

# **ZEEHAN ZINC LIMITED**

**Mining Licenses: 43M/85, 19M/1995, 123M/47 &  
9M/2002**

**Exploration Licenses: 20/2002 and 30/2002  
Western Tasmania**

## **RESOURCES ESTIMATION and CLASSIFICATION UPDATE**

**Prepared By**



**COTLCO PTY. LTD.**

**A.C.N. 068 037 669**

**September 2005**



**COTLCO Pty. Ltd.**

A.C.N. 068 037 669

13 Warrawee Court

Clifton Springs, Vic. Aust 3222

Email: [cotlco@bigpond.net.au](mailto:cotlco@bigpond.net.au)

Tel: (613) 5253 2789

Fax: (613) 5251 2764

This Report was prepared by Dr John W Cottle of Cotlco Pty. Ltd. for Zeehan Zinc Limited. Dr Cottle is a Fellow and Chartered Professional of the Australasian Institute of Mining and Metallurgy (AusIMM) and meets the requirements of a competent person in accordance with the Joint Ore Reserves Committee (JORC) guidelines on the Australasian Code for the Reporting of Mineral Resources and Ore Reserves (2004).

A large, stylized handwritten signature in black ink, reading "J W Cottle".

John W Cottle  
Principal

September 27, 2005

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## 1.0 Introduction

Zeehan Zinc Limited (Zeehan Zinc) requested Cotlco Pty. Ltd. (Cotlco) carry out a resources estimation and classification update of their Silver (Ag), Lead (Pb), Zinc (Zn) lodes in the Comstock and Oceana areas in the proximity of Zeehan in Tasmania. This update follows an initial estimate made by Cotlco in February, 2005 and encompasses updates for the West Comstock and Allison's lodes, as well as the Oceana deposit, following recent additional drilling on these properties. This report therefore, is an adjunct to the initial report. The exploration leases concerned and held by ZZ Exploration Pty. Ltd. include EL 30/2002, surrounding Oceania Tasmania Pty. Ltd. Mining Licences ML 123M/47, ML 43M/85, ML 19M/95, and ML 9M/02, encompassing the Comstock Area, and EL 20/2002 which covers the Oceana deposit (see Figure 1).

<b>Table 5. Zeehan Zinc Tasmania Estimated Resources</b>				
Classification	Tonnes	Pb%	Zn%	Ag g/t
<b>West Comstock Estimated Resources</b>				
Measured	5,070	3.2	4.1	40
Inferred	12,710	1.7	4.3	24
<b>Sub-Total Resources</b>	<b>17,780</b>	<b>2.1</b>	<b>4.2</b>	<b>29</b>
<b>Balstrup Fault Lode</b>				
Inferred	4,600,000	3.3	5.7	35
<b>Allison's Lode Estimated Resources</b>				
Measured				
Stockpiled Ore	3,300	14.5	21.5	540
Insitu Resource	4,120	3.9	12.1	67
<b>Total Measured</b>	<b>7,420</b>	<b>8.6</b>	<b>16.3</b>	<b>277</b>
Indicated				
Insitu Resource	30,160	2.0	7.2	36
Inferred				
Insitu Resource	26,150	1.9	7.0	35
<b>Sub-Total Resources</b>	<b>63,730</b>	<b>2.7</b>	<b>8.2</b>	<b>64</b>
<b>Oceana Deposit</b>				
Inferred				
Open Pit	208,100	7.5	1.7	57
Other	1,891,900	9.4	2.7	91
<b>Sub-Total Resources</b>	<b>2,100,000</b>	<b>9.2</b>	<b>2.6</b>	<b>88</b>
<b>Total Resources</b>				
Measured	12,490	6.4	11.3	181
Indicated	30,160	2.0	7.2	36
Inferred	6,738,860	5.1	4.7	51
<b>Grand Total</b>	<b>6,781,510</b>	<b>5.1</b>	<b>4.8</b>	<b>52</b>



