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Curragh Resources Limited

Grum Pit

1989 Dewatering Assessment

Prepared by
hydrogeological consultants ltd.

July 6, 1989

hydrogeological consultants ltd

EBA Engineering Consultants Ltd.

Civil, Geotechnical and Materials Engineers

1989–07–31

Curragh Resources Inc.
P.O. Box 1000
FARO, Yukon
YOB 1K0

<u>ATTENTION:</u> Mr. Leo Hwozdyk
Engineering Dep't

Dear Sir:

Subject: Hydrogeological Report
Grum/Vangorda Minesite
Faro, YT

Please find enclosed the original of the letter recently faxed to you, along with three original copies of the Report by Hydrogeological Consultants Ltd. Copies of the letter are attached to each Report, to indicate that the Letter augments the recommendations presented in the Report.

Please call either myself or Roger Clissold in Edmonton if further clarification or assistance is required on this subject.

Yours truly,

EBA Engineering Consultants Ltd.,

J. Richard Trimble, P.Eng.
Project Director
Office Manager

Encl.

3167-3rd Avenue, WHITEHORSE, Yukon, Canada Y1A 1G4

▪ *Telephone (403) 668-3068* ▪ *Facsimile Copier: (403) 668-4349* ▪

hydrogeological
Consultants ltd. investigations involving any aspect of **GROUNDWATER**

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July 21, 1989

EBA Engineering Consultants Ltd.
WHITEHORSE, Yukon
FAX (403) 668-4349

Attn: J. Richard Trimble, P. Eng.

I have gone over Curragh's comments and can offer the following:

Drill five water test holes at locations indicated on Figure 2 of our July, 1989 report. At this time, there are too few hydrogeological data to select sites for dewatering wells and too few sites to evaluate the expected effect of the dewatering wells. Each water test hole would need to be cased and completed with a screen to determine the aquifer parameters at various sites. If these are in the way of the mining operation, they can be removed at a future time. However, I would recommend that the water test holes be left in place as long as possible.

Estimated cost	$100,000
Estimated time	2 weeks

Based on the results of the drilling, sites for up to eight dewatering wells would be selected. To meet Curragh's time frame, 20,000 cubic metres of water per day will need to be removed from the sand and gravel aquifer. This may be accomplished by eight dewatering wells pumping 2,500 cubic metres per day or five dewatering wells pumping 4,000 cubic metres per day; the number of dewatering wells will depend on the aquifer at each site. These pumping rates allow for the removal of 2 million cubic metres within 100 days. Hopefully, the extra time would be sufficient to drain the overlying sediments and to remove other recharge to the aquifer. ?

The present bedrock topography indicates a dewatering well should be located in the general vicinity of Piezometer No. GPH-89-01. However, if the aquifer is as large as the existing data suggest, then adequate dewatering will not be accomplished by having dewatering wells only on the upstream side of the pit. Therefore, the actual selection of the dewatering sites has to be based on hydrogeological data obtained during the drilling of the five water test holes. At this time, I would suspect that at least two more dewatering wells would be required along the north edge of the proposed pit. The additional wells would be positioned such that they would overlie the thalweg of the linear depressions. These dewatering wells on the north side of the pit would both help dewater the aquifer and help control flow toward the pit through the aquifer from the north end. However, whether more dewatering wells are needed further north would be determined once additional hydrogeological data are available.

Estimated cost	$350,000 drilling and completion
	$120,000 pumps and appurtenances
Estimated time	2 months

If the field work begins August 15, 1989, drilling should be finished by October 31, 1989, and 2 million cubic metres should be removed from the aquifer by January 31, 1990. An attempt would be made to speed up the program by using two drilling rigs. It cannot be emphasized enough that we do not know the full extent of the aquifer nor the quantity of water entering the aquifer. The proposed time schedule would provide only a limited time to remove additional water.

As an estimate, I would think that the entire project would involve an expenditure in the order of $750,000.

Drilling	$450,000
Pumps & Appurtenances	$120,000
Consulting	$70,000
Miscellaneous	$110,000
Estimated Total	$750,000

The miscellaneous is to cover access costs and power for the pumps. I can visualize the dewatering wells situated at three centres. I am not sure of the logistics of getting power to these sites.

On the long-term, I would see some of the dewatering wells being operated continuously to intercept most of the water flowing through the aquifer. The remaining water would have to be intercepted by a ditch along the edge of the pit. I would suspect that EBA would handle the design of the ditch.

As you are aware, many mines have dewatering problems. Usually the problem can be related to a lack of understanding of the local hydrogeological conditions. I would recommend that if Curragh Resources wishes to proceed with the dewatering of the Grum Pit in the time frame they indicate in their letter to you dated July 19, 1989, then the start of the program should not be delayed beyond the middle of August, 1989.

If Curragh Resources wishes to discuss our report or the details in this letter, perhaps we can arrange a conference call, or a meeting at some strategic location.

Yours truly,

J MacMillan

for/ R. J. Clissold, P. Geol.,
President and Senior Hydrogeologist

RJC/jm

INTRODUCTION

Holes drilled along parts of the proposed Grum Pit have encountered significant quantities of groundwater. The non-pumping water levels in the holes are above ground surface. A dewatering program was set up by Curragh Resources Limited. One water well was drilled and completed to be used initially to determine aquifer characteristics through the conducting of an aquifer test; after the testing, the completed water well is to be used as a dewatering well (Dewatering Well GDW-89-01). The dewatering well was completed in the lower part of a sand and gravel aquifer and in the upper part of the bedrock. In addition, three piezometers were drilled and completed into the sand and gravel aquifer and the upper bedrock.

