UR1985_56

1985/56. The Bradshaws Road drill hole through the South Henty Fault Zone, western Tasmania

K.D. Corbett

INTRODUCTION

Geological mapping for the author's Mt Read Volcanics Project over the last few years has shown a major fault system cutting obliquely through the volcanic belt from the Henty River area to Tullah. This Henty Fault System divides into two faults southwards, one of which (the South Henty Fault) follows the gorge of the Henty River before disappearing under glacial deposits near the Bradshaws Road - Zeehan Highway junction (fig. 1). This fault is presumed to connect with a major lineament through Truscott Creek, south-west of the highway, and thence to the Firewood Siding Fault near The Sisters. The fault appears to be a major structure separating an unusual sequence with pillow basalts and gabbros to the north from a volcano-sedimentary sequence flanking the Mt Read Volcanics to the south.

Drilling was aimed at: (a) establishing whether the fault was present under the thick glacial cover; (b) determining its nature and attitude, if possible; (c) examining the sequence on either side of the fault; and (d) determining whether any significant mineralisation was associated with the fault.

GENERAL GEOLOGY

The sequence to the north-west of the South Henty Fault, as exposed along the Zeehan Highway (fig. 1), in the Henty River, and on various logging tracks between the highway and the river, consists of shale, greywacke and felsic tuff (vitric ash, vitric-crystal tuff, including quartz-feldspar and feldspar-phyric varieties) intercalated with units of basaltic to andesitic volcanic rocks and intruded by gabbroic and basaltic dykes. Measured strikes are mostly NNW to NW, with subvertical bedding in which both east and west facings have been seen. Fossils of probable Middle Cambrian age (trilobites, brachiopods) occur in the sequence in a tributary creek of the Henty River.

The basaltic units comprise pillow lavas and massive flows, associated with numerous small dykes in some areas, of pyroxene-plagioclase-phyric and plagioclase-phyric types, the latter being partly of andesitic composition (Corbett, 1984). Breccias and tuffs of intermediate to mafic composition are associated with the basalts, and include prominently banded types in some areas. A large gabbro body exposed on the highway may be continuous with a similar body exposed in the Henty River. Geochemical plots prepared by M. McClenaghan show the basalts to be tholeiitic in nature, as opposed to the calc-alkaline nature of the Mt Read Volcanics.

Extensive Pleistocene moraine, rich in boulders of Owen Conglomerate, blankets much of the area.

The sequence south-west of the South Henty Fault comprises interbedded felsic vitric tuff, vitric-crystal tuff (usually quartz-phyric), black shale and greywacke, with large quartz-feldspar (±pyroxene) porphyry intrusives east of the area shown in Figure 1. The sequence is generally similar to that north-west of the fault, except that it lacks the basaltic-andesitic units.

The shear zone of the South Henty Fault is exposed in the Henty River near the north-east corner of Figure 1, and is probably represented

by the linear feature followed by a major tributary creek of Truscott Creek near the southern margin of Figure 1. The approximate position of the fault beneath the moraine cover is shown, as well as the fault intersections projected from the drill hole.

RESULTS

The hole was collared in massive basalt on the south flank of a small hill projecting through the glacial cover. The hole was angled south-east at -50°, and flattened to about -29° at 500 m. After 59 m of basalt, the hole entered an east-facing sequence of shale and tuffaceous sandstone, grading east into sandy vitric ash containing numerous basalt dykes (many with chilled margins) towards the eastern margin. At 284 m a sequence of pillow lavas and basalt flows was entered, containing intercalations of tuff and basaltic breccia, including breccia with pillow fragments (marked by chilling and vesicle development). This continued to where a 3.6 m wide fault zone was intersected at 436 m, marked by highly broken rock and puggy clay. 90% of the core was lost through this zone, which is interpreted as representing the South Henty Fault.

The sequence east of the fault zone consisted of contorted and broken tuffaceous sandstone (quartz-phyric) and siltstone, with some puggy clay patches and zones of core loss. A two metre unit of pale porphyritic basalt was intersected at 445 m, but whether this represents a fault block (of the NW sequence) or an intrusive is uncertain.