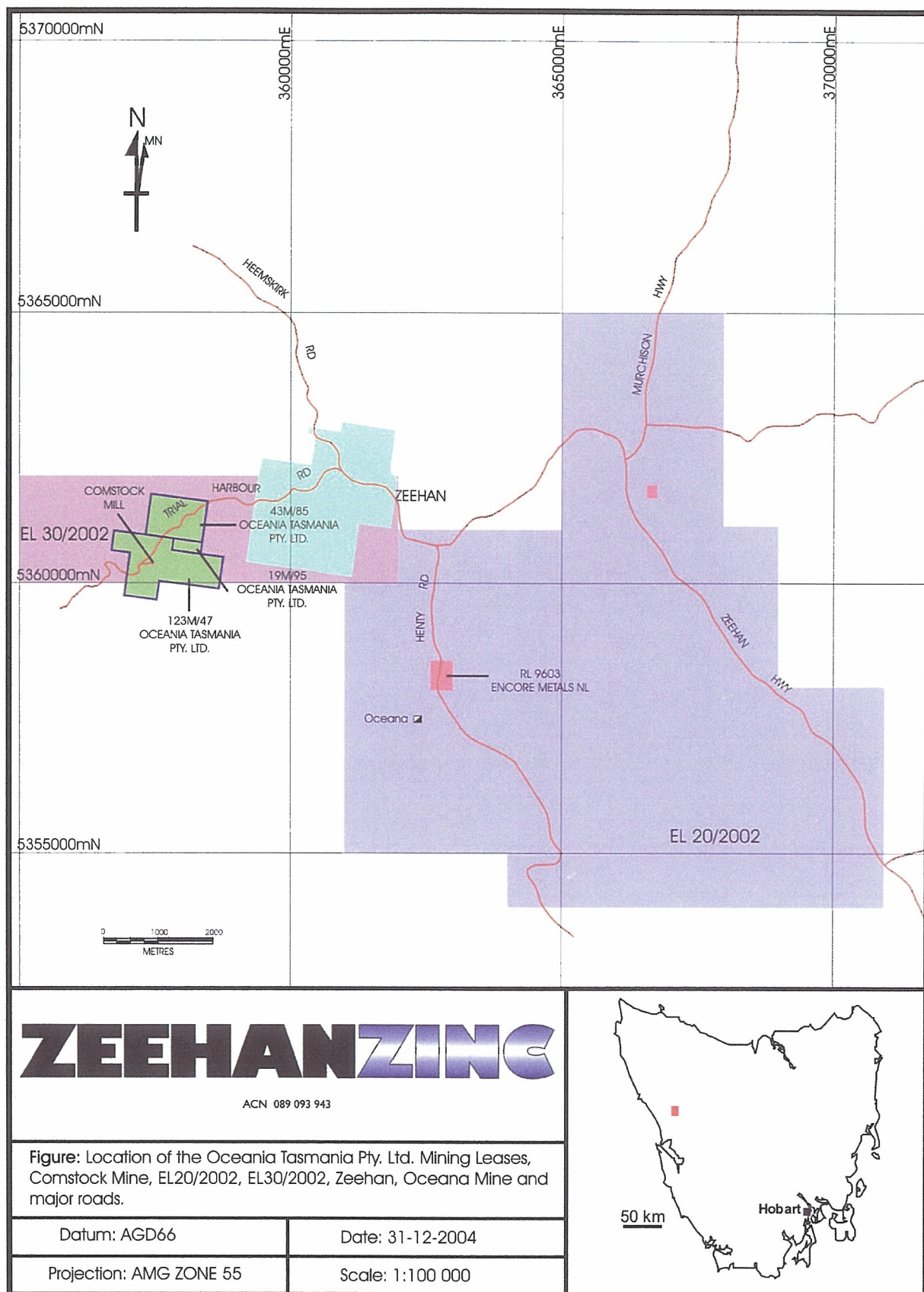


Figure 1. Exploration Licenses and Mining Leases (after Zeehan Zinc)

## **2.0 Summary, Conclusions and Recommendations**

### **Summary**

The resources estimated in this report comply with the Australasian Code for Reporting of Mineral Resources and Ore Reserves (The JORC Code) 1999. The estimates and classifications according to JORC are listed in the preceding Table in the Introduction.

### **Conclusions**

Only a small portion of these resources are classifiable in anything other than the **Inferred** category according to JORC. This stems mainly from the variability of the mineralisation, as to both grade and thickness as well as the need for regular close spaced drilling.

### **Recommendations**

However, if the drilling/sampling density is increased and spaced more regularly both along strike and down dip, then the potential for higher classification of a good proportion of the current estimated resources would be strong.

## **3.0 Exploration Database**

Site visits were undertaken and geology, interpretation, and surface exposures have been reviewed. During Office visits (and subsequently), Zeehan Zinc provided a number of past exploration, geological, and resource estimation reports. Various computerised data sets were also provided, comprising drill hole, costean, and traverse samples, including collar coordinates, downhole surveys, sample interval Pb, Zn, Ag assays, and downhole lithological logs.

The data has been scrutinised on a selective basis for defects such as data entry errors etc., by comparing hardcopy drill hole logs with the actual respective down hole intervals in drill core for a number of holes. Assay certificates were also compared with the downhole logs and the

assay values recorded in electronic form. In virtually all instances each data recording medium compared satisfactorily with the others. The adequacy of geological logging and the location of drill holes in 3D space etc. were also spot checked and found to be satisfactory.

Blind duplicate and check assaying programs have been initiated and now are a routine part of drilling/sampling campaigns and will ensure no systematic biases creep into the recorded data. Specific gravity testing of drill cores has been performed with determinations on over 80 samples now available.

#### **4.0 Interpretation and Modelling**

A comprehensive understanding of the geological/lithological and structural setting together with mineralisation formation interpretations was gleaned by reviewing the many available reports (see References). This information will not be repeated here in detail and the interested reader is referred to the references. Suffice it to say that the Zeehan field comprises a highly complex package of isoclinally folded, faulted and metamorphosed, siliceous (ie. shales, sandstone etc.) and carbonaceous (ie. dolomite and limestones), late Proterozoic and early Palaeozoic, sediments and volcanic tuffs of the Crimson Creek Formation and Oonah Formation, respectively. Intrusion of the Heemskirk Granite (underneath ?) and out cropping to the west of the Zeehan field is considered the source of mineralisation and much of the local structural deformation.

At Comstock the mineralisation occurs as both fissure-fill veins in shale and volcanic host rocks and fissure-replacement zones in carbonate, limestone and dolomite, rocks. The fissure-replacement zones also appear to reflect the swell category of 'pinch and swell' mineralisation probably due to tensional dilation in the more ductile carbonate rocks, resulting in the development of high grade virtually 100% massive sulphide pods, ranging in 'ellipsoidal' diameter from centimeters to metres.

The form and habit of the mineralisation ranges from large massive sulphide pods (0.5 to 5m), to disseminated blebs and patches of sulphides in a puggy talcose (weathered dolomite)



groundmass, to relatively thin (0.2 to 1m) sub-parallel vein packages (up to 5m in width). Consequently, while recent drilling has been completed on all lodes that are the subject of this report, the combination of the mineralisation form and habit, along with a still relatively sparse drilling density, renders detailed interpretation and modeling of mineralized lodes difficult.

Due to the current sparsity of samples no geostatistical analysis, variography or kriging was able to be carried out on the data or applied during resources estimation and classification. Resource estimates were made on the basis of 'polygons of influence' attached to each drill hole intercept or surface sample point. The generally widely spaced sampling of the lode horizons relative to the mineralisation form and habit described above leaves uncertainty as to the interpreted spatial continuity of the mineralisation grade and thickness and as such is reflected in the ultimate classification of the predominant part of estimated resources in the **Inferred** category.

## 5.0 Resources Estimation and Classification

### West Comstock

West Comstock was a new discovery/surface exposure of mineralisation to the west of the South Comstock open pit that was made at the time of the previous February report. Its approximate position is shown in Figure 2 as a small magenta line, along with the other Comstock Area lodes, drilling, geology and Mining Leases.