Hydrogeological Consultants Ltd. were retained to oversee the aquifer test, to synthesize and interpret the data and to review the proposed dewatering plan. The present report provides the basic data from the aquifer test, plus documents the review of the dewatering plan.

GENERAL HYDROGEOLOGY

The proposed Grum Pit will be located between Rose and Vangorda Creeks. The present ground elevation is approximately 1300 metres AMSL (above mean sea level). Part of the area is presently occupied by Doal Lake. The pit is expected to cover an area of 0.48 square kilometres and to reach a maximum depth of 270 metres.

Within the area of the proposed pit, the bedrock surface varies between 1190 and 1300 metres AMSL. The bedrock lows are associated with two linear depressions (Figure 1). One of the depressions enters the area of the proposed pit along the northern edge and leaves toward the southeast corner of the pit (Figure 1). The second linear depression enters near the northeast corner of the proposed pit and appears to join the first linear depression near the southwest corner of the proposed pit (Figure 1).

Because the material overlying the bedrock is of little interest to the mine, there are very few details readily available as to the geology of the overburden. While drilling the water well, which was to be used for testing and later to serve as Dewatering Well GDW-89-01, it was observed that more than 20 metres of the overburden is a saturated sand and gravel deposit at the site of the pumped well; at the site of Piezometer GPH-89-01, the saturated sand and gravel is 30 metres thick.

PRESENT PROGRAM

For the present program, a site visit was made to become familiar with some components of the local hydrogeological setting and to obtain any geological information from Curragh Resources Limited's files, which would be helpful in assessing the proposed dewatering program.

The water well/dewatering well and the piezometers were drilled by Midnight Sun Drilling Ltd. in March, 1989. When the well and piezometers were completed, all were flowing between 1 and 100 lpm.

On May 23, 1989, AquaTech Supplies and Services Ltd. installed a submersible pump in the dewatering well to a depth of 65.4 metres. After installing the pump, two aquifer tests were conducted. The first was a step-drawdown test consisting of 40 minutes of pumping at between 322.8 and 998.8 lpm. The second test consisted of 2336 minutes of pumping, at an average of 1134.6 lpm, and 1860 minutes of recovery. Pumping rates were measured using a turbine meter; water levels in the pumped well and one piezometer were measured using vented pressure transducers connected to a data logger. The water levels were measured and recorded by the data logger every two minutes. In addition to the pressure transducers, the water levels were measured manually using a Mow-Tech MT 200A contact gauge. All water levels were measured to the nearest 0.01 metres.

The step-drawdown test was to include pumping up to 1200 lpm, but the portable generator was not set up properly and the maximum pumping rate was 998.8 lpm. The generator was repaired before the start of the constant-pumping rate test and an average pumping rate of 1134.6 lpm was used for the aquifer test. The test was to have consisted of 2880 minutes of pumping. However, the generator failed after 2336 minutes.

The water pumped during the constant-pumping rate test was discharged into the perimeter ditch.

A water sample was collected but has not been submitted to the laboratory for analysis.

RESULTS

Part of the proposed Grum Pit occupies Doal Lake. The catchment area for Doal Lake is not large. The most logical reason for the lake is the presence of a hydraulic gradient which is tending to bring groundwater toward the land surface. The presence of a northeast-southwest trending lineament northeast of Doal Lake increases the catchment area.

Because of the large topographic relief to the south of Doal Lake, the saturated sand and gravel aquifer which underlies part of the proposed Grum Pit must be truncated. On the aerial photographs, there is an indication of groundwater discharge, 500 metres south of the proposed pit limit.

Prior to conducting the step-drawdown test, the water flowed from the dewatering well at 115.9 lpm and from Piezometer GPH-89-02 at 18.4 lpm. The flow from the other two piezometers was measured after the step-drawdown test and before the constant-pumping rate test. From Piezometer No. GPH-89-01, the flow was 19.5 lpm and from Piezometer GPH-89-03, the flow was 0.9 lpm.

The data from the step-drawdown test are included in Appendix A. The specific capacity and the transmissivity implied by the specific capacity for each step is as follows:

Step No.	Pumping (lpm)	Specific Capacity*	Transmissivity m^2/day
1	322.8	117.8	200
2	628.7	85.8	140
3	946.0	71.1	114
4	998.8	67.9	108
5	1136.5	67.0	107

*Specific Capacity - in litres per minute per metre of drawdown

Note: 5th step is first 10 minutes of constant-pumping rate test.

Two sets of water-level data are available for the pumped well; one set includes the data measured and recorded by the transducer and data logger and the second set is the data obtained from the manual measuring of the water level. The manually-measured water-level data show a maximum drawdown of 26.76 metres, measured after 2280 minutes of pumping. The data logger shows a drawdown of 27.35 metres after 2282 minutes of pumping. The discrepancy is related to two situations. One is that something in the pumping system was creating interference with the transducer during the pumping interval. Consequently, the transducer was recording a short-term fluctuation of two metres in the water level where none was being measured manually. The fluctuation is apparent from the semi-log plot in Appendix A. The second reason for the discrepancy is that the transducer is measuring a higher head before the start of the test. This situation was more evident in Piezometer GPH-89-01, where a drawdown of 1.95 metres was recorded before the flow stopped from the piezometer.