A highly broken and weathered zone of sandstone and siltstone, which appears to be a second major fault zone, extended from 490 m to the end of the hole at 502 m.

Although the attitude of the main fault zone is difficult to determine from the drill core, the core-schistosity angles suggest an easterly dip and the projection of the intersection to the surface (fig. 1) lies east of the extrapolated position, suggesting an easterly dip of 60-70°.

Small veins, films and disseminations of pyrite occur scattered through the sequence, but no significant mineralisation was intersected. Carbonate veining is widespread.

REFERENCE

CORBETT, K.D. 1984. Geological maps and summary of the Cambrian stratigraphic units and relationships in the Henty River-Williamsford area. *Unpubl.Rep.Dep.Mines Tasm.* 1984/84.

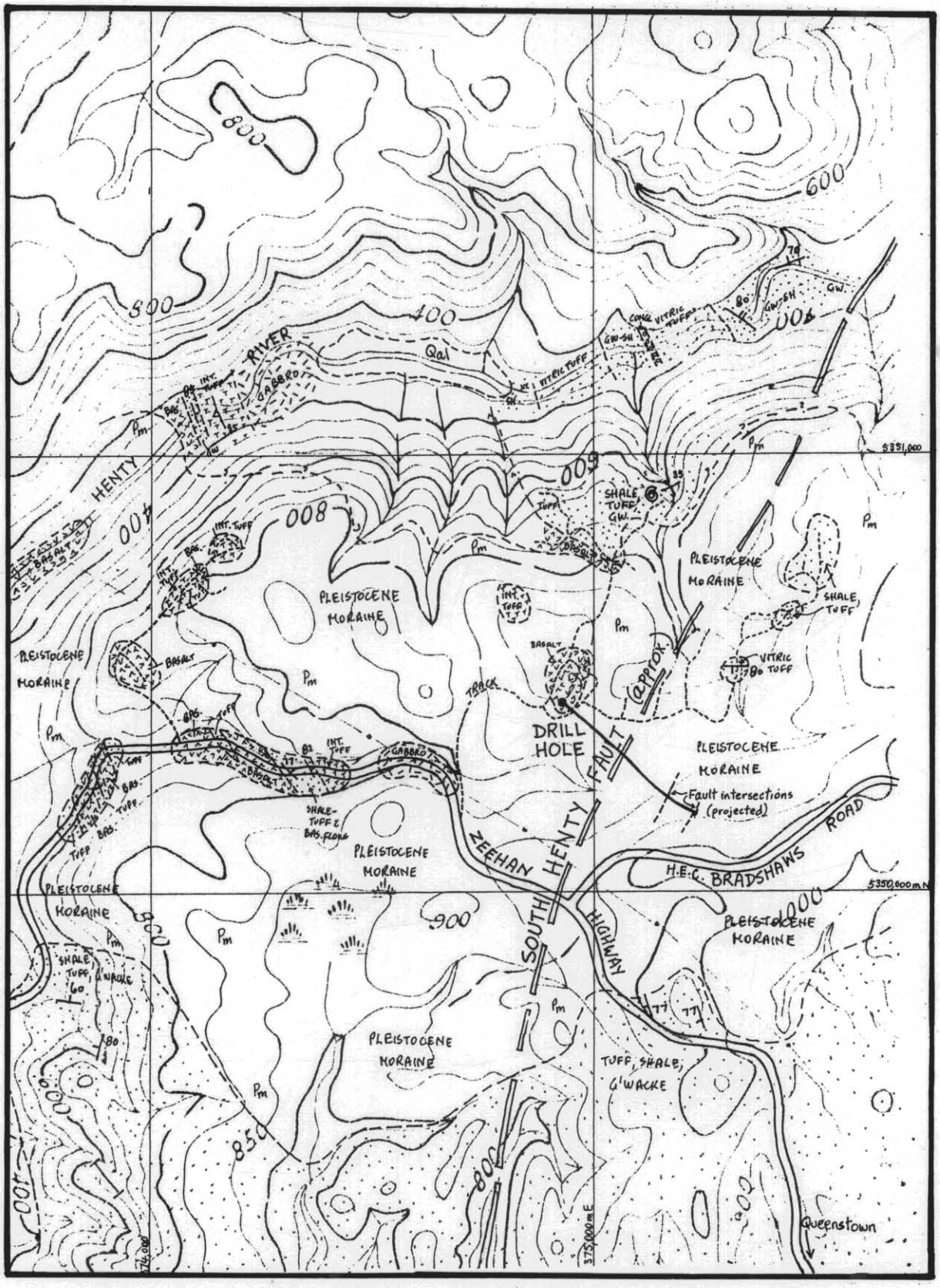

Figure 1. *Geology of the Henty River - Bradshaws Road area.*

5 cm

TASMANIA DEPARTMENT OF MINES
GEOLOGICAL SURVEY BRANCH

DIAMOND DRILL CORE RECORD

HOLE No. BRADSHAWS ROAD 1
REF. No. SHEET No. 1 of 5

PROJECT: MT READ VOLCANICS AND ASSOCIATED SEQUENCES

OBJECTIVE: To test for presence and nature of South Henty Fault under glacial cover near Zeehan Highway.

PROPOSED BY: K. Corbett LOGGED BY: K. Corbett August 1985

LOCATION: 400 m NE of Zeehan Highway near Bradshaws Road junction.

MAP SHEET: ZEEHAN 7914-II GEOL. ATLAS: ZEEHAN
A.M.G. CO-ORDS: 374929.5 mE 5350434 mN
