PITEAU ASSOCIATES
GEOTECHNICAL AND
HYDROGEOLOGICAL CONSULTANTS

215 - 260 WEST ESPLANADE
NORTH VANCOUVER, B.C.
CANADA V7M 3G7
TELEPHONE (604) 986-8551
FAX (604) 985-7286

Our file: 1327

January 29, 1996

007195

Anvil Range Mining Corporation
Postal Bag 1000
Faro, Y.T.
Y0B 1K0

Attention: Mr. Ian Horne, P.Eng.

Dear Sirs:

Re: Groundwater Control in Grum Pit

Mr. Andrew Holmes, P.Eng. of Piteau Associates Engineering Ltd. visited the mine site on November 22, 1995. While on site, Mr. Holmes inspected wells and seeps in the pit area, had discussions with Messrs. Ian Horne and Brad Piteau regarding various dewatering issues, and reviewed water level and pumping well information that had been compiled by Mr. Brad Piteau since the last update report, prepared by Mr. Holmes in June 1995. This report has been prepared to present the results of our assessment of the current status of groundwater control measures in the Grum Pit, and our recommendations for future dewatering measures.

OVERBURDEN DEWATERING

At the time of the site visit, only Wells 89-1, 91-2 and 92-3 were in operation on the east wall of the pit (Fig. 1). The cumulative yield from these three wells was on the order of 80 Usgpm at that time (Fig. 2). In addition to the pumped well discharges, an artesian flow of about 10 to 12 Usgpm was discharging from Well 95-2 and flooding onto the 1228 bench, and an additional 15 to 20 Usgpm was observed to discharge from two other locations on the east wall of the pit, approximately at the overburden/bedrock contact (Fig. 2). We understand that on November 25, 1995, a permeable section of the aquifer was exposed in the east pit wall, and a flow of about 100 to 150 Usgpm was encountered. This flow was relayed to the sump on the 1216 bench.

Groundwater level monitoring data (Figs. 3, 4 and 5) indicate that a steady-state groundwater flow condition has been approached, and that the deep and shallow aquifers in the east wall have been adequately depressurized (Fig. 6). Some further depressurization will occur as a result of the recent increased rate of seepage from the east wall. The objective of the overburden dewatering measures now is to intercept as much groundwater flow as possible behind the pit walls, to minimize seepage onto the overburden benches.

Wells which should be maintained for permanent use include Wells 89-1, 92-2, 92-3 and 95-2. Both Wells 92-2 and 95-2 are located near the centre of the deep aquifer channel, and therefore have screens positioned below the elevation at which the aquifer will daylight on the pit wall (Fig. 6). These wells have the greatest potential to intercept seepage towards the pit, and should therefore be given a high priority in the well maintenance budget. Wells 89-1 and 92-3 are both good producers, and should be kept in service as long as possible. Well 91-2 should be decommissioned, as its yield will likely fall to less than about 5 gpm as the east wall is excavated.

As the final pit wall is developed, and the aquifer daylights at lower elevations on the pit wall, the wells will become less effective at intercepting groundwater. The lowest bench on which the aquifer will daylight is estimated to be about 1200m (Fig. 6, Section D-D'). A permanent sump should be planned for this area of the pit, and elsewhere along the first bedrock bench where significant seepage is noted to occur from permeable zones within the aquifer. These sumps should be lined to minimize seepage losses, which could have an adverse affect of the stability of slopes below the sumps.

Based on historical pumping data (Fig. 2), and recent observations of seepage into the pit, future well yields and rates of seepage into the pit are expected to vary as per Table II. Well and sump pumps should be sized accordingly. Well pumps should not be oversized, as they will not be reliable if they are allowed to pump air or are operated against almost closed valves. Sump pumps can be oversized to provide adequate capacity for spring runoff or storms.

We understand that vehicle access cannot be maintained to Well 95-2. The pump in this well should therefore be a 4 inch diameter pump, suspended on a polyethylene pipe. This pump could then be installed and pulled by hand, if necessary. Alternatively, a safety cable could be attached to the pump, and a small winch and mast with a pulley wheel could be welded onto the casing.

BEDROCK DEWATERING

Well 95-1 was drilled in the spring of 1995, in an attempt to gain pump access into the exploration drift which underlies the pit area. The well did not penetrate the underground workings, but did encounter some permeable rock and was put into service at about 40 Usgpm on November 9, 1995. Prior to this, the well was monitored on a regular basis, and typically displayed a level about 5m above the elevation of the lower pit sump. This relationship indicates that the rock mass drains readily to the pit, likely due to the presence of the underground drift, and a good hydraulic connection between the drift and the pit.

Significant seepage has been encountered in bedrock at the south end of the pit. This water is interpreted to flow into the pit area along old exploration drillholes which now daylight in the base of the pit (Fig. 1).

Dewatering the underground drift will benefit the pit until its base reaches the 1142m elevation, which is the nominal elevation of the drift invert beneath the northern pit area. This dewatering can be achieved either by drilling a well to intersect the drift, or by rehabilitating the drift and establishing an underground sump.