From the analysis of the time-drawdown data, the aquifer has a transmissivity of 85 m^2/day and an effective transmissivity of 59 m^2/day. From the t/t'-residual drawdown analysis, no definitive transmissivity value is apparent; a value of 150 m^2/day was calculated for reference purposes only.

The manually-measured water levels in the three piezometers show transmissivity values in the range of 46 to 83 m^2/day, with corresponding storativity values in the range of 5.0×10^{-3} to 1.0×10^{-2}. The water levels from the data logger for Piezometer GPH-89-01 indicate that several values of transmissivity and corresponding storativity values can be obtained from different time intervals. The early time-drawdown data indicate a transmissivity of 650 m^2/day and a storativity of 2.7×10^{-4}. The transmissivity value decreases with increased time, with the value for the last time interval being 77 m^2/day.

A distance-drawdown analysis after 1200 minutes of pumping, between Piezometers No.'s GPH-89-01 and 02, indicates the aquifer has an effective transmissivity of 220 m^2/day and a corresponding storativity of 1.2×10^{-3}. If the drawdown in Piezometer No. GPH 89-03 is superimposed on the distance-drawdown graph, the value plots above the type curve by 0.65 metres.

The recovery data from the pumped well indicate that a projected full recovery can be expected.

The temperature of the groundwater was in the range of 3.45 to 3.5 degrees Celsius.

INTERPRETATION

There are no data to establish the hydraulic gradient in the aquifer. From the local setting, the groundwater is most likely flowing from north to south. Obviously, the sand and gravel aquifer cannot extend more than a few hundred metres north of the proposed Grum Pit site. The indications are that groundwater discharge is occurring in the area south of the proposed pit.

A bedrock topography map was prepared by mine personnel and should be accurate due to the density of control points. However, it is not known if the sand and gravel deposits are associated with the thalwegs of the linear depressions over their entire lengths. The absence of significant groundwater discharge south of the pit suggests that the sand and gravel deposits have been truncated. The likely scenario for the sand and gravel aquifer is that it occupies an area in the order of one square kilometre. If the average thickness is 20 metres and the specific yield of the gravel is 0.1, then the volume of water stored in the gravel would be 2,000,000 cubic metres. Because the water level is at least 40 metres above the top of the aquifer, the aquifer would be expected to store an additional 40,000 cubic metres.

The actual transmissivity of the aquifer cannot be determined from the available data. The indications are that the aquifer has a transmissivity in the order of 650 m^2/day, with the storage coefficient in the order of 2.7×10^{-4}. Obviously, the sand and gravel deposit is of finite width. If the aquifer were 450 metres wide with a transmissivity of 650 m^2/day and a storativity of 1.0×10^{-4}, the cone of depression caused by pumping during the constant-pumping rate aquifer test would have intersected the edges of the sand and gravel deposits in less than two minutes.

The four different values for transmissivity obtained from Piezometer No. 89-01 suggest that the cone of depression encountered four separate boundaries of the aquifer. However, despite encountering four boundaries, the data do not indicate the presence of a depletion aquifer. The absence of indications of a depletion aquifer under these conditions would indicate recharge to the aquifer. The recharge could be in the form of drainage from the overlying sediments or from flow through the aquifer. Additional data would be required to establish the nature of the recharge.

The water well being used to conduct the aquifer test was completed with 7.5 metres of telescopic screen. Based on the maximum open area of the screen, with a pumping rate of 1000 lpm, the groundwater flowing through the screens would have a velocity of 0.6 metres/minute. Under normal conditions, at least half of the openings would be plugged, increasing the velocity to 1.2 metres per minute. Under field conditions, the flow through the screens would be expected to be efficient. However, with a transmissivity of 108 m^2/day based on the specific capacity, it would appear that the water well design has not been adequate enough to allow for efficient removal of groundwater from the aquifer. If an efficient well design had been attained, the drawdown in the pumped well after 10 minutes of pumping would have been 3.5 metres rather than 16.7 metres.

The piezometers and the dewatering well have been completed both in the upper bedrock and the saturated sand and gravel aquifers. Because of the dual completion, it cannot be determined if there is one or two aquifers and if there are two, which is the more permeable. It has been assumed that the main aquifer is the sand and gravel deposit.

CONCLUSIONS

Based on the aquifer parameters obtained from the present program, two dewatering wells, each pumping 1,000 cubic metres per day, would result in 60 metres of drawdown within the area of the proposed pit within 2.8 years. However, this pumping does not allow for flow through the aquifer nor recharge, each of which could be as significant as the volume of water stored in the aquifer. With the positioning of the dewatering wells upstream from the pit, there are two problems:

1) the drawdown within the pit is less than if the dewatering wells are placed downstream of the pit;

2) the maximum drawdown within the pit is limited because part of the aquifer must be left saturated to allow for flow of water to the dewatering wells.

The dewatering program proposed by Curragh Resources would not be the most efficient. First of all, the sand and gravel aquifer is not expected to be present at all locations along the north end of the proposed pit. Secondly, due to the high permeability of the aquifer material, the cone of depression would be expected to be relatively flat. The main advantage to numerous dewatering wells would be low pumping rates and minimal well losses. However, if low pumping rates are to be used, then smaller diameter casings could be used.

