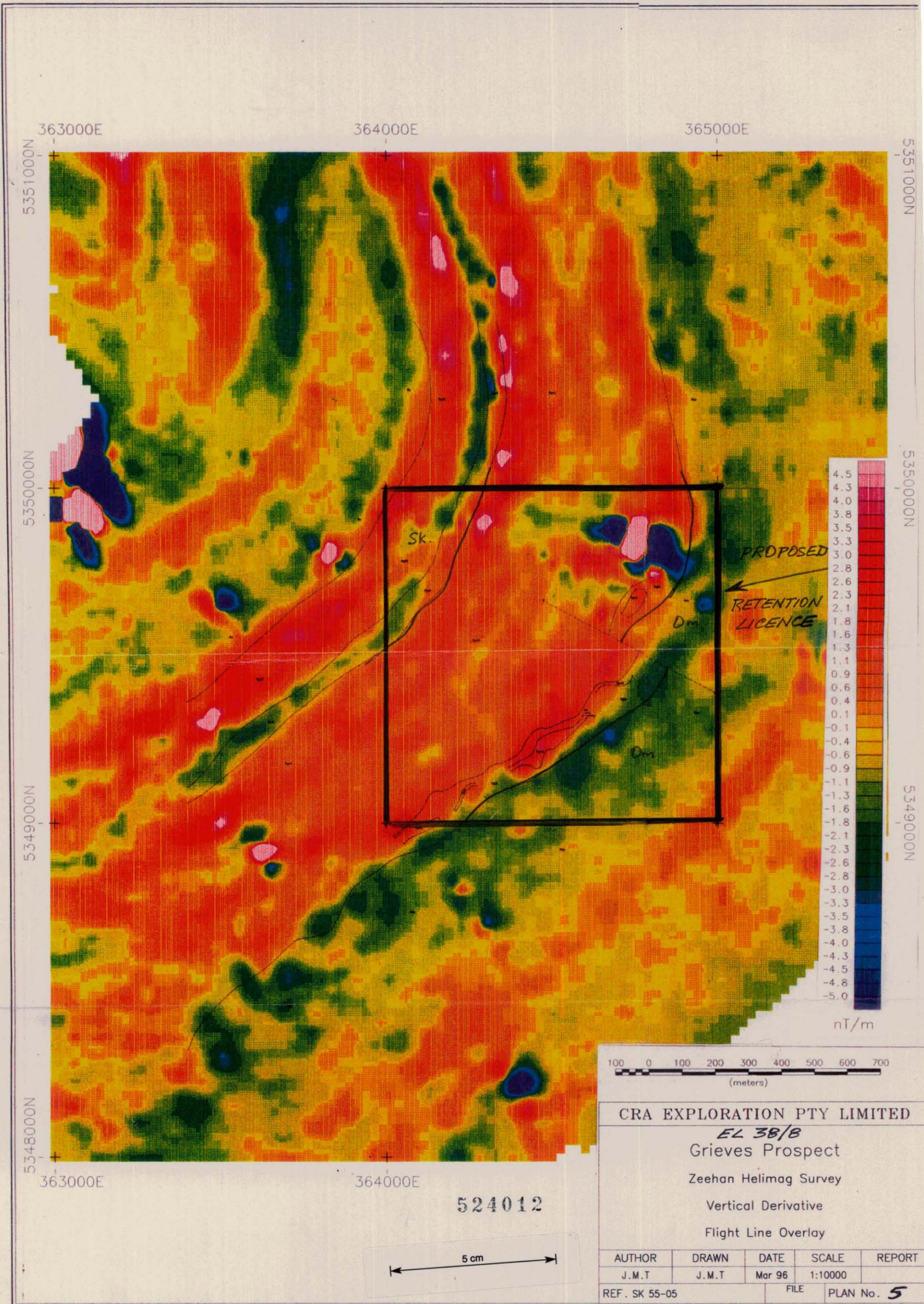
The mineralisation has been interpreted as late Cambrian-early Ordovician, having percolated into the shallow marine Ordovician basin from the underlying (still cooling) Mt Read Volcanics, and forming in a "pool" like deposit close to the base of the limestone.

This sequence was later (Devonian) folded and faulted resulting in the current north dip of the host sequence (Map 1), and the dislocation of mineralisation by Grieves Fault (Maps 1, 3).

It is suggested by this writer that the Grieves mineralisation was originally sphalerite, but this has been extensively modified to considerable depths by weathering and associated leaching by acidic ground waters. These secondary processes resulted in the formation of zinc carbonates and zinc aluminosilicates (clays) to depths of 100-200 m below current surface.

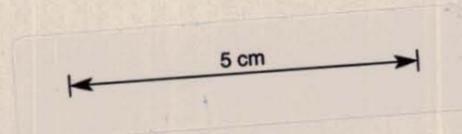
Re-precipitation of zinc as low Fe sphalerite occurred in the totally decarbonated limestone sequence at or near surface, where it is now represented by 5-20 m of black and grey pug, grading down-dip into progressively less weathered limestone.

Sulfide deposition in these black clays developed above primary sulfide deposits in Gordon Limestone is a common feature in western Tasmania.



CRA EXPLORATION PTY LIMITED
 EL 3B/B
 Grieves Prospect
 Zeehan Helimag Survey
 Vertical Derivative
 Flight Line Overlay

AUTHOR	DRAWN	DATE	SCALE	REPORT
J.M.T	J.M.T	Mar 96	1:10000	
REF. SK 55-05		FILE	PLAN No. 5	



5. RESOURCE POTENTIAL

Zinc mineralisation at Grieves Siding is concentrated as a stratabound deposit in the lower 50 m of the Gordon Limestone over a strike length of 700-800 m.

The deposit dips approximately 50° north and has been drill tested at shallow depths by aircore drilling and to approximately 250 m vertically by core drilling. Several widely spaced drill holes cut this sequence at substantially greater depths.

This drilling has demonstrated that the basal mineralised zone is variably weathered, and the intensity of weathering directly influences the nature of the zinc minerals present. This, in turn, impacts on potential zinc recovery performance and hence the ultimate economics of the deposit.