COLLAR R.L.: 272.4 TOTAL DEPTH: 502 m
COLLAR DIP: -50° AZIMUTH: 127° M
DATE COMMENCED: 22.10.84 DATE COMPLETED: 19.4.85
DRILL RIG: Longyear 38
DRILL CREW: D. Whamond

HOLE SIZE:

HQ	to	22	m
NQ	to	299	m
BQ	to	502	m
	to		m
	to		m

HOLE CONDITION AFTER COMPLETION:
Clear

SURVEY DATA INSTRUMENT: Eastman Single Shot

DEPTH	INCLINATION		AZIMUTH		COMMENTS
	As read	Dip	As read, °M	°A.M.G.	
152		-49°	130		
264		-45°	132		
363		-36°	138		
469		-29°	117		

SUMMARY GEOLOGICAL LOG

From (m)	To (m)	ROCK DESCRIPTION
0	59	Basalt, mainly massive, with minor tuff-breccia
59	284	East-facing sequence of shale and tuffaceous sandstone, with some basaltic breccia, grading to thick unit of sandy vitric ash-tuff. Numerous basalt dykes up to one metre wide towards eastern margin
284	436	Pillow lavas and massive basalt flows with intercalated tuffs and breccias, including pillow breccia.
436	439.6	Fault zone (South Henty Fault?) of highly broken rock and puggy clay, 90% core loss
439.6	490	Broken sandstone and siltstone, with puggy clay patches. One two metre unit of porphyritic basalt at 445 m may be fault-bounded. Bedding highly disturbed.
490	502	Probably fault zone of highly broken and weathered sandstone and silstone, with puggy clay patches.

SUMMARY GEOCHEMICAL DATA (g/t unless specified)

From	To	Length	Rec. (%)							

REPORT REFERERENCE: Unpublished Report Tasmania Department of Mines 1985/56

OTHER COMMENTS:

