

271002

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LIST OF PLATES(VOLUME 2)

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ZEEHAN PROJECT RESOURCE ESTIMATIONSUMMARY

Geological resources within the Zeehan Project area at 18 August 1982 are estimated to be:

Total Mineralised Envelope (0.1% Sn cut off)

LENS	CATEGORY	TONNES x 10 ⁶	% Sn	% Cu	% Zn	% Pb	g/t Ag
Queen Hill	Indicated	1.8	0.82	0.08	0.45	0.77	33
Severn	Inferred	5.1	0.60	-	-	-	-
Montana	Inferred	0.4	1.22	0.02	2.00	1.41	51
TOTAL		7.3	0.69				10.9

Within the total mineralised envelope higher grade zones are identified. These resources are:

LENS	CATEGORY	TONNES x 10 ⁶	% Sn	% Cu	% Zn	% Pb	g/t Ag
Queen Hill	Indicated	0.93	1.39	0.10	0.47	0.55	28.9
Severn	Inferred	2.37	1.11	-	-	-	-
Montana	Inferred	0.31	1.45	0.02	2.61	1.59	58
TOTAL		3.61	1.21				12.4

DEFINITIONSGeological Resources

The accumulation of a naturally occurring material in or on the earth's crust in such form that extraction of a mineral is technically feasible and potentially beneficial.

Cut Off Grade

A cut off grade is one chosen to provide a basis for decision making.

Indicated Category

Material for which estimates of the quality and quantity have been computed partly from sample analyses and measurements and partly from reasonable geological projections such that actual metal content will have a high probability of being in the range of 70% to 130% of the prediction.

Inferred Category

Material for which estimates of the quality and quantity are based on sampling and considerable geological projection such that the actual metal content is known with a low degree of certainty.

CALCULATION PROCEDURES

The resource was estimated using the following procedure:

- i) Interpret Geological observations
- (ii) Review all mineralisation data together with geology and determine what constitutes an intersection.
- (iii) Accumulate all assay data into "intersections"
- (iv) Estimate Specific Gravity.
- (v) Prepare a file of complete intersection data.
- (vi) Use interpolation procedure to estimate tonnage and grade.
- (vii) Review intersection data to determine if higher grade zones exist.
- (viii) Use interpolation procedure to estimate high grade resource.

Interpret Geological Facts

All diamond drill holes testing the Queen Hill zone of mineralisation, all diamond drill holes testing Severn and Golf Course horizons and all diamond drill holes testing the Montana horizon were collated onto cross sections and level plans at 1:500 scale. In the case of Queen Hill the sections used are at 50 metre spacing; at Severn and Montana they are at 100 metre spacing. Level plans in all areas are at 50 metre spacing. Using the knowledge of the location of the drill holes, geological interpretations were produced in plan and cross section.

Determine Drill Intersections - Total Envelope

For every drill hole, the analytical data was reviewed by comparing the distribution of tin based on analyses with geological observations. Tin occurs within volcanics, dolomites, shales, siltstones and the intercalated shale quartzite unit. Sulphide is observed to occur in several styles.

- . Fine grained, disseminated, bedded and massive, strataform 'syngenetic pyrite'.
- . Coarse grained disseminated to massive pyrite interpreted to be recrystallised.
- . Network and stringer pyrite of varying dimensions and in varying concentration.

. Vein pyrite with significant associated galena and sphalerite.

. Disseminated to massive and network pyrrhotite.

Tin is known to occur as cassiterite and as stannite. It is apparent that in detail, it is neither stratabound (except for Montana) nor is it spatially related to pyrite or pyrrhotite. Consequently the only way of locating the limits of the mineralisation down the drill hole is to use an assay cutoff. In all three lenses 0.1% Sn was used to define the total mineralised envelope. In some cases more than one zone of tin mineralisation occurred in a single drill hole. Two factors were taken into account in deciding whether to separate the zones into different intersections. The geological observations were used as a primary justification. In Queen Hill lens the majority of the mineralisation occurs between the transgressive boundary separating the QS sediments and the volcanic and sediment sequence, and the eastern contact of the western most volcanic unit. (Refer Plate 194). A separation within this zone was in most cases ignored except where it was greater than 5 metres in extent and supported by adjacent intersections. In Severn lens the most significant mineralisation occurs adjacent to the contact between the Crimson Creek sequence on the east and the Quartzite and QS of the Conah sequence on the west. Starting from the west, if a zone greater than 5 metres of less than 0.1% was encountered between two zones of mineralisation, then the easternmost zone was ignored for this assessment. Some mineralisation east of the main zone is evident in drill holes but it is erratic and constitutes an insignificant resource in the context of this assessment.

Prior to finalising the down hole limits of the mineralisation, each intersection was plotted in cross section and long section. The shape of the mineralised zone was interpreted by drawing outlines on cross section and level plan. In circumstances where intersections could not be rationalised, the down hole limits in relevant drill holes were reviewed. It was only necessary to modify one intersection where two mineralised intervals separated by a barren section were accumulated into one intersection.

At the same time, the dip and strike extents of the mineralised envelope were established by rationalising the interpreted limits in plan, cross section and long section.

On final acceptance of the limits down the hole, the assay data for each sample was entered onto disc file on the HP1000 (Z---#-). The average grade for each intersection was then calculated by multiplying the individual sample length by the analytical value for the relevant element using programme ZEOU. No assays are cut. All assays prior to accumulation are rounded to the nearest second decimal place. No account is taken at this stage of the individual sample density measurement. For Severn lens it was decided to ignore the copper, lead, zinc and silver analyses since in some cases they were not available; where they were available they are almost always below 0.05% and in the case of silver the tenor was generally below the limit of detection of 10ppm.

Specific Gravity

In recent exploration work it has been the practice to measure specific gravity on individual samples. During the programme attempts were made to measure specific gravity on samples from old drill holes. At the time of assessment of these resources it is estimated that useful specific gravity measurements are available for less than 50% of the drill holes and even then the holes that have useful S.G. measurements often do not have complete data. Many of the results on early drill holes can not be reconciled with analytical results (eg. Hole ZQ11 from 149.35m to 149.66m Assayed 0.09% Sn, 0.24% Cu, 8.00% Zn, 16.30% Pb; S.G. measured to be 2.81. Theoretically it should exceed 3.6).

The Specific Gravity for each intersection was calculated by:

- i) Averaging the measured S.G.'s where it was judged that the individual measurements reconciled with the assays.
- ii) Calculating an S.G. by observing the tenor of the sulphide from geological observations and assuming the sulphide has an S.G. of 5.0, the remaining rock having an S.G. of 2.65.

This is almost certainly conservative since the sulphide observations suggest a significantly lower tenor than indicated by sulphur assays and the remaining rock probably has an S.G. in the vicinity of 2.80. This conservatism is balanced by the fact that the rock is observed to have cavities.

Preparation of intersection data file

It was decided to estimate the quantity and quality of the resource in longitudinal projection assuming all the mineralisation is essentially tabular and steep dipping. The greatest dimensions of individual lenses are along strike and in the dip direction.

It was decided to treat each drill intersection as though it was located, in long section, at the mid point of intersection. This point was located and the Northing and R.L. was identified. By locating the same mid-point on the cross section plot of the drill hole and using the interpreted outlines of the mineralised envelope, a horizontal width equivalent was measured.

Subsequently a file of intersections labelled ?Z---- for each mineralised deposit was built up and stored on disc on the HP1000 in the following form:

Hole I.D., Hor. Width, S.G., % Sn, % Cu, % Zn, % Pb, g/t Ag, North, R.L.

As well as those intersections within the mineralised envelope being stored in the disc file, barren holes or weakly mineralised holes were also stored. Barren holes were treated as holes of zero thickness and no grade information. This data is necessary since it is considered that the mineralisation deteriorates to zero thickness at its extremities except in the case of Montana where the mineralisation is fault bounded.

Interpolation procedure

In this assessment Kriging has been used to interpolate a value for all variables into 10m x 10m blocks for Queen Hill and 20m x 20m blocks for Severn and Montana. The Kriged results are stored in files labelled ?KZ---

The Kriging technique is dependant on being able to develop experimental variograms from the basic data. In most exploration situations the density of the drilling data is rarely adequate for development of experimental variograms as there is generally a lack of close spaced sampling. This is the case for Severn and Montana. For Queen Hill lens, useable variograms were derived and acceptable models were fitted. For Severn and Montana it was decided to use Kriging since the technique is useful for interpolation in the presence of clustered drilling. Since Severn data is wide spaced, the range of influence was arbitrarily extended to allow interpolation into the whole of the geologically interpreted lens extent. The block estimation variances are consequently of little value. The variable block values become highly smoothed. In fact as the range is extended towards infinity the smoothing is increased and the block values approach the arithmetic mean of all the samples. For Montana the same procedure was used but with a reduced range. Where there were less than two drill holes within the specified range the variables were set to "-1.0" during the interpolation process. Since each lens was interpreted to have limits either due to barren intersections, or insufficient sampling (lack of confidence), the interpolated results were edited by applying a sorting routine (programme ZPOLY) using a polygon representing the lens limits. Consequently a new disc file (labelled ?PKZ--)

was established consisting of interpolated values for variables within the specified polygon. This file was used as the basis for tonnage and grade estimation and for generating plots of the blocks and variable values.

The tonnage and grade was calculated by accumulating at a series of user specified block cut offs. The horizontal width for each block was multiplied by the S.G. and the block dimensions to derive the tonnage, and the tonnage grade accumulations were added and later divided by the total tonnage. (The resource average grade is the block tonnage weighted average.) For Queen Hill lens this technique is soundly based since the variograms are experimentally derived. It is considered that the total resource estimates for Severn and Montana are realistic but it should be remembered that the individual block variable values have low credibility. They are presented as a model for conceptual planning purposes. Details of the resources are produced on Table 1 (Queen Hill), Table 2 (Severn) and Table 3 (Montana).

Review of down hole cut off

(i) Queen Hill Lens

It has been observed for some time that the tenor of tin mineralisation within a drill hole is relatively consistent within two fields. By scanning the assays down the hole it is clear that these two fields are fairly easily separated by using 0.5% Sn cut off. Separating intervals down the hole on this basis in most cases is decisive. Within the zone above 0.5% the assays commonly exceed twice the cut off, and outside the zone there are very few occasions where the cut off is exceeded by

individual samples. The high grade samples are clearly clustered. There is no direct correlation between the high grade patches and observed lithology and or structure. Analysis of the spatial correlations of the high grade patches indicates that two zones can be interpreted but with a low degree of confidence. They occur close to the east and west sides of the low grade envelope and are named accordingly.

In view of the uncertainty in correlating the high grade east and west lenses, it was decided to estimate the resource which lies within the east limit of the east lens and the west limit of the west lens. This is essentially equivalent to the bulk mining option in the lower (below RL1110) section of Queen Hill. When this resource is combined with the selective high grade Queen Hill resource above RL1110 a "safe" high grade resource is produced which is considered to have a good chance of being realised in mining. It is this accumulated resource which is quoted in the summary, and identified in the plans and tables as the bulk mining option.

(ii) Severn Lens

Severn lens is generally composed of a higher grade, high sulphide "lode" located between the footwall and the centre of the mineralised envelope. The tenor of the tin mineralisation generally decreased away from this "lode". It is possible to use two cut off grades to define higher grade zones. An arbitrary 0.3% Sn, and 0.5% which essentially defines the "lode". In some cases the 0.5% cut off was overridden when geological observations indicated that the lode limit extended beyond the 0.5% cut off.

The dip and strike extents of the 0.5% cut off "lode" are in doubt at the southern end of the zone. A conservative approach was taken in establishing polygonal limits to the interpolation.