Estimation of the resource was made by the interpretation of a sub-vertical mineralisation block encompassing the along-strike and down-dip limits of the new drilling. Calculation of the resource estimate tonnage was achieved by calculating the volume of the block, using an average thickness equal to that of the interpreted drillhole intercepts and applying a density of 3.8 tonnes per cubic metre (tcm). The grade of the block was set to the average grade of the interpreted intercepts within the block combined with the surface samples used in the previous report. These intercepts are listed in Table 1.



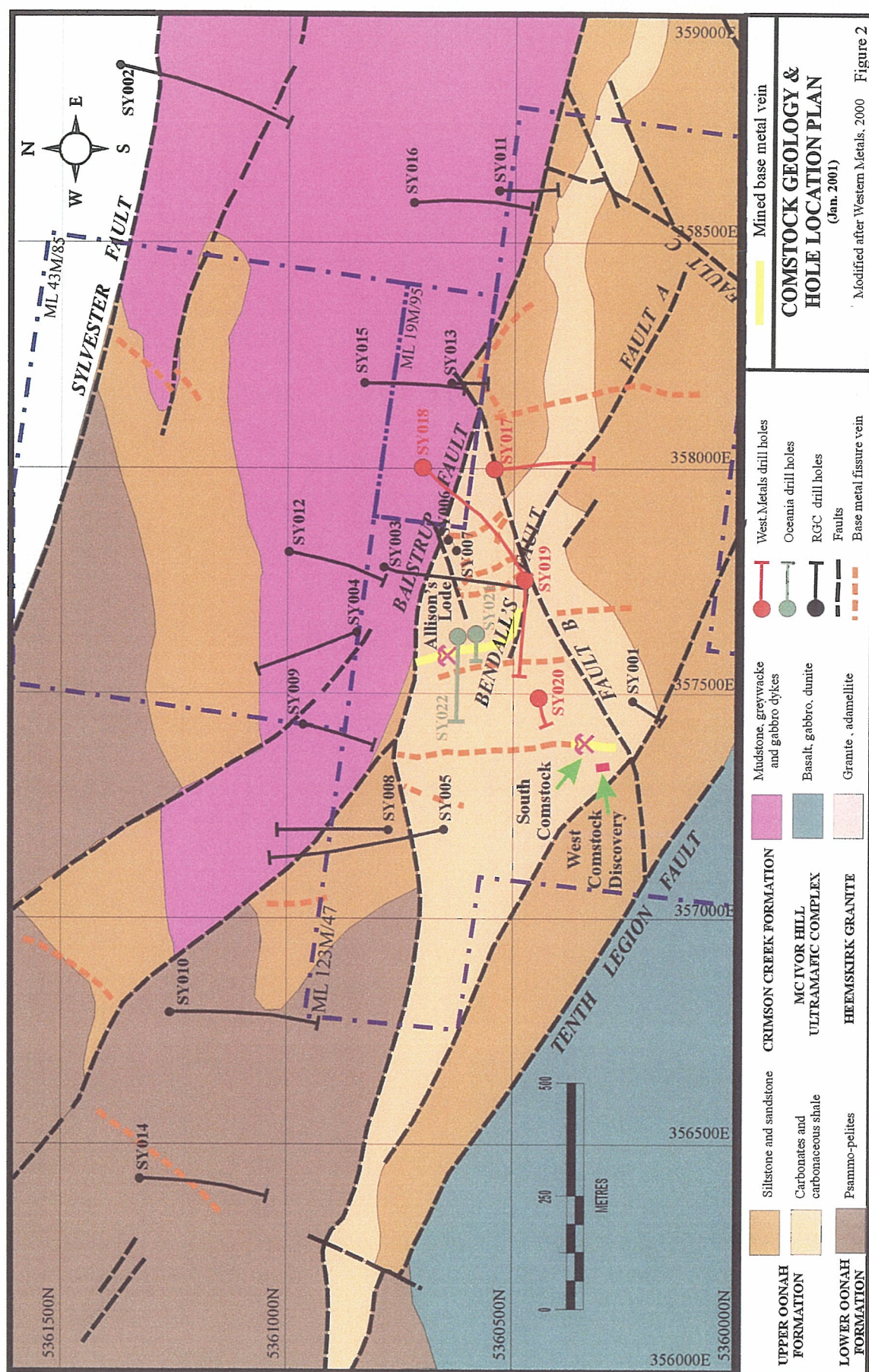


Figure 2: Comstock - Balstrup Fault Area Geology, Drilling and Lodes (After Zeehan Zinc & Western Metals)



**Table 1. West Comstock Lode Mineralisation Intercepts**

Holeid	Length	True Width	Pb%	Zn%	Agppm	Zn+Pb
SY023	17	0.30	1.97	7.81	47	9.77
SY024	12	0.21	1.41	1.82	38	3.23
SY025	2	0.03	0.26	1.42	0	1.68
SY026	7	0.12	1.34	1.69	1	3.03
SY027	12	0.21	0.63	2.21	5	2.84
SY028	18	8.29	1.55	5.82	23	7.37
SY029	5	1.64	0.20	1.19	5	1.39
SY030	3	1.25	0.03	0.42	0	0.44
SY031	1	0.34	0.69	1.89	8	2.58

Based on the surface samples and the continuity manifest by relevant drill intercepts, the top 4m of the defined resource has been classified in the **Measured** category with the remainder being classified as **Inferred** in accordance with JORC guidelines. The total estimate of 17,780 tonnes at 2.1 % Pb, 4.2 % Zn, and 29 g/t of Ag, is slightly up in tonnage but markedly down in grade from that estimated in February. The dominant factor in this down grading is that the drillhole grade intercepts suggest that the surface (grab) samples, while possibly indicative of surface grade, are not well representative of the in-situ mineralisation resource grade.

West Comstock resource estimates classified according to Jorc are included (with all other estimates for comparison) in Table 5.

#### Balstrup Fault Lode

No new drilling was carried out on the Balstrup Fault lode and so the resource estimate is not updated in this report. However, the resource estimated in February is included here (see Table 5) for completeness.

#### Allison's Lode

Allison's Lode, with pit floor traverses and plan projected drill holes are shown in Figure 3. This Figure does not include the most recent drilling but is included here for orientation purposes.