Two possible dewatering well sites (see Fig. 1), which both target the underground workings and quartzitic ore zones in the rock mass (reported to have been permeable when the exploration was first constructed, PAEL, August, 1987), are documented below. These wells would provide opportunities to penetrate the underground workings, and also to explore for permeable zones in the deeper rock mass, which could be pumped to dewater the pit below 1140m elevation.

	Well 1	Well 2
Location	2815E 6555N	2725E 6380N
Collar Elev.	1216m	1190m
Depth to U/G	100m	58m
Depths to Quartzitic Ore Intersections	70-115, 155-160, 210-220	28-40, 110-116, 143-170, 200-210
Depth to Interpreted Fault	N/A	190m
Recommended Depth	220m	210m

Based on previous experience with Well 95-1, there is a high probability that these holes will not penetrate the underground workings, hence should be considered as groundwater exploration wells only. It is recommended that dewatering resources be directed towards rehabilitating the underground workings, and that the problem of dewatering the rock mass below the workings be addressed after the pit base is below about 1180m and more well sites are available on final pit walls.

It is expected that the pit will drain readily into the underground workings via the many underground exploration drillholes, and that virtually all pit dewatering and sumping could be carried out underground. This would allow construction of a sump which could serve for an extended period of time, and which would not be subject to freezing conditions in the wintertime. After the pit has been excavated below the exploration drift, it may also be possible to maintain access to and use of a dewatering pipeline in the decline.

Based on recent sumping experience in the Grum Pit, total pit inflows are on the order of 200 to 250 Usgpm (Table II). Allowing for typical spring runoff and overburden seepage flows (Table II), a pumping capacity of about 500 Usgpm should be installed in the drift. The pumping equipment should be submersible, so that it will remain operational in the event the lower drift is flooded in an extreme storm event.

PEAT DEWATERING OUTSIDE NE PIT LIMIT

We understand that considerable icing and seepage problems were encountered on the upper northeast wall during the 1995 spring thaw. Runoff apparently flowed down a draw, saturating a surficial peat/muskeg layer that is at least 2m thick. Although the peat is underlain by dense glacial till, the elevation of the dense material is apparently lower than the invert of the ditch to the south. Extending the existing diversion ditch into this area is therefore not considered practicable.

To intercept seepage through the peat towards the pit, it is recommended that a ditch and sump be excavated across the draw. The invert of the sump and ditch should be in dense till, and the sump volume could be increased by constructing a low till embankment along its downstream side. The sump should be pumped on an as needed basis between the freshet and freeze-up each year.

DRAINAGE FROM SMALL LAKE

The small lake which is present outside the northeast limit of the pit currently drains into the east diversion ditch down a natural draw. This drainage course should be maintained, to prevent damming and impoundment of a larger volume of water in the lake, and to control erosion along the drainage channel. It is unlikely that seepage from this small lake has an adverse affect on the stability of the northeast wall; hence, this lake should not be completely drained.

We trust this letter report addresses the Grum Pit dewatering concerns which you have at the present time. If you have any questions regarding our recommendations, or require further information, please contact us.

Yours truly,

PITEAU ASSOCIATES ENGINEERING LTD.

Andrew T. Holmes, P.Eng.

ATH/ef

Att.