(iii) Montana Lens

Montana lens represents a near massive sulphide deposit with relatively sharp boundaries. The edge of the significant sulphide mineralisation is identified by using a 0.2% Sn cut off. This is the only higher grade selection possible.

Estimation of high grade resources

The technique of Kriging was used for all the higher grade resources. Experimental variograms were derived for Queen Hill high grade west lens, but insufficient data was available to derive variograms for all other lenses. In lenses where variograms were not experimentally derived, models were assumed and parameters applied to allow interpolation. The individual block values have little credibility other than as a model for planning purposes.

The total resource estimates are considered reasonable estimates. Details of resources are given in Tables 4, 5, 6, 7, 8, 9, 10.

VALIDATION OF INTERPOLATION PROCEDURESGrade

In resource estimation where reconciliation with production is not possible it is useful to have alternative grade estimation techniques as checks to ensure that significant errors do not occur. For this purpose two other techniques were used to estimate the average grade. A simple arithmetic mean of all the relevant intersections is a reliable estimate provided an adequate number of samples are distributed evenly throughout the mineralisation and provided the frequency distribution of the intersection grades is 'normal'. In other cases biases may result. The thickness weighted mean may also be a reasonable estimate of the true average grade particularly where there is a relationship between thickness and grade. Table 11 shows comparisons of the resource estimates based on the three techniques.

TABLE 11

LENS	C/O	KRIGED GRADE % SN	ARITHMETIC MEAN % SN	WEIGHTED MEAN % SN
Queen Hill	0.1%	0.82	0.90	0.89
Queen Hill East	0.5%	1.90	2.02	1.84
Queen Hill West	0.5%	1.73	1.66	1.82
Severn	0.1%	0.66	0.64	0.51
Severn	0.3%	1.11	1.09	0.95
Severn	0.5%	1.49	1.67	1.54
Montana	0.1%	1.22	1.14	1.24
Montana	0.2%	1.43	1.44	1.70

On reviewing these results two sets of comparisons indicate significant differences. For Severn lens at 0.1% cut off the Kriged grade estimate is higher than either of the other two estimates. Since there are major differences in thickness between holes, and the thinner intersections seem to have higher grades, it was arbitrarily decided to reduce the Kriged estimate to 0.60% Sn. (It was considered that the smoothing may have resulted in over-estimation). In Montana lens at 0.2% cut off the Kriged estimate is lower than the other two estimates. On rationalisation of the low grade intersections in G86 and G86W the arithmetic mean increases to 1.60% Sn. (Arithmetic average giving equal weight to all intersections when two are only a few metres apart is unreasonable. Rationalisation gives each of G86 and G86W weight of 0.5). It is interpreted that Kriging is smoothing too much and the grade has consequently been rounded up to 1.45% Sn.

Volume

Since the interpolation procedure for Severn and Montana is based on arbitrarily chosen variogram parameters, checks were conducted to ensure that bias was not introduced in the volume calculation.

The simplest check is probably the most useful. The areal extent of the lens is multiplied by the average thickness of intersections. The arithmetic average of the drill intercept S.G.'s was multiplied by the volume in calculating the tonnage.

TABLE 12

LENS (C/O)	AV. THICKNESS Metres	AV.S.G.	AREAL EXTENT Sq. Metres	TONNES X 10 ⁶	KRIGED TONNES X 10 ⁶
Severn (0.1%)	27.20	3.22	69,200	6.00	5.10
Severn (0.5%)	6.14	3.28	48,800	0.98	0.95
Montana (0.2%)	3.6	3.84	23,200	0.32	0.31

In all cases the tonnage derived by Kriging is less than that in the check calculation. The difference is most significant in the Severn "low grade" estimate. The tonnage is significantly reduced by the excessive smoothing achieved by Kriging with a long range of influence, particularly since three of the thirteen holes used are outside the lens and are assigned zero thickness. Since the difference is of the order of 20% and the resource is judged to be "inferred" no change is considered necessary.

Close agreement between the estimates for each of Montana and Severn (high grade) together with the possibly conservative estimate for Severn (low grade) support the conclusion that the method of calculation does not introduce significant bias.

RESOURCE QUALIFICATION

All the resources identified in this assessment are judged to be categorised as indicated or inferred.

Queen Hill lens

Queen Hill lens is drilled on an erratic pattern. Hole spacing varies from fifty metres to less than ten metres. In one section, three holes and an adit testing a zone of thirty metres in strike, all have mineralisation in excess of 2.0% Sn. This indicates that over a short range tin distribution is quite predictable. From hole to hole the geology is reasonably consistent. The lens terminations are abrupt and not understood. These observations suggest that there is little chance of significant variations within the lens and that the resource should be classified as indicated.

Geostatistics allows the uncertainty to be quantified. Using the block Kriging technique and making the block very large, but approximately the same as the orebody, the estimation variance of the block quantifies the resource uncertainty. Two tests were done on Queen Hill (low grade). A 100 metre square block (in long section) was located wholly within the lens boundaries (centred at 3100N, 1060 RL). At 95% confidence level the grade is estimated to be 0.84% Sn \pm 0.29% Sn. A second test was made by locating a 200 metre square block centred at 3050N, 1100 RL. While this encloses most of the

lens, it also includes poorly tested sections outside the lens. The estimation error will be higher than that for the irregularly shaped lens. The grade of the 200 metre square block was estimated to be 0.83% Sn \pm 0.23% Sn at the 95% confidence level or 0.83% Sn \pm 30% relative. This result supports the conclusion that Queen Hill can be categorised as an Indicated resource.

Severn lens

The drill spacing in Severn Lens is variable but for the bulk of the tonnage it exceeds 100 metres. While certain features of the mineralisation appear to be very consistent, there is insufficient close spaced drilling to be confident of the continuity. It was not possible to derive a variogram from the data. This confirms a lack of close spaced testing. Severn lens was consequently classified as Inferred.

Montana lens

Montana lens is stratiform, but is small and irregular in grade and thickness. The data was inadequate for development of an experimental variogram. The resource was classified as Inferred.

VARIATION ANALYSIS

Previous estimates of resources at Zeehan were made at 21 December 1981. A comparison of the total resource at 0.1% cut off is as follows:

LENS	DECEMBER 1981		AUGUST 1982	
	TONNES	GRADE % SN	TONNES	GRADE % SN
QUEEN HILL	1.86	0.81	1.80	0.82
SEVERN	4.00	0.61	5.10	0.60
MONTANA	0.50	1.50	0.4	1.45

The increase in tonnes at Severn does not indicate the full significance of the changes. In fact reviewing cut off points in holes ZS39, ZS65, ZS72, ZS74 accounts for an estimated net decrease of approximately 750,000 tonnes. Two additional intersections ZS84, ZS87 have added approximately 1.8 million tonnes. Although the two recent holes are lower grade than average the reduction in thickness of the pre-existing holes was accompanied by an increase in grade.

The change in tonnes in Montana lens is a combined function of reinterpretation with consequent reduction in interpreted thickness, and drilling of ZM86 and ZM88 consequently altering the strike limits of the lens.

A comparison of the high grade resource estimates is as follows:

LENS	TONNES	DECEMBER 1981		AUGUST 1982		
		%SN	TONNES SN x 10 ³	TONNES	%SN	TONNES SN x 10 ³
QUEEN HILL	1.0	0.94	9.4	0.93	1.39	12.9
SEVERN	1.50	1.06	15.9	2.40	1.11	26.6
MONTANA	0.50	1.5	7.5	0.31	1.45	4.5

The high grade resources for Queen Hill and Severn are highly susceptible to changes in cut off and in fact this is the main reason for any changes that have occurred.

In the assessment of Queen Hill high grade, it was decided to quote a safe high grade resource assuming a 0.5% cut off above RL.1110 and a bulk mining approach to the zone below RL.1110, on the grounds that a 0.5% cut off resource below RL.1110 may not be coherent. The December 1981 Queen Hill high grade estimate is based on 0.1% cut off down the hole and accumulation of individual blocks into higher grade zones. For Severn, use of 0.3% cut off indicates a substantial increase in resource at the same grade. Approximately 450,000 tonnes of this resource is estimated to have a grade of between 0.75 and 1.00% Sn. The increase reflects the exploration successes since the last assessment.

Montana resource estimate is decreased, as recent drilling has limited strike extent of the mineralisation. The variation from hole to hole in Sn, Pb and Zn suggests that significant changes are still probable.

QUALIFICATION OF RESOURCE ESTIMATION TECHNIQUE

In Queen Hill lens and at least parts of Severn, the thickness of the mineralisation is such that treatment as though they were tabular deposits is questionable. With long raking drill intercepts, identifying the mid point of the intersection as the point where the whole intersection transects the lens is of doubtful validity. 3D Kriging may be a better process since it will take into account the distribution of smaller composites and should predict with more reliability the location of the higher grade sections.

It is proposed that 3D Kriging will be attempted during 1983.

POTENTIAL FOR ADDITIONAL MINERALISATION

Queen Hill lens is reasonably well delineated and opportunities for expansion of this resource are not good. Drilling to the north has intersected stanniferous mineralisation on a lineal projection from Queen Hill. Possibilities in the vicinity of drill hole ZQ52 should not be ignored. Severn mineralisation is limited at its upper extremities but appears to have its greatest dimensions towards the lowest levels of drilling where it is open. Potential for additions to both high grade and low grade are excellent. In the hanging wall of Severn lens additional mineralisation is indicated by drilling. Some may be added to resources but it is possibly lower grade.

The southern and northern limits to the high grade of Severn are arbitrary boundaries. There is good potential for increasing the high grade by more, than 250,000 tonnes within the same vertical interval.

APPENDIX 1

INDIVIDUAL LENS GRADE TONNEAGE

TABLES

TABLE 1

QUEEN HILL RESOURCES (LOW GRADE) AT 0.1% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.00	1788419	16.26	3.27	0.82	0.08	0.45	0.77	32.73
0.30	1788419	16.26	3.27	0.82	0.08	0.45	0.77	32.73
0.40	1788419	16.26	3.27	0.82	0.08	0.45	0.77	32.73
0.50	1677223	16.48	3.28	0.85	0.07	0.43	0.63	28.43
0.55	1405889	16.34	3.31	0.91	0.06	0.39	0.47	22.95
0.60	1187220	15.94	3.34	0.97	0.05	0.37	0.39	19.72
0.65	1027451	15.85	3.36	1.03	0.05	0.36	0.35	17.44
0.70	956431	15.78	3.37	1.06	0.05	0.36	0.33	16.25
0.75	860202	15.65	3.37	1.09	0.04	0.34	0.33	15.14
0.80	801771	15.41	3.38	1.12	0.04	0.34	0.33	14.46

TABLE 2

SEVERN LENS RESOURCES (LOW GRADE) 0.1% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.40	5110438	22.98	3.21	0.66	0.00	0.00	0.00	0.00
0.45	5110438	22.98	3.21	0.66	0.00	0.00	0.00	0.00
0.50	5110438	22.98	3.21	0.66	0.00	0.00	0.00	0.00
0.55	4122438	22.40	3.22	0.69	0.00	0.00	0.00	0.00
0.60	3360325	22.07	3.23	0.72	0.00	0.00	0.00	0.00

271025

TABLE 3

MONTANA RESOURCES AT 0.1% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.10	420984	4.88	3.72	1.22	0.02	2.00	1.41	51.31
0.50	420984	4.88	3.72	1.22	0.02	2.00	1.41	51.31
0.75	393504	4.89	3.73	1.26	0.02	1.97	1.47	53.57
0.90	291730	4.89	3.75	1.41	0.02	1.86	1.65	59.11
1.00	248435	5.01	3.76	1.49	0.02	1.76	1.86	66.32