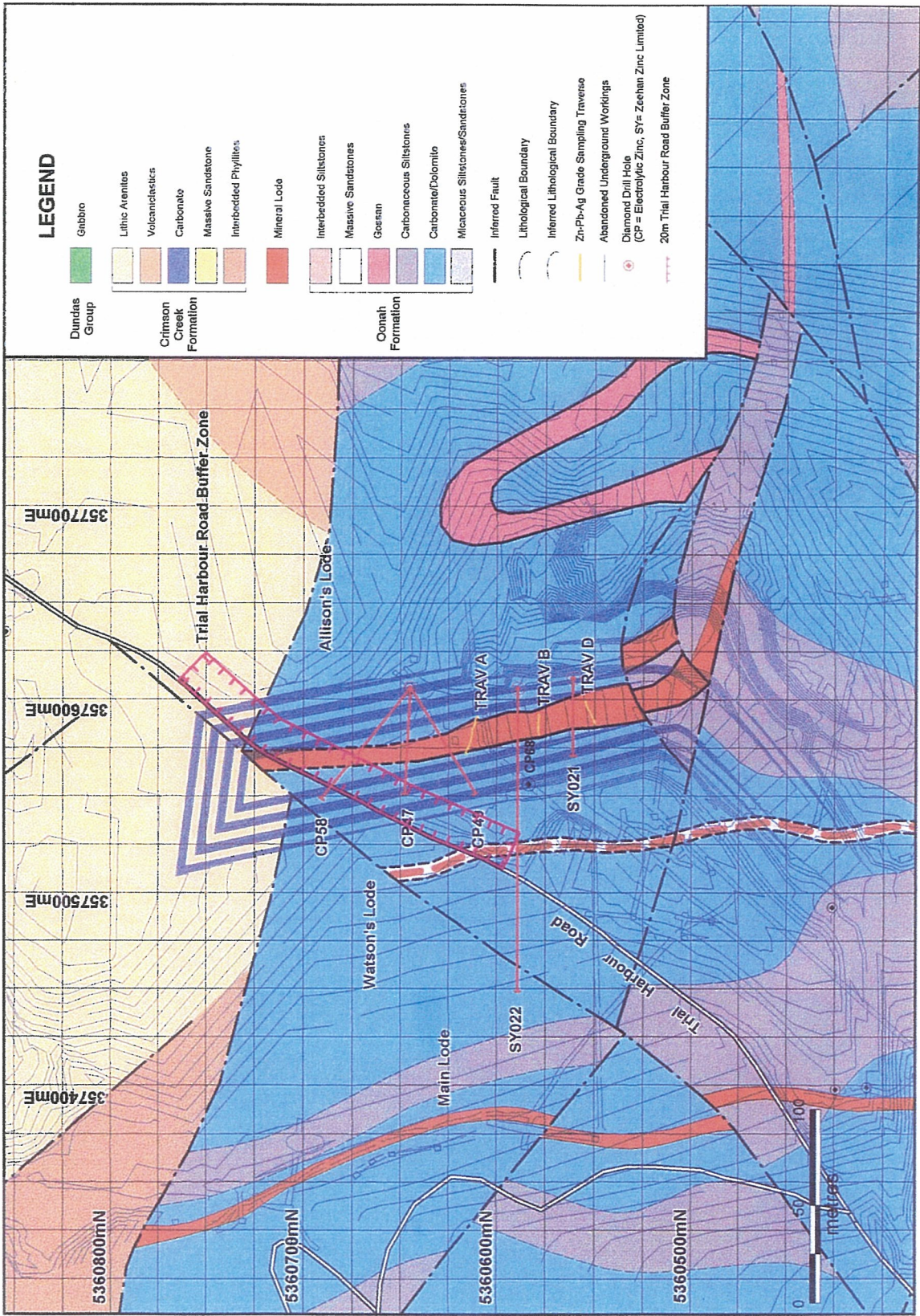


Figure 3. Allison's Lode Pit Floor Plan (Pre recent Drilling)



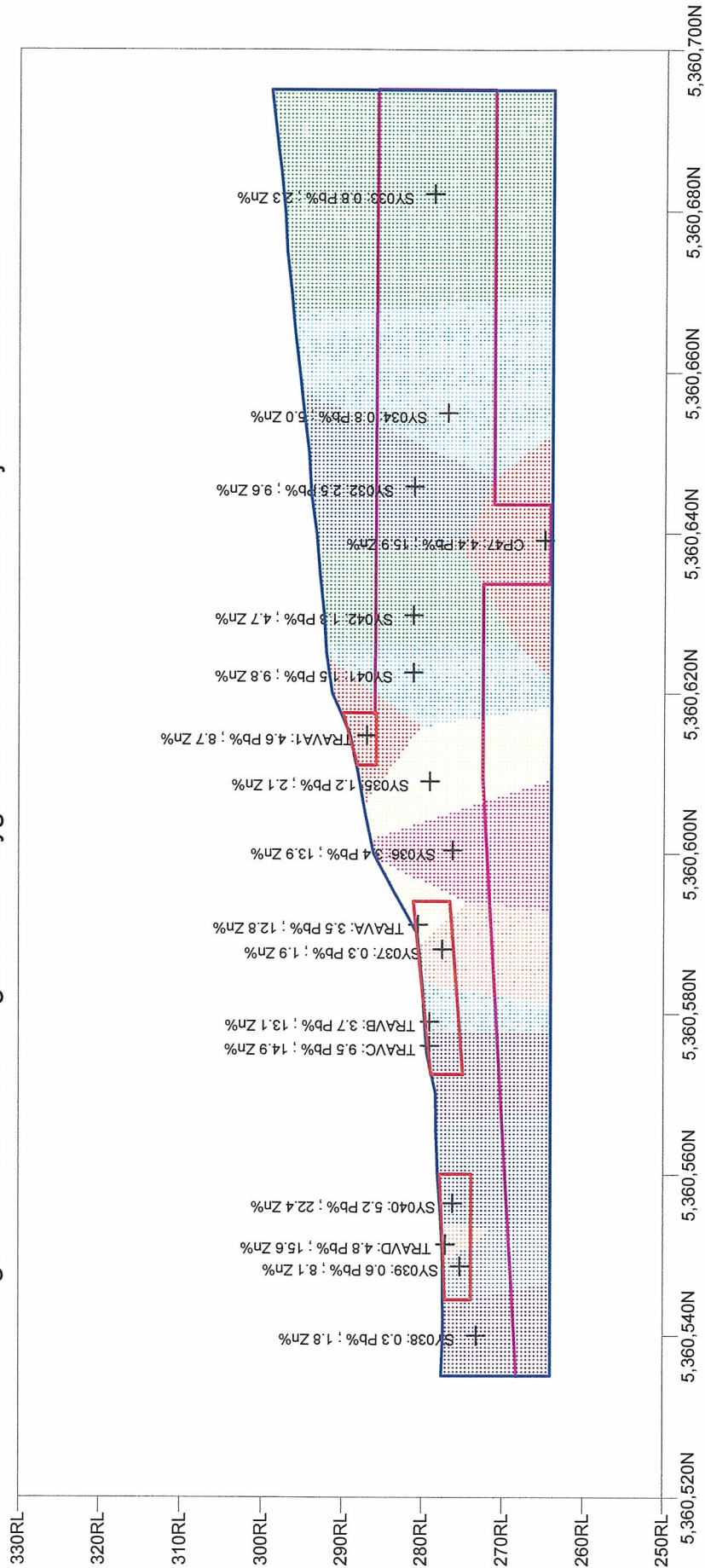
Nominal Open Pit resource estimates were generated for the varying depth extent from surface to RL (Reduced Level) 264m. These were calculated by applying ‘polygons of influence’ for each drillhole intercept. The intercepts are listed in Table 2 and the ‘polygons of influence’ pertaining to each intercept are shown in Figure 4.