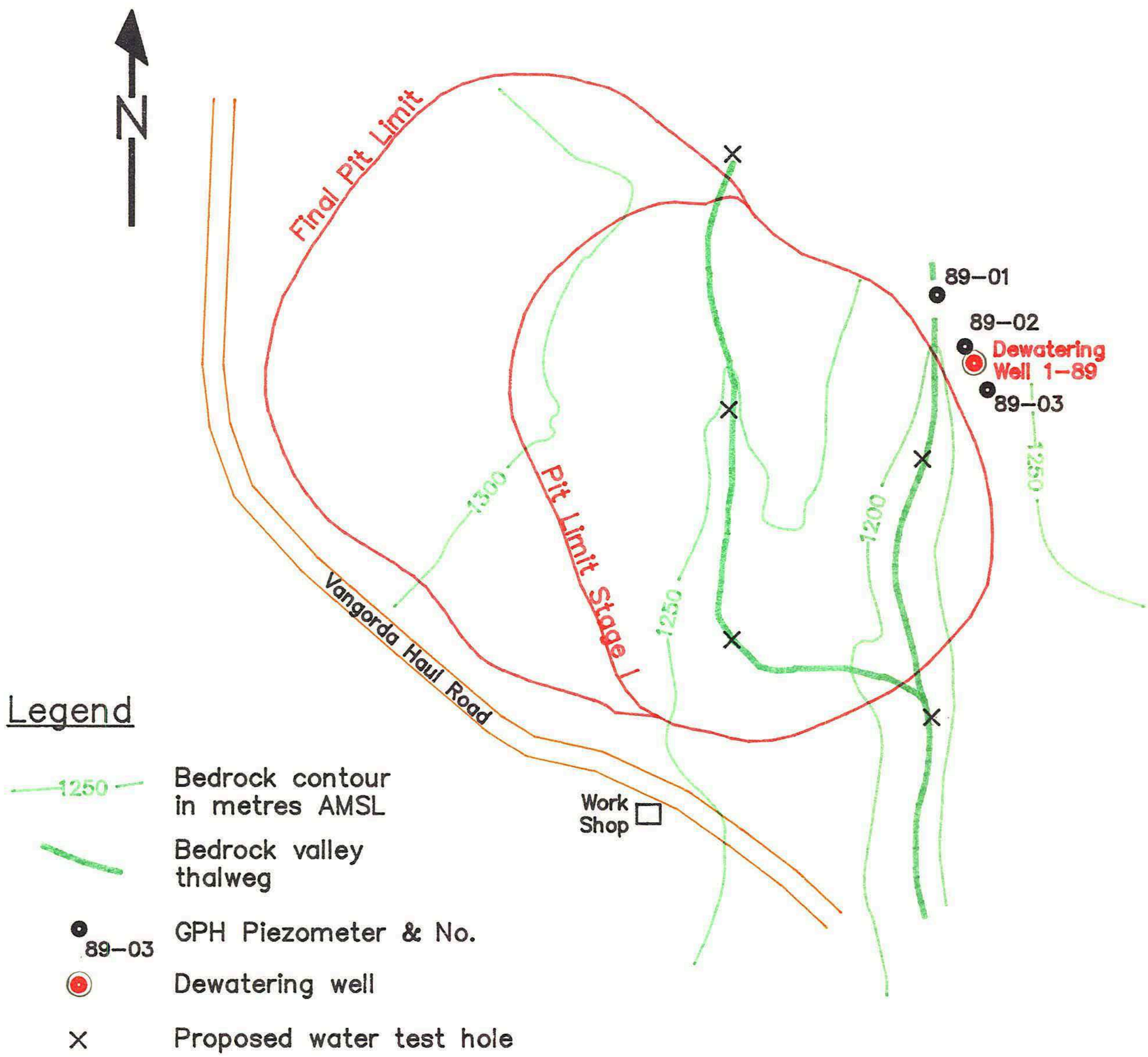
RECOMMENDATIONS

There is need for more information about the sand and gravel aquifer in order to establish a definitive dewatering program. If recharge to the sand and gravel aquifer is minimal, then dewatering of the aquifer would be best attained by putting the dewatering wells at a location where the base of the aquifer is at its lowest elevation. From the present data, it would appear as if that would be in the vicinity of the work shops.

If recharge to the aquifer is minimal, then once the aquifer is drained, it may be possible to control flow through the aquifer with a collector system within the Grum Pit proper along the northern edge. This would be more effective than the use of wells.

In order to establish the flow through the aquifer, it would be necessary to drill and complete additional holes in the sand and gravel aquifer. It is recommended that five water test holes be drilled and completed in the sand and gravel aquifer along the thalweg at locations shown in Figure 1. This program would indicate the variability of the aquifer parameters and permit better positioning of the dewatering wells. The completed water test holes would be used to establish the hydraulic gradient in the aquifer and would also be used during the dewatering program to check on the effectiveness of the pumping.

After completion of the five water test holes, the position for the dewatering wells could be established. In the meantime, it is recommended that pumping from the existing dewatering well be started. A data logger and transducer should be used to record the water level in Piezometer No. GPH-89-01. The water level in the other piezometers and the pumped well, and the quantity of water being pumped from the dewatering well, should be measured and recorded weekly.