TABLES

TABLE I
SUMMARY OF GRUM PIT WATER LEVELS, 1992 TO 1995

	89-1	89-2	89-3	89-4	89-5	91-1	91-2	91-3	91-4	92-1	92-2	92-3	92-4	95-1	95-2
DATUM (m)	1301.67	1301.14	1301.17	1300.74	1302.05	1271.29	1285.93	1300.37	1305.22	1278.39	1289.71	1289.66	1271.31	1293.08	1253.38
10-Jul-92	1267.78	1290.26	1288.98	1291.90	#N/A		1257.64	1291.26	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13-Jul-92	1266.56	1289.47	1288.34	1291.14	#N/A		1258.92	1290.49	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
16-Jul-92	1268.69	1290.69	1290.29	1291.90	#N/A		1259.41	1291.44	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
20-Jul-92	1265.19	1288.86	1287.76	1290.47	#N/A		1262.09	1289.82	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25-Jul-92	1263.97	1288.00	1287.06	1289.58	#N/A		1247.37	1288.97	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
27-Jul-92	1262.78	1286.84	1285.93	1288.58	#N/A		1234.88	1286.93	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
31-Jul-92	1261.10	1285.53	1284.53	1287.21	#N/A		1232.59	1285.65	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
3-Aug-92	1259.89	1284.50	1283.46	1286.23	#N/A		1233.69	1284.67	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
12-Aug-92	1256.75	1281.78	1281.05	1283.58	#N/A		1260.42	1282.02	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2-Nov-92	1245.04	1269.04	1268.92	#N/A	#N/A		#N/A	1270.86	1274.31	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23-Nov-92	1267.38	1267.85	1268.00	#N/A	#N/A		1266.96	1268.79	1272.70	1266.38	1255.51	1267.53	1263.69	#N/A	#N/A
28-Nov-92	1244.06	1264.80	1263.85	#N/A	#N/A		1266.93	1266.25	1271.32	1265.22	1261.82	1245.43	1263.59	#N/A	#N/A
7-Dec-92	1244.06	1260.38	1257.15	#N/A	#N/A		1236.73	#N/A	1268.71	1258.06	1257.46	1205.84	1261.68	#N/A	#N/A
1-Apr-93	#N/A	1249.23	1250.60	#N/A	#N/A		1236.27	#N/A	1264.62	1247.27	#N/A	#N/A	1259.15	#N/A	#N/A
19-Nov-94	#N/A	#N/A	1266.54	1290.03	#N/A		1270.60	#N/A	1265.92	1267.19	1266.24	1238.56	#N/A	#N/A	#N/A
28-Nov-94	#N/A	#N/A	1264.54	1288.90	#N/A		1268.30	#N/A	1261.42	1264.79	1271.81	#N/A	#N/A	#N/A	#N/A
7-Dec-94	#N/A	#N/A	1264.04	1290.70	#N/A		1267.00	#N/A	1262.02	1264.19	1261.80	1259.70	#N/A	#N/A	#N/A
16-Dec-94	#N/A	#N/A	1262.14	1294.90	#N/A		#N/A	#N/A	1268.62	1264.09	1215.50	#N/A	#N/A	#N/A	#N/A
19-Dec-94	#N/A	#N/A	1261.64	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1262.21	#N/A	#N/A
10-Feb-95	1245.40	#N/A	#N/A	#N/A	#N/A		#N/A	1251.00	#N/A	#N/A	1248.60	1240.00	#N/A	#N/A	#N/A
11-Mar-95	#N/A	#N/A	#N/A	#N/A	#N/A		1257.00	#N/A	#N/A	#N/A	#N/A	#N/A	1259.00	#N/A	#N/A
7-Apr-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1280.88	#N/A
13-Apr-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1276.08	#N/A
17-Apr-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1284.88	#N/A
24-Apr-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1249.28	#N/A
25-Apr-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1261.08	#N/A
30-Apr-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1244.88	#N/A