The depth of weathering will also influence the mineability of the deposit.

In the upper near surface section of the deposit, the mineralised limestone has been totally weathered and decomposed by circulating acid ground water to black and grey clays, commonly known as "pug". The vertical thickness of pug is typically 5-20 m.

The pug, or **surficial resource**, zone has been extensively tested by aircore drilling which gave high ground recoveries as opposed to core drilling where pug tended to wash away.

The clays are typically sulfidic and mineralogical studies confirm that most of the zinc is present as low Fe sphalerite.

Beneath the pug zone the Zn appears to be concentrated in a sideritic limestone unit and an adjacent clay zone. The clay zone may represent a more severely weathered or degraded member of the siderite zone. Zinc is present as sphalerite (often coated with iron), zinc carbonates (Zn rich siderite and smithsonite) and Zn aluminosilicates (zinc clays).

A combination of analytical and XRD investigations suggests that, firstly, in the stratabound clays the zinc is present almost equally as sphalerite and Zn clays and, secondly, in the siderite zone Zn is present mainly as Zn carbonates (60-75%) and sphalerite (25-30%).

It is suggested that the Zn mineralogy is not random but reflects the degree of weathering degradation of the limestones on the following scale:

- minor weathering: Zn as sphalerite
- moderate weathering (alteration to sideritic carbonate): Zn as sphalerite and Zn carbonates
- severe weathering (development of strata-bound clays): Zn redeposited as sphalerite and Zn clays
- extreme weathering (black pug formation): Zn redeposited as low Fe sphalerite

Because of the above detailed mineralogical complications combined with the uncertainties of mining such a deeply weathered deposit, it is not considered appropriate to attempt to classify the drilled resource as an identified mineral resource.

Rather, this report attempts to highlight the resource potential of the area as a basis on which to direct future evaluation work on the project.

The **resource potential** is subdivided into three categories:

- (a) primary resource (below black pug zone)
- (b) surficial resource (black pug)
- (c) additional resources (beyond current drilling pattern)

(a) Primary Resource Potential:

This resource includes all the zinc mineralisation below the surficial black pug material. This is dominated by mineralisation in the sideritic zone and the adjacent stratabound clays. In attempting to quantify this resource, no attempt has been made to differentiate between zinc clays, zinc sulfides or zinc carbonates.

The relevant drilling data is presented as Map 3, both in plan view and longitudinal projection.

Correlatable mineralised intersections have been structurally contoured on plan and this data transferred to the projection.

The mineralised body has been dissected by the Grieves Fault which is interpreted from the structural contours as west block down. An additional fault is inferred to the north of Grieves Fault, further disrupting the sequence but north of the main mineralisation.

Blocks of mineralisation were outlined north and south of Grieves Fault using a 4% Zn cut-off on bulked drill intersections. The potential resource tonnage in each block was estimated using the arithmetic average of the drill hole thicknesses in each block. (Drill hole intersection widths are approximately equal to horizontal widths on the drilling completed to date.)

Resource potential grades were the weighted average of the intersections in each block.

The resource potential thus estimated is:

South Block:	450,000-500,000 t 8-10% Zn
North Block:	200,000-250,000 t 6-7% Zn
Combined:	650,000-750,000 t 7-9% Zn

(b) Surficial Resource Potential:

The resource refers to the surficial black and grey pugs developed above the primary resource. Mineralogical studies suggest >90% of the zinc is present as free grains of low Fe sphalerite.

This resource potential is defined by aircore drilling and would be amenable to open-cut mining. Drilling results are present as Map 4 in plan and sections. Its distribution closely mirrors the primary resource.

Tonnages and grades were estimated as for the primary resource but using a drill hole intersection cut-off of 3% Zn.

The resource potential thus estimated is:

South Block:	88,000 t 5-6% Zn
North Block:	80,000 t 4-5% Zn
Combined:	150,000-200,000 t 4-5% Zn

(c) Additional Resources:

Modest potential exists for further primary resources down-dip of the blocks described above.

The two most northerly holes indicated a further zone of mineralisation may be developing in that direction.

Modest potential exists to increase the surficial resources by extending the aircore drilling pattern a short distance to the south-east right up to the Moina Sandstone boundary. Given reasonable success, this **may** result in an increase in the surficial resource of, say, 50% to approximately 300,000 t.

6. FUTURE INVESTIGATION

A significant Zn resource has been drill indicated at Grieves Siding. However, as it stands, there are substantial technical impediments to its commercial development.

These impediments include:

- (a) **Size** - the resource potential is relatively small. Drilling to date has indicated a maximum 1 Mt of material grading in the range 5-9% Zn. Scope for substantially increasing this resource (say, by a factor of 2) appears limited.
- (b) **Variable metallurgy** - the zinc is present in three forms; viz, carbonates, silicates, sulfide. This would make concentration by conventional sulfide flotation uneconomic.
- (c) **Mining difficulties** - whilst the surficial clays and the upper section of the primary resource could be readily mined by open-cut methods, the deeper primary resource **may** present some mining complications because of the zinc bearing decomposed limestone or clay zones on the footwall of the siderite host rock.

Any future development at Grieves Siding will depend upon successfully identifying innovative solutions to these three principal impediments.

Size is important because innovative metallurgical and mining solutions will be more expensive than straightforward and proven conventional approaches. An increase in size is one way of keeping unit costs down, thereby maintaining competitiveness.

The most likely way to increase size is to identify other resources in the district which also require innovative metallurgical approaches to make them economically viable. Such deposits may or may not be held by the Grieves Siding partners and, thus, may require either acquisition or co-operative arrangements.

The **variable metallurgy** problem may have two solutions. Firstly, the free low Fe sphalerite in the surficial clays might be extractable by simple washing to break up the clays, and sulfide flotation to produce a high grade sphalerite concentrate. On the existing resource such an operation would be small. Secondly, the primary resource may be amenable to the pyrometallurgical extraction of Zn. However, a larger resource, possibly derived from a number of deposits in the district, would be required to make such an operation feasible.

