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PROJECT NAME:

ALLUVIAL TIN PROJECT

TITLE:

A PRELIMINARY REVIEW OF THE ALLUVIAL TIN POTENTIAL OF THE RINGAROOMA VALLEY INCLUDING AN ASSESSMENT OF THE MINERAL TENEMENTS HELD BY AMDEX MINING LIMITED

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AUSTRALIAN ANGLO AMERICAN LIMITED

Incorporated in the State of Victoria

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PLANS

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Figure 1 The Blue Tier Batholith and valley of the Weld River, catchment of the Echo Lead. Looking southeast across the basalt of the Ringarooma Valley.

NOTE

All reserves are quoted in terms of grammes of SnO_2 containing 70 percent Sn per cubic metre.

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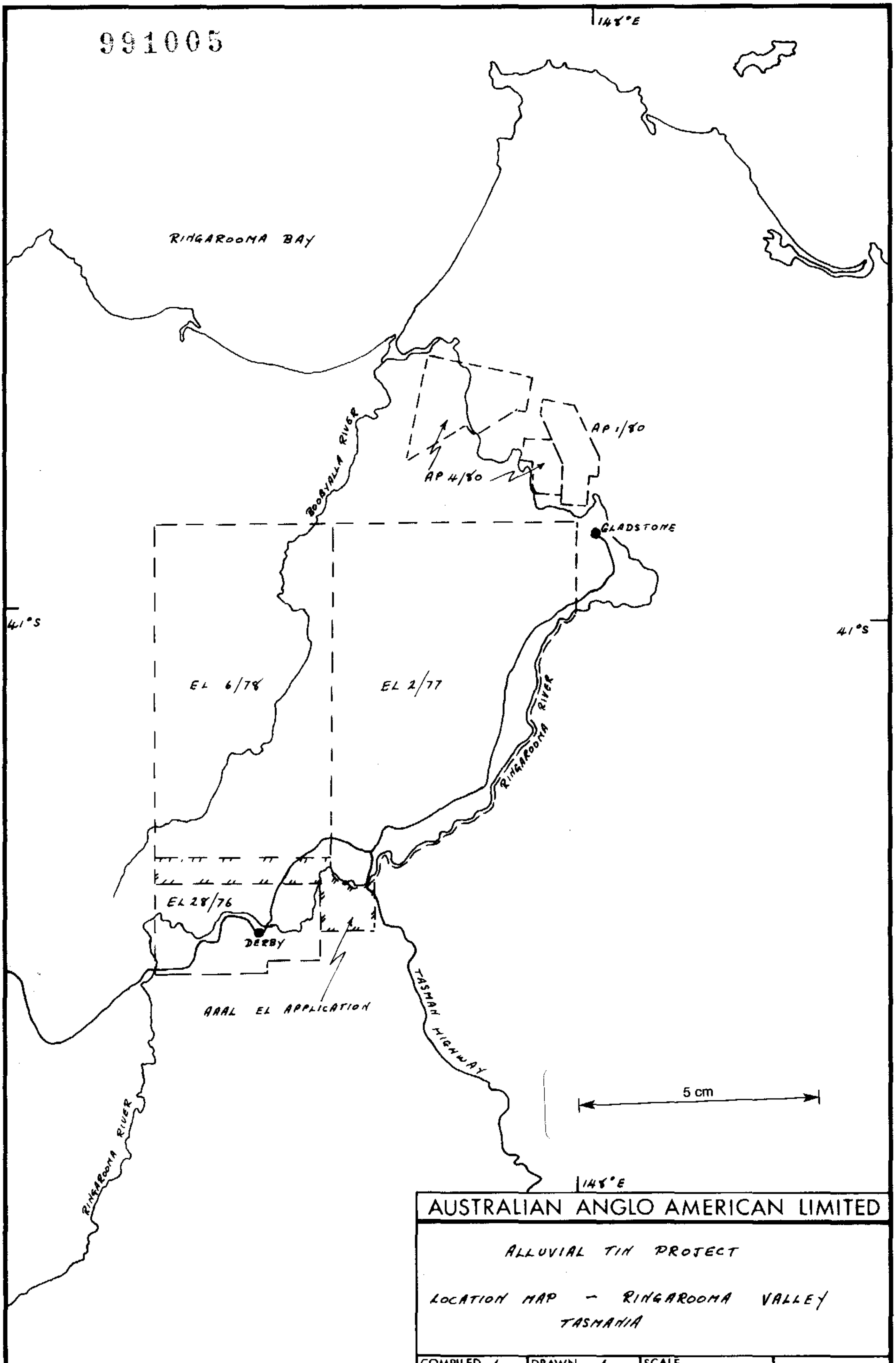

AUSTRALIAN ANGLO AMERICAN LIMITED

ALLUVIAL TIN PROJECT

LOCATION MAP - RINGAROOMA VALLEY
TASMANIA

COMPILED	DRAWN	SCALE 1:250,000	TAS-100-6

PRELIMINARY REVIEW OF THE RINGAROOMA VALLEY

1. SUMMARY

A conceptual model for the accumulation of alluvial tin in the Ringarooma Valley is established based on an interpretation of the Cainozoic geology and existing geomorphic features. This model is applied to the search for extensions of known reserves and to the search for new reserves. These reserves are briefly reviewed and it is concluded that the Ringarooma Valley is prospective for small scale tin dredging operations and for several deep lead situations. It is recommended that agreement be reached with Amdex Mining whereby AAAL be allowed to participate in exploration for alluvial tin within the Ringarooma Valley.

2. INTRODUCTION

The Ringarooma Valley is located in northeast Tasmania (TAS-100-6) and has been one of the major Australian production centres of alluvial tin. The area includes the Briseis Mine, the largest alluvial tin operation in Australia, which has yielded 21,120 tonnes of tin metal. Current production from the area is small and largely confined to the activities of Amdex Mining Limited. The area was recommended for further investigation for alluvial tin (1) and an approach was made to Amdex Mining Limited, the current holders of prospecting rights over the area, to allow these investigations to take place. This preliminary report outlines the results of those investigations.

During this work no attempt has been made to calculate reserves from known drill hole information and figures for volume and grade of possible reserves are pure "guestimates" except where reference is given. The figrues are included only in order to attach a relative prospectivity to individual areas. The main objective of the work is to establish a broad regional model for the accumulation of alluvial tin in the Ringarooma Valley and to apply this model in the search for extensions to known reserves and areas which may be prospective for as yet undiscovered reserves.

3. GEOLOGY

The geology of the Ringarooma Valley has been studied by various authors during the past (2, 3, 4, 5, 6, 7, 8) and several descriptions and interpretations are available. The publication of detailed 1:50,000 topographic maps of the area and recent work at the Pioneer Mine (9) has contributed new evidence which has been used as the basis for the present synthesis.

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flat-lying, preferentially greisenised, sometimes flat-topped, fine-grained granite zones ?

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Concentrations of alluvial cassiterite are present in Tertiary sediments derived from erosion of the tin-bearing Upper Devonian to Lower Carboniferous Blue Tier Batholith. Primary tin mineralisation occurs within flat-lying greisen sheets in granite, steeply-dipping greisen veins or pipes in granite and cassiterite stockworks within the adjacent Ordovician to Devonian Mathinna Beds (10). The major source of detrital cassiterite is the flat-lying greisen sheets which occur close to the upper contact of bodies of muscovite-biotite granite within the batholith. The location of these greisen sheets is shown on plan TAS-100-7 but they were probably formerly more extensive, parts of them having been removed by erosion.

Minor quantities of alluvial gold are present within the Quaternary sediments of the Ringarooma Valley and these have been derived from discordant quartz veins within the Mathinna Beds to the west of the Blue Tier Batholith. These quartz veins are confined to a north northwest trending zone as shown on plan TAS-100-7.

The Cainozoic sediments of the Ringarooma Valley rest on deeply weathered Palaeozoic sedimentary units of the Mathinna Beds or acid intrusive rocks of the Blue Tier Batholith. In the Great Northern Plain area Mesozoic sediments and basalt are also present. The depth of weathering is variable with the greatest thickness recorded being 49m which was encountered on a basement ridge south of the Endurance Lead.

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The Cainozoic sediments are flat-lying and attain a maximum thickness of 123m recorded in bore holes from the central part of the Ringarooma Basin. The thickness exposed at the Briseis Mine is 94m but where exposed at other localities is generally 40m to 60m. The sedimentary sequence can be divided into a lower, generally tin-bearing unit and an upper, generally barren unit. The type section is that given by Nye (2) for the Briseis Mine (see Table 1). The lower part of the sequence consists predominantly of cross-bedded sands and gravels with minor peat units and the upper part consists of clays and sands with minor gravel units. The pollen assemblage within the peat units suggests a Middle Eocene to Middle Miocene flora dominated by Nothofagus brassi typical of a temperate rain forest environment. The presence of the zone spore-pollen Cyatheacidites annulatus indicates the age of the peat with more precision as late Oligocene to early Miocene (9).

The lower part of the sedimentary sequence is regarded as being deposited in a high energy braided stream environment with the upper part of the sequence being deposited in a lacustrine to deltaic environment.