1-May-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1245.38	#N/A
6-May-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1242.81	#N/A
8-May-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1242.84	#N/A
9-May-95	#N/A	#N/A	#N/A	#N/A	#N/A		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	1242.15	#N/A
11-May-95	#N/A	#N/A	#N/A	#N/A	#N/A		1254.67	1253.07	#N/A	#N/A	#N/A	#N/A	1255.76	1241.79	1253.38
12-May-95	#N/A	#N/A	#N/A	#N/A	1293.25		#N/A	#N/A	1263.22	#N/A	1253.52	1221.49	#N/A	1241.67	#N/A
18-May-95	#N/A	#N/A	1252.30	1256.74	1294.09		1254.07	1252.37	1263.22	#N/A	1252.99	1240.11	1255.98	1241.31	1246.83
25-May-95	#N/A	1250.32	1250.76	1255.09	1294.78		1235.85	#N/A	1268.08	#N/A	1251.55	1244.59	1254.20	1240.80	1247.20
1-Jun-95	#N/A	1250.63	1250.26	1255.57	1295.18		1235.84	1253.15	1267.52	#N/A	1251.34	1249.28	1253.73	1239.96	1246.38
12-Jun-95	#N/A	1248.72	1249.28	1255.67	1296.66		#N/A	#N/A	1268.44	#N/A	1261.08	1254.54	#N/A	#N/A	#N/A
17-Jun-95	#N/A	#N/A	#N/A	#N/A	#N/A		1235.84	#N/A	#N/A	#N/A	#N/A	#N/A	1251.36	1238.69	1244.92
30-Jun-95	#N/A	1248.65	1249.15	1255.69	1298.33	1252.23	#N/A	1253.37	1267.64	#N/A	#N/A	#N/A	1251.85	1233.55	1245.92
6-Jul-95	#N/A	1248.60	1249.20	1255.66	1298.44	1251.80	#N/A	#N/A	1267.04	#N/A	1260.95	#N/A	1251.49	1230.35	1244.16
13-Jul-95	#N/A	1248.52	1249.06	1255.68	1298.50	1251.14	1242.93	#N/A	1266.75	#N/A	#N/A	#N/A	1250.69	1231.84	1243.82
20-Jul-95	#N/A	1248.45	1248.96	1255.54	1297.05	1250.59	#N/A	#N/A	1266.38	#N/A	#N/A	#N/A	1250.10	1231.03	1243.38
27-Jul-95	#N/A	1248.43	1248.73	1255.65	1296.67	1249.51	#N/A	#N/A	1266.02	#N/A	#N/A	#N/A	1249.36	1229.88	1243.22
3-Aug-95	#N/A	1248.30	1248.70	1253.34	#N/A	1249.37	#N/A	#N/A	#N/A	#N/A	1261.76	#N/A	1248.91	1229.73	#N/A
24-Aug-95	#N/A	1248.17	1248.53	#N/A	1297.44	1248.55	#N/A	#N/A	1265.70	#N/A	1261.50	#N/A	1248.40	1229.76	#N/A
31-Aug-95	#N/A	1247.94	1248.28	#N/A	1297.87	1248.60	#N/A	#N/A	1265.75	#N/A	1259.84	#N/A	1248.16	1229.08	#N/A
11-Sep-95	#N/A	1247.67	1247.88	#N/A	1298.26	1247.66	#N/A	#N/A	1266.87	#N/A	1260.77	#N/A	1247.65	1227.98	#N/A
19-Sep-95	#N/A	1247.69	1248.01	#N/A	1298.39	1247.91	#N/A	#N/A	1267.71	#N/A	1259.54	#N/A	1247.56	1227.80	#N/A
28-Sep-95	#N/A	1247.81	1247.98	#N/A	1298.51	1247.59	#N/A	#N/A	1267.67	#N/A	1259.49	#N/A	1247.48	1226.63	#N/A
5-Oct-95	#N/A	1247.85	1247.92	#N/A	1298.64	1246.31	#N/A	#N/A	1267.18	#N/A	1259.41	#N/A	1246.98	1225.48	#N/A
12-Oct-95	#N/A	1247.85	1247.88	#N/A	1298.54	1247.24	#N/A	#N/A	1266.66	#N/A	1259.32	#N/A	1246.94	1224.51	#N/A
20-Oct-95	#N/A	1247.71	1247.73	#N/A	1298.49	1247.18	#N/A	#N/A	1266.15	#N/A	1259.17	#N/A	1246.92	1223.48	#N/A
27-Oct-95	#N/A	1247.55	1247.60	#N/A	1297.60	1246.93	#N/A	#N/A	1265.81	#N/A	1259.02	#N/A	1246.64	1222.42	1229.24
2-Nov-95	#N/A	1248.02	1247.86	#N/A	1297.26	1247.10	1240.61	#N/A	1265.71	#N/A	1259.19	#N/A	1247.17	1221.86	1229.77
9-Nov-95	#N/A	1248.42	1248.20	#N/A	1297.11	1246.77	#N/A	#N/A	1265.62	#N/A	1259.42	#N/A	1246.53	1221.62	1231.00
16-Nov-95	#N/A	1247.81	1247.96	#N/A	1296.95	1246.86	#N/A	#N/A	1265.50	#N/A	1259.35	#N/A	1246.79	#N/A	1231.00