TASMANIA DEPARTMENT OF MINES
GEOLOGICAL SURVEY BRANCH

DIAMOND DRILL CORE GEOLOGICAL RECORD

HOLE No. BRADSHAWS ROAD 1
REF. No. SHEET No. 2 of 5

INTERVAL From (m)	INTERVAL To (m)	REC. (%)	Core lift	Core loss	Depth (m)	Graphic Log	Min	DESCRIPTION	SPECIMEN Number	SPECIMEN Depth	SPECIMEN Prep'n
0	32							Broken and weathered basalt, plagioclase-phyric; many joints and epidote veins. Strongly bleached in some sections, normal colour dark grey. Pinkish in some sections. Lower 6 m or so is vesicular, with carbonate vesicles mostly weathered out.			
32	32.15							150 mm of bedded volcanic sediment or breccia, fine-grained in part. Probably inter-flow material. Bedding - core angle 25°.			
32.15	51.9							Relatively fresh grey vesicular basalt with carbonate and epidote-carbonate veins. Some bleached altered zones, often with epidote, could be inter-flow contacts. Small plagioclase phenocrysts and glomerocrysts are mostly pink.			
51.9	54.9							3 m of pale fawn "felsic"-looking rock, extremely broken in part, strongly veined (mainly quartz?). Has gradational boundaries with basalt on either side, so could be an inter-flow zone.			
54.9	59.3							Basalt, finely-porphyritic, slightly vesicular in parts, very bleached and pale towards lower contact with sediments. Contact broken.			
59.3	76.6							Grey shale interbedded with fawn to grey tuffaceous sandstone. Bedding-core angle at contact is 25°. Breccia unit with small angular shale clasts (100 mm strat. thickness) at 59.6 m. Scattered shale clasts in some sandy units. Bedding-core angle still 25° at 63.2 m, where sandstone unit contains small green shards. Irregular base of sandstone unit at 64.3 m indicates downhole (E) facing; another at 71.65 m. Bedding-core angle 18° at 73.6 m.			
76.6	84.1							Agglomerate unit, doubly-graded, with sandy sections towards both boundaries. Clasts up to 40 mm in places, many are pink, some dark and fine-grained; most look basaltic. Conformable lower contact with shale.			
84.1	89.6							Shale, with interbedded fawn ash and fine to medium-grained tuffaceous sandstone. Bedding-core angle 40° at 84.2 m. Downhole (E) facing from good erosional base at 84.2 m. Bedding-core angle 20° at 89.6 m.			
89.6	136.6							Black shale, massive, only faint bedding in places. Numerous thin white carbonate veins in places. Cleavage-core angle at 92.6 m is 40° (spaced cleavage). Small breccia zones (to 10 mm across) associated with some veins. Bedding-core angle 20° at 105.6 m. Grades east (downhole) to fine grey ash. Thin carbonate veins common.			
136.6	284							Fine-grained sandy ash with some interbedded sandy layers, some showing irregular mixing and breccia development like slumps. Scattered ovoid "concretions" to 50 mm long, consisting partly of carbonate and with blebs of silica arranged concentrically, are probably devitrification structures. Rock is mostly massive, with some faint bedding. A few breccia zones. Bedding-core angle 15° at 138.8 m. Pyrite on vein at 152.7 m. Bedding-core angle 15° at 150 m, also at 157.6 m. Sandy tuffaceous layer one metre across at 161.2-162.2 m has many clasts of ash-tuff in it. Thin graded sandy layer at 162 m suggests downhole (E) facing. Bedding-core angle 5° at 182 m. Cleavage-core angle 30° at 187.6 m. Pyrite on joints at around 211 m. Carbonate veining with some pyrite at 218.4 m. Mostly sandy fine tuff from 225-235 m, massive. Basalt dyke 300 mm across, at 35° to core axis, at 240 m - has prominent chilled margins. 20 mm wide breccia zone at angle of 20° to core axis at 264 m. 40 mm wide basalt dyke with chilled margins at 265 m - altered fine-grained, with carbonate blebs. 20 mm wide dykelet at 264.4 m. Basalt unit 500 mm wide at 267 m has very irregular margins and lobe-like features on one contact - this could be a thin flow. 300 mm wide basalt dyke at angle of 55° to core axis at 269.8 m. One metre wide dyke from 272-273 m. 270 mm wide dyke at 274 m.			
284	293							Mainly basalt, fine-grained, with patches of unusual breccia and some chilled contacts suggesting multiple flows and/or dykes. Lots of carbonate veins. Basalt contact has angle of 10° with core axis at 293 m. Composite dyke(?) 700 mm wide at 290 m has 45° angle to core axis.			
293	297							Fine ash-tuff, grey to fawn colour.			
297	307.4							Basalt, variably vesicular fine-grained, non-porphyritic. Very lobate lower contact looks like small pillows.			