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TABLE I CAINOZOIC STRATIGRAPHY AT THE BRISEIS MINE (FROM NYE-2)

Depth.	Thickness.	Strata.
ft. 0	ft 0	
118	118	Hard, dense, fine-grained olivine basalt with large masses of olivine. Slightly vesicular at upper surface. Columnar and ball-and-socket jointing.
120	2	Quartz grits and sands.
160	40	Basalt completely decomposed, with exception or a few kernals in areas of spheroidal jointing and weathering. Highly vesicular at upper surface.
190	30	Basalt completely decomposed, with exception of a few kernals in areas of spheroidal jointing and weathering. Highly vesicular at top.
215	25	Quartz grits and gravels.
240	25	Clay (pug) with quartz grit, and interbedded quartz grits and gravels.
250	10	Gravels.
260	10	Quartz grits, gravels, and clayey beds.
270	10	Sands and quartz grits.
275	5	Clay (pug) with quartz grit.
285	10	Quartz gravels with pebbles up to ½-inch diameter.
300	15	Clay with quartz grit.
355	55	Strata not exposed. Probably quartz grits, gravels and clays as above.
355	...	Present river-level.
375	20	Quartz grits.
415	40	Quartz grits, sands, and gravels.
415	...	Black colouration, due to carbonaceous material, appears.
425	10	Thinly-bedded sands with pieces of lignitised wood. Interbedded layer of quartz grits and coarse gravels.
445	20	Sands with occasional pieces of lignitised wood.
455	10	Sands and grits. } To north-east of section a 20-foot bed of clay occurs at this depth.
465	10	Grits and coarse gravels with pebbles up to 6-inch diameter. Rocks cemented with iron pyrite. Lead water issuing from gravels.
475	10	Sands and grits cemented with iron pyrite, and containing numerous pieces of lignitised wood.
495	20	White tenacious clay (pug).
500	5	Basal beds of large boulders, white clay (pug), &c.
		Decomposed granite.

The late Oligocene to early Miocene sediments are locally overlain by basaltic lava flows which have been dated at 16 m.y. (early to middle Miocene) (34). The basalts attain a maximum thickness of about 100m and three discrete flows can be recognised at the Briseis Mine with local intercalations of sediment between the flows. The two lowest flows are deeply weathered but the upper flow is generally quite fresh.

Post basaltic deposits are restricted to Quaternary alluvium associated with the present Ringarooma River and its attendant flood plain. North of Mount Cameron these deposits have probably been reworked by marine influences during the Pleistocene and are overlain locally by aeolian sands.

3.1 Geological Synthesis

The Blue Tier and associated highlands south of the Ringarooma Valley were already well established in the late Mesozoic and the erosion of this area contributed sediment during the Cretaceous to the Boobyalla Graben on the southern margin of the Bass Basin (11).

In common with the rest of Australia (12) the Ringarooma area was subjected to a period of intense chemical weathering under a warm wet climatic regime during the Palaeocene to Eocene. Northeast Tasmania was largely reduced to a peneplain gently sloping to the north and northwest with the Blue Tier highlands in the south and Mount Cameron and Mount Horror rising as monadnocks from the plain. Under these conditions cassiterite was released by deep chemical weathering of the tin-bearing granites of the Blue Tier Batholith and accumulated as rich kaksa deposits in the upper reaches of the broad valleys. It is suggested that the rich alluvial deposits of the upper Weld River accumulated during this period.

Drainage at this time was dendritic and consequent on the peneplain surface sloping gently towards the subsiding Bass Basin in the north and northwest (see plan TAS-100-7). During the Oligocene a series of downwarps (possibly fault induced) occured concentric to the margin of the Bass Basin in response to continued subsidence in the centre of the basin. These axes of downwarp moved progressively outward from the basin and had a profound modifying influence on the drainage system (plans TAS-100-7) with major subsequent rivers developing along the axes of downwarp. These downwarps became the site of active sedimentation under a prevailing moist temperate climate during the Oligocene and Lower Miocene and contain detrital cassiterite brought down by the rivers flowing off the Blue Tier Batholith. Three separate sedimentary basins can be identified becoming progressively younger to the south; the upper Tomakawk, the upper Boobyalla and the Ringarooma. A similar sequence of events occured in each of these downwarps and is illustrated with reference to plan TAS-100-8 which is a model developed for the Ringarooma downwarp, the best preserved of the three.

Initial downwarping instigated a period of rapid erosion within the creeks immediately above the downwarp causing the formation of a deep narrow gutter commonly found at the head of the deep leads. The debris from this period of erosion accumulated in the subsiding valley as a high energy braided stream deposit with sedimentation keeping pace with subsidence and the stream maintaining its former course. Erosion removed the rich kaksa deposits and re-deposited them within the braided stream environment. Continued downwarping caused a diversion of the river along the axis of the downwarp and a silting up of the basin with deltaic to lacustrine sediments.

Evidence of these periodic downwarpings can be seen in a profile of the Cascade River (plan TAS-100-9) which once entered the sea via the Great Forester River. Each successive downwarp caused a change in the local base level of the drainage basin which is registered in well defined nick points in the upper reaches of the Cascade River. These nick points identify a fourth possible downwarp (the Great Forester downwarp) which has not yet been located on the ground.

Basaltic lava flows were errupted towards the close of the Lower Miocene and filled much of the low-lying areas of the Ringarooma and Boobyalla Basins. The basalt flows once again modified the drainage and caused the main Ringarooma River to occupy the southern margin of its former broad alluviated valley. The climate during this period returned to a warm humid regime (12) which is reflected in the deep chemical weathering of the basalt flows. Later declines in temperature and rainfall during the Middle and Upper Miocene (12) are reflected in the local preservation of deep weathering profiles mapped as ferricrete by Geol. Survey.

The Upper Cainozoic was a period of continued erosion during which the Miocene sediments were re-worked and re-deposited, together with their contained tin and gold derived from the upper Ringarooma Valley, as fluviatite alluvium along the flood plains of the major rivers.

Marine incursions of the low-lying areas in the northeast of the upper Tomahawk and upper Boobyalla depressions probably occured during the Oligocene and Miocene and estuarine conditions of the lower parts of the Monarch, Scotia and Boobyalla Leads are indicated. Fluctuating sea levels during the Pleistocene caused some re-working of earlier alluvial deposits which were later buried by aeolian sand.

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4. MINERALISATION

Three types of alluvial tin deposits are recognised by Amdex Mining (13, 14) and these are described below.

Type 1 - Deeply buried deposits of relatively fine - grained black and brown cassiterite with abundant ilmenite and monazite, in a sedimentary sequence dominated by stratified gravels, trough cross-bedded gravels, planar cross-bedded sands and peat units. This type of deposit occurs at a major break in basement slope and is commonly refered to as a deep lead.

Type 2 - Tributary gutters to deep leads, elevated in respect to the deep lead and consisting of coarse black cassiterite in poorly sorted boulder-rich sediments depleted in accessory heavy minerals.

Type 3 - Shallow surficial deposits of red, yellow and black cassiterite with accessory spinel and gold in a fining-up sequence of pebbles, sands and clays. This type is restricted to the present Ringarooma River and preserved remnants of elongated zones which run essentially parallel to the river.

A fourth type of deposit may be identified in the Great Northern Plain area where marine influences may have modified types 1 and 3.

Descriptions of the individual mines and prospects are given below together with comments on possible reserves and prospectivity. The location of the prospects is shown on plan TAS-100-10. No attempt is made to quote details of prospects adequately described elsewhere but appropriate references are given.

4.1 Arba Lead

The Arba Lead is described by Nye (2), King (15) and Warin and Appleby (7). Production ceased in 1920 when the depth of overburden became unmanageable. Remaining reserves lie beneath a cap of basalt 18m thick and have been estimated by King at 3.24M cu m at 181 gms and by Amdex at 7.30M cu m at 375 gms. The area is held in part under Mining Lease by Mr. Edwards, under EL 54/80 by Mineral Holdings and under EL 28/76 by Amdex Mining.

The lead has not been identified downstream and assuming it originally flowed northwards into the Boobyalla River no drilling has been carried out in the most prospective area. An optimistic estimate of some 10M cu m of unknown grade may be present northwest of the abandoned workings at a depth of about 50m below the present Ringarooma River flats.

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4.2 Valley Lead

The Valley lead is described by Nye (2) and King (15). Mining on a small scale terminated in 1962 due to inadequate water supply, heavy shingle and low recovery. Possible remaining reserves have been calculated by King at 0.69M cu m at 886 gms and by Amdex at 0.22M cu m at 431 gms. The area is held by Amdex Mining under EL 28/76.

The Valley Lead has a small catchment area and tin grades fall off rapidly downstream. No tin was encountered by Amdex during their drilling of Frasers Flats (EP2) which would have penetrated bedrock close to any possible continuation of the Valley Lead. No significant reserves are therefore believed to remain in this area.

4.3 Cascade Lead

The Cascade Lead is described by Nye (2), King (15) and Braithwaite (16). Mining of the Cascade Lead ceased in 1959 when overburden problems got beyond the scope of the operating company. Remaining reserves lie beneath a basalt flow some 50m thick and have been estimated (16) at 0.86M cu m at 1452 gms or 6.58M cu m at 168 gms inclusive of the overburden. The area is held in part under Mining Lease by Mr. R.J. Hayes and in part by Amdex Mining under EL 28/76.

The lead has been traced by drilling to the northwest and was found to rise topographically on the last line of holes with an associated decrease in tin content of the lead (Fig. 12). Geophysical evidence (17) suggests that the lead changes direction beyond the last line of holes to flow north but later drilling by the Mines Department failed to confirm this trend. If the Cascade Lead continues towards the northwest as postulated (see section 3.1) a possiblity of some 20M cu m of reserves remain in the lead with a grade of about 200 gms per cu m. These reserves lie beneath a cover of some 70m of basalt and about 20m of sub basaltic, largely barren overburden.