The possible **mining difficulties** associated with the primary resource may be overcome by using remote controlled equipment in a benching or caving mining method with underground access being developed in the more competent Molna Sandstone footwall rocks. The definition of additional resources at Grieves would certainly assist this problem.

Recommendation:

In the near term, it is recommended that work at Grieves be focused on the following three tasks:

- (a) Identifying additional resource opportunities in the district to supplement Grieves
- (b) Undertake some sulfide flotation and gravity test work on the surficial clays
- (c) Complete an aircore drilling program to more fully define the surficial clay resource and possibly increase the resource to, say, 300,000 t.

7. PROPOSED AREA REDUCTION

It is recommended that EL 38/89 of nine (9) sq km be replaced by a one (1) sq km Retention Licence, as shown on the attached Maps 1 and 2, and whose corner co-ordinates would be:

364,000 E / 5,349,000 N

365,000 E / 5,349,000 N

365,000 E / 5,350,000 N

364,000 E / 5,350,000 N

This Retention Licence adequately covers the Grieves Siding resource and would be sufficient to allow the above work to be undertaken.

8. REFERENCES

(In chronological order)

"Zeehan No 4 EL 38/89, Tasmania. Report on Exploration for the Third Year of Tenure 01 March, 1992-28 February, 1993" by Parkinson, R G, February 1993, for CRA Exploration Pty Limited, CRA Rept No. 18647.

"Zeehan No 4 EL 38/89, Tasmania. Report on Exploration for the Fourth Year of Tenure, 01 March, 1993-28 February, 1994" by Parkinson, R G, March 1994, for CRA Exploration Pty Limited, CRA Rept No 19635.

"Zeehan No 4 EL 38/89 Tasmania. Report on Exploration for the Fifth Year of Tenure, 01 March, 1994-28 February 1995" by Parkinson, R G, March 1995, for CRA Exploration Pty Limited, CRA Rept No 20613 (3 Volumes).

"Sixth Annual Report for the Period Ending 28 February, 1996 EL 38/89 Zeehan No 4, Tasmania" by Tear, S J, March 1996, for CRA Exploration Pty Limited, CRA Rept No 21169.

"Seventh Annual Report for the Period Ending 01 March, 1997 EL 38/89 Zeehan No 4, Tasmania" by Tear, S J, Russell, S A J, for CRA Exploration Pty Limited, CRA Rept No 22210 (3 Volumes).



LEGEND

- Sc Croty quartzite
- Og Gordon limestone
- Ogd Upper dolomite
- Ogsi Carbonaceous/calcareous siliceous matter
- Ogul Undifferentiated limestone
- Ogz Lower Zone: Undifferentiated altered carbonate and siliceous clays
- Ogd Lower Zone: Siderite alteration
- Om Molino sandstone
- Geological boundary
- - - Conceded geological boundary
- Fault
- Surficial high Zinc zone (>1% Zn)
- Cored drill hole
- 4.5m 2.0 Zn intersection, % Zn
- Allcore drillhole
- Allcore drillhole with >1% Zn intersection