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DIAMOND DRILL CORE GEOLOGICAL RECORD

HOLE No. BRADSHAWS ROAD 1
REF. No. SHEET No. 3 of 5

INTERVAL From (m)	INTERVAL To (m)	REC. (%)	Core lift	Core loss	Depth (m)	Graphic Log	Min	DESCRIPTION	SPECIMEN Number	SPECIMEN Depth	SPECIMEN Prep'n
307.4	307.7							300 mm of fine-grained green tuff between flows.			
307.7	311.6							Basalt, variably vesicular (carbonate fillings mostly). Small green chlorite flecks in places after small ferromagnesian phenocrysts. 300 mm unit of fine ash-tuff has sub-parallel contact with core at 308.6 m.			
311.6	327.4							Fine tuff, grey-green, with basalt dyke 500 mm wide at 313.6 m.			
327.4	328							600 mm basalt dyke with chilled margins.			
328	332.6							Fine tuff, grey-green (difficult to tell from basalt). Lower 100 mm very chloritic and strongly cleaved - cleavage-core angle 30° at 332 m.			
332.6	335							Basalt, pale to dark green, variably vesicular. Strongly lobate flow contacts are probably pillows at 332.6, 333.6, have abundant vesicles following the edges of the lobes. Small amount of green chloritic tuff(?) wrapping around the pillows.			
335	336							One metre of fine tuff, grey-green, massive.			
336	336.6							Basalt, vesicular.			
336.6	340							Massive basalt, becoming vesicular after two metres. Top contact has angle of 15° with core axis.			
340	341							Tuff, with thin dyke(?) of basalt 50 mm across at 340.5 m.			
341	343							Mainly basalt - very lobate pillow-like contact at 341 m and another at 341.4 m against 100 mm of tuff, then back into basalt. Looks like pillow lavas.			
343	350.5							Massive basalt, slightly vesicular in few places, some carbonate veins.			
350.5	358.6							Basalt breccia, with rounded to irregular clasts of vesicular basalt in fine chloritic matrix (partly tuffaceous?). Some sections of more massive vesicular basalt.			
358.6	363							Mainly tuff, with scattered large rounded clasts of vesicular basalt to 200 mm long. Breccia zone at top of next basalt.			
363	363.8							Basalt			
363.8	364.1							300 mm tuff.			
364.1	369.2							Basalt, vesicular, very lobate contact at 364.1 m, several lobate pillow-like internal contacts with narrow sections of tuff - looks like pillow lava.			
369.2	370.2							One metre of pale tuff.			
370.2	376.3							Mainly massive basalt.			
376.3	379.8							Tuff, sandy, fine-grained, pale grey-green.			
379.8	380.5							Basalt, notably vesicular at margins			
380.5	380.7							Tuff.			
380.7	381							Basalt.			
381	381.2							Tuff.			
381.2	383.7							Basalt, irregular chilled margins.			
383.7	384							Tuff.			
384	384.3							Basalt.			
384.3	386.5							Mainly tuff.			
386.5	389.6							Basalt breccia with irregular clasts of cleaved porphyritic basalt with green phenocrysts (chlorite?) in tuffaceous breccia matrix.			
389.6	402.2							Mainly massive basalt, slightly vesicular in patches, some breccia development.			
402.2	404							Mainly tuff with one or two basalt clasts.			
404	405							Mainly basalt breccia - presence of vesicular clasts with chilled margins suggests this is probably a pillow breccia.			
405	424.5							Mainly massive basalt, vesicular in part (carbonate fillings), some carbonate veins. Lower contact has angle of 40° with core axis. Disseminated pyrite in patches.			
424.5	436.2							Tuff, massive, grey-green, abundant fused dark joints in places.			
436.2	439.6	10%						Fault zone - lightly broken core with lot of core loss. Rock types are white fine tuff and green coarser felsic tuff of next sequence, with few remnants of grey puggy clay. Some patches of pyrite in broken green tuffaceous sandstone towards 439.6 m. 90% of core lost.			
439.6	442.6	73%						Very broken to moderately broken green tuffaceous sandstone. Thin section shows a quartz-feldspar-phyric tuff or tuffaceous sandstone, with abundant quartz and weathered feldspar grains, also some murky and chloritic grains, and rare felsic volcanic clasts, in a fine-grained ~~sericitic matrix, possibly after shards. Cut by carbonate veins, with cleavage slightly oblique~~ to core. 0.8 core loss.	BR1	442 m	TS