4.4 Main Lead

The Main Lead has been worked on a small scale at Mutual Hill and north of the Ringarooma River; the latter workings were not profitable but they are not considered to have been located at the base of the lead (2) which does not appear to be exposed north of the Ringarooma River. The Main Lead has not been prospected northwards from these workings. The area is held by Amdex Mining under EL28/76.

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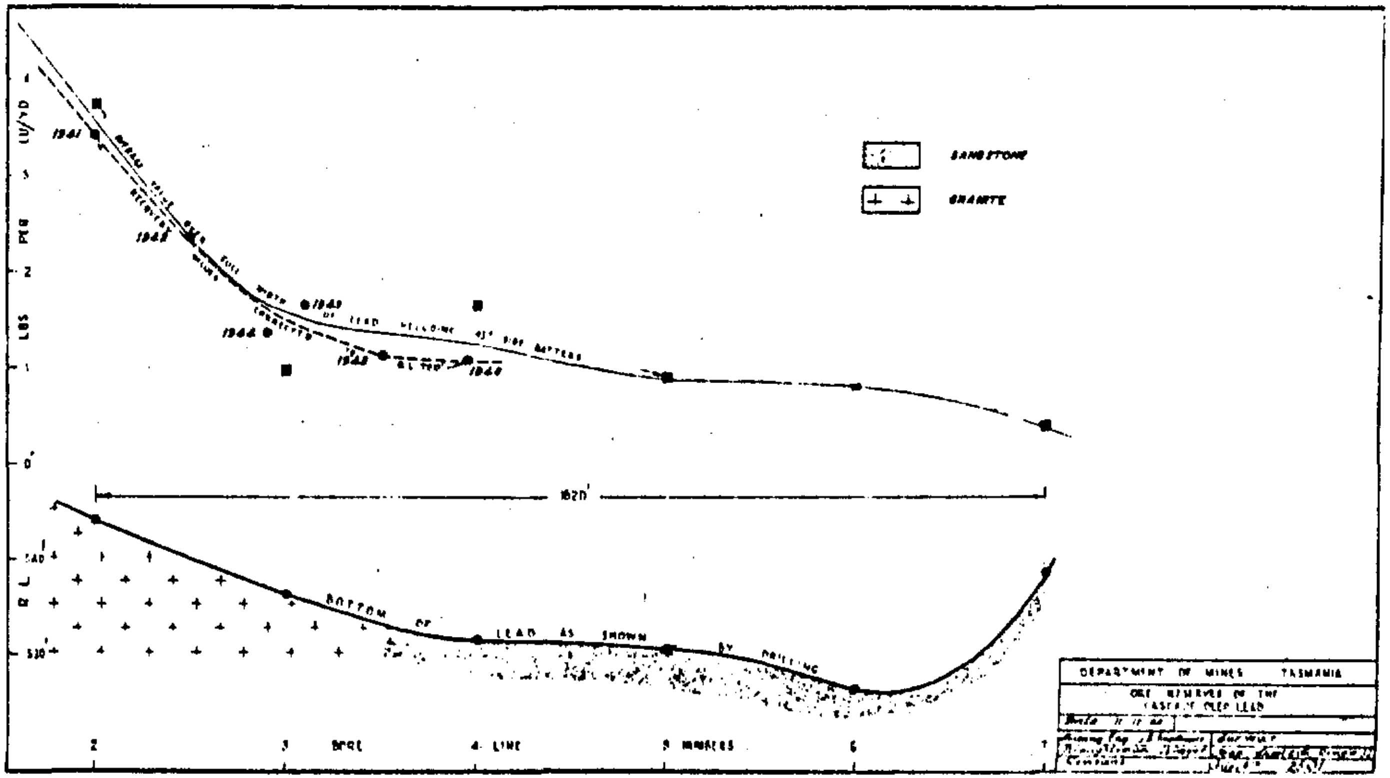
FIGURE 12 GRADE AND TOPOGRAPHY OF THE CASCADE LEAD (FROM BRAITHWAITE - 16)



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If the lead continues to the northwest a possibility of some 15M cu m of reserves remain in the lead beneath a cover of 70m of basalt and a variable thickness of barren overburden. The grade of the tin-bearing wash is unknown.

4.5 Echo Lead

The Echo Lead is described by Nye (2) and is currently held under Mining Lease by Mr. George Machen who is presently equipping the abandoned workings. The remaining area is held by Amdex under EL's 2/77 and 6/78.

The Echo Lead has been traced northwest in front of the abandoned working face with grades of about 100 gms per cu m over a thickness of about 30m beneath some 50m of overburden. If the lead continues towards the northwest it will pass beneath a basalt hill and emerge in the vicinity of Davids Creek where it will lie beneath some 50m of largely barren overburden. Early records of drilling in Davids Creek (18) indicate that tin was located in two places 6.44 km apart at depths of 34.7m and 7.9m-15.2m. There is no indication of the location of this drilling but a map accompanying the report shows tin-bearing wash outcropping beneath the basalt on the south side of Davids Creek between Herrick and Winneleah which may be a continuation of the Echo Lead.

If the lead continues to the northwest a possibility of some 10M cu m of reserves remain in part beneath a basalt cap up to 40m thick and a variable thickness of barren overburden. The grade of the lead is unknown.

4.6 Golden Sovereign Lead

Little is known of this lead. The catchment area is small and devoid of greisenised sheets and early mining operations appear to have been unprofitable. The Mines Department has done some drilling in the area but their results are not yet available. The lead is held in part under Exempt Area by the Mines Department and the remainder by Amdex under EL 2/77.

A possibility of some 7M cu m of reserves exist in this lead at an unknown grade.

4.7 Poverty Point Lead

The Poverty Point Lead was worked in the early days of mining in the Ringarooma district and has recently been investigated by Amdex in conjunction with their operations at Pioneer. These investigations have been unable to establish the junction between the Pioneer and Poverty Point Leads and it is possible that the Poverty Point Lead may have a more westerly trend.

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The low grades associated with this lead can be attributed to the small catchment area and absence of greisenised sheets within that area. A possible 5M cu m of reserves are present in this lead with a grade of about 150 gms per cu m. The area is held by Amdex under Mining Lease.

4.8 Pioneer Lead

This is the best documented lead (2, 9, 19) and the site of present operations by Amdex Mining. Proven reserves are 5.45M cu m at 280 gms per cu m (19) and there is a possibility of a further 15M cu m at a grade of about 200 gms per cu m. The area is held by Amdex in part under Mining Lease and in part under EL 2/77.

4.9 Eastern Leads

The Eastern Leads have been in part prospected by Utah (20) and Texins Development (21) but in general have been poorly prospected and are little known. Drilling by Amdex has located a lead south of the Endurance Lead which may be part of the Eastern Leads system. The upper part of the leads appear to have been reworked by post Miocene meanderings of the Ringarooma River and are obscured by post Miocene overburden.

There is a possibility of some 20M cu m of wash in the Eastern Leads at an unknown grade. The area is currently held by Amdex in part under Mining Lease and in part under EL 2/77.

4.10 Endurance Lead

The Endurance Lead has been investigated by BMI and Amdex (19) and probable reserves of some 5.44M cu m at 307 gms per cu m have been established. The position of the lead has been located by auger drilling for a further 1300m below the area for which the above reserves have been calculated and it is estimated that a total of some 13M cu m of wash remain in the Endurance Lead at a grade of about 250gms per cu m. The area is held under Mining Lease by Amdex.

4.11 Ringarooma Lead

The existance of a Ringarooma Lead has long been considered (2) but to date no evidence of its presence has been forthcoming. This lead is envisaged to result from a proto-Ringarooma river which was the mainstream to which all the previously described deep leads were tributary. According to the geological concept outlined above (section 3.1) no such lead is likely to exist as the proto-Ringarooma did not develop until after the main phase of tin deposition. Tin-bearing wash has however been intersected in drill holes in Davids Creek (18) in the area where the Ringarooma Lead would be likely to be present. Although a second interpretation has been placed on the presence of tin beneath Davids Creek (see section 4.5) the possibility of the existence of the Ringarooma Lead should not be discarded lightly as it would represent the most prospective target within the Ringarooma Valley.

4.12 Hasties-Clarence Lead

This lead was investigated by the Clarence Tin Prospecting Association around 1916 and later by Utah and BMI with Amdex drilling check holes more recently. The course of the lead is reasonably well established and there is a possibility of 1M cu m of wash with a grade of about 200 gms per cu m. The area is held under Mining Lease by Amdex.

4.13 Monarch Lead

The Monarch Lead is described by Twelvetrees (22) and King (15). More recently the area has been examined by BHP (23) and BMI and was subsequently mined by BMI. Ore reserves have been calculated by Amdex (19) and minor additions may be anticipated making a possibility of 3M cu m at about 250 gms.

The tin-bearing wash at the Monarch Mine appears to be confined to a series of channels and fan deltas and is complicated by the likelihood that the western part of the area was under marine influence. The ore reserves quoted are therefore in three separate but adjacent blocks. The area is held under Mining Lease by Amdex.