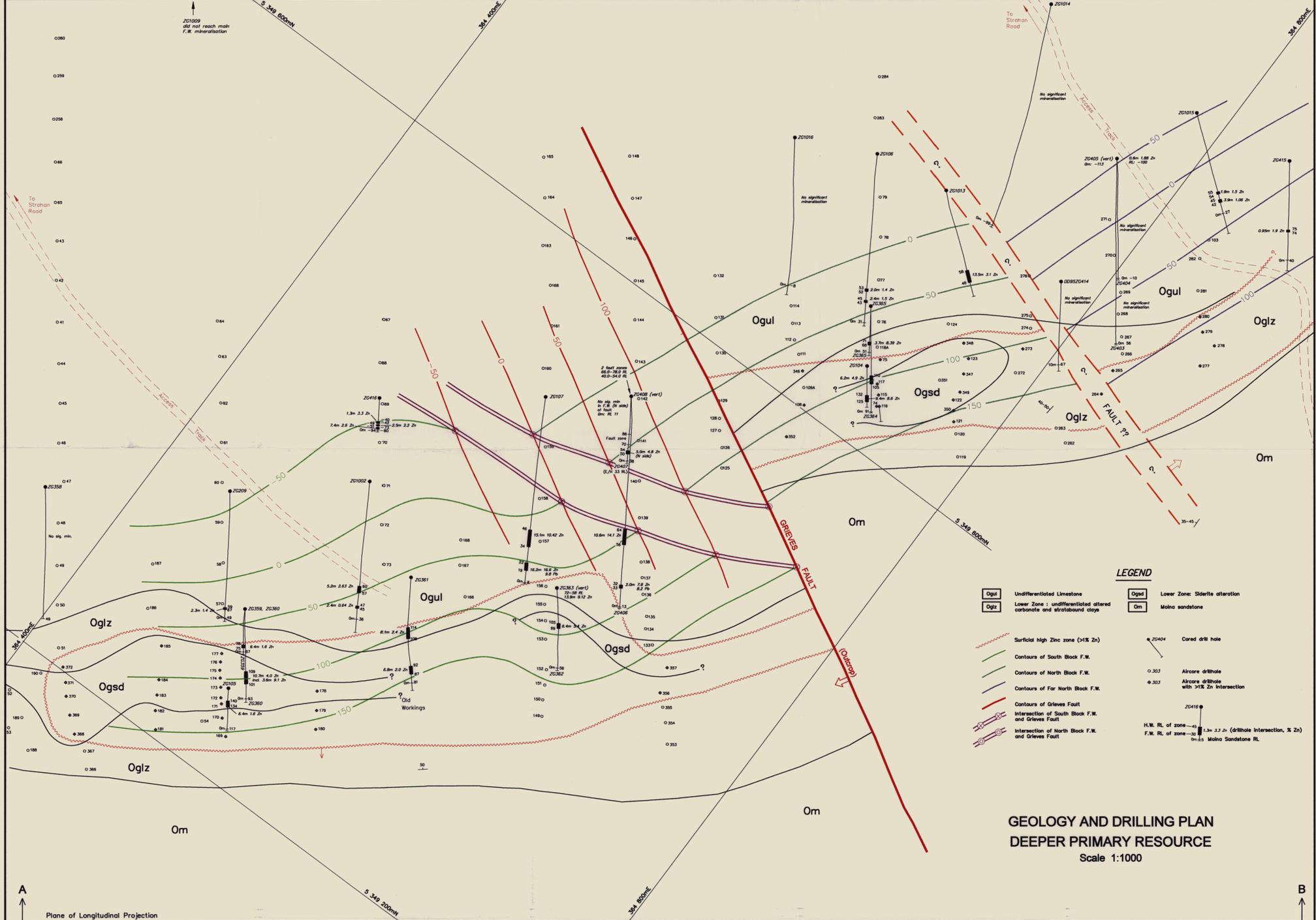
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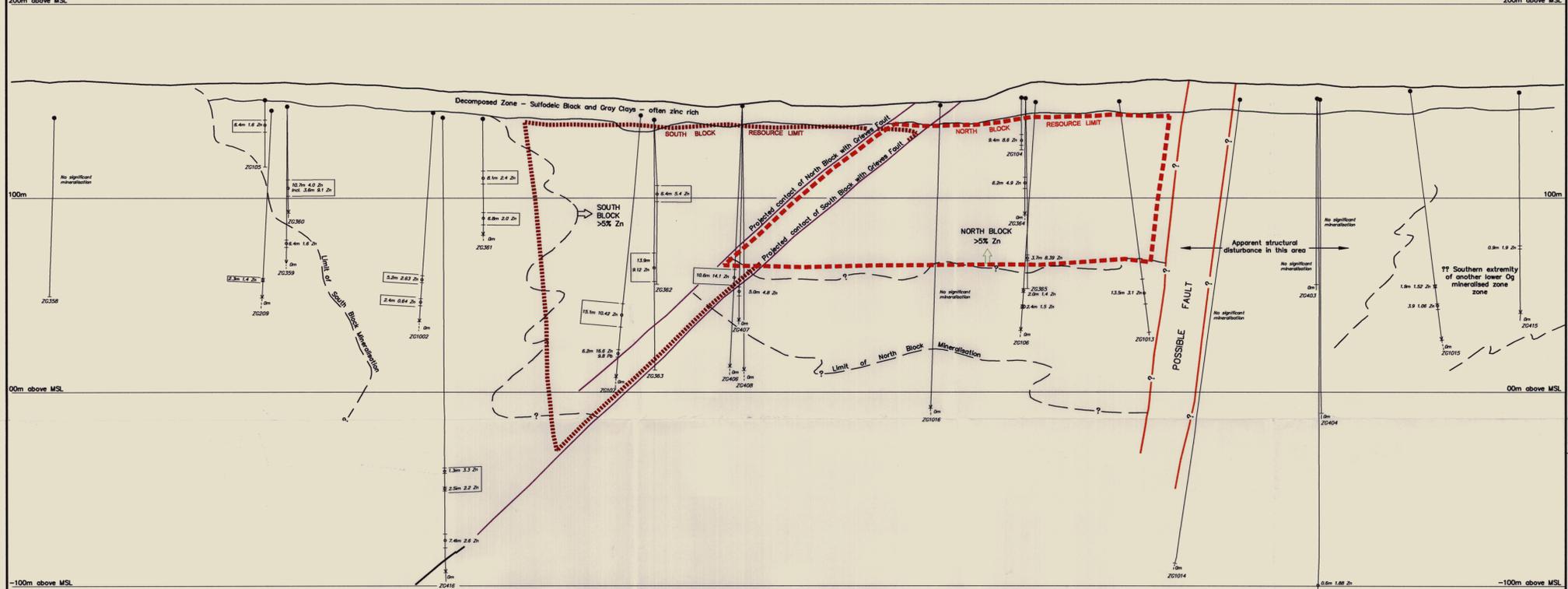
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REF: IN SUPPORT OF RL APPLICATION
EL 38/89 - ALLEGIANCE - RIO TINTO
L.A. NEWNHAM

NEWNHAM EXPLORATION AND MINING SERVICES <i>Serving the Minerals Industry</i>	
ALLEGIANCE-RIO TINTO JOINT VENTURE	
GRIEVES SIDING PROJECT	
EL 38/89	
DISTRICT GEOLOGY AND	
DRILLING PLAN	
SCALE: 1:2500	FIGURE No. 2
COMPILED: L.A.M.	DATE: June 1998
DRAWN: G.M.B.	REVISIONS:
FILE: G8_G8PLAN	



**GEOLOGY AND DRILLING PLAN
DEEPER PRIMARY RESOURCE
Scale 1:1000**



SOUTH BLOCK RESOURCE POTENTIAL
450,000 - 500,000 tonnes
8-10% Zn

NORTH BLOCK RESOURCE POTENTIAL
200,000 - 250,000 tonnes
6-7% Zn

98-4193
RPT IN SUPPORT OF RL APPLICATION
EL. 38/89 - ALLEGIANCE - RIO TINTO
L.A. NEWNHAM

LONGITUDINAL PROJECTION
(Looking North-West)
DEEPER PRIMARY RESOURCE
Scale 1:1000

524022

5 cm

NEWNHAM EXPLORATION AND MINING SERVICES <i>Serving the Mineral Industry</i>	
COMPILED: L.A.N.	DATE: June 1989
ALLEGIANCE-RIO TINTO JOINT VENTURE	
GRIEVES SIDING PROJECT	
EL 38/89	
PRIMARY RESOURCE	
SCALE: AS SHOWN	FIGURE No. 3

RESOURCE POTENTIAL

South Zone: 350m long, average 25m wide, average 6m deep
= 52,000 cu m
Density 1.7 (dry) = 88,000 tonnes 5-6% Zn

North Zone: 300m long, average 20m wide, average 8m deep
= 48,000 cu m
Density 1.7 (dry) = 81,000 tonnes 4-5% Zn