TABLE 4

QUEEN HILL RESOURCES (HIGH GRADE WEST LENS) 0.5% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.10	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
0.50	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
0.75	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
0.90	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
0.95	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
1.00	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
1.10	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
1.20	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
1.25	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92
1.30	270587	4.85	3.53	1.73	0.14	0.58	0.79	46.92

271026

TABLE 5

QUEEN HILL RESOURCES (HIGH GRADE EAST LENS) 0.5% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.50	211110	7.59	3.66	1.90	0.11	0.24	0.17	28.73
1.00	211110	7.59	3.66	1.90	0.11	0.24	0.17	28.73
1.10	211110	7.59	3.66	1.90	0.11	0.24	0.17	28.73
1.20	211114	7.65	3.66	1.91	0.11	0.24	0.17	28.41
1.30	203288	7.72	3.66	1.93	0.10	0.23	0.17	27.22

TABLE 6

SEVERN LENS RESOURCES (HIGH GRADE) AT 0.3% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.10	2427377	10.85	3.20	1.11	0.00	0.00	0.00	0.00
0.50	2427377	10.85	3.20	1.11	0.00	0.00	0.00	0.00
0.75	2365816	10.69	3.20	1.11	0.00	0.00	0.00	0.00
1.00	1913779	10.07	3.21	1.16	0.00	0.00	0.00	0.00
1.10	1232385	9.91	3.24	1.23	0.00	0.00	0.00	0.00

271027

TABLE 7

SEVERN LENS RESOURCES (HIGH GRADE) AT 0.5% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.50	951347	5.90	3.30	1.49	0.00	0.00	0.00	0.00
0.90	951347	5.90	3.30	1.49	0.00	0.00	0.00	0.00
1.00	951347	5.90	3.30	1.49	0.00	0.00	0.00	0.00
1.10	886161	5.79	3.30	1.53	0.00	0.00	0.00	0.00
1.25	822736	5.67	3.30	1.55	0.00	0.00	0.00	0.00

TABLE 8

MONTANA RESOURCES AT 0.2% CUT OFF

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.10	310550	3.49	3.84	1.43	0.02	2.61	1.59	58.04
0.50	310550	3.49	3.84	1.43	0.02	2.61	1.59	58.04
0.75	310550	3.49	3.84	1.43	0.02	2.61	1.59	58.04
0.90	310550	3.49	3.84	1.43	0.02	2.61	1.59	58.04
1.00	310550	3.49	3.84	1.43	0.02	2.61	1.59	58.04

271028

TABLE 9

QUEEN HILL RESOURCES (HIGH GRADE ABOVE RL.1110

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
.10	117234	4.80	3.59	1.82	.20	.83	1.35	68.93
.50	117234	4.80	3.59	1.82	.20	.83	1.35	68.93
.75	117234	4.80	3.59	1.82	.20	.83	1.35	68.93
.80	117234	4.80	3.59	1.82	.20	.83	1.35	68.93
.90	117234	4.80	3.59	1.82	.20	.83	1.35	68.93
1.00	117234	4.80	3.59	1.82	.20	.83	1.35	68.93
1.10	117234	4.80	3.59	1.82	.20	.83	1.35	68.93

TABLE 10

QUEEN HILL RESOURCES (BULK MINING OPTION - BELOW RL.1110

BLOCK CUTOFF	TOTAL TONNEAGE	HOR. WIDTH MEAN	S.G. MEAN	% SN MEAN	% CU MEAN	% ZN MEAN	% PB MEAN	G/T AG MEAN
0.10	815009	12.53	3.44	1.33	.07	.42	.44	23.04
0.50	815009	12.53	3.44	1.33	.07	.42	.44	23.04
0.75	808882	12.49	3.44	1.33	.07	.42	.44	23.13
0.80	791333	12.41	3.45	1.35	.07	.42	.44	23.39
0.90	756390	12.30	3.45	1.37	.07	.42	.45	23.69
0.95	734781	12.22	3.46	1.38	.07	.42	.46	23.89
1.00	724540	12.19	3.46	1.39	.07	.42	.46	23.88

COMPUTER FILE IDENTIFICATION

1. Z---#-

Z - Zeehan
 - Q = Queen Hill
 - S = Severn
 - M = Montana
 -] Drill hole numeric identification
 -]
 # Abbreviation for number
 - File number starting at .1 for first intersection at lowest grade

e.g. ZQ10#1, ZS72#1

2. ?Z----

? - Data file for later manipulation
 Z - Zeehan
 - Q, S, M, depending on lens.
 -]
 -] Abbreviations for resource objective.
 -] i.e., LG Low grade - 0.10% Cut off
 M.G. Medium grade 0.30% Cut off
 H.G. High grade 0.50% Cut off
 E.H.T. East High Grade
 W.H.T. West High Grade

3 ?KZ---

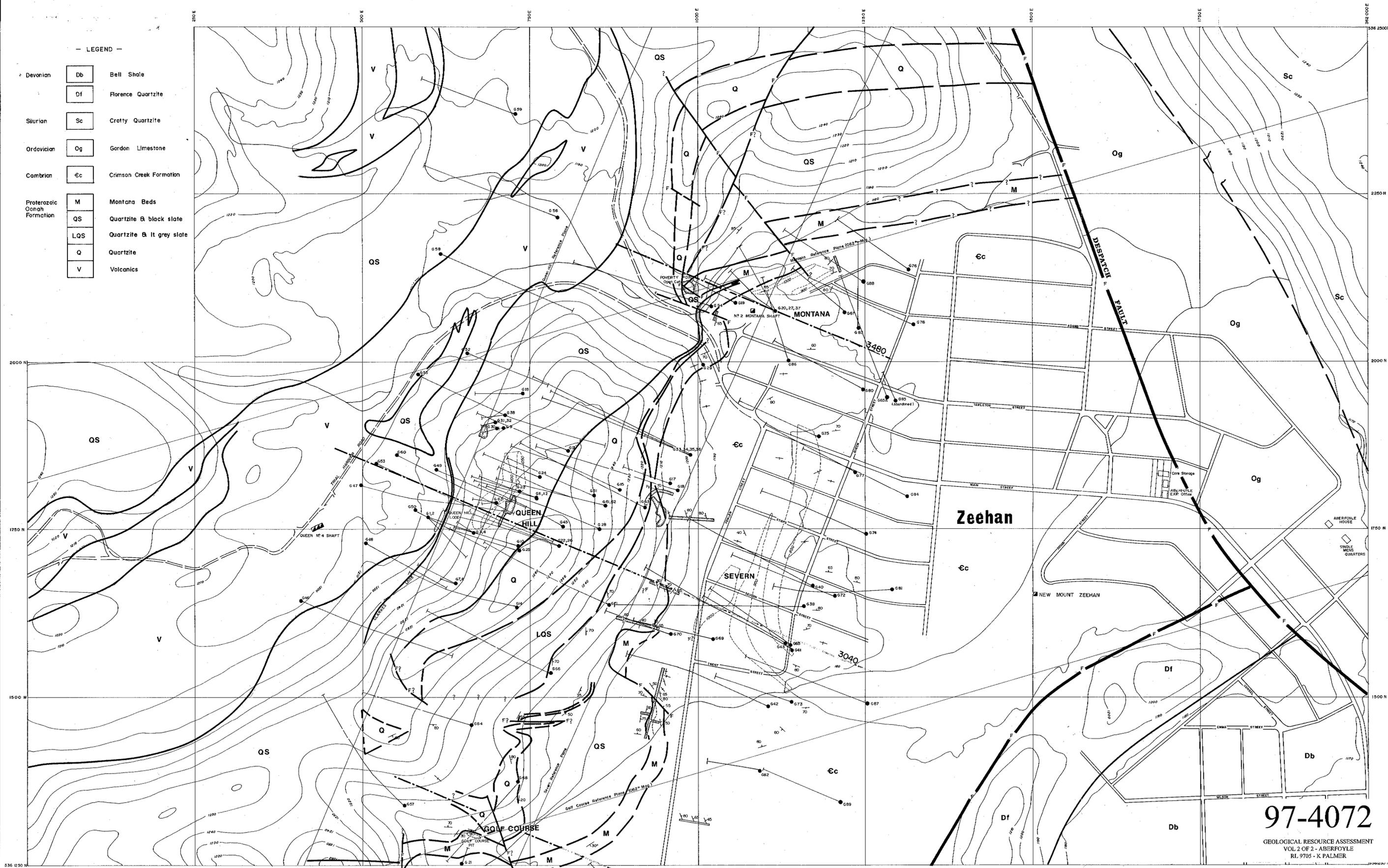
As before but the K identifies the file as a Kriging output file.

4. ?PKZ--

As before but the P identifies the file as a Kriging output file modified by screening so that only those blocks within a specified polygon are retained within real values.

— LEGEND —

- Devonian
 - Db Bell Shale
 - Df Florence Quartzite
- Silurian
 - Sc Crotty Quartzite
- Ordovician
 - Og Gordon Limestone
- Cambrian
 - Ec Crimson Creek Formation
- Proterozoic
Congo
Formation
 - M Montana Beds
 - QS Quartzite & black slate
 - LQS Quartzite & lt grey slate
 - Q Quartzite
 - V Volcanics



97-4072

GEOLOGICAL RESOURCE ASSESSMENT
VOL 2 OF 2 - ABERFOYLE
RI 9705 - K PALMER

5 cm

REFER PLATE QH138 FOR DETAILED LEGEND

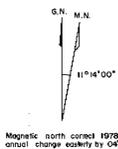
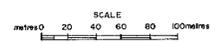
Aberfoyle Exploration Pty Ltd

Geology: S.M. Richardson
Drawn: R.J.E.
Traced: J.L.R.
Checked:
Revised by: SHR Date: 2/8/82