4.14 Boobyalla Lead

The lower part of the Boobyalla Lead has been prospected in the past (3, 24, 25, 26, 27) and although the probable position of the lead has been penetrated by drilling only trace amounts of tin have been found. Later work by BMI located a 45m deep lead in the East Banca area which has not been sampled. A small amount of high grade surface tin is also available here derived from the Banca area to the west. The only record located of work in the upper Boobyalla area refers to a single bore hole above the junction with Trout Creek which located a trace of tin within sediments 76.2m thick (28).

The Boobyalla Lead above Little Mount Horror remains the largest single untested Tertiary basin in the Ringarooma Valley and a possibility of 25M cu m of potentially tin-bearing wash exists here. This wash is also anticipated to contain some gold derived from the Warrentinna Goldfield upstream. The area is held by Amdex in part under Mining Lease and in part under EL 6/78.

4.15 Scotia-Locharber Leads

The Locharber and Scotia Leads have been investigated by a number of workers with the most recent assessment made by BMI (29). Recent check drilling by Amdex confirms the general results obtained by BMI and there seems little likelihood of any increase in grade or volume in this area. The area is held in part by Amdex under SR 166/67 and in part under Mining Lease by a third party optioned to Amdex. Tin reserves are shown in Table II.

4.16 MacGregor Lead

The MacGregor Lead together with the associated Beltz and Taylor Leads lie largely within ground held by Mineral Holdings. Reserve calculations by Amax (30) based on drilling carried out by South Cameron Tin (31) suggest combined reserves of about 2M cu m with a grade of around 150 gms per cu m with little chance of any improvements.

4.17 Great Northern Plain

The area known as the Great Northern Plain embraces the low-lying ground between the Scotia Lead and the mouth of the Boobyalla River. This area has been investigated by a large number of workers including Austral Malay, Storeys Creek, Utah, Preussag (32) and the Mines Department (33) and several tin prospects are known. A review of the area including a comprehensive plot of all known bore holes was made by Amax (30), and a review has also been made by Renison (35). Most of the known tin occurrences in this area are held by Amdex Mining under SR 32/70.

The tin-bearing sediments of the Great Northern Plain are younger than the sediments of the deep leads described above and are probably Pleistocene in age representing sedimentation towards the mouth of the Ringarooma River at a time when the course of the river above Gladstone was similar to its present course. For this reason traces of gold can be anticipated associated with the tin although none appears to have been recorded to date. Topographically the tin in these sediments is higher than the lowest point of the Tertiary deep leads which terminate on the margin of the plain. Fluctuations in sea level during deposition of the sediments on the Great Northern Plain is evident from local thin shell-bearing horizons (32) within

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the sequence. It is considered that such marine transgressions have caused re-working of the sediments and consequent dispersal of the cassiterite and lowering of the tin grade of the sediments.

Two areas of tin accumulation are known in the Great Northern Plain; Braithwaites and Fosters Marsh. Braithwaites area was found to contain 6.16M cu m at a grade of 136 gms per cu m over an average depth of 14m (32). Later drilling by Preussag (32) to the north failed to find any significant increase in volume or grade. Preussag's best hole (No. 4) was drilled within the area previously outlined by Braithwaite and gave a value of 231 gms per cu m. remaining drill holes peaked at 71 gms with most holes yielding a lower grade. The drilling rig used by Preussag was subsequently used by Amdex at the Pioneer Mine and the grades obtained were lower than previously indicated by as much as one third. Preussag's drilling can therefore be regarded with some degree of suspicion and patchy increases in grade and volume can be anticipated to the northwest of Braithwaites area.

The Fosters Marsh area has been investigated by Austral Malay and Utah and is estimated to contain 45.8M cu m at 79 gms per cu m (30).

Dugards area which lies within EL 19/77 held by Mineral Holdings is estimated to contain a potential of up to 23M cu m at a grade of 118gms per cu m (35).

4.18 Quaternary River Terraces

Terrace deposits associated with the present course of the Ringarooma River are worked by Amdex at their Riverside Property and have been worked in the past by the Dorset Dredge. These deposits are shallow surficial deposits and contain recoverable quantities of gold. Some 4.6M cu m at a grade of 123 gms per cu m are estimated to lie ahead of the now abandoned Dorset dredge (19) within ground held by Amdex Mining and a further 0.7M cu m at 295 gms per cu m was indicated by Texins Development near Chung Creek in ground held under Mineral Lease by Mr. N.B. Moor. Similar terrace-like deposits are known along the Ringarooma River below Gladstone but reserves are small and the grade is patchy.

4.19 Recent Alluvium

Recent alluvium of the Ringarooma River is currently worked on a small scale below Derby (Fig. 2) and the area between Herrick and Pioneer was investigated by Texins Development. Approximately 1.34M cu m of alluvium with a grade of about 600 gms per cu m with associated gold exists in this area. The large area of alluvium above Derby was investigated by Dorset Tin and found to contain extremely low tin values. This was confirmed by later drilling by Amdex at Frasers Flats although 0.04 gms per cu m of gold was found in the top 6m of the alluvium.

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TABLE II **TIN RESERVES HELD BY AMDEX MINING LIMITED** (FROM NEALE - 19)

AREA	RESERVE CLASS	CUT OFF GRADE gms SnO_2/m^3	VOL cu m x 10^6	WT. AV GRADE gms SnO_2/m^3
Pioneer	proven	200	3.833	333.6
	proven	100	5.448	279.6
Endurance	probable	200/100	5.437	307.5
Monarch	possible	200	1.802	353.0
		100	2.437	296.7
Scotia	proven	?	7.233	178.4
	probable	?	4.856	73.4
Dorset	possible	-	4.587	123
Chimneys	possible	100	6.160	136

TABLE III THEORETICAL VOLUMES AND GRADES OF TIN-BEARING WASH IN THE RINGAROOMA VALLEY

	VOLUME	GRADE	TIN CONTENT	COMMENTS
	M cu m	gms SnO_2 per cu m	tonnes Sn	
ARBA	10	300	2100	± 50m part sub-basaltic
VALLEY	1	350	245	± 50m
CASCADE	20	200	2800	± 90m sub-basaltic
MAIN	15	200	2100	± 90m sub-basaltic
ECHO	10	200	1400	± 50m in part sub-basaltic
GOLDEN SOVEREIGN	7	100	490	± 50m in part sub-basaltic
POVERTY POINT	5	150	525	40-60m part of Pioneer system
PIONEER	20	250	3500	± 60m includes known reserves
EASTERN	20	150	2100	± 50m
ENDURANCE	13	250	2275	± 50m includes known reserves
HASTIES-CLARENCE	1	200	280	± 20m positions established
MONARCH	3	250	525	± 30m partly proven
BOOBYALLA	25	200	3500	± 60m some Au
SCOTIA	8	180	1008	± 40m partly proven
MACGREGOR ETC.	2	150	210	Partly proven
BRAITHWATES	6	140	588	± 14m largely proven,possible Au
FOSTERS MARSH	46	80	2576	Shallow, possible Au
DORSET	4.6	123	396	Largely proven,shallow,some Au
CHUNG	0.7	296	144	Largely proven,possibly some Au

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5. MAIN PROSPECTIVE AREAS

Table III is an estimate of the magnitude of possible reserves within the Ringarooma Valley. These figures are little more than guesswork but give some indication of the relative merit of each area. From this it can be seen that the best documented leads of Pioneer and Endurance are the most prospective areas. The Boobyalla Lead is the best virgin prospect in the area and is enhanced by the absence of basaltic overburden and the possibility of accessory gold. The Arba and Echo Leads are also considered prospective but the Arba is downgraded as the Ringarooma River would have to be diverted to allow mining operations in this area.

6. CONCLUSIONS

A single large scale dredging operation of AAAL target parameters does not exist in the Ringarooma Valley. Small scale dredging operations with a throughput of about 1M cu m per year may be worthy of some consideration in the lower Ringarooma and Great Northern Plain area. Prospects of extending known reserves in deep lead situations are good and there is a reasonable likelihood of locating virgin leads particularly in the Boobyalla area. Three or more of these deep leads could be worked in rotation to provide reserves in excess of 50M cu m.

7. RECOMMENDATIONS

It is recommended that agreement be reached with Amdex Mining to allow AAAL to participate in exploration for tin in the Ringarooma Valley. Initially our investigations should be confined to three areas.

(a) The Boobyalla Valley above Little Mount Horror to investigate the possibility of deep lead tin and gold. This area is regarded as an older analogue of the Ringarooma deep lead system and will contain tin-bearing sediments in the south bank tributaries and tin and gold-bearing sediments in the main lead.

(b) The Davids Creek area to determine whether the tin refered to by Thureau represents a continuation of the Echo Lead or whether it is part of the yet undiscovered and highly prospective Ringarooma Lead.

(c) Test drilling in Braithwaites area to check the possibility of gold occuring with the alluvial tin and to determine the reliability of previous drilling programmes on the Great Northern Plain.

J. Newton-Smith

25.2.81

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991025

M.J. Turner
15.6.81

Comments on Report No. 81-1534

Basic Points in the Analysis

1. Peneplaination of N.E. Tasmania at the end of the Palaeocene-Eocene with dendritic, consequent drainage system to the N.W.

2. Profound stream modification in the Oligocene due to S-side-down downwarps causing diversion of drainage.

3. Mid-Miocene basalt post-dated the downwarps and caused the last major phase of stream modification.

General Comment

I do not believe there is any evidence at this time which contradicts any of the basic points.