<b>Table 2. Allison's Lode Mineralisation Intercepts</b>						
Holeid	Length	True Width	Pb%	Zn%	Agppm	Zn+Pb
CP47	2.1	2.1	4.4	15.9	0	20.3
SY032	14.0	5.1	2.5	9.6	69	12.1
SY033	15.0	3.3	0.8	2.3	20	3.1
SY034	11.0	4.3	0.8	5.0	15	5.8
SY035	19.0	6.6	1.2	2.1	22	3.3
SY036	7.0	1.8	3.4	13.9	48	17.3
SY037	2.0	1.0	0.3	1.9	11	2.1
SY038	5.0	1.1	0.3	1.8	8	2.1
SY039	5.0	2.9	0.6	8.1	17	8.7
SY040	4.0	2.1	5.2	22.4	127	27.6
SY041	20.0	8.0	1.5	9.8	28	11.3
SY042	16.0	3.9	1.3	4.7	17	6.0
TRAVA	17.0	16.1	3.5	12.8	47	16.3
TRAVA1	15.0	14.5	4.6	8.7	45	13.3
TRAVB	11.0	10.7	3.7	13.1	109	16.8
TRAVC	7.0	1.6	9.5	14.9	117	24.4
TRAVD	15.0	15.0	4.8	15.6	96	20.4

The red outlines in Figure 4 enclose those parts of the Allison's resource that have been classified in the **Measured** category according to JORC. Similarly the central magenta zone (including the surface towards the southern end of the resource) is classified as **Indicated**, and the remaining portions outside (above and below) this central band are classified as **Inferred** according to JORC.

The total open pit resource at Allison's is estimated as 63,730 tonnes at 2.7 % Pb, 8.2 % Zn, and 64 g/t Ag. These figures are shown in Table 5 and include an estimate of stockpiled Allison's ore of 3,300 tonnes at 14.5 % Pb, 21.5 % Zn, and 540 g/t Ag. This latter estimate was calculated volumetrically from a topographical survey, applying the ‘two-thirds’ ‘marbles-in-a-jar’ rule because of the predominantly ‘boulder’ nature of the ore. A density of

Figure 4. Allisons Longitudinal Polygonal Resource Blocks Projection Schematic



3.8 tcm, derived from the average of 46 stockpile ore density determinations, was applied to both stockpile ore and in-situ Allison's resource volumes.

### Oceana

The location of the Oceana deposit is shown on Figure 1. The deposit comprises variable thickness veins, disseminations, and vein stockworks of galena rich and, relatively zinc poor mineralisation. Post mineralisation faulting controls the extents and locally disrupts the mineralisation. Local geology and the mineralisation body are shown in Figure 5.