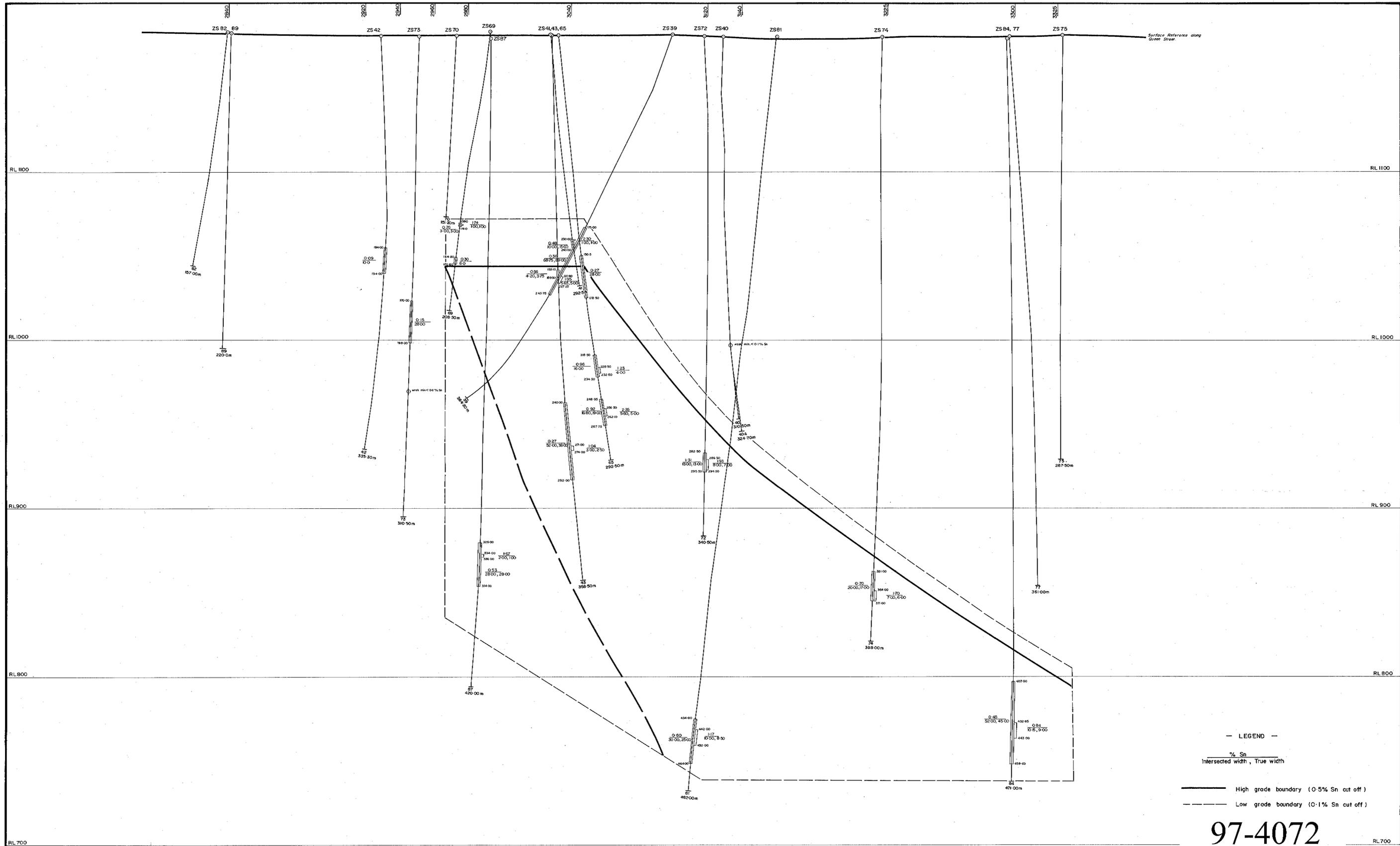
NORTH WEST TASMANIA
QUEEN HILL AREA
INTERPRETIVE SUMMARY PLAN

Location code:
Date: February, 1982
Scale: 1:2,500
Plate No: QH 1B1

Revised by	Date
S.M.R.	25/1/83
S.M.R.	29/4/83



Magnetic north correct 1978
annual change easterly by 04



— LEGEND —
 % Sn
 Intersected width, True width
 — High grade boundary (0.5% Sn cut off)
 — Low grade boundary (0.1% Sn cut off)

97-4072

GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER

5 cm

metres 0 10 20 30 40 50 60 70 80 90 100

Aberfoyle Exploration Pty Ltd		
Geology: K.G.P., S.R.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: R.J.E.	SEVERN	Date: November, 1982
Checked:	LONGITUDINAL PROJECTION	Scale: 1: 1000
Revised by: Date:	LOOKING WEST ALONG SEVERN REFERENCE PLANE	Plate No: QH 192

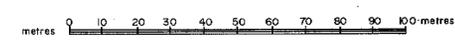
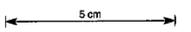


— LEGEND —

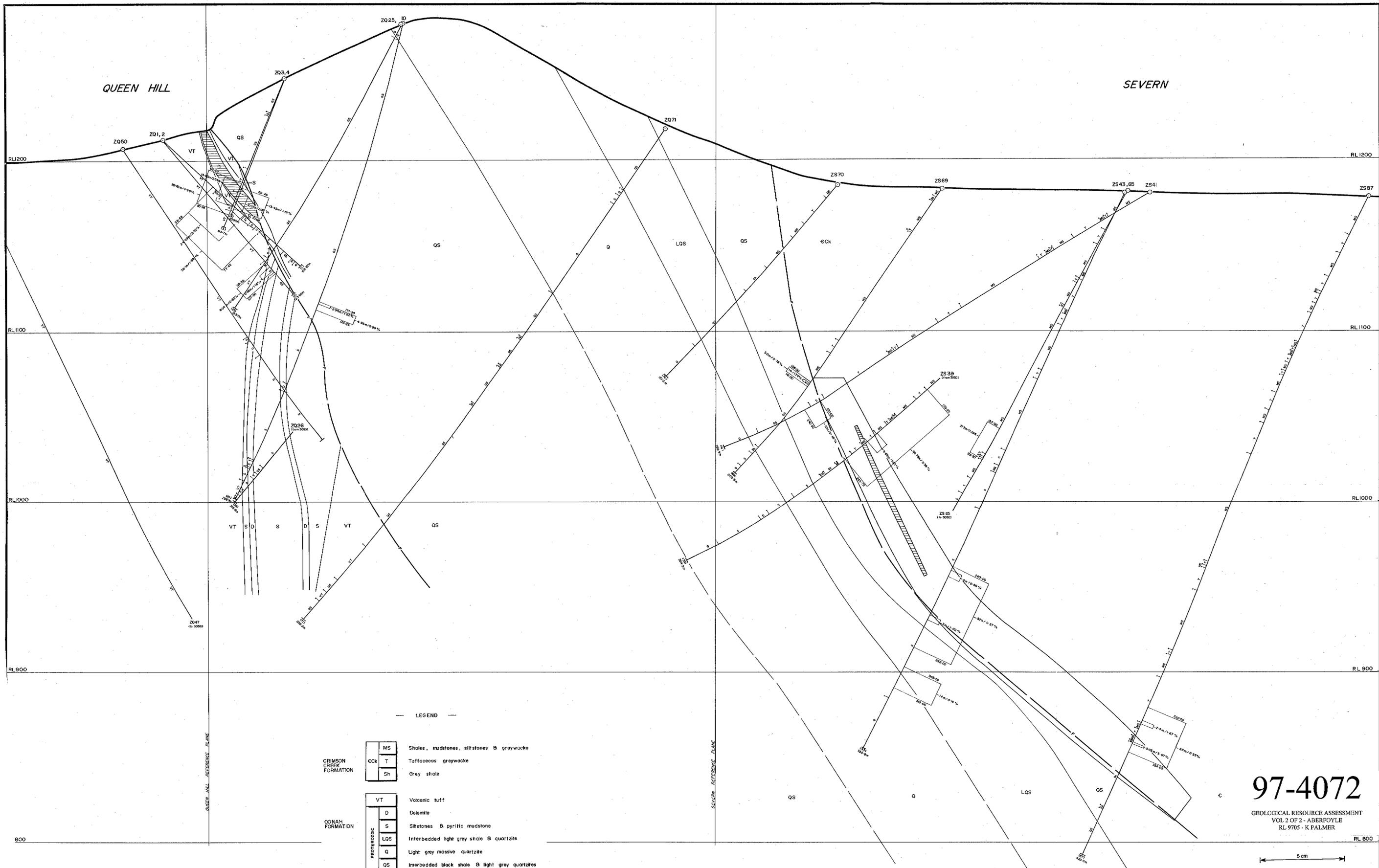
- % Sn
Intersected width, True width
-  High grade West (0.5% Sn cut off)
 -  High grade East (0.5% Sn cut off)
 -  Low grade (0.1% Sn cut off)

97-4072

GEOLOGICAL RESOURCE ASSESSMENT
VOL 2 OF 2 - ABERFOYLE
RL 9705 - K PALMER



Aberfoyle Exploration Pty Ltd		
Geology: K.G.R., S.R.	NORTH WEST TASMANIA	Location code: K 55/5
Drawn: R.J.E.	QUEEN HILL	Date: November, 1982
Traced:	LONGITUDINAL PROJECTION	Scale: 1:1000
Checked:	LOOKING WEST ALONG QUEEN HILL REFERENCE PLANE	Plate No: QH 193
Revised by: Date:		

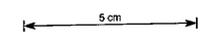


— LEGEND —

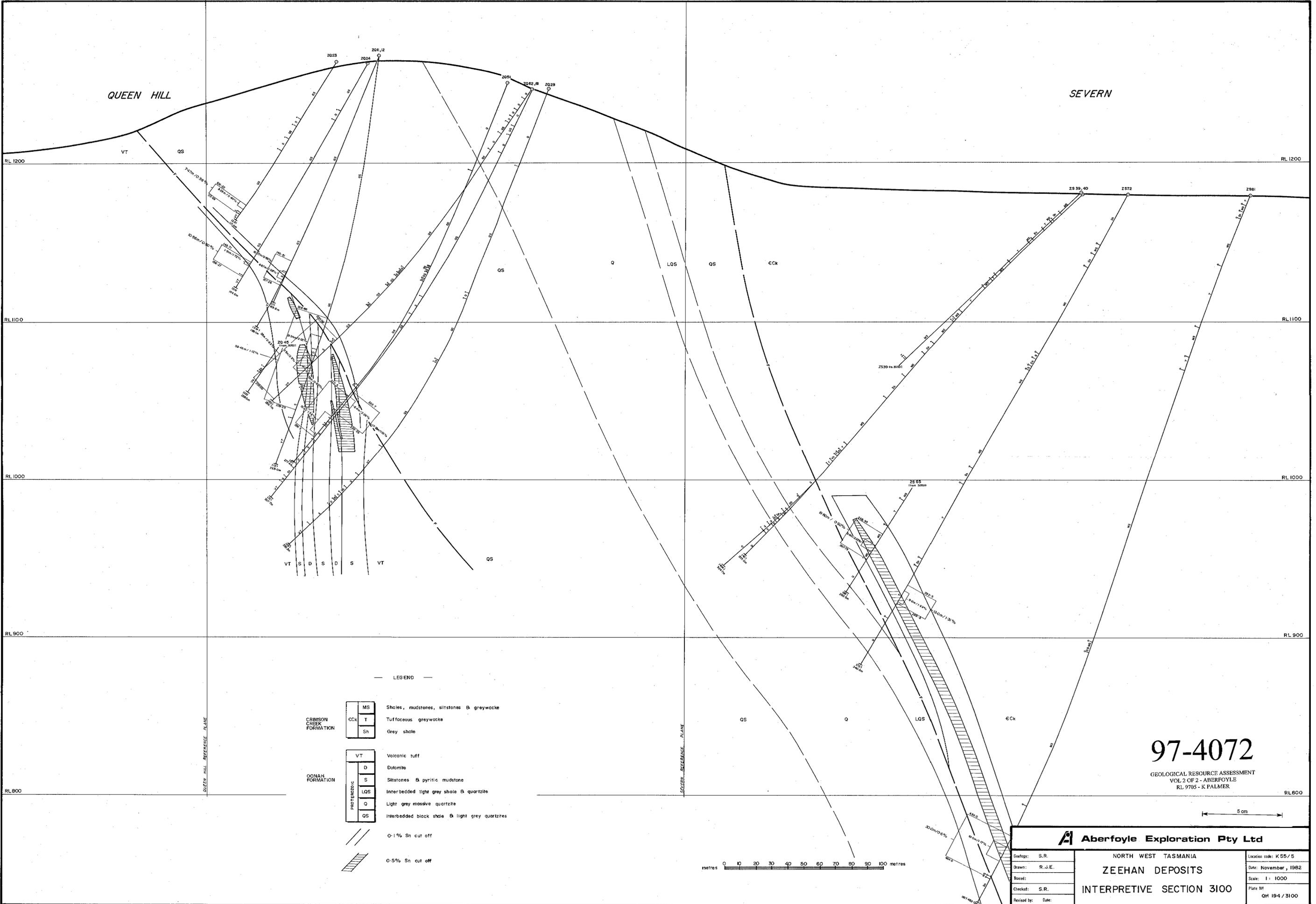
CRIMSON CREEK FORMATION	MS	Shales, mudstones, siltstones & greywacke
	ECK	Tuffaceous greywacke
	Sh	Grey shale
OONAH FORMATION	VT	Volcanic tuff
	D	Dolomite
	S	Siltstones & pyritic mudstone
	LQS	Interbedded light grey shale & quartzite
	Q	Light grey massive quartzite
QS	Interbedded black shale & light grey quartzites	
	//	0.1% Sn cut off
	///	0.5% Sn cut off