Alternative geological histories can be constructed and I would be inclined to do so because I am cautious of point 1 and of the short duration allowed for the changes in point 2. No evidence of warps or equivalent fault/fracture zones has been recognised in the course of field mapping.

The long-standing problems of drainage escape from the main basin S of Mt Cameron is not resolved by the analysis. Damming of an outlet W of Mt Cameron by mid-Miocene basalt is an adequate solution since it avoids the real problem of why the base of the pre-basalt sediments rises to the NW, i.e. in the postulated downstream direction.

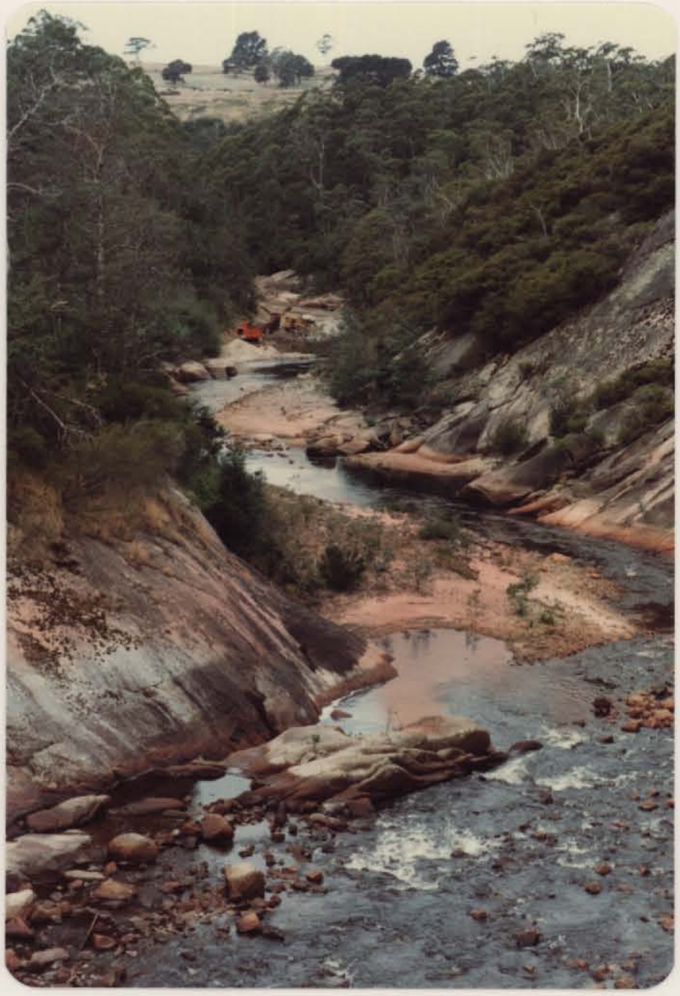


Figure 2 Current mining operations in the Ringarooma River at Derby.

Figure 3 Silting up of the Ringarooma River near Gladstone as a result of early mining activities mainly on the Cascade Lead.

Figure 4 Abandoned workings on the Cascade Lead at Derby.

Figure 5 Abandoned workings at the Monarch Mine.

991028

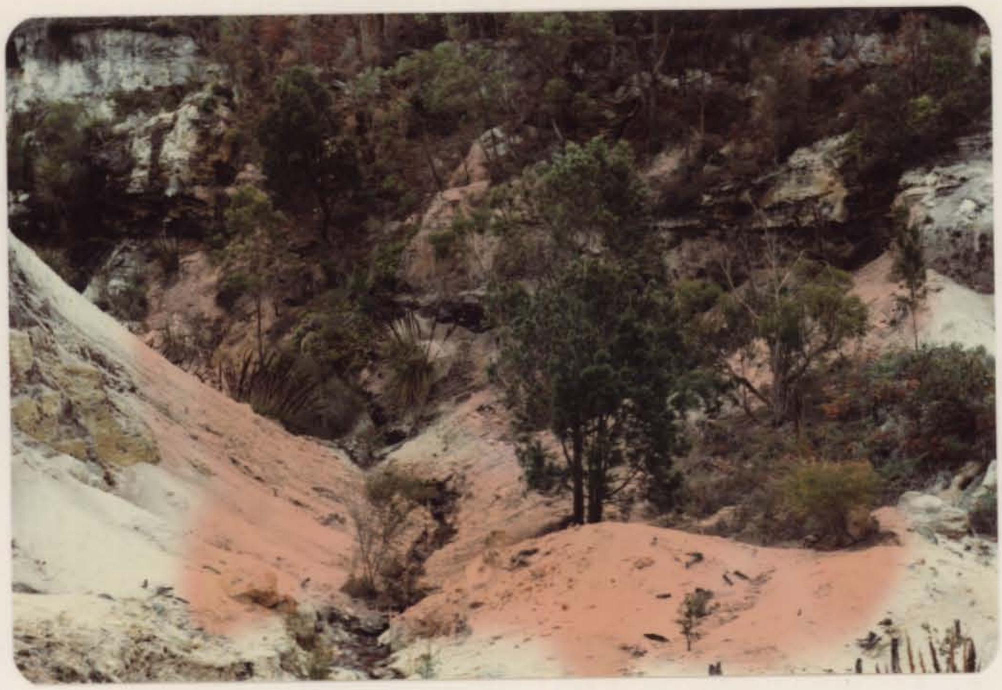


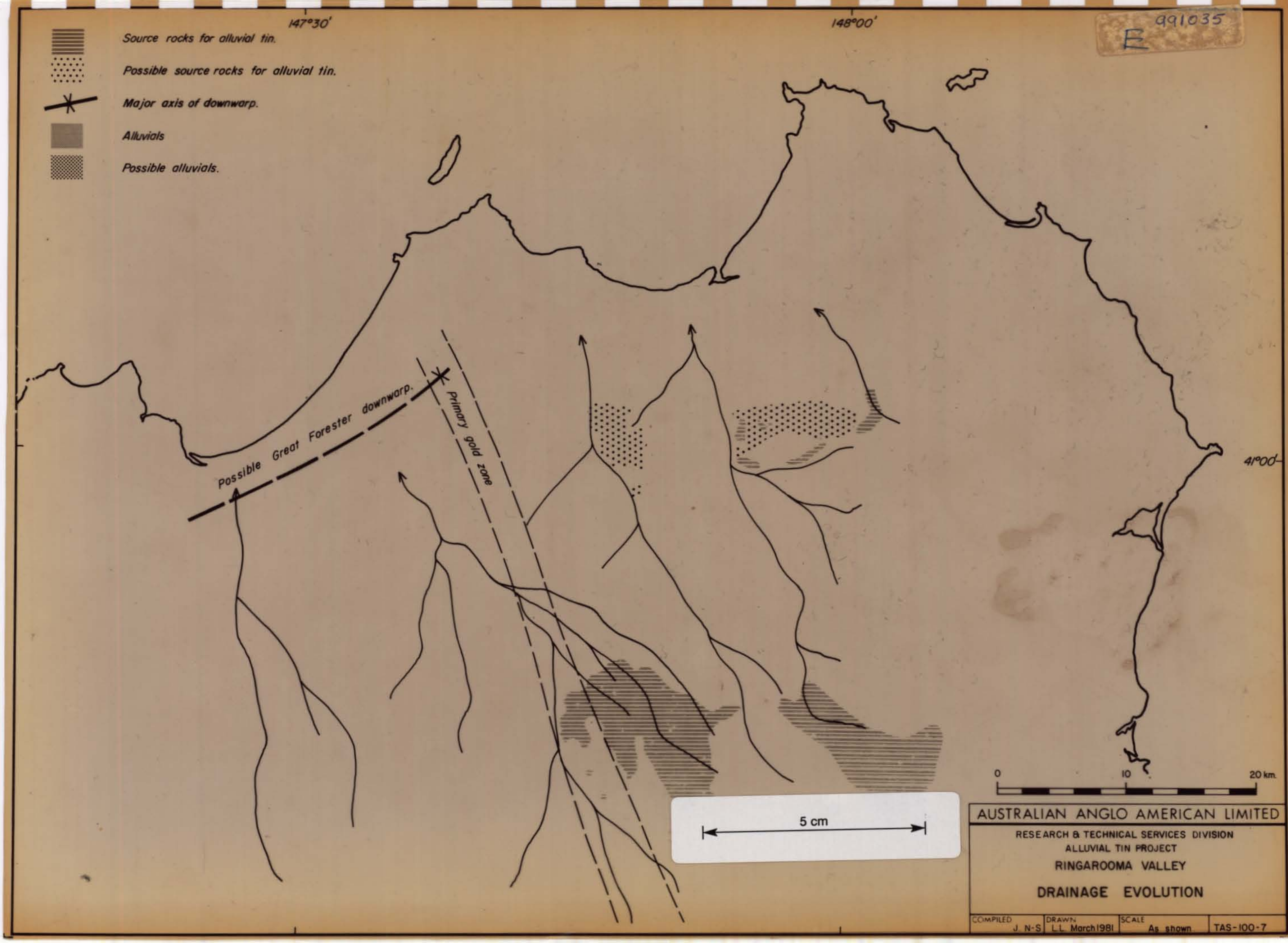
Figure 6 Abandoned workings on the Hasties Lead.

Figure 7 Abandoned workings on the White Rocks Lead.

Figure 8 The basal tin-bearing wash at the Pioneer Mine overlain by leached (podzolised), mainly barren overburden.

Figure 9 The basal contact at the Pioneer Mine. Tin-bearing wash overlying deeply weathered granite.