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GEOLOGICAL SURVEY BRANCH

DIAMOND DRILL CORE GEOLOGICAL RECORD

HOLE No. BRADSHAWS ROAD 1
REF. No. SHEET No. 4 of 5

INTERVAL From (m)	INTERVAL To (m)	REC. (%)	Core lift	Core loss	Depth (m)	Graphic Log	Min	DESCRIPTION	SPECIMEN Number	SPECIMEN Depth	SPECIMEN Prep'n
442.6	443.6	100%						Moderately broken green tuffaceous sandstone, ± full core.	BR2	445 m	TS
443.6	445.7	100%						Pale porphyritic basaltic rock, very broken in patches. Thin section shows a plagioclase-phyric basalt with pilotaxitic groundmass; very carbonate-altered, with scattered small vesicles. Cut by small faults with carbonate on them, which displace earlier carbonate veins. Much paler coloured than basalts in previous sequence.			
445.7	453.8	2.2 m core loss						Sandstone and siltstone, very broken and mashed, black to dark grey. Strongly cleaved and weathered in part, with puggy clayey patches possibly representing faults. 2.2 m of core lost between 445.6 m and 448.6 m, probably on a major fault. Schistosity - core angle about 40° at 449 m. Very veined and fractured. Schistosity - core angle 18° at 452.6 m.			
453.8	457							Sandstone, moderately broken in parts. Grey, fairly fine-grained tuffaceous quartzwacke, with rare silty patches. Too broken to see bedding.			
457	460							Siltstone, grey, broken, with very weathered puggy clay sections; some fine sandstone. Schistosity parallel to core at 457.6 m. Pyrite vein 50 mm across at 457 m.			
460	467							Sandstone and siltstone, fairly solid, veined and fractured in parts. Bedding-core angle 60° at 464.6 m, but generally bedding looks very disturbed and fractured. Schistosity - core angle 30° at 466.2 m.			
467	468							Siltstone and sandstone, very broken, with puggy clay patches.			
468	472.6							Sandstone, relatively solid, with broken patches.			
472.6	477							Very broken sandstone-siltstone, with some thin puggy clay patches.			
477	489.6	2 m core loss						Very broken, very weathered siltstone and sandstone with puggy clay patches. One metre core loss between 478.6 m and 481.6 m, also one metre lost between 484.6 m and 487.6 m looks like beginning of large fault zone.			
489.6	502							Mainly brecciated sandstone and siltstone with many puggy clay zones - probably a large fault zone. Includes grey silty breccia with abundant small sandstone clasts and wisps. Wispy bedding in breccia has 40° angle with core axis at 501 m. Schistosity-core angle 25° at 490 m, 40° at 495.5 m, 30° at 501.5 m. Clasts in breccia range from 1 mm to over 100 mm across. Rock is still weathered and soft at end of hole.			
								End of hole.			