97-4072

GEOLOGICAL RESOURCE ASSESSMENT
VOL 2 OF 2 - ABERFOYLE
RL 9705 - K PALMER

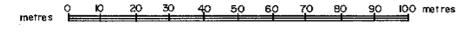


Aberfoyle Exploration Pty Ltd		
Geology: S.R.	NORTH WEST TASMANIA	Location code: K55/S
Drawn: R.J.E.	ZEEHAN DEPOSITS	Date: November, 1982
Traced:	INTERPRETIVE SECTION 3000	Scale: 1:1000
Checked: S.R.		Plate No: QH 194/3000
Revised by: Date:		



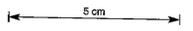
— LEGEND —

- | | | | |
|-------------------------|--|------|---|
| CRIMSON CREEK FORMATION | | MS | Shales, mudstones, siltstones & greywacke |
| | | T | Tuffaceous greywacke |
| | | Sh | Grey shale |
| OONAH FORMATION | | VT | Volcanic tuff |
| | | D | Dolomite |
| | | S | Siltstones & pyritic mudstone |
| PROTEROZOIC | | LQS | Interbedded light grey shale & quartzite |
| | | Q | Light grey massive quartzite |
| | | QS | Interbedded black shale & light grey quartzites |
| | | /// | 0-1% Sn cut off |
| | | //// | 0-5% Sn cut off |



97-4072

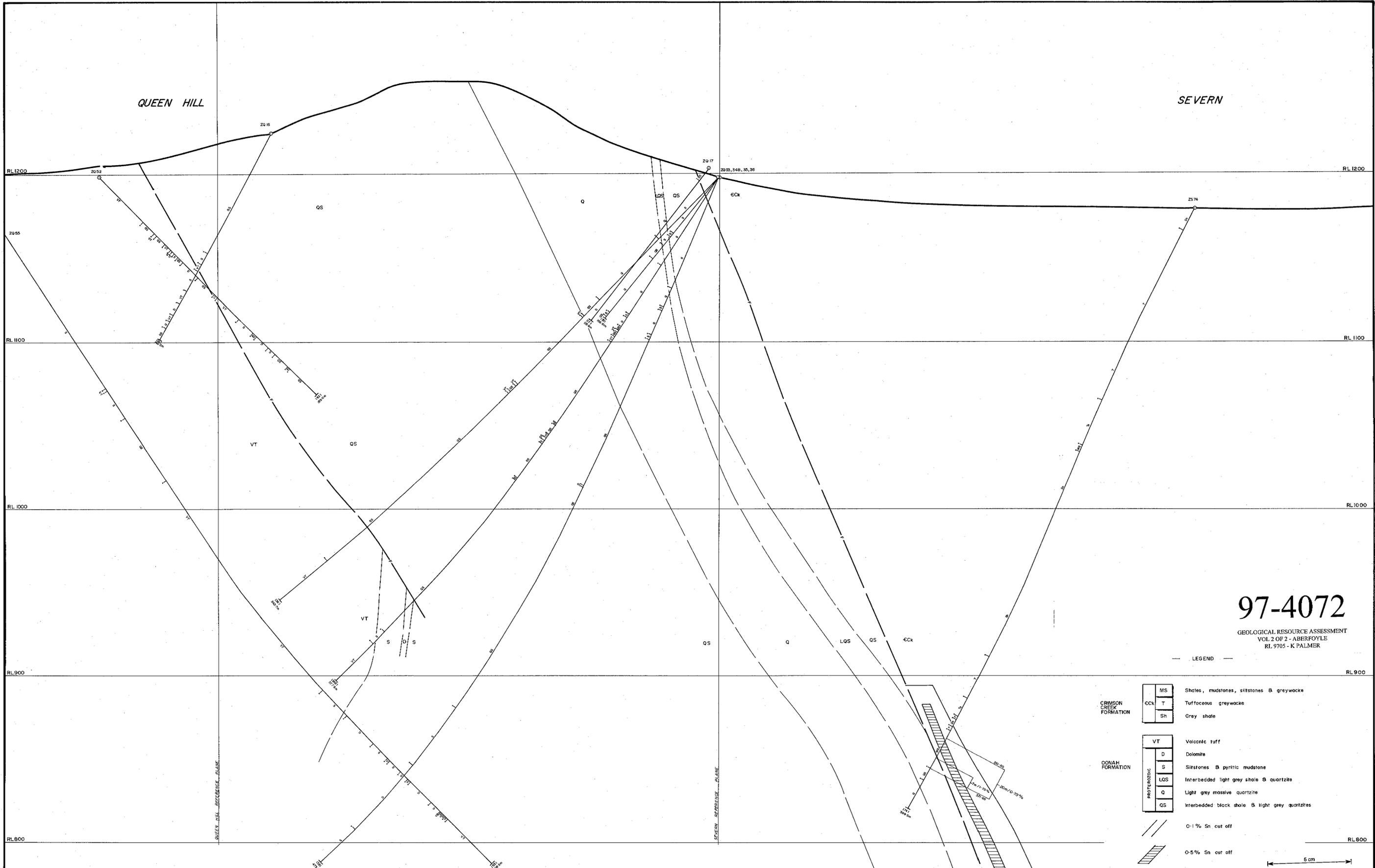
GEOLOGICAL RESOURCE ASSESSMENT
VOL 2 OF 2 - ABERFOYLE
RL 9705 - K PALMER



Aberfoyle Exploration Pty Ltd		
Geology: S.R.	NORTH WEST TASMANIA	Location code: K 55/5
Drawn: R.J.E.	ZEEHAN DEPOSITS	Date: November, 1982
Checked: S.R.	INTERPRETIVE SECTION 3100	Scale: 1 : 1000
Revised: Date:		Plate No: QH 194 / 3100

QUEEN HILL

SEVERN

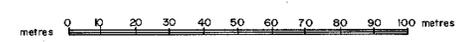


97-4072

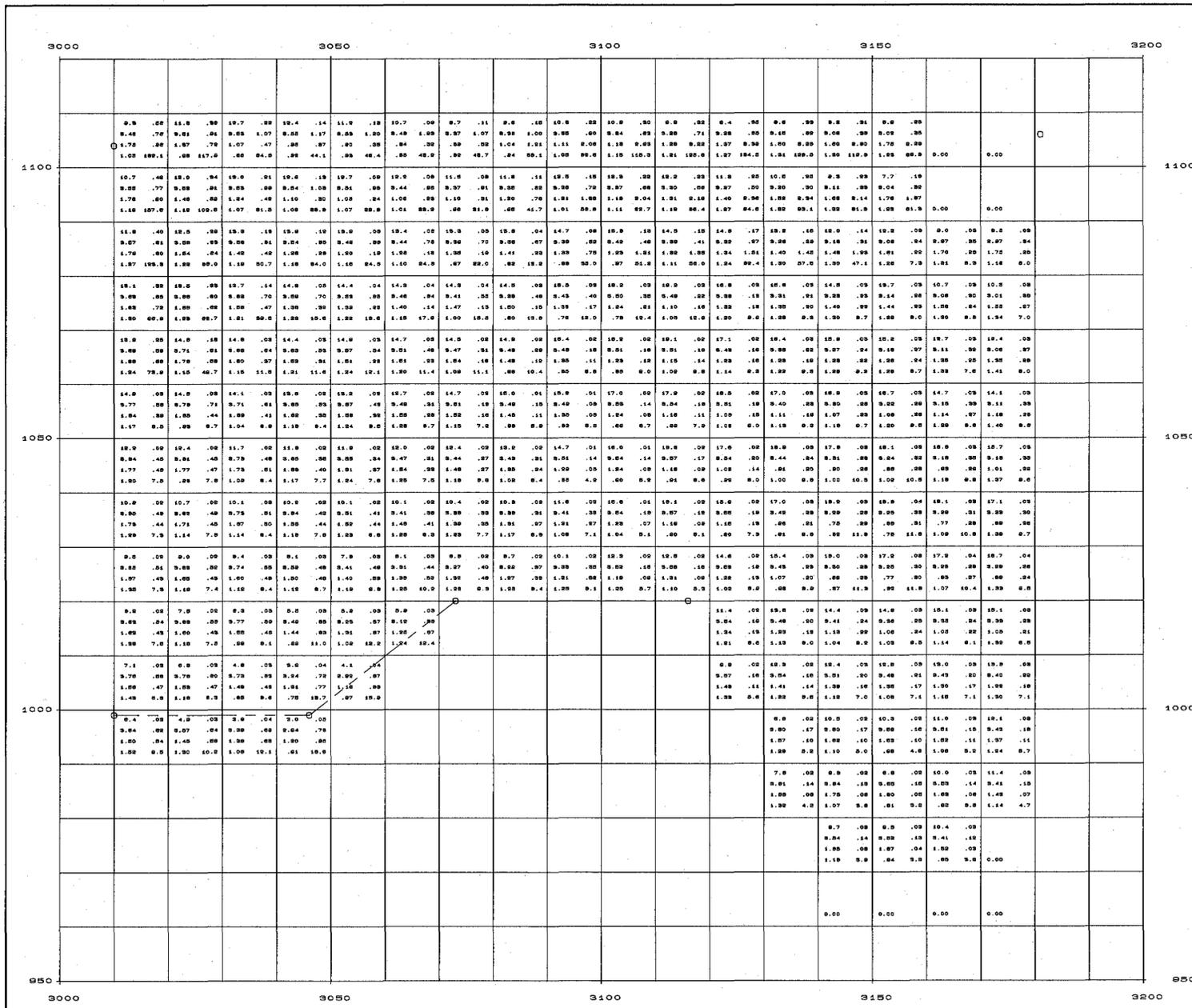
GEOLOGICAL RESOURCE ASSESSMENT
VOL 2 OF 2 - ABERFOYLE
RL 9705 - K PALMER

LEGEND

- | | | |
|-------------------------------|-----|---|
| CREMSON
CREEK
FORMATION | MS | Shales, mudstones, siltstones & greywacke |
| | ECK | Tuffaceous greywacke |
| | Sh | Grey shale |
| OONAH
FORMATION | VT | Volcanic tuff |
| | D | Dolomite |
| | S | Siltstones & pyritic mudstone |
| | LQS | Interbedded light grey shale & quartzite |
| | Q | Light grey massive quartzite |
| | QS | Interbedded black shale & light grey quartzites |
| | | 0-1% Sn cut off |
| | | 0-5% Sn cut off |



Aberfoyle Exploration Pty Ltd		
Geology: S.R.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: R.J.E.	ZEEHAN DEPOSITS	Date: November, 1982
Checked: S.R.	INTERPRETIVE SECTION 3200	Scale: 1:1000
Revised: Date:		Plate No: QH 194 / 3200

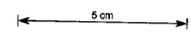


ZEEHAN RESOURCE ESTIMATES 1982/83
 Queen Hill Lower Bulk Mining Option
 3:48 PM FRI.. 14 JAN.. 1983