Figures 10 and 11   Current mining operations at the Pioneer open pit; the monitor is fed by hydrostatic pressure from a dam on the Frome River.



147°30'
148°00'
E 991035
Source rocks for alluvial tin.
Possible source rocks for alluvial tin.
Major axis of downwarp.
Alluvials
Possible alluvials.
Possible Great Forester downwarp.
Primary gold zone
41°00'
0
10
20 km.
5 cm
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RESEARCH & TECHNICAL SERVICES DIVISION
ALLUVIAL TIN PROJECT
RINGAROOMA VALLEY
DRAINAGE EVOLUTION
COMPILED J. N-S
DRAWN L.L. March 1981
SCALE As shown
TAS-100-7

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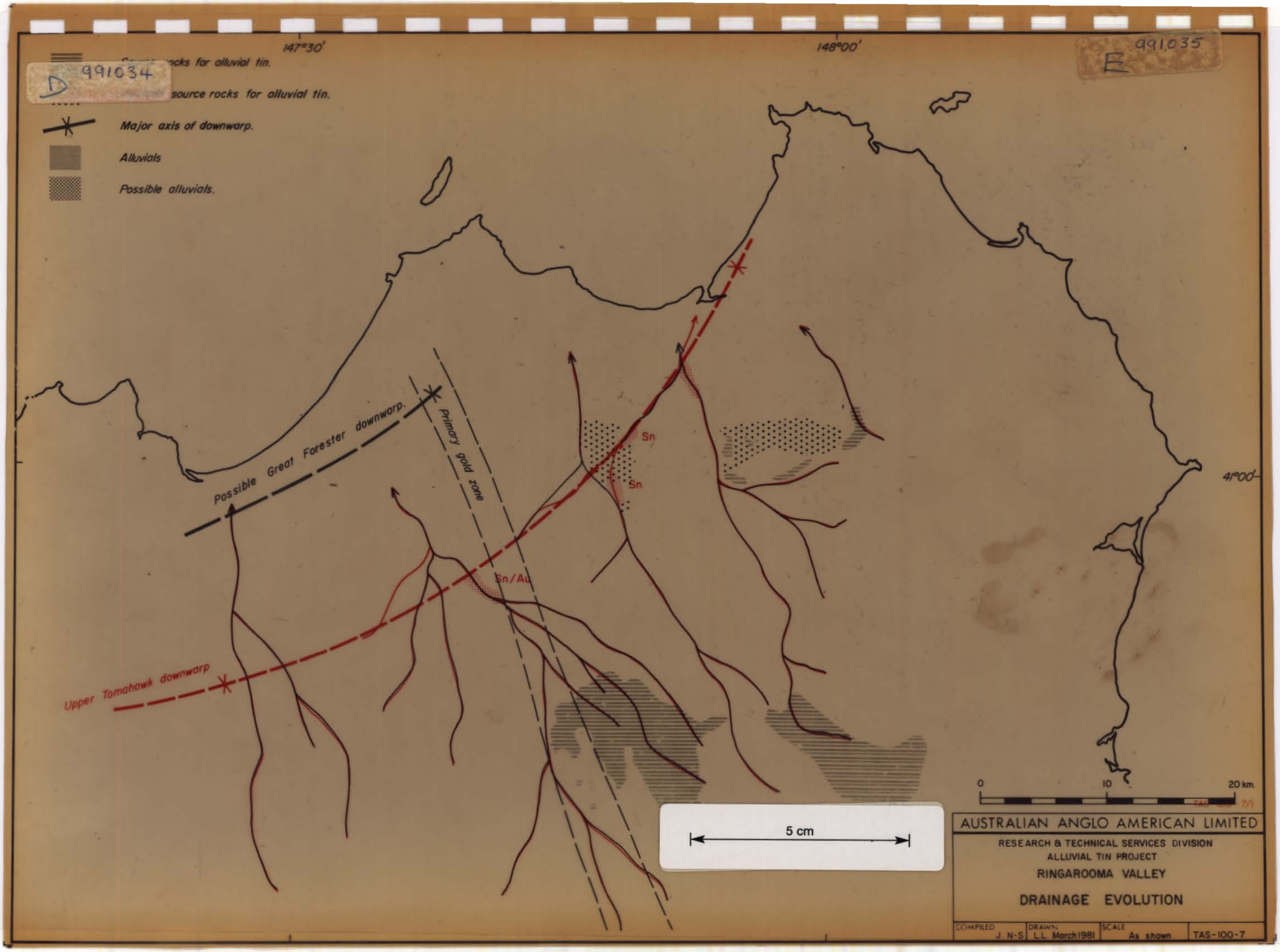

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Major axis of downwarp.
Alluvials
Possible alluvials.
Possible Great Forester downwarp.
Primary gold zone
Upper Tomahawk downwarp
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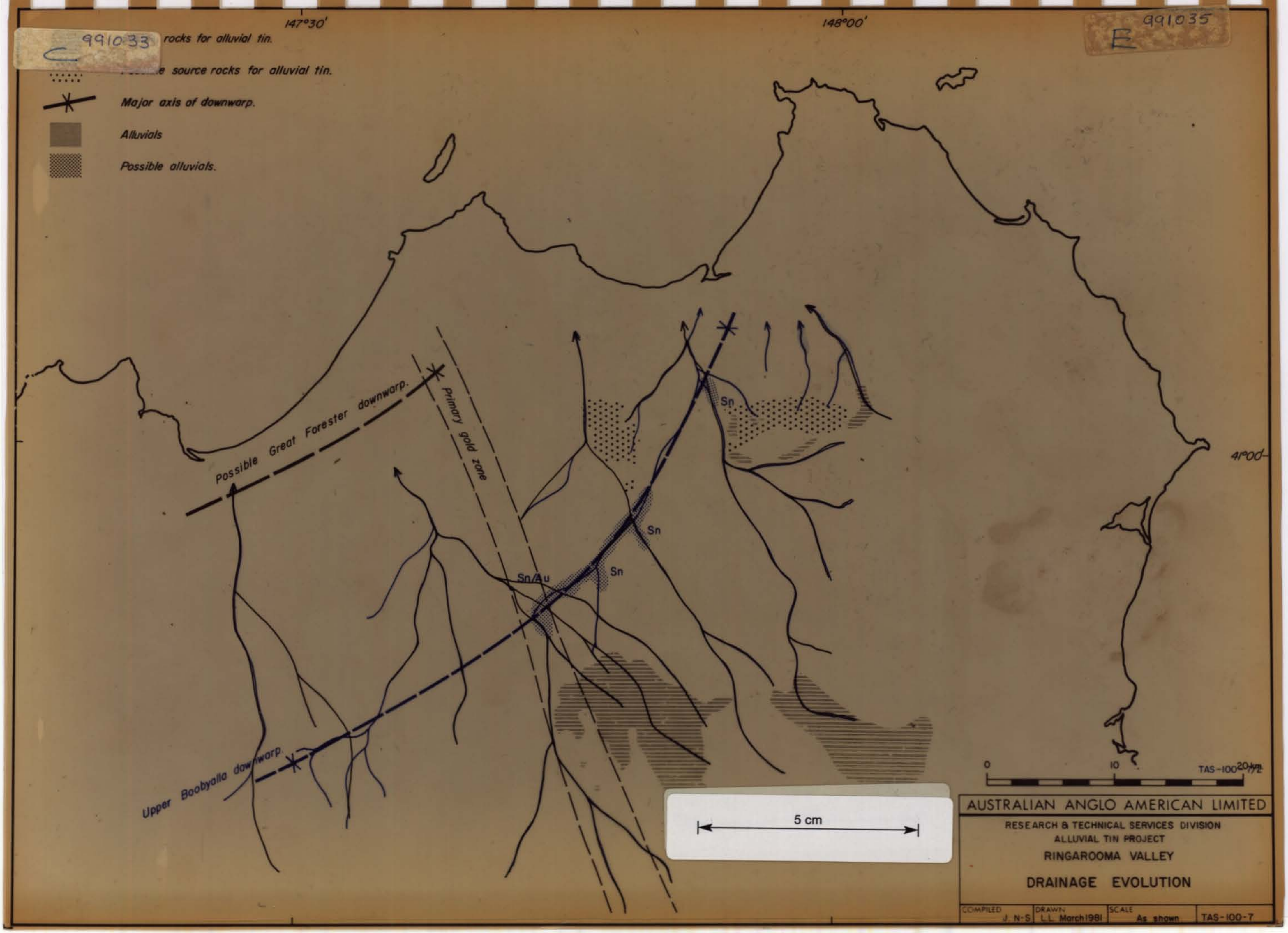
TAS-100-7