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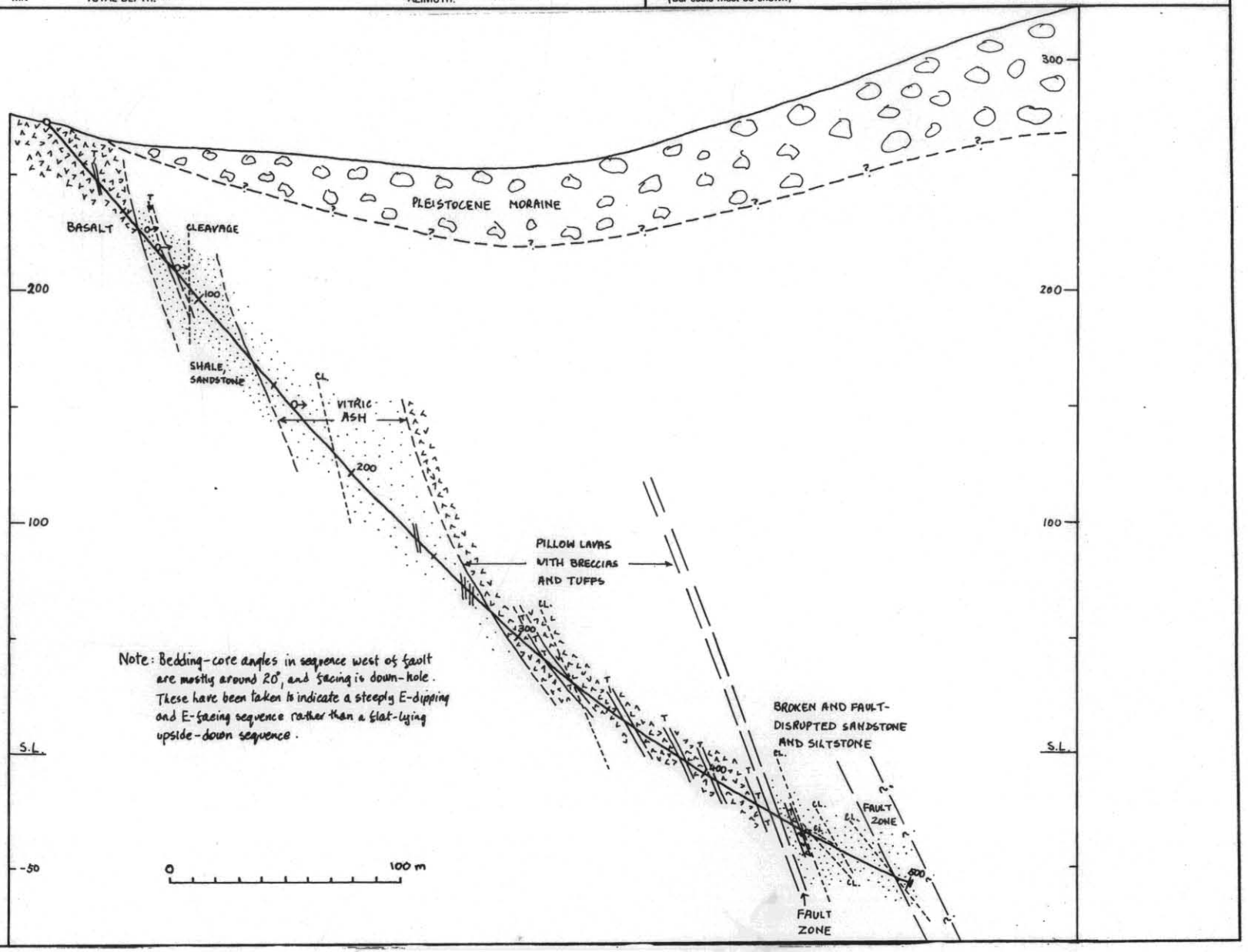
GEOLOGICAL SURVEY BRANCH

DIAMOND DRILL HOLE PLOT

HOLE No. BRADSHAWS ROAD 1
REF. No. SHEET No. 5 of 5

A.M.G. CO-ORDS:	374929.5	mE	COLLAR R.L.: 272.4	COLLAR DIP:	-50°
	5350434	mN	TOTAL DEPTH: 502	AZIMUTH:	127°M

SCALE 1 :
(Bar scale must be shown)



Note: Bedding-core angles in sequence west of fault are mostly around 20°, and facing is down-hole. These have been taken to indicate a steeply E-dipping and E-facing sequence rather than a flat-lying upside-down sequence.

5 cm

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