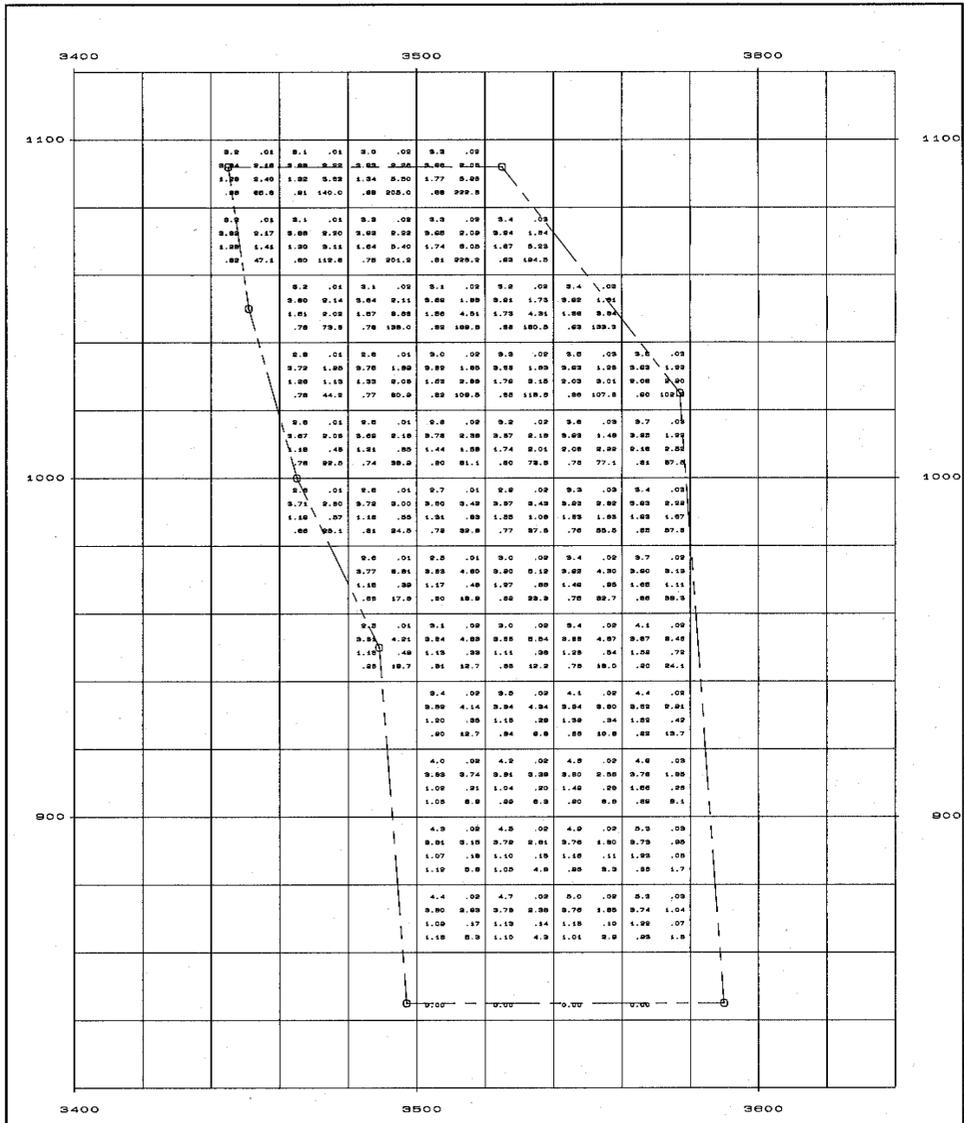
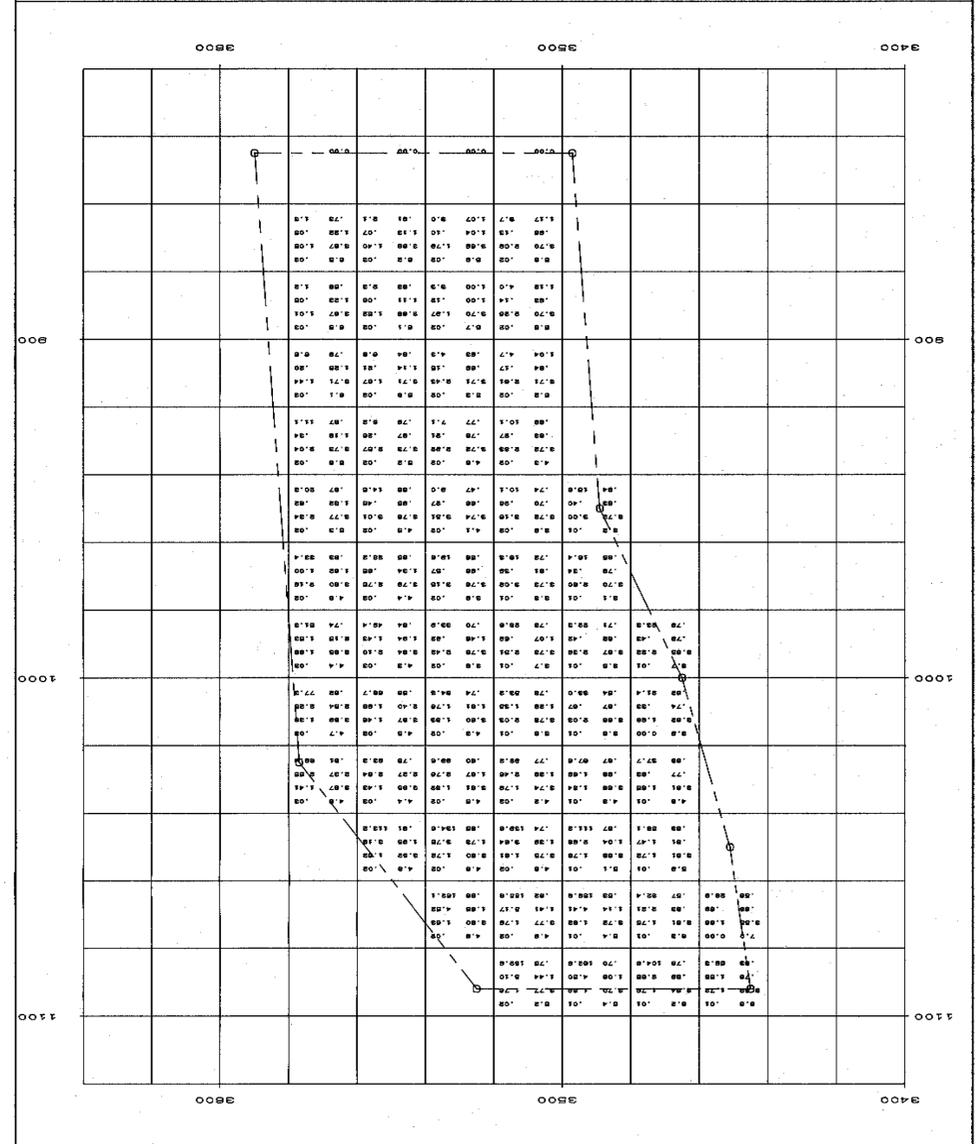
SCALE 1: 500
 LEGEND
 H2M 80u
 S.P. 82h
 80M 80u
 81M 81M

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GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER



Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 14 January, 1983
Checked: K.G.P.	QUEEN HILL LOWER BULK MINING OPTION	Scale: 1:500
Revised by: Date:		Plate No: QH 200



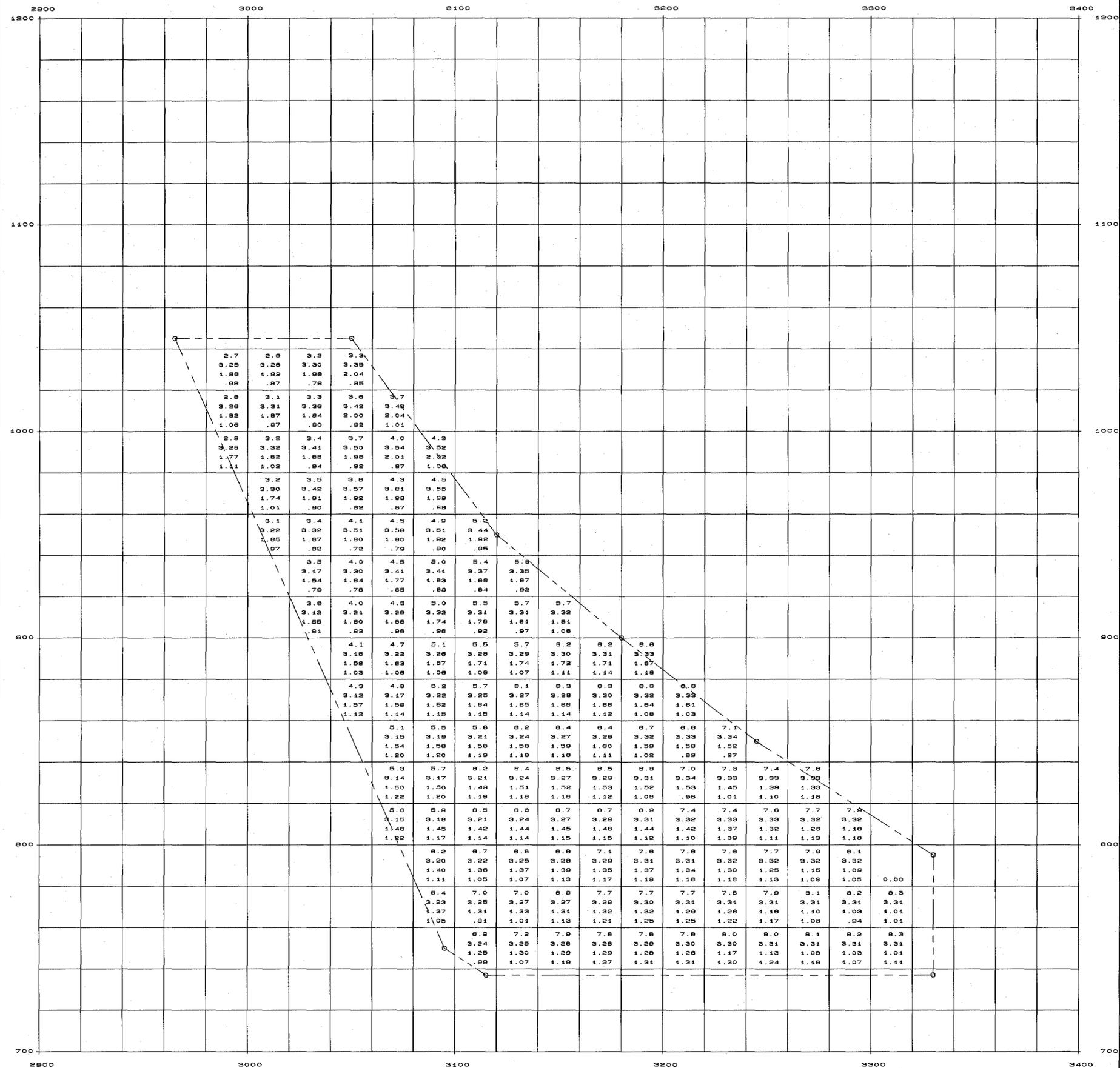
ZEEHAN RESOURCE ESTIMATES, 1982/1983
 MONTANA LENS, High Grade, 0.2% c/o
 1:43 PM TUE, 18 JAN, 1983
 SCALE 1:1000
 LEGEND:
 HIGH GRADE
 LOW GRADE
 UNK

97-4072

GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER

5 cm

Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 18 January, 1983
Traced:	MONTANA LENS	Scale: 1:1000
Checked: K.G.P.	HIGH GRADE 0.2% c/o - LOW GRADE 0.1% c/o	Plate No: QH 201
Revised by: Date:		