TAS-100-7/2



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Possible Great Forester downwarp.
Primary gold zone
Upper Boobyalla downwarp.
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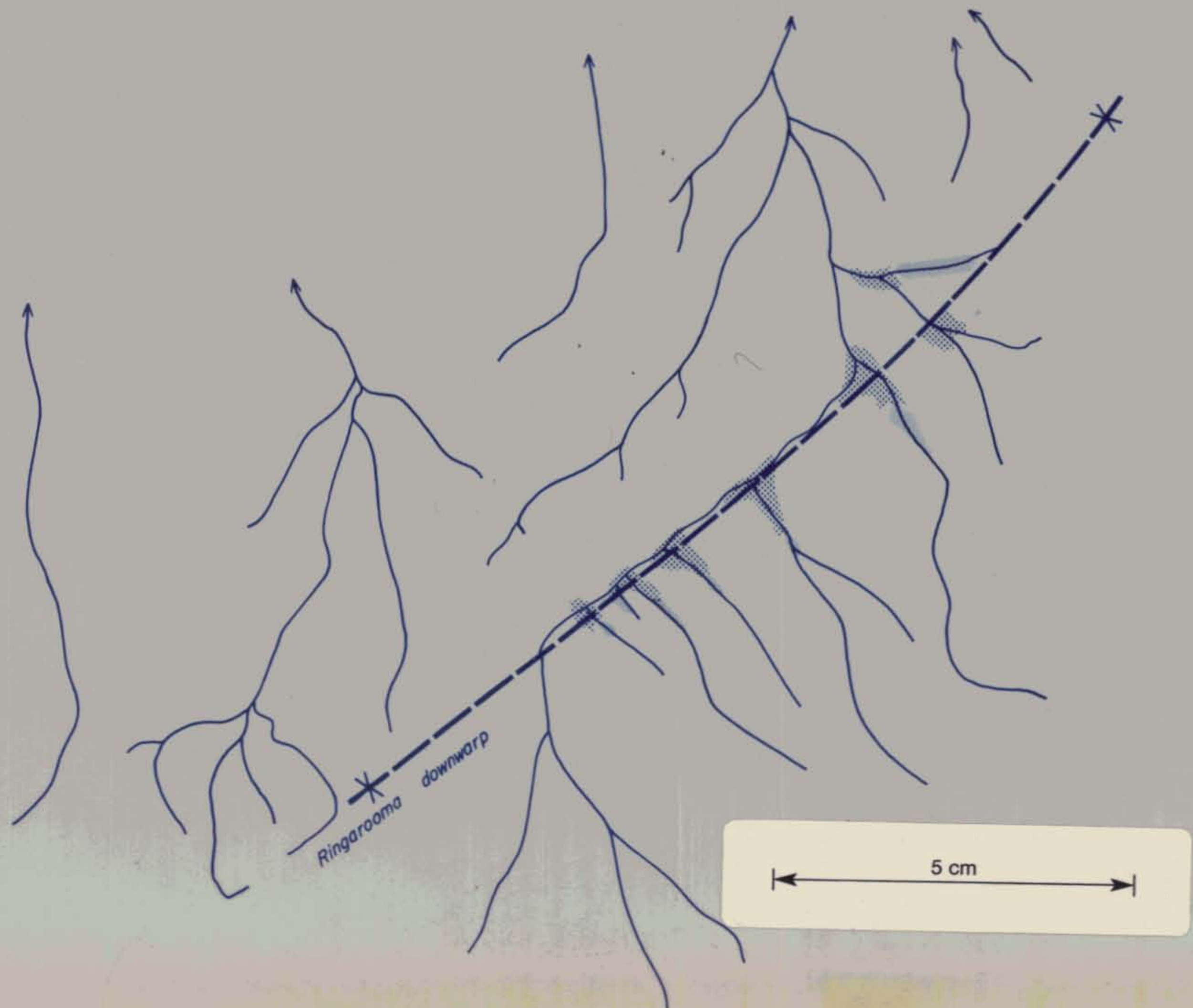

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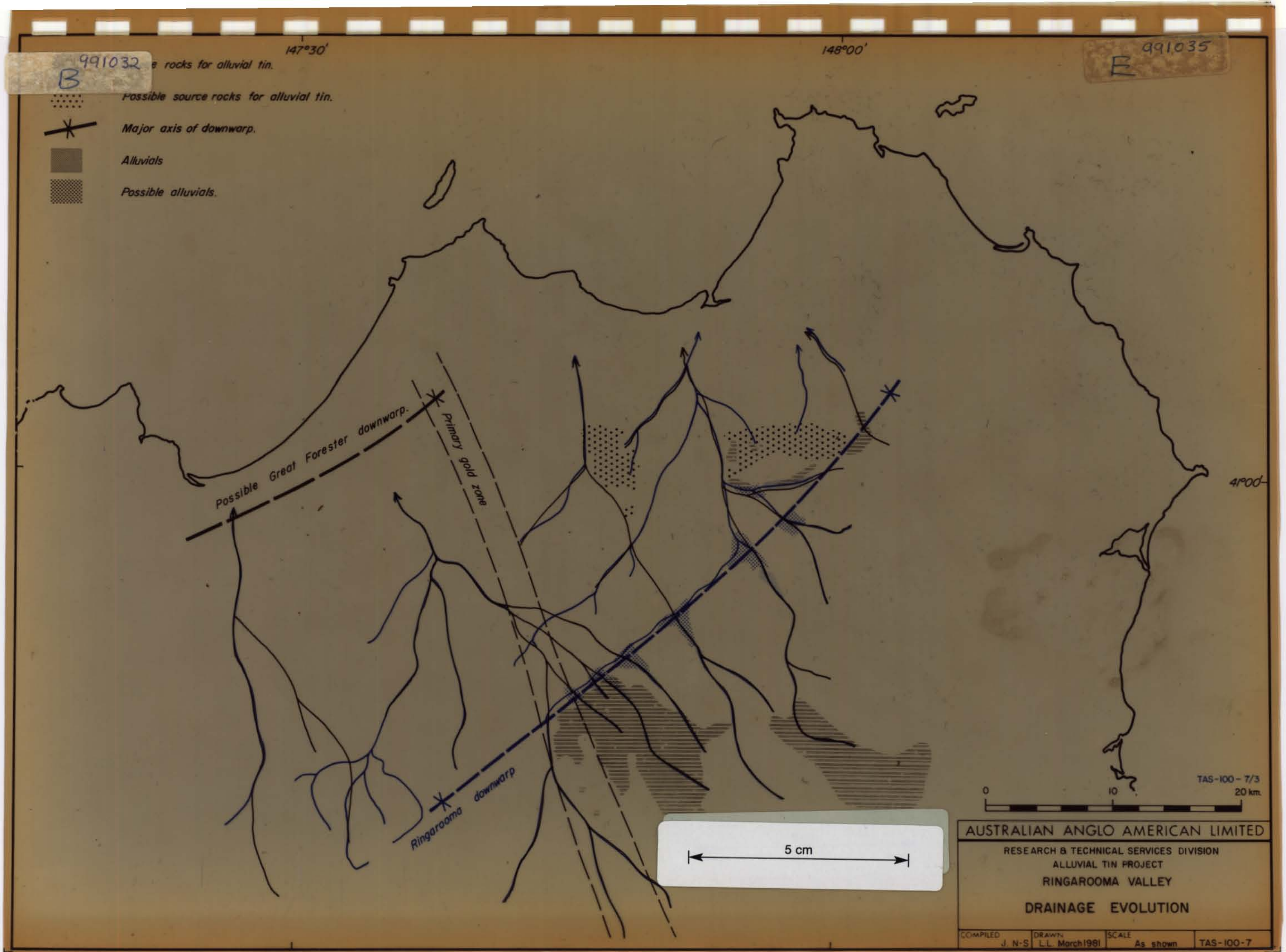

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Alluvials
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Primary gold zone
Ringarooma downwarp
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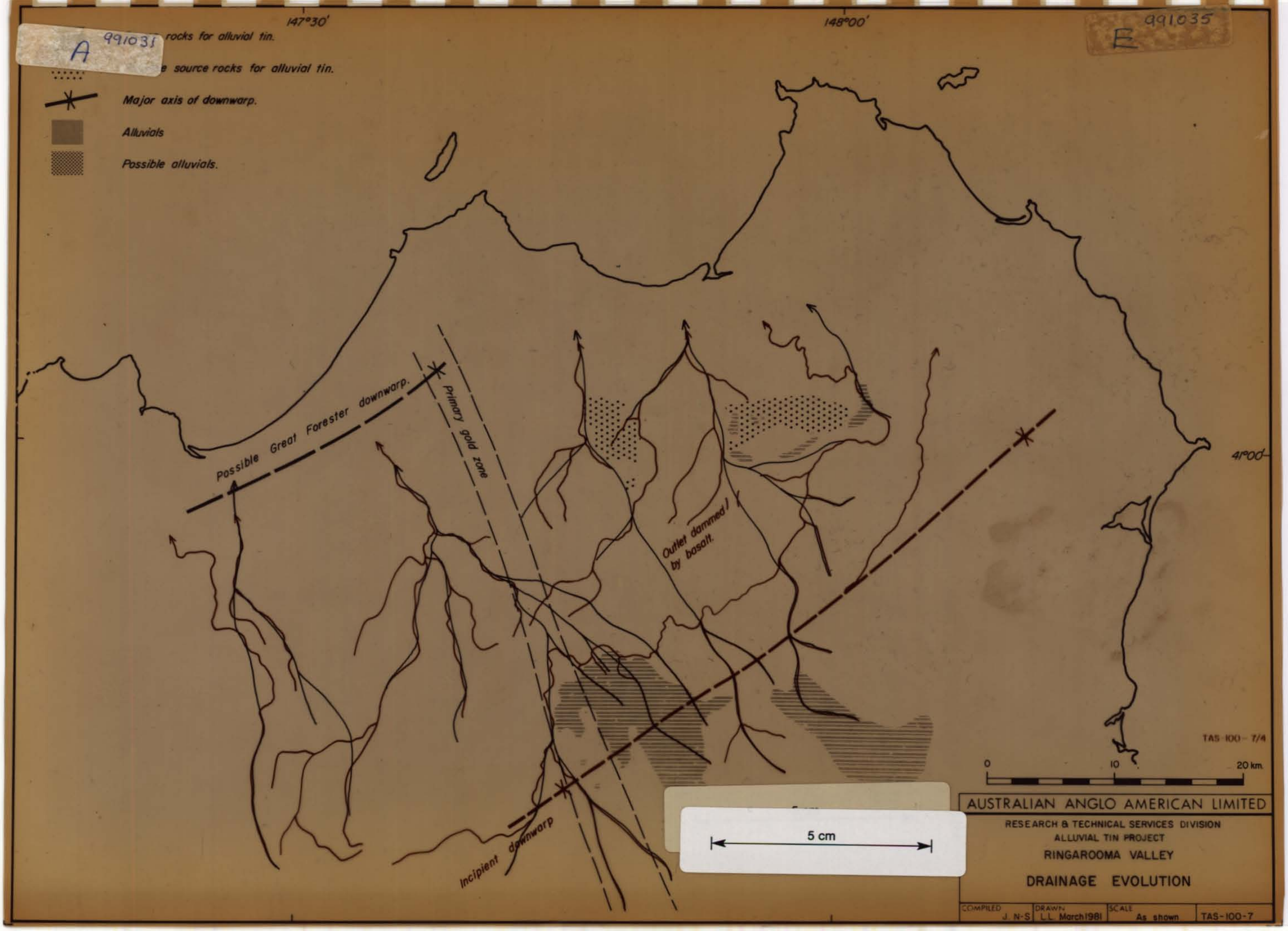
DRAINAGE EVOLUTION
COMPILED J. N-S
DRAWN L.L. March 1981
SCALE As shown
TAS-100-7