Curragh Resources Limited
Grum Pit
1989 Dewatering Assessment

Site Plan

June, 1989

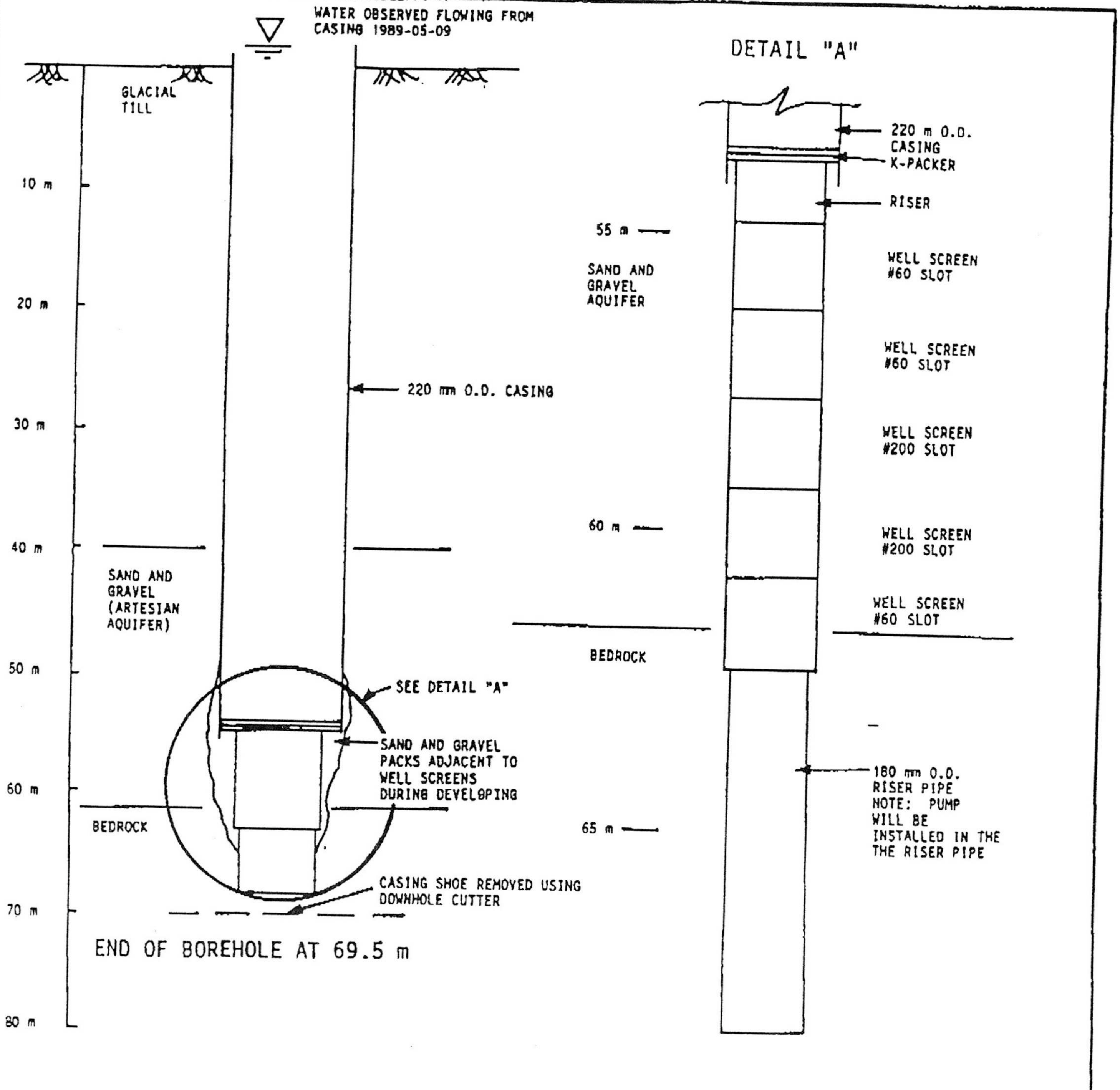
Figure 1.

hydrogeological Consultants ltd.

GLOSSARY

AMSL	- above mean sea level
NPWL	- non-pumping water level
l/min	- litres per minute
lpm	- litres per minute
igpm	- imperial gallons per minute
m^3	- cubic metres
m^2/day	- metres squared per day
BGL	- below ground level
BTOC	- below top of casing
DOC	- top of casing
Transmissivity	- measure of the quantity of groundwater which can flow through the rocks; units are metres squared per day
Storativity	- measure of the quantity of groundwater which can be stored in a rock unit; units are cubic metres per cubic metre
UTM	- Universal Transverse Mercator Grid
GWRIS	- Ground Water Resources Information Service of Alberta Environment

APPENDIX A



NOTE: 1) Refer to borehole log (10018-04) for detailed stratigraphic description

2) Horizontal dimensions not to scale

EBA Engineering Consultants Ltd.	PROJECT GRUM MINE SITE - FARO, YUKON
CLIENT CURRAGH RESOURCES INC.	TITLE DEWATERING WELL GDW-89-01 INSTALLATION DETAILS
DATE 89/05/16 DWN WAS CHKD [signature]	DWG NO. 0201-10018

Curragh Resources Limited
Grum Pit
1989 Dewatering Assessment
Dewatering Well No. 1-89

Pumped Well
Step-Drawdown Aquifer Test

Non-Pumping Water Level: flowing
Date Test Started: 89/05/24
Pumping Interval: *40 min.
Depth of Dewatering Well: 69.5 m

Depth Casing Set: 54 m

Average Test Rate: variable
Time Test Started: 00:44 Hrs
Recovery Interval: n/a
Depth to Top of Main Aquifer: 40 m
Depth to Pump Intake: 65.4 m