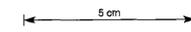


ZEEHAN RESOURCE ESTIMATES. 1982/1983
 SEVERN LENS. High Grade . 0.5% c/o
 11: 37 AM TUE.. 15 JAN.. 1983

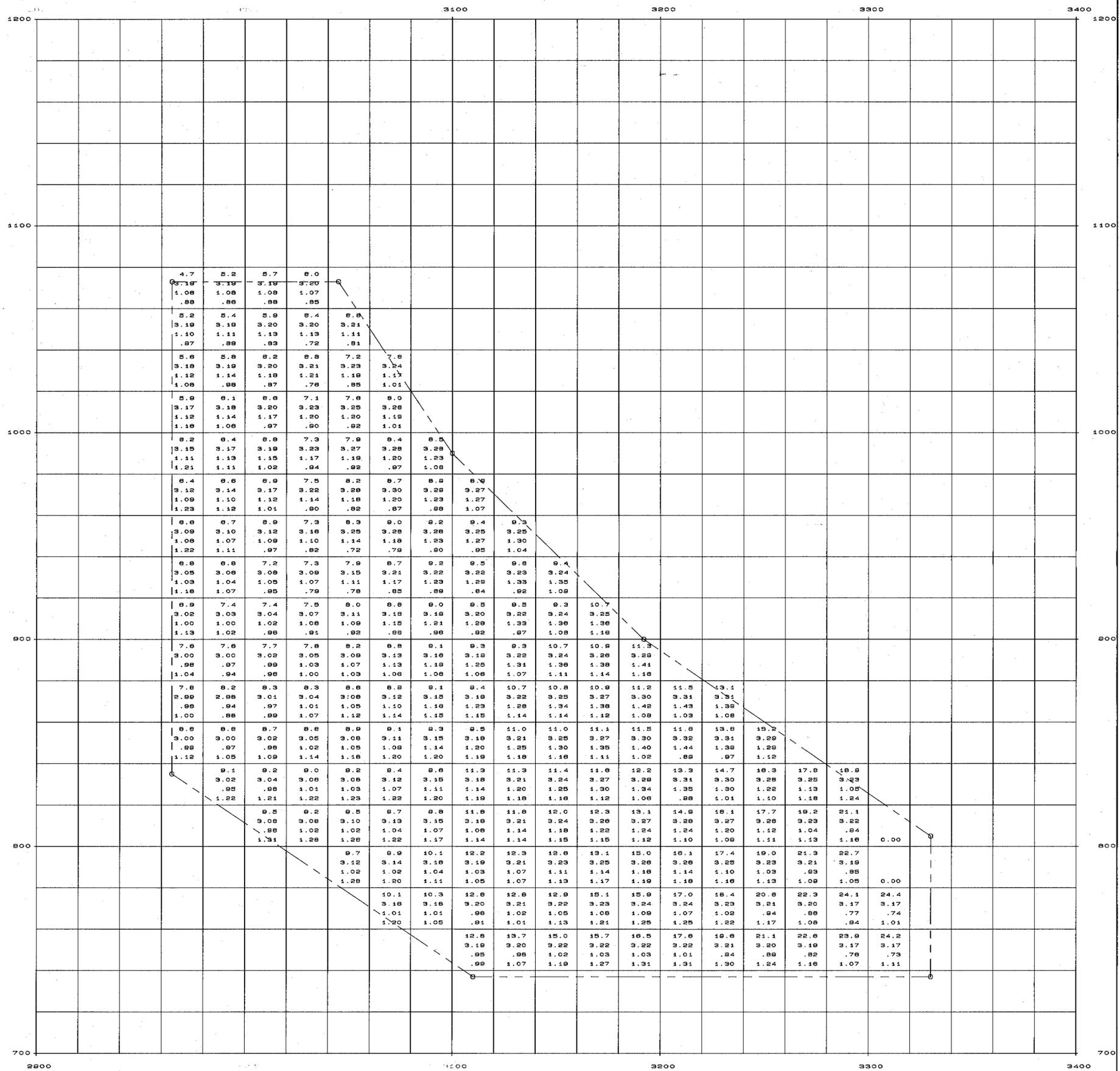
SCALE 1: 1000
 LEGEND :
 Horw
 S.G.
 %ant
 Srvr

97-4072

GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER



Aberfoyle Exploration Pty. Ltd.		
Geology : K.G.P.	NORTH WEST TASMANIA	Location code : K55/5
Drawn : ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date : 15 January, 1983
Traced :	SEVERN LENS	Scale : 1:1000
Checked : K.G.P.	HIGH GRADE 0.5% c/o	Plate No:
Revised by: Date:		QH 202

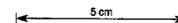


ZEEHAN RESOURCE ESTIMATES, 1982/1983
 SEVERN LENS, Medium Grade, 0.3% c/o
 10:36 AM TUE., 18 JAN., 1983

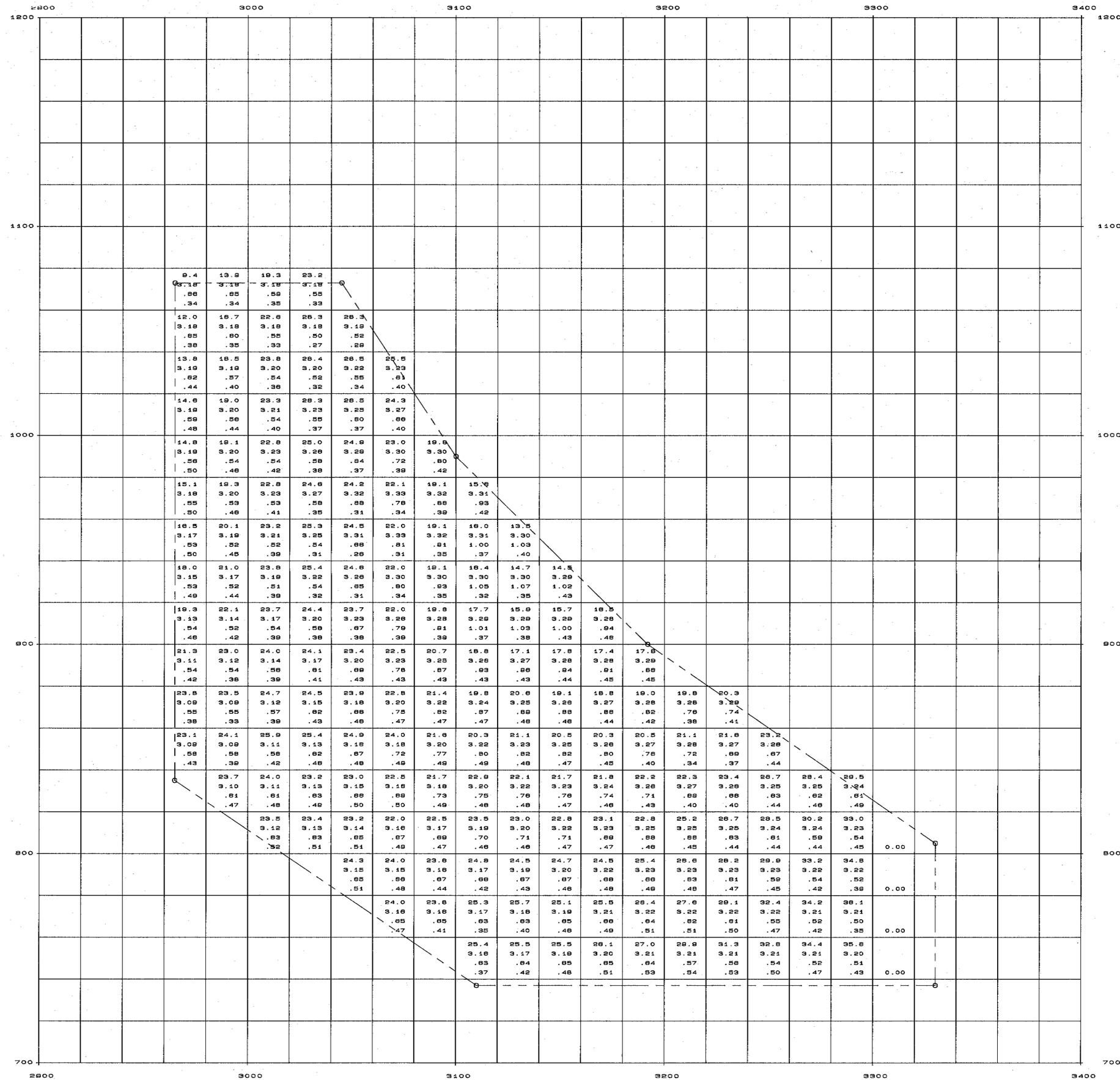
SCALE 1:1000
 LEGEND:
 HorW
 S.G.
 XSnT
 SnVr

97-4072

GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER



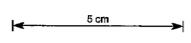
Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 18 January, 1983
Traced:	SEVERN LENS	Scale: 1:1000
Checked: K.G.P.	MEDIUM GRADE 0.3% c/o	Plate No: QH 203
Revised by: Date:		



ZEEHAN RESOURCE ESTIMATES, 1982/1983
 SEVERN LENS, Low Grade, 0.1% c/o
 10: 03 AM TUE., 18 JAN., 1983

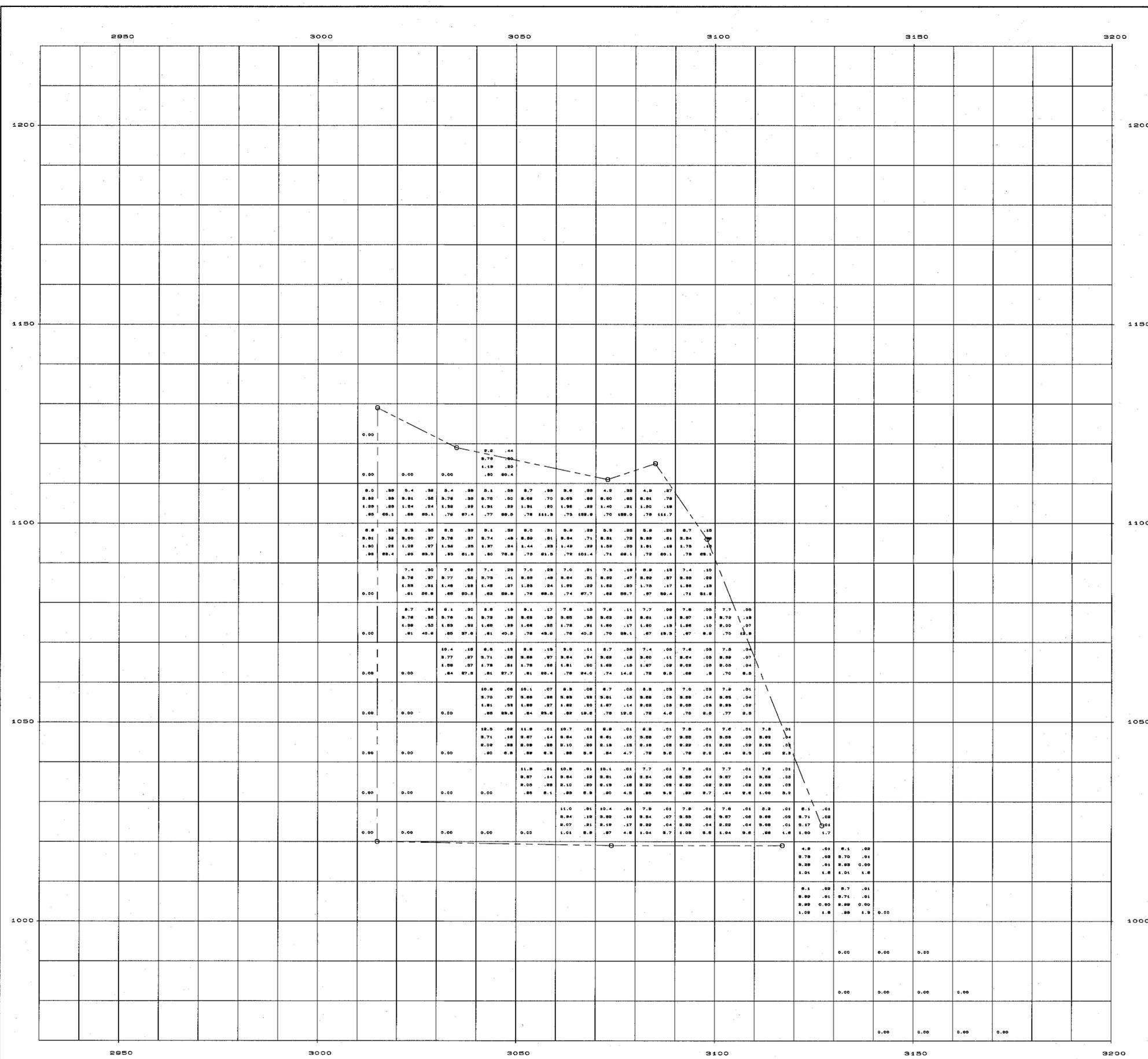
SCALE 1: 1000
 LEGEND :
 HorW
 S.S.
 NSNT
 Srvr