TABLE II
WATER BALANCE FOR GRUM PIT FLOWS

MONTH	GRUM PIT FLOWS									
	FROM O/B WELLS[1]		PIT SUMPS						TOTAL SUMP FLOW	
			FROM BEDROCK[2]		FROM O/B[3]		FROM RUNOFF[4]			
	L/S	USgpm	L/S	USgpm	L/S	USgpm	L/S	USgpm	L/S	USgpm
SUMMER	2.5	40	7.9	125	3.8	60	17.4	229.4	31.4	414.4
FALL	2.5	40	7.9	125	3.2	50	8.0	105.3	30.6	404.4
WINTER	2.5	40	7.9	125	2.5	40	0.0	0.0	20.5	270.3
FRESHET	4.4	70	7.9	125	6.3	100	17.7	234.1	34.4	454.4

INDIVIDUAL WELL PUMPING CAPACITIES

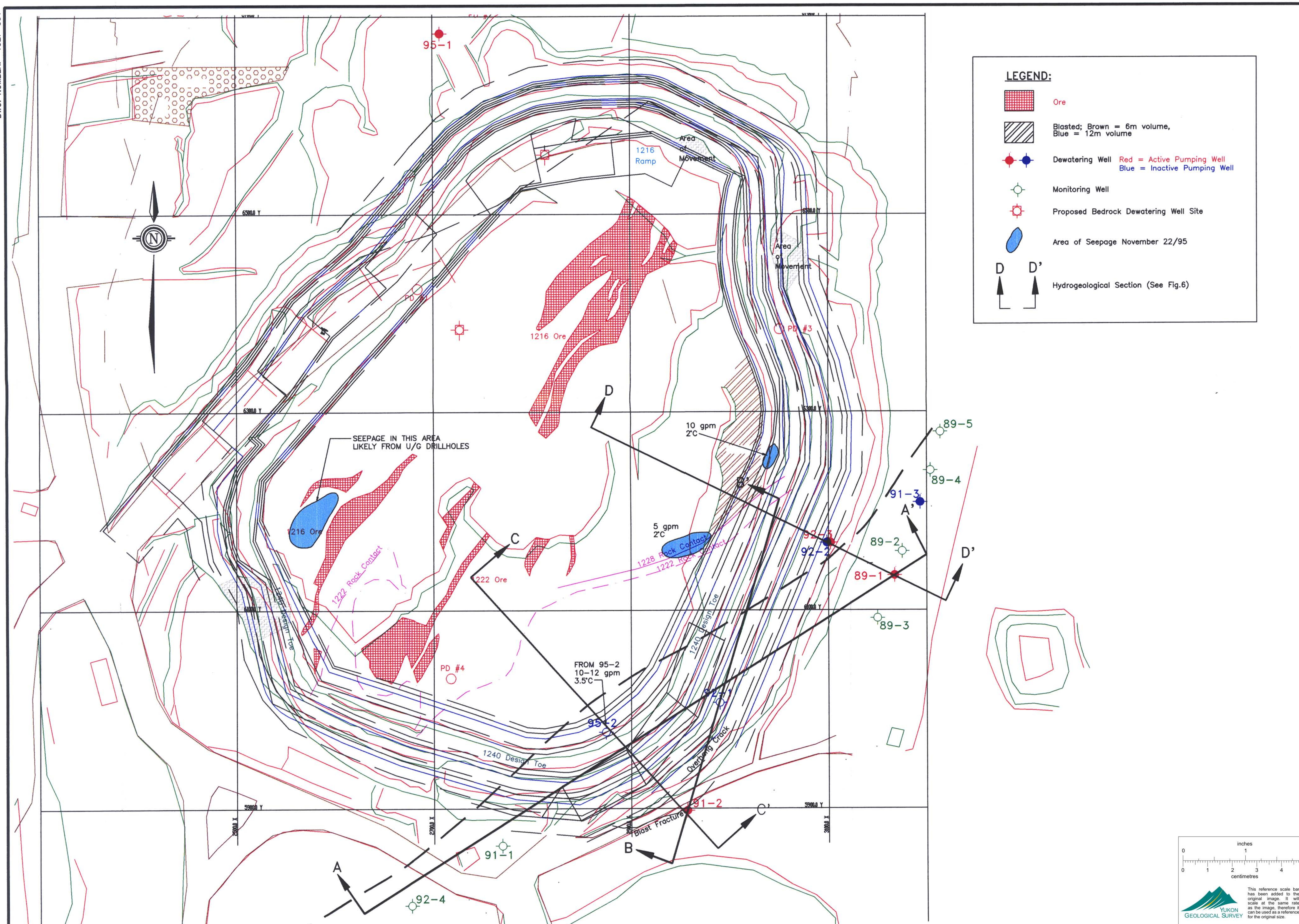
	89-1 Usgpm	91-2 Usgpm	92-2 Usgpm	92-3 Usgpm	95-2 Usgpm	Cumulative Yield
Nov-95 Yields	20	12.5	0	51	12	108
Recommended pump capacity	20	Decom-mission	15	35	12	94