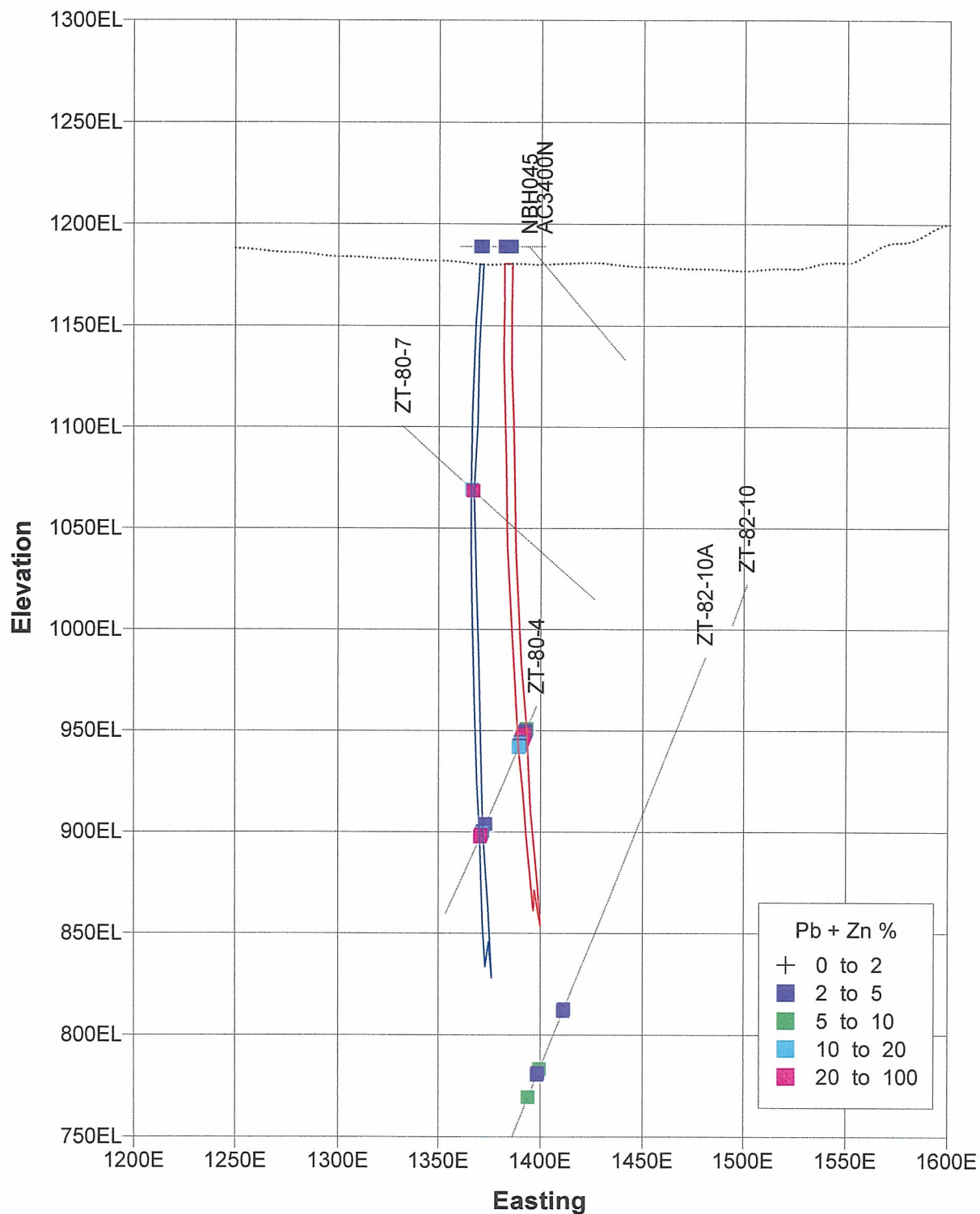
Three detailed resource estimates of the deposit have been carried out. One by Cyprus in 1988 (2.5 mt at 9.4% Pb, 4.0% Zn, and 75 g/t Ag), another by Pasminco in 1994 (2.5 mt at 7.5% Pb, 2.6% Zn, and 50 g/t Ag), and the third in the previous February report by Cotlco.

The current estimation is based on all drill hole intercepts, traverse and costean data, together with three new, recently (mid-2005) drilled holes. Further, this estimation relates to a nominal open pit resource to a depth from surface of 50m. Composited intercepts within costeans and drillholes were included as defining the resource if they comprised at least 4m of at least 5% combined Pb and Zn. Because of the variable thickness, grade, and distance between drillhole intercepts most other intercepts at better than 1.5 % combined were also included to best reflect the variability and thus model potentially barren zones both along stike and down dip within the resource. Further, because of this lack of continuity, and too ensure it is not over-estimated, the area of influence of each intercept has been adjusted to one quarter (0.25) of the distance between neighbouring holes. In this way only half of the zone between intercepts has been included as estimated resources, with the remainder being ascribed as 'barren'.

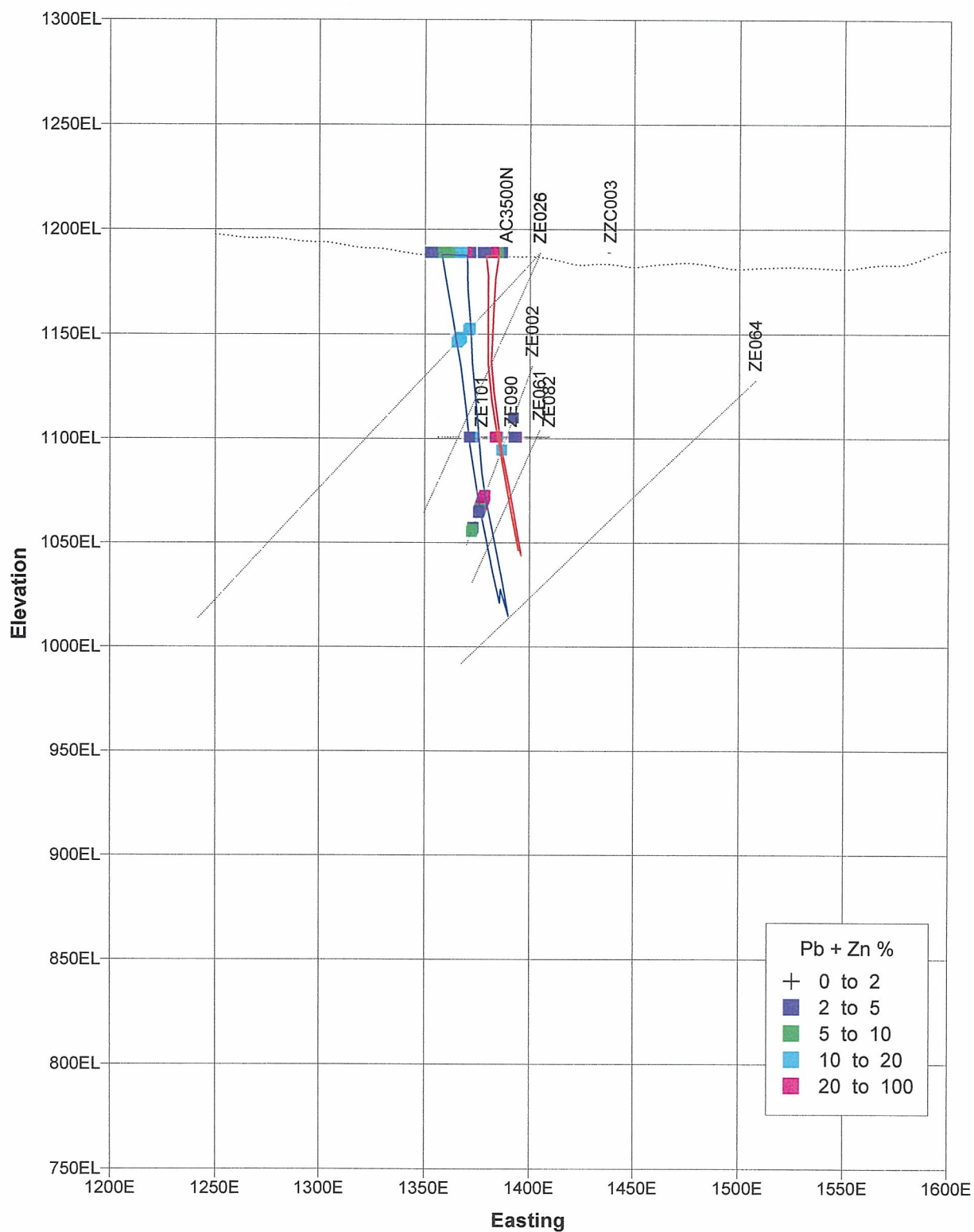
Prior to estimation, drillhole assays and composited intercepts were used to generate a basic interpretation of the mineralisation at Oceana. This identified two sub-parallel main zones variably separated from each other from 0m up to approximately 15m. These zones were interpreted on to 25m east-west (local grid) sections from 3375N to 3700N. Examples of these are included as Figures 6, 7, and 8.