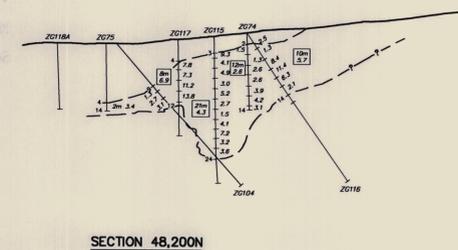
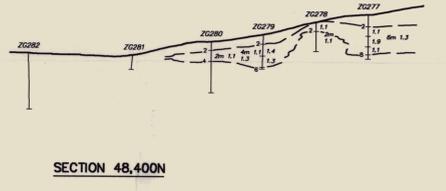
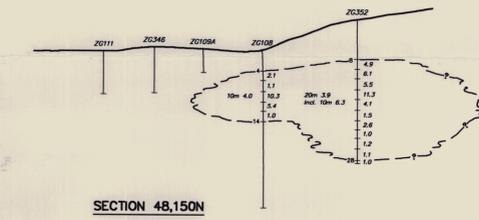
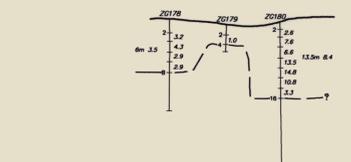
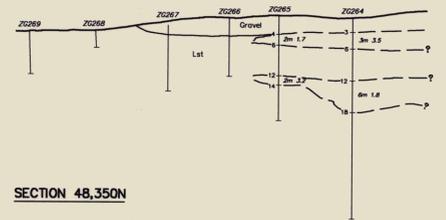
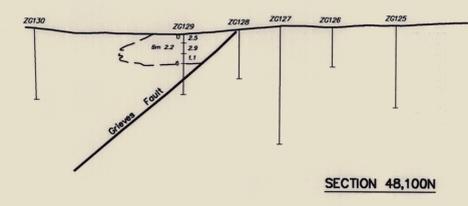
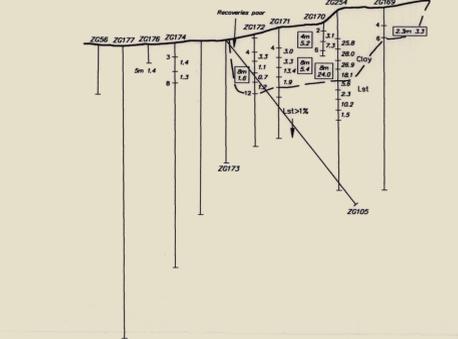
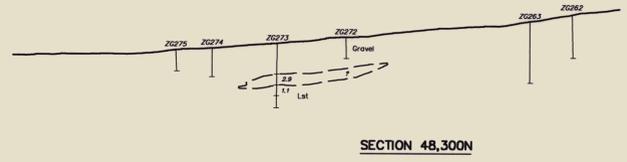
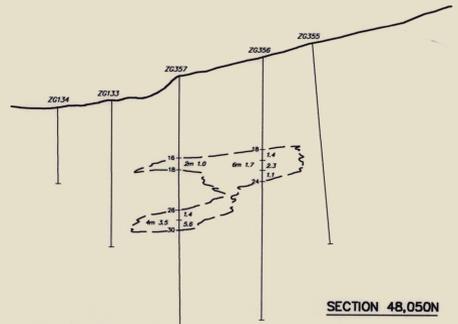
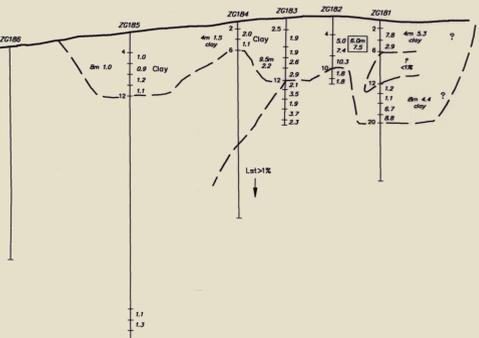
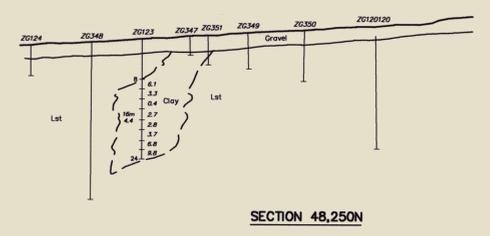
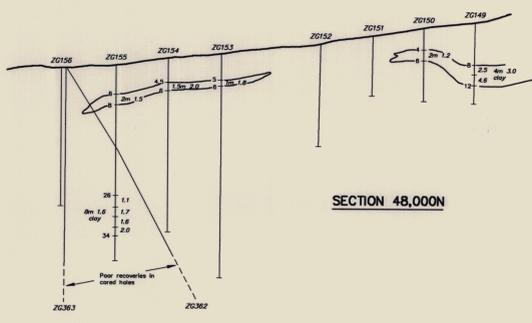
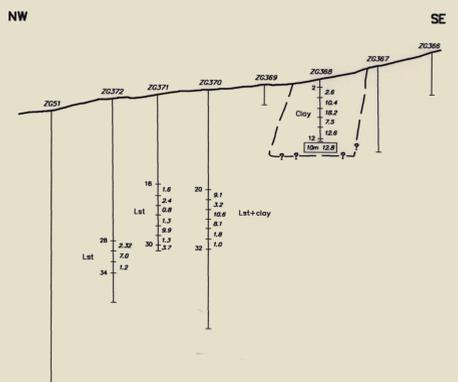
Total Potential: 150,000-200,000t 4-6% Zn

NOTE: This potential would require drill testing to enable an estimate to be made of an identified mineral resource.