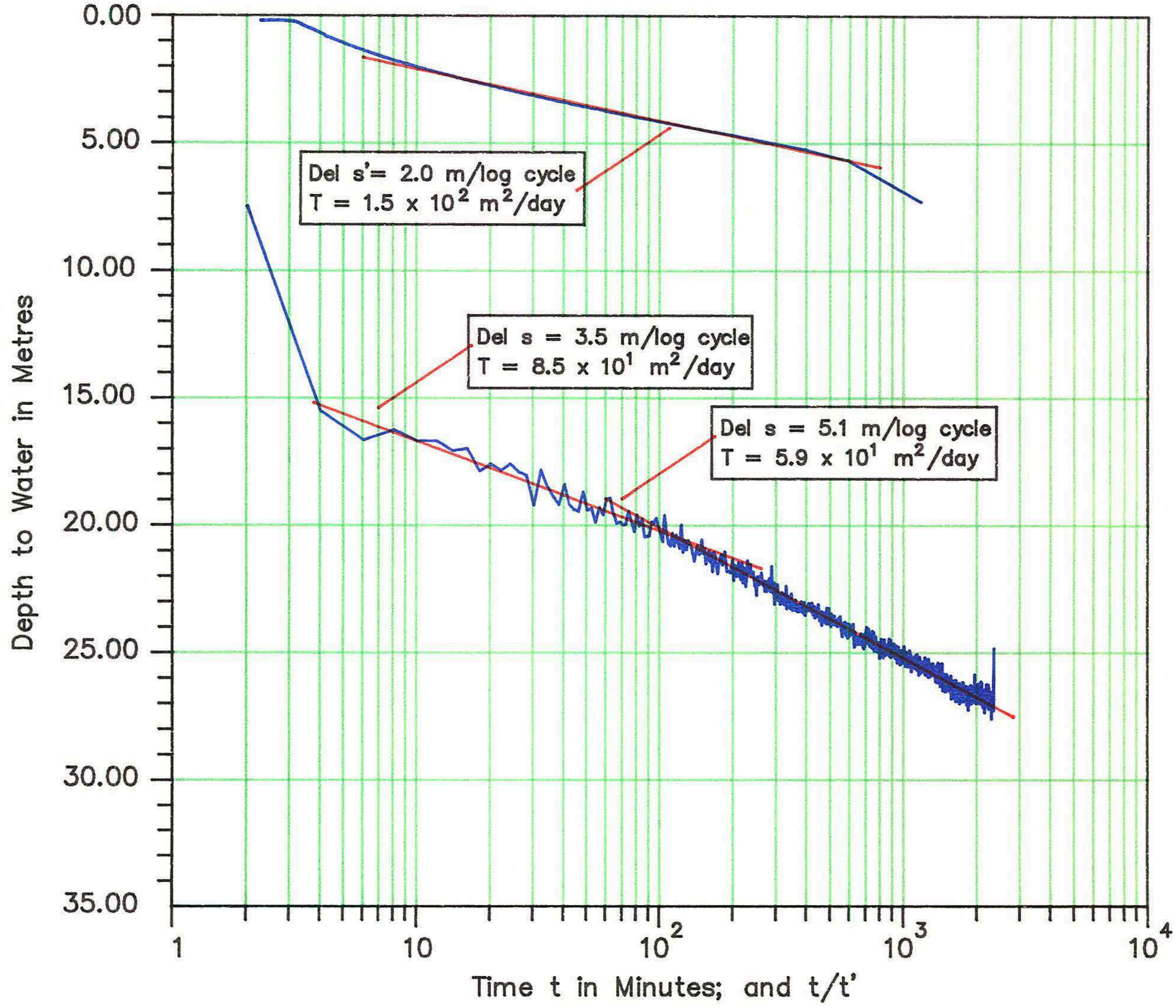
Comments:

*The fifth step is the first 10 minutes of the constant-pumping-rate test. All water levels were obtained from manual measurements.

t (min)	Drawdown (metres)
Step 1 Q=322.8 lpm	
1	2.74
2	-.-
3	2.25
4	2.58
6	2.81
8	2.82
10	2.74
Step 2 Q=628.7 lpm	
1	6.30
2	6.90
3	7.11
4	7.22
6	7.23
8	7.29
10	7.33

t (min)	Drawdown (metres)
Step 3 Q=946.0 lpm	
1	11.26
2	12.00
3	12.39
4	12.61
6	12.89
8	13.10
10	13.31
Step 4 Q=998.8 lpm	
1	14.08
2	14.24
3	14.31
4	14.38
6	14.52
8	14.61
10	14.72

t (min)	Drawdown (metres)
***Step 5 Q=1136.5 lpm**	
1	14.52
2	15.18
3	15.57
4	15.91
6	16.45
8	16.73
10	16.96



Curragh Resources Limited Grum Pit 1989 Dewatering Assessment
Semilog Plot Dewatering Water Well GDW-89-01
June, 1989 — Appendix A.

hydrogeological consultants ltd.