NOTES:

1) Based on November 1995 flows, discounted to reflect aquifer dewatering associated with increased seepage on east wall.
2) Based on sump flows for fall of 1995, as reported by B. Piteau. Sump flow not entirely attributed to bedrock discharge, as some runoff would occur.
3) Groundwater inflow based on east wall sump data reported in Fax from B. Piteau to to A. Holmes, dated December 28, 1995.
4) Runoff calculation based on 95 ha catchment area around pit, average monthly precip data available for the Grum Pit area, and 50% runoff rate.

FIGURES

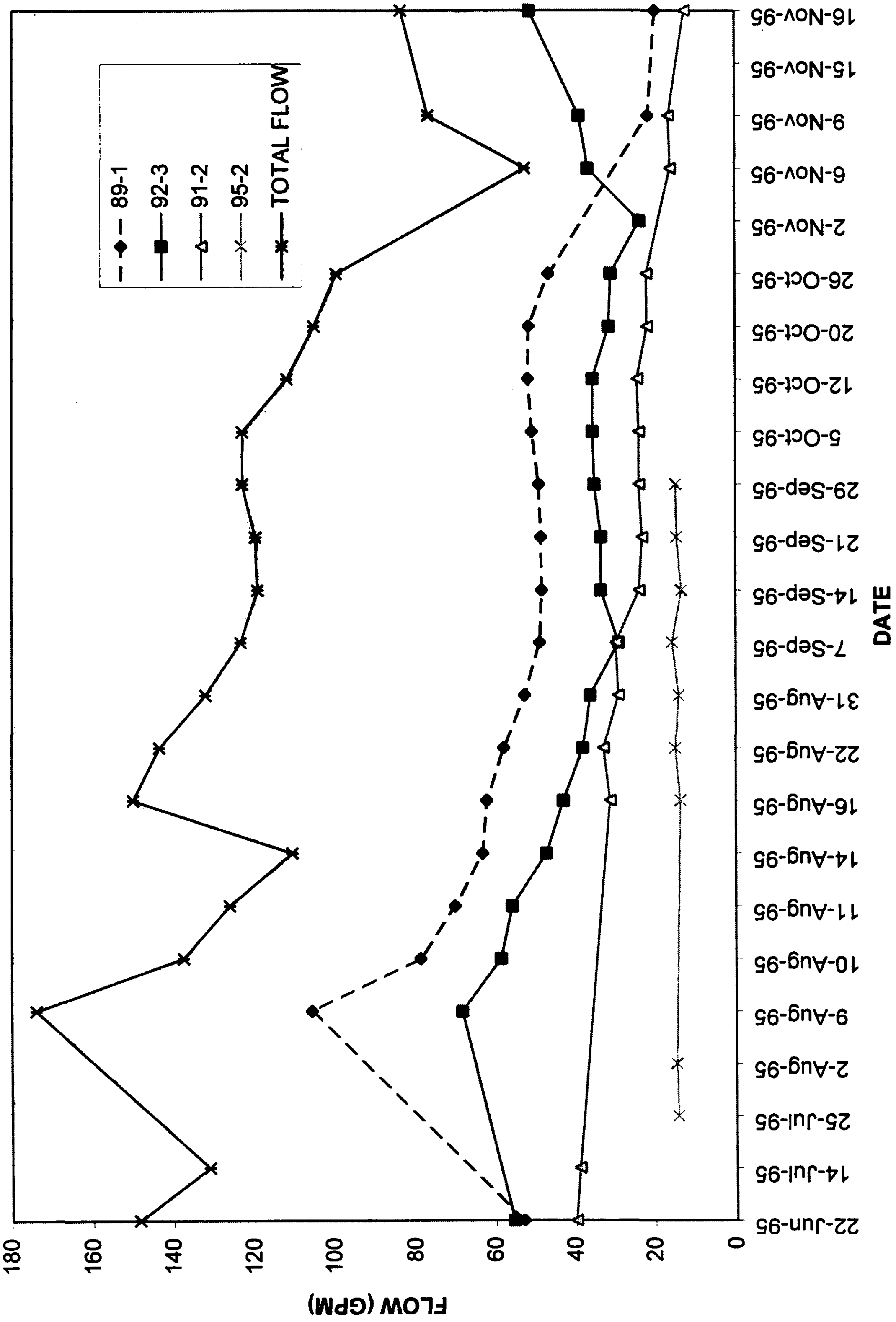
DWG. NUMBER: 1327-001



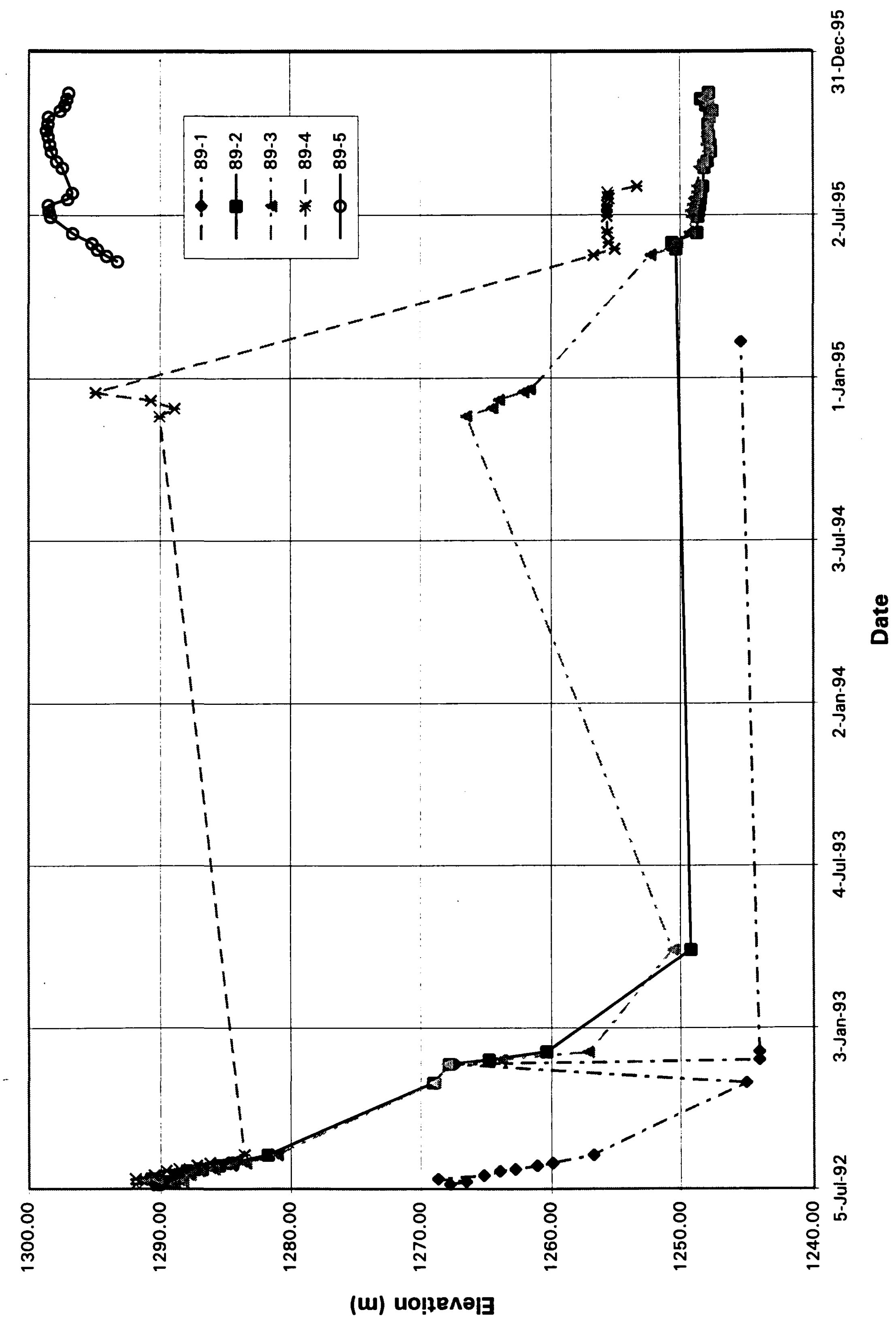
ANVIL RANGE MINING CORPORATION	PITEAU ASSOCIATES GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS VANCOUVER CALGARY	
ASSESSMENT OF AQUIFER DEWATERING FOR GRUM PIT	PIT PLAN SHOWING APPROXIMATE NOVEMBER 16, 1995 STATUS	BY: ATH/CV DATE: JAN. 96 APPROVED: FIG: 1

PREPARED SOLELY FOR THE USE OF OUR CLIENT AND NO REPRESENTATION OF ANY KIND IS MADE TO OTHER PARTIES WITH WHICH PITEAU ASSOCIATES ENGINEERING LTD. HAS NOT ENTERED INTO A CONTRACT.