LEGEND

- 303 Alcove drillhole
- 20404 Cored drillhole
- 303 8-10 Zn rich interval
4m 2.2 Width (m); Znc grade
- Zinc rich clay zone >3% Zn
- Zinc rich clay zone >1% Zn

PLAN OF ZINC RICH CLAYS
Scale 1:1000



ZINC RICH CLAY SECTIONS
(Looking North-East)
Scale 1:500

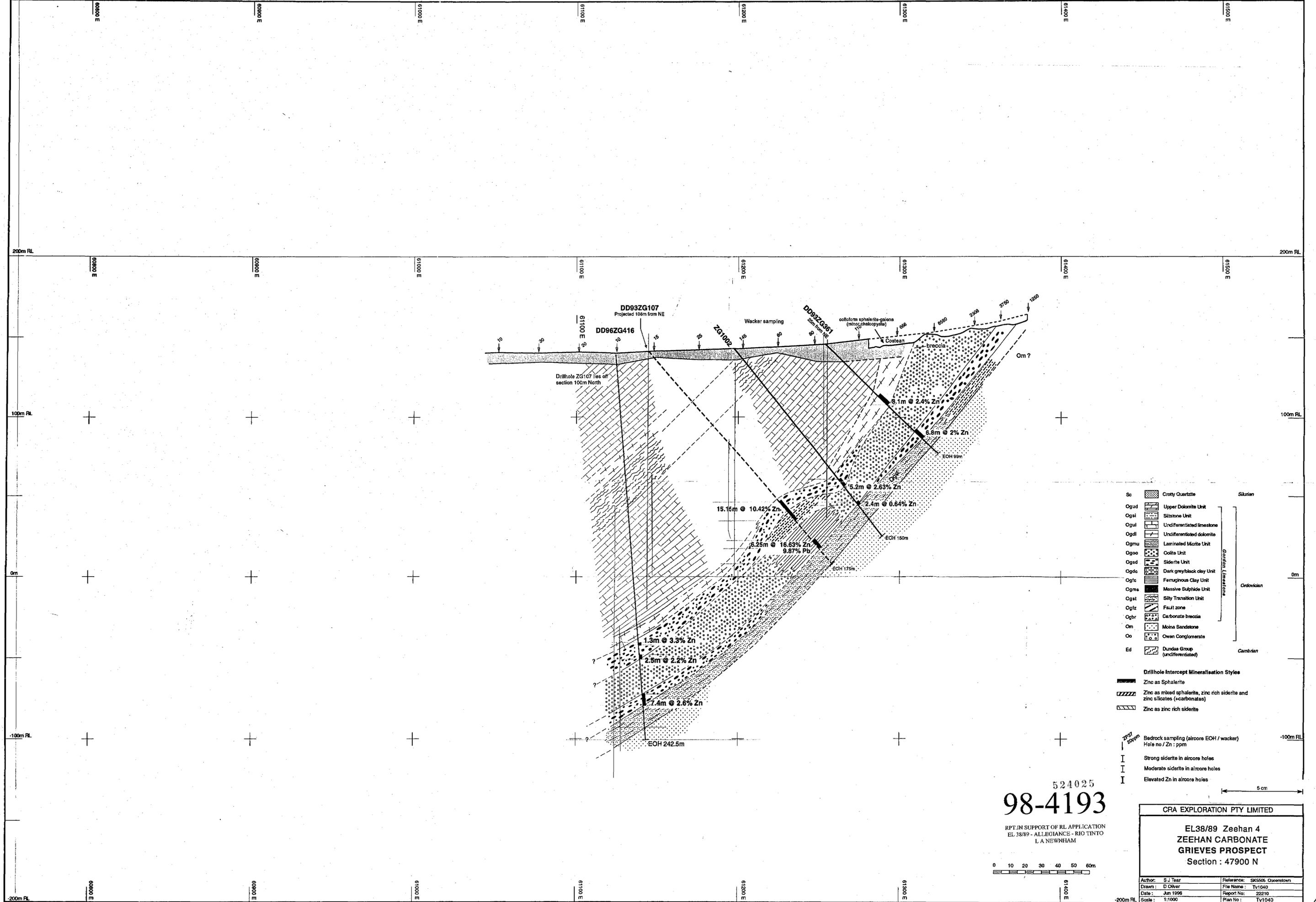
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5 cm

98-4193

RPT. IN SUPPORT OF RL APPLICATION
EL 38/89 - ALLEGANCE - RIO TINTO
L.A. NEWNHAM

NEWNHAM EXPLORATION AND MINING SERVICES <i>Serving the Minerals Industry</i>		COMPILED: L.A.K. DATE: June 1998
ALLEGANCE-RIO TINTO JOINT VENTURE GRIEVES SIDING PROJECT EL 38/89		DRAWN: G.M.B.
SECONDARY (CLAY) SURFICIAL RESOURCE		REVISIONS:
SCALE: AS SHOWN	FIGURE NO.	

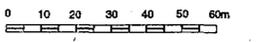


Sc	Crouty Quartzite	Silurian
Ogud	Upper Dolomite Unit	Gordon Limestone
Ogsl	Siltstone Unit	
Ogul	Undifferentiated limestone	
Ogdl	Undifferentiated dolomite	
Ogmu	Laminated Murtie Unit	
Ogoo	Colite Unit	
Ogsl	Siderite Unit	
Ogdc	Dark grey/black clay Unit	
Ogfc	Feruginous Clay Unit	
Ogms	Massive Sulphide Unit	
Ogst	Silty Transition Unit	Ordovician
Ogfs	Fault zone	Cambrian
Ogbr	Carbonate breccia	
Om	Moine Sandstone	
Oo	Owen Conglomerate	
Ed	Dundas Group (undifferentiated)	

- Drillhole Intercept Mineralisation Styles**
- Zinc as Sphalerite
 - Zinc as mixed sphalerite, zinc rich siderite and zinc silicates (+carbonates)
 - Zinc as zinc rich siderite
- Bedrock sampling (aircore EOH / wacker)**
- Hole no / Zn : ppm
 - Strong siderite in aircore holes
 - Moderate siderite in aircore holes
 - Elevated Zn in aircore holes