**Figure 6. Section 3400N Drillhole Assays and Interpreted Orezones Schematic**

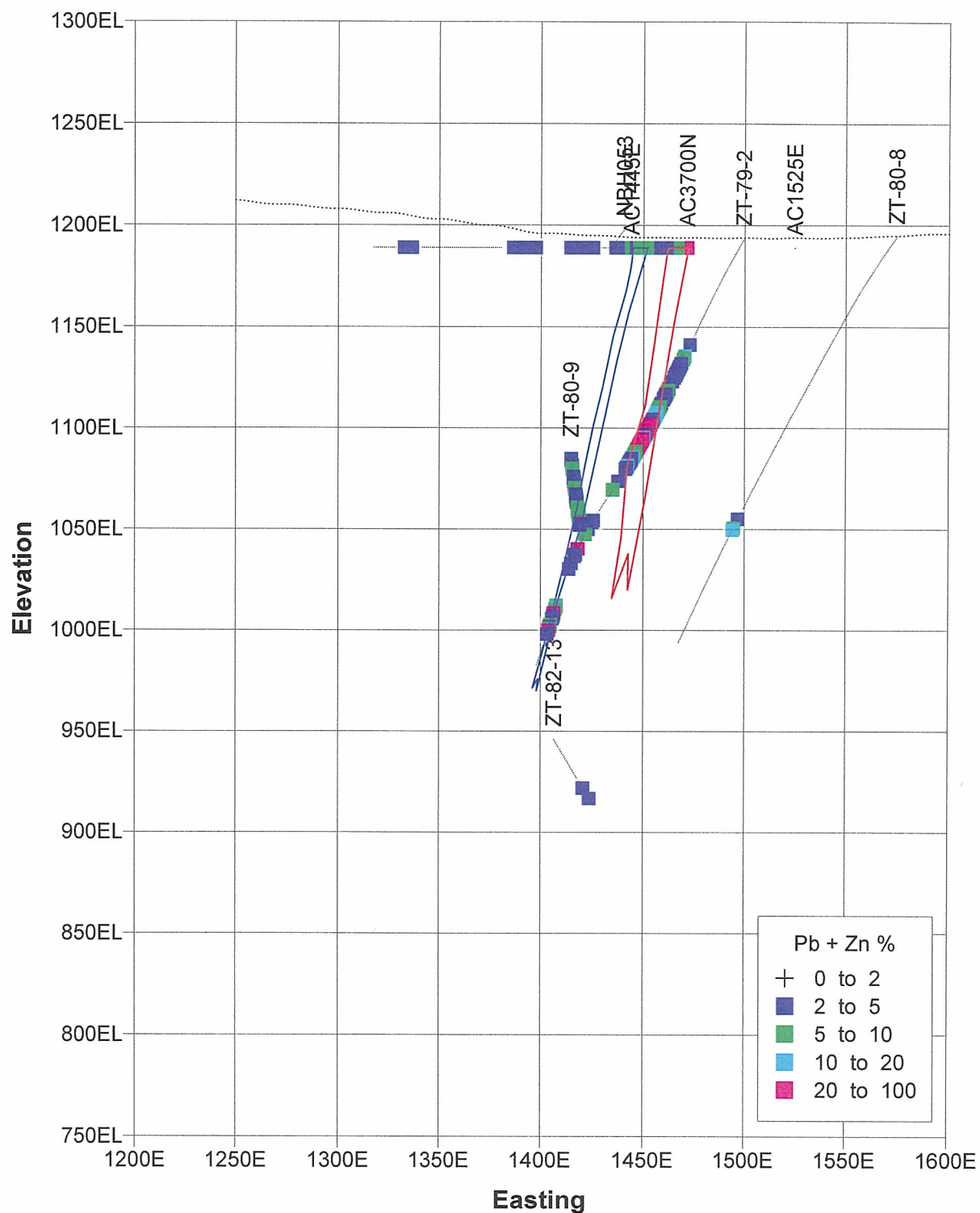


**Figure 7. Section 3500N Drillhole Assays and Interpreted Orezones Schematic**





**Figure 8. Section 3700N Drillhole Assays and Interpreted Orezones Schematic**



‘Polygon areas of influence’ were then applied to each defined intercept together with the application of the intercept true width to calculate volumes. A tonnage factor of 2.7 tcm was applied, and weighted average grades were estimated for Pb, Zn, and Ag with each intercept being weighted by its interpreted volume of influence, adjusted accordingly, as per the above discussion. The applied intercepts for both East and West mineralisation zones are listed in Tables 3 and 4, respectively. The area of influence polygons are shown in Figures 9 and 10. The derived nominal open pit resource estimate was 208,100 tonnes at 7.5% Pb, 1.7% Zn, and 57 g/t Ag. These figures, along with the ‘other’ remaining resources estimated in February 2005, are shown in Table 5. Because of the grade, thickness, and separation distance variability between intercepts discussed above, it is considered that both the nominal open pit, and ‘other’ resources can only be classified in the **Inferred** category according to JORC.