Curragh Resources Limited
Grum Pit
1989 Dewatering Assessment
GDW-89-01

Pumped Well
Aquifer Test I

Non-Pumping Water Level: flowing
Date Test Started: 89/05/24
Pumping Interval: 2336 min.
Depth of Water Test Hole: 69.5 m

Depth Casing Set: 54 m

Average Test Rate: 1134.6 lpm
Time Test Started: 12:30 Hrs
Recovery Interval: 1860 min
Depth to Top of Main Aquifer: 40 m
Depth to Pump Intake: 65.4 m

Comments:

Pumping from the dewatering well began at 12:30 Hrs on May 24, 1989. Recovery began at 03:26 Hrs on May 26, 1989. Water levels were measured using a pressure transducer connected to data logger 312. These levels differed from manually measured water levels by 0.26 metres.

The quantity of groundwater pumped from the water well was measured using a turbine meter.

The water sample for chemical analysis was obtained just prior to the end of the pumping interval of the test.

Pumping Interval - 2

t (min)	Drawdown (metres)
2	7.51
4	15.54
6	16.67
8	16.27
10	16.70
12	16.71
14	17.09
16	17.00
18	17.88
20	17.61
22	17.86
24	17.61
26	17.93
28	18.06
30	19.23
32	17.85
34	18.48
36	18.89
38	19.20
40	18.42
42	19.20
44	19.40
46	19.47
48	18.71
50	19.42
52	19.34
54	19.89
56	19.31
58	19.60
60	18.98
62	18.94
64	19.57
66	19.92
68	19.89
70	20.00
72	19.97
74	19.47
76	19.87
78	20.26
80	19.61
82	20.04
84	19.76
86	20.47
88	20.44
90	20.42
92	19.87
94	19.90
96	19.74
98	20.04
100	20.30
102	20.64
104	19.62
106	20.32
108	20.73
110	20.82
112	20.32
114	20.84
116	20.40
118	20.68
120	20.91
122	20.00
124	21.07
126	20.61
128	20.95
130	20.60
132	20.74
134	20.85
136	21.12
138	21.39
140	21.04
142	20.81
144	21.15
146	21.12
148	20.57
150	21.11
152	20.92
154	21.51
156	21.26
158	21.02
160	21.43
162	21.10
164	21.82
166	21.06
168	21.20
170	21.66
172	21.90
174	21.49
176	21.27
178	21.16
180	21.55
182	21.33
184	21.05
186	21.53
188	21.81
190	21.81
192	21.82
194	21.87
196	21.64
198	21.38
200	22.17
202	21.58
204	21.71
206	22.01
208	21.69
210	21.46
212	21.99
214	22.13
216	21.48
218	22.26
220	21.68
222	21.77
224	22.41
226	22.06
228	21.40
230	21.86
232	21.76
234	21.55
236	22.01
238	21.92
240	21.85
242	22.08
244	22.38
246	22.45
248	22.74
250	22.02
252	22.25
254	22.34
256	22.10
258	22.00
260	21.88
262	22.30
264	22.35
266	22.19
268	22.60
270	22.22
272	22.60
274	22.53
276	22.46
278	22.16
280	22.10
282	22.61
284	22.57
286	21.63
288	22.64
290	22.67
292	22.25
294	23.11
296	22.45
298	22.63
300	22.77
302	22.33
304	22.96
306	22.79
308	22.71
310	23.09
312	23.09
314	22.85
316	22.65
318	22.69
320	23.09
322	23.12
324	23.09
326	22.85
328	22.39
330	23.28
332	22.76
334	23.08
336	22.92
338	22.86
340	23.26
342	23.05
344	22.70
346	22.93
348	23.34
350	23.03
352	23.11
354	23.07
356	23.33
358	22.94
360	23.31
362	23.23
364	23.39
366	23.12
368	23.28
370	23.23
372	23.39
374	23.10
376	23.34
378	23.00
380	23.19
382	23.38
384	23.42
386	23.12
388	23.04
390	23.50
392	23.54
394	23.36
396	23.21
398	23.27
400	23.36
402	23.30
404	23.12
406	23.07
408	23.34
410	23.26
412	23.23
414	23.38
416	23.25
418	23.06
420	23.38
422	23.52
424	23.54