TAS-100-7/4



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ALLUVIAL TIN PROJECT
RINGAROOMA VALLEY
DRAINAGE EVOLUTION

COMPILED	DRAWN	SCALE	
J. N-S	L.L. March 1981	As shown	TAS-100-7

Comments on Report No. 81-1534 991036 N.J. Turner
15.6.81

Basic Points in the Analysis

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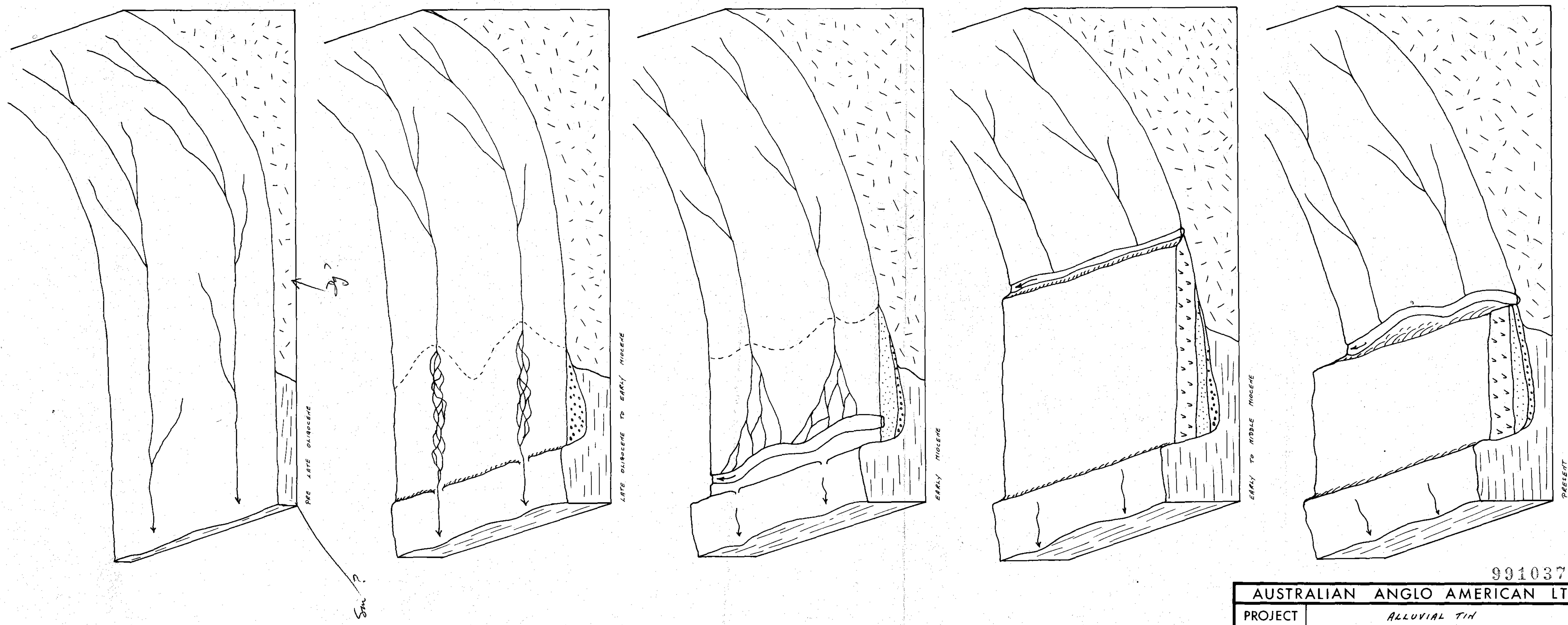

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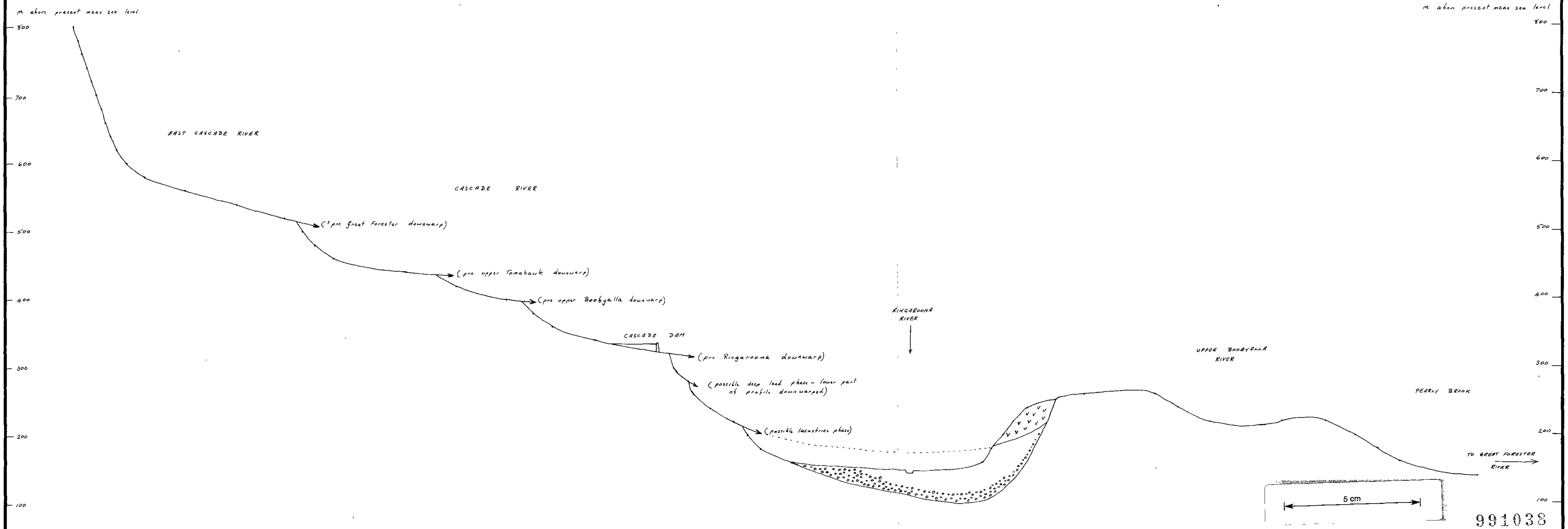
AUSTRALIAN ANGLO AMERICAN LTD			
PROJECT	ALLUVIAL TIN		
AREA	RINGAROOMA VALLEY		
DATA	STAGES IN THE DEVELOPMENT OF THE RINGAROOMA BASIN		
COMPILED	d.	SCALE	
DRAWN	d.	REF No	TAS - 100 - 8
AMENDED			



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AUSTRALIAN ANGLO AMERICAN LTD			
PROJECT	ALLUVIAL TIN		
AREA	RINGAROOMA VALLEY		
DATA	PROFILE OF THE CASCADE RIVER EXTENDED NORTHWEST TO THE GREAT FORESTER RIVER SHOWING NICK POINTS WITH POSSIBLE CAUSE		
COMPILED	f.	SCALE	h = 1:50,000 v = 1:4000
DRAWN	f.	REF No	TAS - 100 - 9
AMENDED			

81-1534

Possible contour form line on base of Tertiary sediments interpreted from various sources.

Alluvial tin occurence.

Possible alluvial tin occurence.

E.L. or A.P. boundary.

AUSTRALIAN ANGLO AMERICAN LIMITED

RESEARCH & TECHNICAL SERVICES DIVISION

ALLUVIAL TIN PROJECT

RINGAROOMA VALLEY

POSSIBLE TIN DISTRIBUTION

DRAWN	L.L.
DATE	March 1981
COMPILED	J. N-S
SCALE	1:50000

TAS-100-10

991039

81-1534