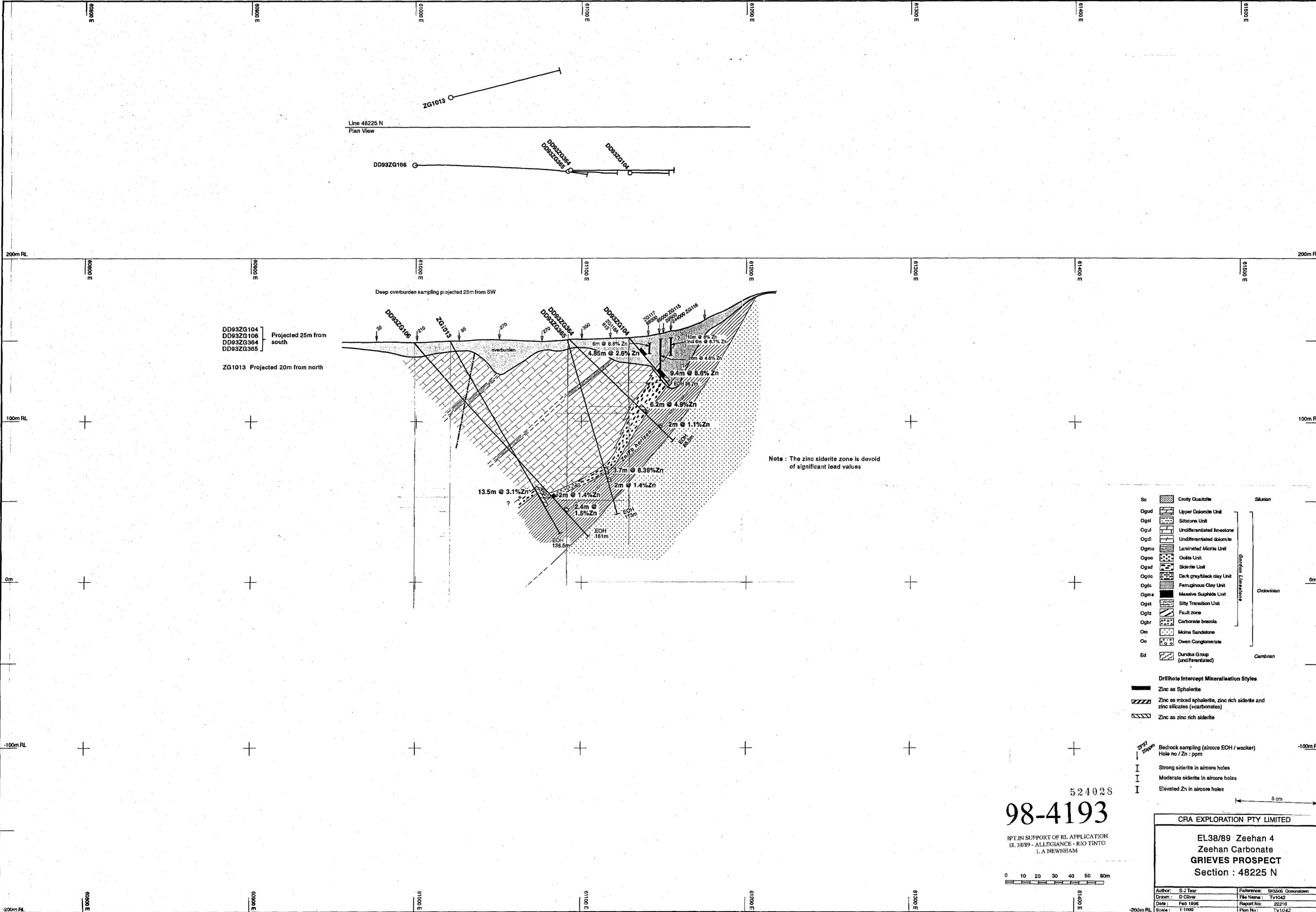
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RPT. IN SUPPORT OF RL APPLICATION
EL 38/89 - ALLEGIANCE - RIO TINTO
L.A. NEWNHAM



CRA EXPLORATION PTY LIMITED	
EL38/89 Zeehan 4 ZEEHAN CARBONATE GRIEVES PROSPECT Section : 47900 N	
Author: S J Toar	Reference: SKS06 Ozeerslow
Drawn: D O'Leary	File Name: Tv1040
Date: Jun 1998	Report No: 22210
Scale: 1:1000	Plan No: Tv1040

6(6)



DD93ZG104
DD93ZG106
DD93ZG364
DD93ZG365
Projected 25m from south

ZG1013 Projected 20m from north

Deep overburden sampling projected 25m from SW

Note: The zinc siderite zone is devoid of significant lead values

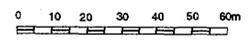
- | | | |
|------|---------------------------------|------------|
| Sc | Crofty Quartzite | Silurian |
| Ogud | Upper Dolomite Unit | Ordovician |
| Ogsl | Siltstone Unit | |
| Ogul | Undifferentiated limestone | |
| Ogdl | Undifferentiated dolomite | |
| Ogmu | Laminated Micrite Unit | |
| Ogoo | Oolite Unit | |
| Ogsd | Siderite Unit | |
| Ogdc | Dark grey/black clay Unit | |
| Ogfc | Ferruginous Clay Unit | |
| Ogma | Massive Sphalide Unit | |
| Ogst | Silty Transition Unit | Cambrian |
| Ogtz | Fault zone | |
| Ogbr | Carbonate breccia | |
| Om | Moine Sandstone | |
| Oo | Owen Conglomerate | |
| Ed | Dundas Group (undifferentiated) | |

- Drillhole Intercept Mineralisation Styles**
- █ Zinc as Sphalerite
 - ▨ Zinc as mixed sphalerite, zinc rich siderite and zinc silicates (+carbonates)
 - ▧ Zinc as zinc rich siderite