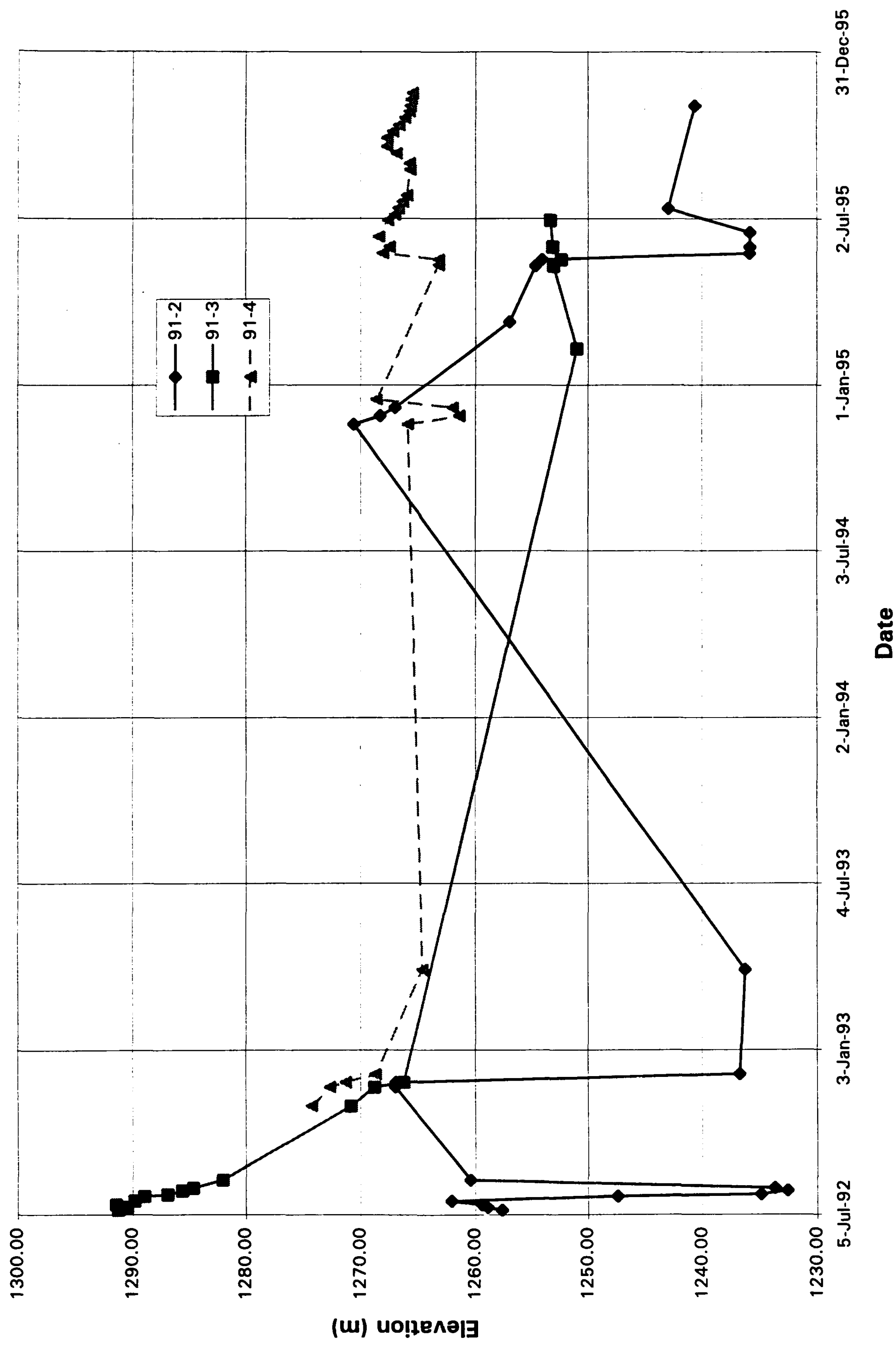
DWG NUMBER: 1327



ANVIL RANGE MINING CORPORATION	PITEAU ASSOCIATES GEOTECHNICAL & HYDROGEOLOGICAL CONSULTANTS VANCOUVER CALGARY	
HYDROGEOLOGICAL REVIEW OF GRUM PIT DEWATERING FARO, YUKON TERRITORIES	PLOTTED YIELDS FOR OVERBURDEN WELLS IN GRUM PIT	BY: ATH DATE: JAN 96 APPROVED: [signature] FIG: 2