**Table 3. Oceana East Lode Mineralisation Intercepts**

Holeid	Length	True Width	Pb%	Zn%	Agppm	Zn+Pb
AC3450N	10.00	10.00	8.57	0.24	73.20	8.81
AC3500N	10.00	10.00	11.80	0.92	172.00	12.73
AC3600N	14.00	14.00	6.73	2.09	63.21	8.83
AC3650N	18.00	18.00	2.00	3.46	31.50	5.47
AC3700N	15.00	15.00	8.17	2.62	23.33	10.79
ZE027	16.80	10.34	5.80	0.50	1.90	6.30
ZZC004	12.00	8.48	18.27	4.23	265.92	22.50
ZZE2	37.00	18.62	6.06	1.49	14.24	7.55

**Table 4. Oceana West Lode Mineralisation Intercepts**

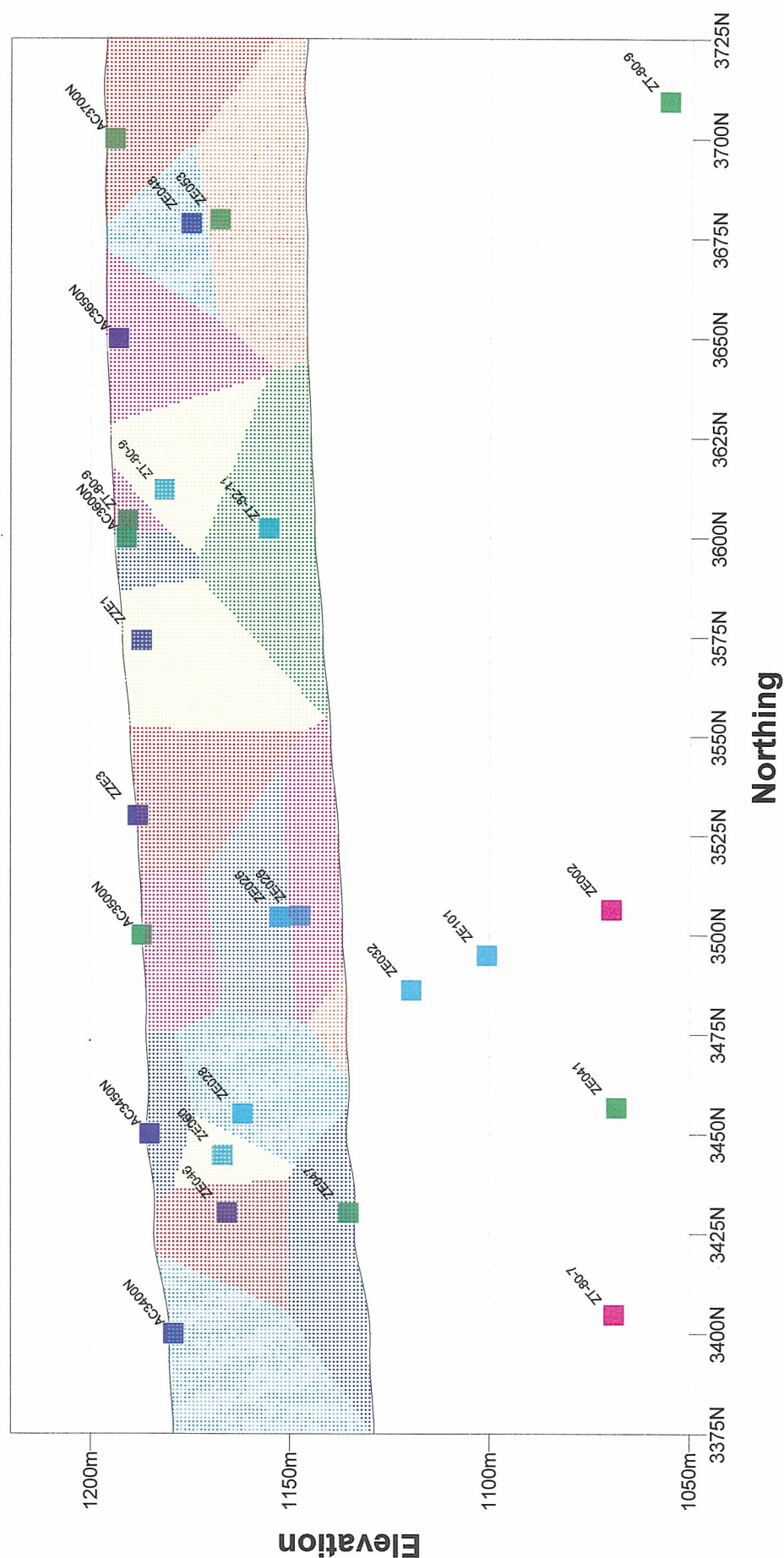
Holeid	Length	True Width	Pb%	Zn%	Agppm	Zn+Pb
AC3500N	6.00	6.00	14.82	0.64	101.67	15.46
AC3600N	10.00	10.00	6.82	0.66	30.80	7.47
AC3700N	11.00	14.00	4.75	0.43	61.64	5.18
ZE032	10.00	5.52	10.30	0.70	3.80	11.00
ZE053	30.78	8.32	4.46	1.22	8.70	5.69
ZT-82-11	7.00	4.86	9.35	1.83	36.86	11.18

A.C.N. 068 037 669





**Figure 10. Long Section 1400E Drillhole Pb+Zn Intercepts  
Western Zone Open Pit Polygonal Areas of Influence**



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## 6.0 References

Cotlco Pty. Ltd. 2005 Zeehan Zinc Limited, Resources Estimation and Classification 2005.

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