97-4072



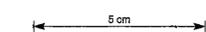
GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER

Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 18 January, 1983
Traced:	SEVERN LENS	Scale: 1: 1000
Checked: K.G.P.	LOW GRADE 0.1% c/o	Plate No: QH 204
Revised by: Date:		



ZEEHAN RESOURCE ESTIMATES 1982/1983
 Queen Hill, High Grade East Lens, 0.5% c/o
 4: 17 PM MON.. 17 JAN.. 1983

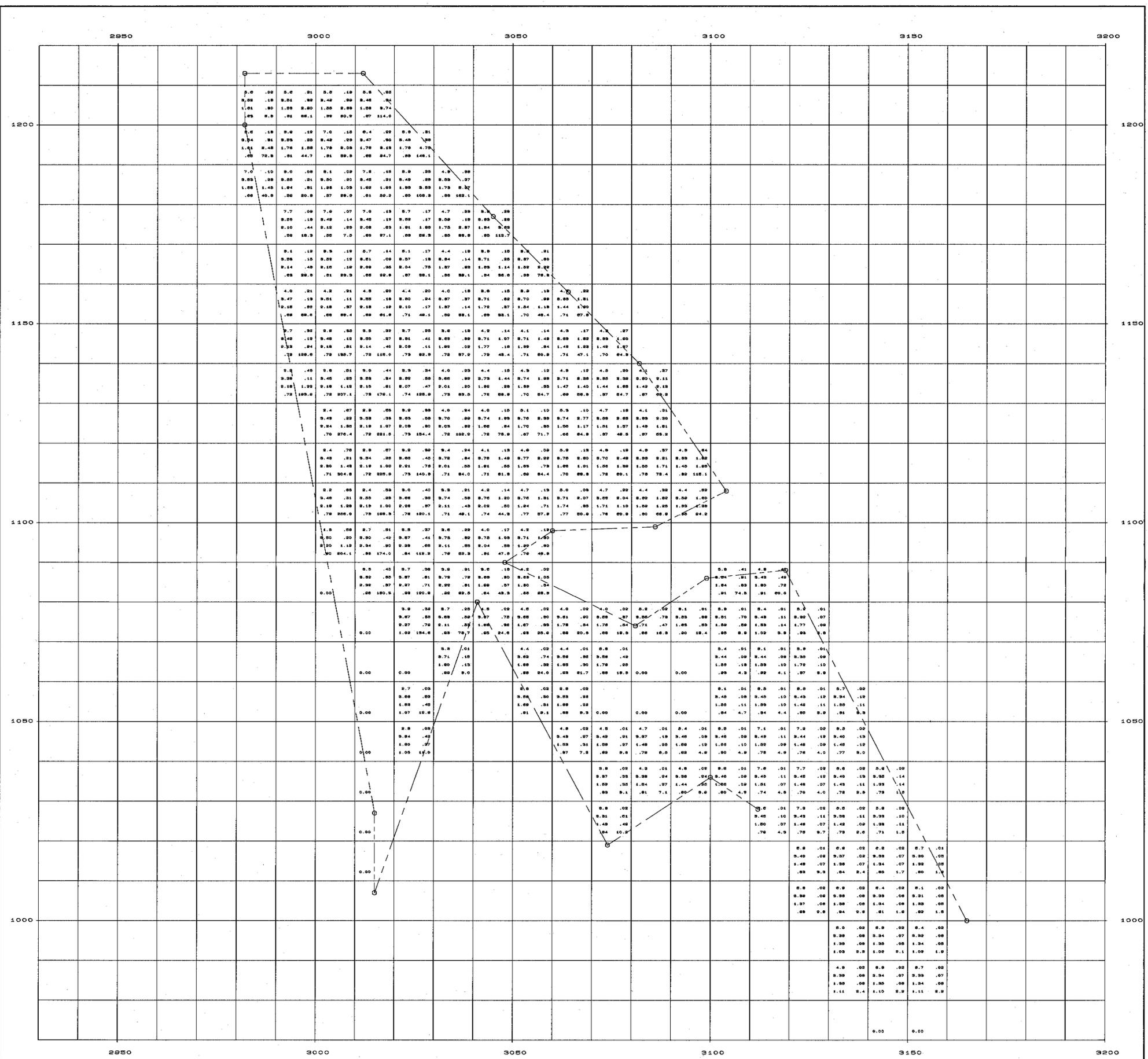
SCALE 1: 500
 LEGEND:
 HGM: 20u
 S.S.: 22u
 SSHT: 25u
 SHY: 25u



97-4072

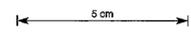
GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER

Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 17 January, 1983
Traced:	QUEEN HILL EAST LENS	Scale: 1: 500
Checked: K.G.P.	HIGH GRADE 0.5% c/o	Plate No:
Revised by: Date:		QH 205



ZEEHAN RESOURCE ESTIMATES 1982/1983
 Queen Hill, High Grade West Lens, 0.5%/o
 3:02 PM MON., 17 JAN., 1983

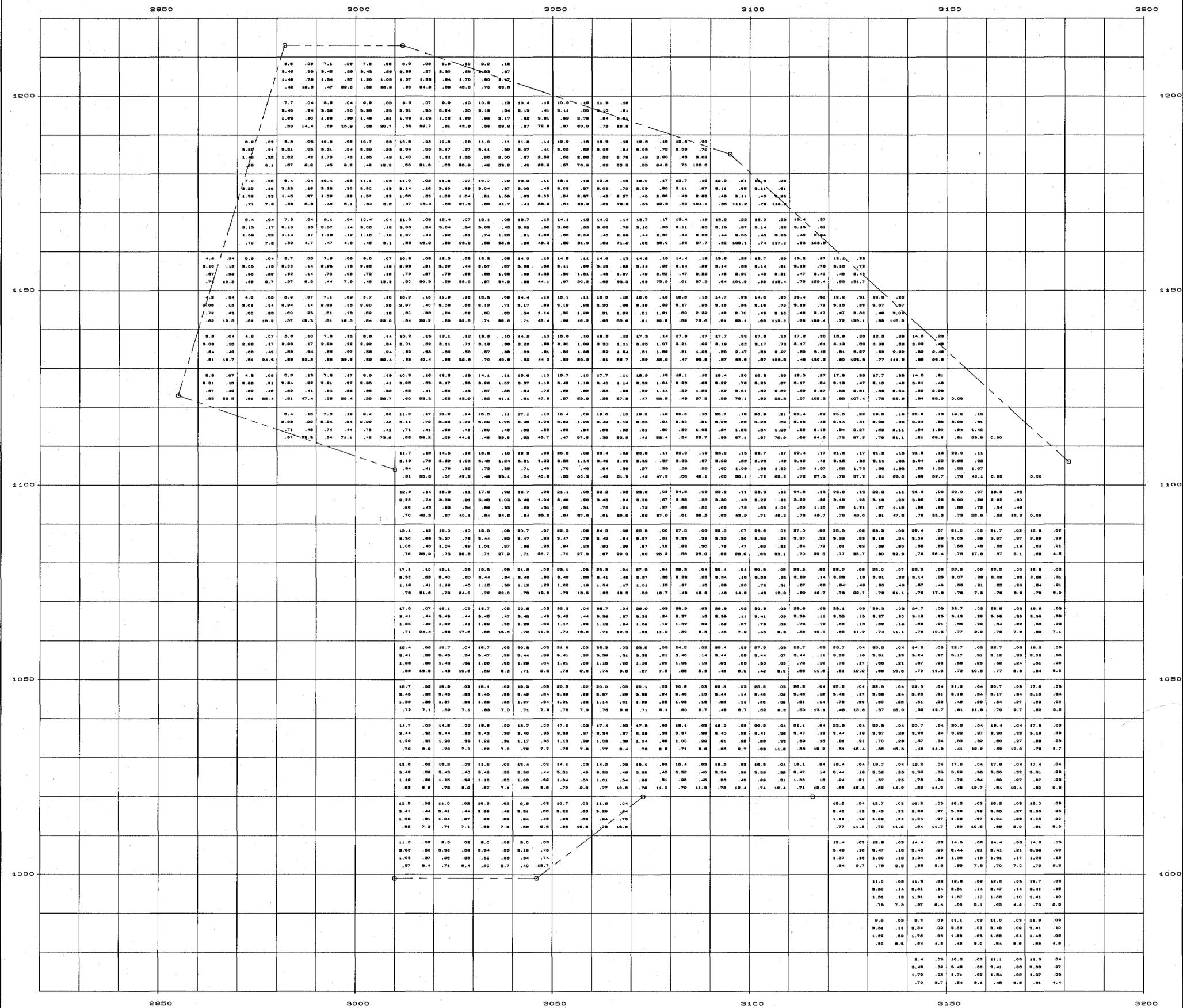
SCALE 1: 500
 LEGEND
 HGM Gm
 S.G. Stn
 SMT Stn
 SMC Stn



97-4072

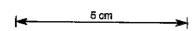
GEOLOGICAL RESOURCE ASSESSMENT
 VOL 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER

Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 17 January 1983
Traced:	QUEEN HILL WEST LENS	Scale: 1: 500
Checked: K.G.P.	HIGH GRADE 0.5% c/o	Plate No:
Revised by: Date:		QH 206



ZEEHAN RESOURCES ESTIMATES 1982/1983
 QUEEN HILL Total Lens, Low grade 0.1% c/o
 2:19 PM MON., 17 JAN., 1983

SCALE 1: 500
 LEGEND:
 HARK ROU
 B.P. RZN
 SMTY RPD
 SWP BTAG



97-4072

GEOLOGICAL RESOURCE ASSESSMENT
 VOL. 2 OF 2 - ABERFOYLE
 RL 9705 - K PALMER

Aberfoyle Exploration Pty. Ltd.		
Geology: K.G.P.	NORTH WEST TASMANIA	Location code: K55/5
Drawn: ASTEC	ZEEHAN RESOURCE ESTIMATES 1982-83	Date: 17 January, 1983
Traced:	QUEEN HILL TOTAL LENS	Scale: 1:500
Checked: K.G.P.	LOW GRADE 0.1% c/o	Plate No: QH 207
Revised by: Date:		

271047