ANVIL RANGE MINING CORPORATION	PITEAU ASSOCIATES GEOTECHNICAL & HYDROGEOLOGICAL CONSULTANTS VANCOUVER CALGARY		
HYDROGEOLOGICAL REVIEW OF GRUM PIT DEWATERING FARO, YUKON TERRITORIES	HYDROGRAPH FOR WELLS 89-1, 89-2, 89-3, 89-4 AND 89-5	BY: ATH	DATE: JAN 96
		APPROVED: [signature]	FIG: 3



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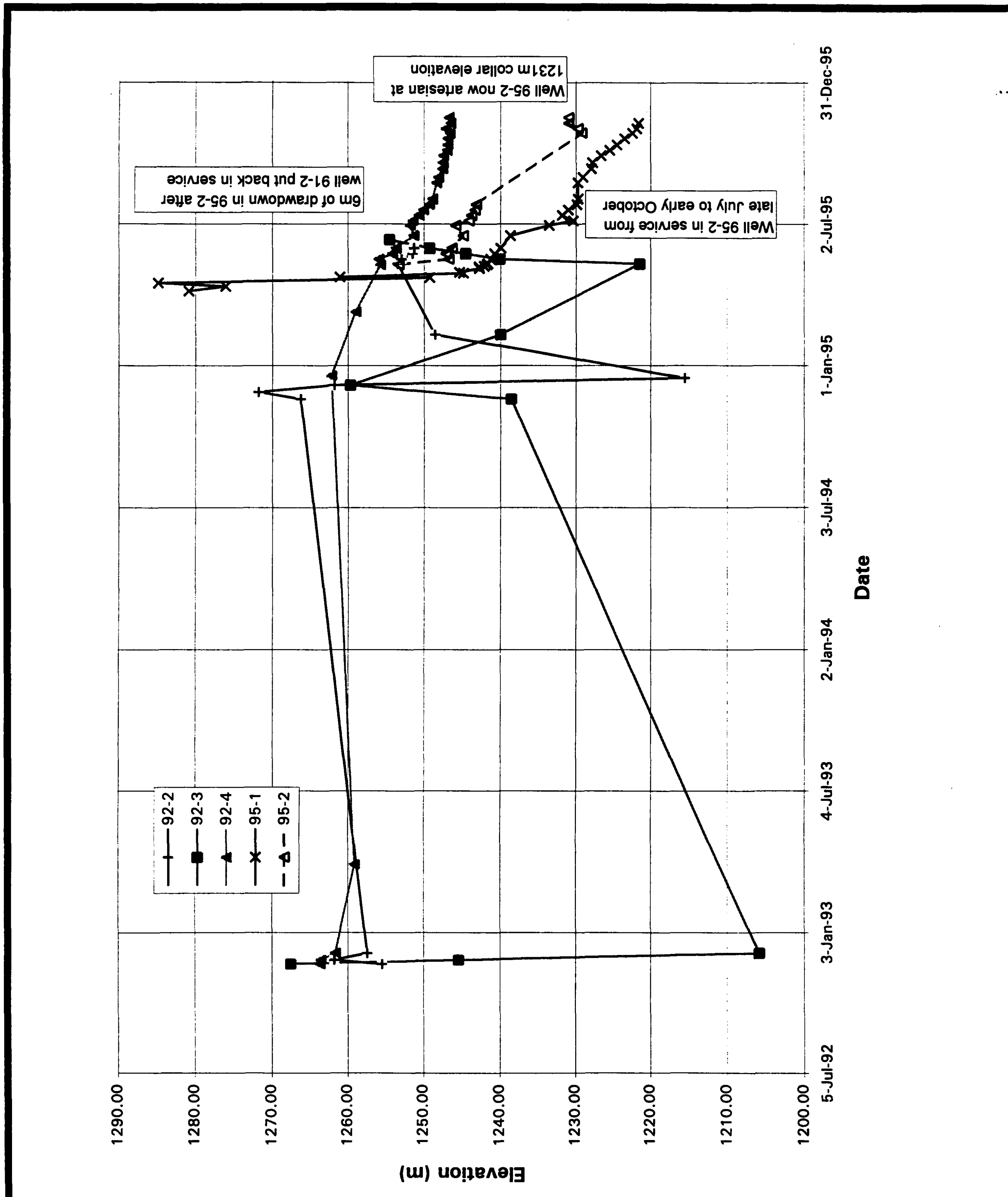
HYDROGEOLOGICAL REVIEW OF GRUM PIT DEWATERING FARO, YUKON TERRITORIES	HYDROGRAPH FOR WELLS 91-3, 91-3 AND 91-4	BY: ATH	DATE: JAN 96
		APPROVED:	FIG: 4

DWG NUMBER:



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HYDROGEOLOGICAL REVIEW OF GRUM PIT DEWATERING FARO, YUKON TERRITORIES	HYDROGRAPH FOR WELLS 92-2, 92-3, 92-4, 95-1 AND 95-2	BY: ATH	DATE: JAN 96
		APPROVED:	FIG: 5

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VANCOUVER CALGARY

ASSESSMENT OF AQUIFER DEWATERING FOR GRUM PIT

HYDROGEOLOGICAL SECTIONS THROUGH SOUTHEAST PIT WALLS

BY:	DATE:
BDT/bl	JAN.96
APPROVED:	FIG
[signature]	6