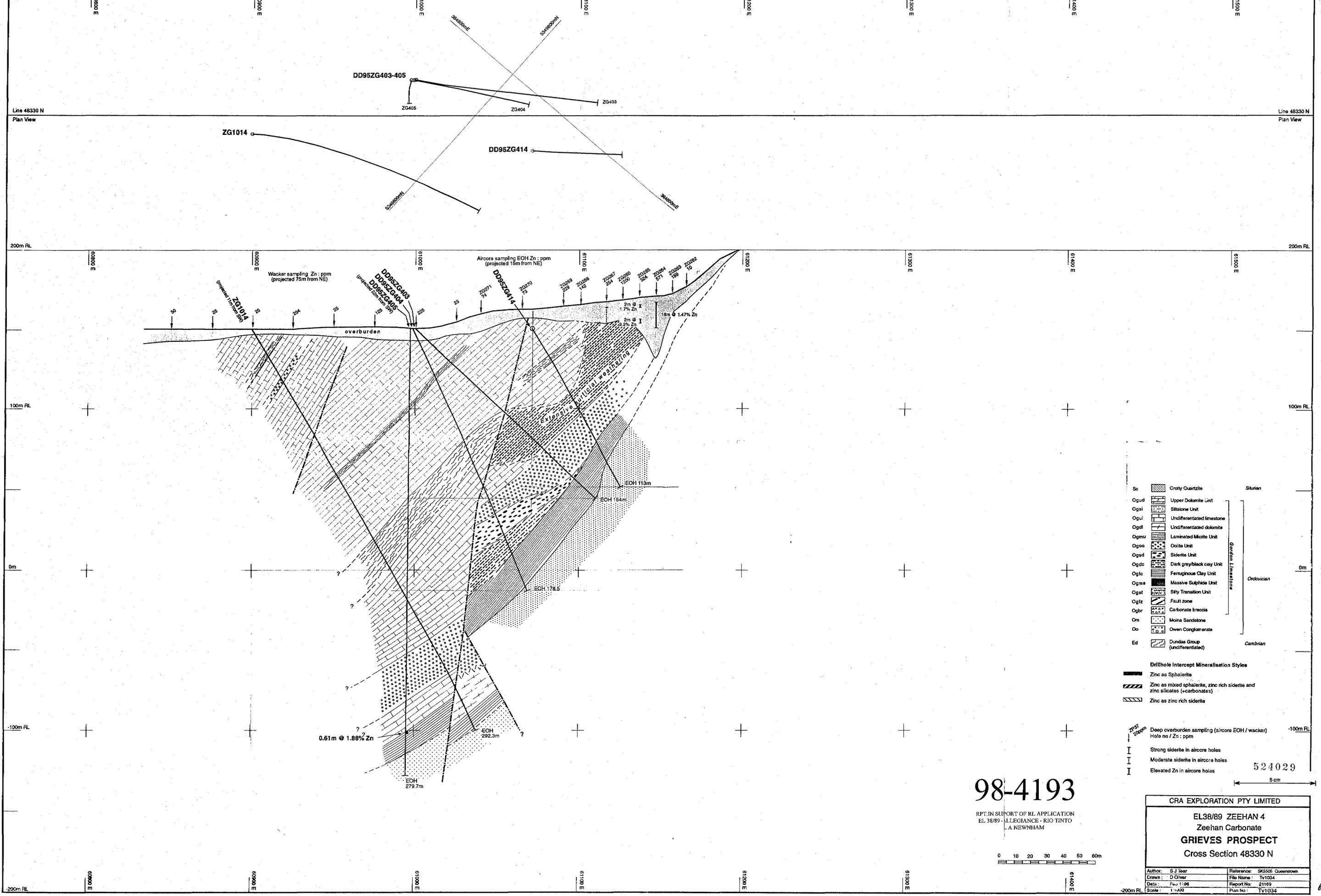
- Drillhole Intercept Mineralisation Styles**
- █ Bedrock sampling (aircore EOH / wacker)
Hole no / Zn : ppm
 - I Strong siderite in aircore holes
 - I Moderate siderite in aircore holes
 - I Elevated Zn in aircore holes

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RPT IN SUPPORT OF RL APPLICATION
EL 38/89 - ALLEGIANCE - RIO TINTO
L.A. NEWNHAM



CRA EXPLORATION PTY LIMITED	
EL38/89 Zeehan 4 Zeehan Carbonate GRIEVES PROSPECT Section : 48225 N	
Author: S J Teer	Reference: SK6265 Queenstown
Drawn: D Clive	File Name: TV1042
Date: Feb 1996	Report No: 2210
Scale: 1:1000	Plan No: TV1042



Code	Description	Stratigraphic Unit
Sc	Crotty Quartzite	Silurian
Ogud	Upper Dolomite Unit	Ordovician
Ogsi	Silstone Unit	
Ogul	Undifferentiated limestone	
Ogdl	Undifferentiated dolomite	
Ogdm	Laminated Micrite Unit	
Ogdo	Siderite Unit	Cambrian
Ogds	Siderite Unit	
Ogdc	Dark grey/black clay Unit	
Ogfc	Ferruginous Clay Unit	
Ogms	Massive Sulphide Unit	
Ogat	Silty Transition Unit	
Ogfs	Fault zone	
Ogbr	Carbonate breccia	
Om	Moira Sandstone	
Oo	Owen Conglomerate	
Ed	Dundas Group (undifferentiated)	

Drillhole Intercept Mineralisation Styles

Zinc as Sphalerite

Zinc as mixed sphalerite, zinc rich siderite and zinc silicates (+carbonates)

Zinc as zinc rich siderite

Deep overburden sampling (aircore EOH / wacker)
Hole no / Zn / ppm

Strong siderite in aircore holes

Moderate siderite in aircore holes

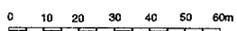
Elevated Zn in aircore holes

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5 cm

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RPT IN SUPPORT OF RL APPLICATION
EL 38/89 - ALLEGIANCE - RIO TINTO
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CRA EXPLORATION PTY LIMITED	
EL38/89 ZEEHAN 4	
Zeehan Carbonate	
GRIEVES PROSPECT	
Cross Section 48330 N	
Author: S J Isar	Reference: SK505 Ousestow
Drawn: D Oliver	File Name: Tv1034
Date: Feb 1998	Report No: 21169
Scale: 1:1000	Plan No: TV1034

6/8