Pumping Interval - 3

426	23.38	534	23.97	642	24.40	750	24.22
428	23.20	536	23.67	644	24.51	752	24.42
430	23.64	538	23.78	646	24.40	754	24.95
432	23.41	540	23.74	648	24.67	756	24.52
434	23.46	542	23.89	650	24.46	758	24.39
436	23.59	544	23.92	652	24.49	760	24.92
438	23.37	546	23.59	654	24.58	762	24.40
440	23.32	548	23.81	656	24.38	764	24.73
442	23.28	550	23.96	658	24.64	766	24.94
444	23.12	552	24.19	660	24.69	768	24.92
446	23.42	554	23.97	662	24.56	770	24.58
448	23.65	556	24.38	664	24.27	772	24.65
450	23.75	558	24.23	666	24.46	774	24.71
452	23.57	560	23.97	668	24.51	776	24.63
454	23.39	562	24.03	670	24.32	778	24.97
456	23.47	564	23.89	672	24.45	780	24.68
458	23.93	566	23.95	674	24.49	782	24.68
460	23.73	568	23.84	676	24.54	784	24.80
462	23.41	570	23.81	678	24.76	786	24.62
464	23.69	572	23.97	680	24.86	788	24.78
466	23.44	574	24.29	682	24.49	790	24.69
468	23.55	576	24.21	684	24.29	792	25.23
470	23.60	578	24.33	686	24.77	794	24.67
472	23.80	580	24.01	688	24.56	796	24.72
474	23.67	582	24.00	690	24.60	798	24.93
476	23.46	584	23.87	692	24.58	800	24.84
478	23.88	586	24.44	694	24.63	802	24.72
480	23.66	588	24.02	696	24.17	804	24.90
482	23.25	590	24.07	698	24.40	806	24.48
484	23.59	592	24.23	700	24.02	808	25.02
486	23.88	594	24.36	702	24.61	810	24.56
488	23.58	596	23.90	704	24.53	812	24.60
490	23.27	598	24.28	706	24.47	814	24.67
492	23.68	600	24.22	708	24.41	816	24.75
494	23.85	602	24.19	710	24.26	818	24.93
496	23.75	604	24.30	712	24.44	820	25.20
498	23.90	606	24.26	714	24.09	822	24.86
500	23.97	608	24.18	716	24.55	824	24.81
502	23.48	610	24.21	718	24.71	826	25.12
504	23.76	612	24.26	720	24.72	828	24.50
506	23.54	614	24.12	722	24.76	830	24.81
508	23.63	616	23.89	724	24.35	832	24.95
510	23.88	618	24.43	726	24.77	834	24.85
512	23.86	620	24.33	728	24.38	836	24.99
514	23.87	622	24.44	730	24.68	838	25.10
516	23.57	624	24.79	732	24.67	840	24.98
518	23.91	626	24.23	734	24.57	842	24.72
520	23.79	628	24.21	736	24.71	844	24.89
522	23.77	630	24.58	738	24.71	846	24.88
524	23.74	632	24.38	740	24.17	848	24.75
526	23.89	634	24.37	742	24.85	850	25.02
528	23.88	636	24.54	744	24.33	852	24.81
530	23.98	638	24.68	746	24.61	854	24.74
532	23.79	640	24.42	748	24.57	856	25.07

Pumping Interval - 4

858	25.05	966	25.11	1074	25.17	1182	25.50
860	25.05	968	25.03	1076	25.43	1184	25.53
862	24.90	970	25.19	1078	25.30	1186	25.59
864	24.70	972	25.08	1080	25.23	1188	25.37
866	24.48	974	25.14	1082	25.49	1190	25.56
868	24.82	976	25.20	1084	25.56	1192	25.74
870	25.15	978	25.41	1086	25.29	1194	25.55
872	24.99	980	25.06	1088	25.26	1196	25.51
874	24.93	982	25.19	1090	25.60	1198	25.36
876	24.83	984	25.20	1092	25.52	1200	25.70
878	24.54	986	24.91	1094	25.32	1202	25.76
880	25.20	988	24.94	1096	25.48	1204	25.53
882	24.96	990	24.89	1098	25.61	1206	25.64
884	24.87	992	24.95	1100	25.20	1208	25.40
886	24.83	994	25.20	1102	25.35	1210	25.36
888	24.94	996	25.18	1104	25.48	1212	25.43
890	25.14	998	24.77	1106	25.40	1214	25.56
892	24.98	1000	25.03	1108	25.35	1216	25.21
894	24.73	1002	25.09	1110	25.54	1218	25.86
896	24.93	1004	25.06	1112	25.30	1220	25.77
898	24.83	1006	25.14	1114	25.12	1222	25.82
900	24.80	1008	25.22	1116	25.21	1224	25.88
902	25.06	1010	25.44	1118	25.33	1226	25.77
904	24.91	1012	25.22	1120	25.48	1228	25.70
906	24.68	1014	25.54	1122	25.46	1230	25.45
908	24.66	1016	25.12	1124	25.62	1232	25.71
910	24.79	1018	24.98	1126	25.69	1234	25.47
912	24.94	1020	25.03	1128	25.20	1236	25.60
914	24.99	1022	25.45	1130	25.09	1238	25.55
916	25.17	1024	25.49	1132	25.24	1240	25.72
918	24.93	1026	25.25	1134	25.45	1242	25.67
920	25.23	1028	25.54	1136	25.28	1244	25.70
922	25.15	1030	25.13	1138	25.29	1246	25.79
924	24.75	1032	25.22	1140	25.46	1248	25.80
926	25.07	1034	25.27	1142	25.18	1250	25.65
928	24.75	1036	25.13	1144	25.36	1252	25.87
930	24.88	1038	25.37	1146	25.23	1254	25.64
932	24.90	1040	25.17	1148	25.88	1256	25.97
934	25.41	1042	25.56	1150	25.35	1258	25.51
936	25.26	1044	25.18	1152	25.68	1260	25.27
938	24.95	1046	25.04	1154	25.34	1262	25.64
940	24.98	1048	24.95	1156	25.20	1264	25.71
942	24.89	1050	24.92	1158	25.46	1266	25.53
944	24.80	1052	25.03	1160	25.43	1268	25.52
946	25.17	1054	25.03	1162	25.40	1270	25.43
948	25.25	1056	25.08	1164	25.58	1272	25.63
950	24.89	1058	25.20	1166	25.80	1274	25.72
952	25.07	1060	25.15	1168	25.54	1276	25.78
954	25.03	1062	25.20	1170	25.42	1278	25.96
956	25.18	1064	25.13	1172	25.69	1280	25.63
958	25.23	1066	25.33	1174	25.45	1282	25.59
960	24.94	1068	25.43	1176	25.40	1284	25.47
962	25.48	1070	25.75	1178	25.67	1286	25.86
964	24.92	1072	25.53	1180	25.39	1288	25.54

Pumping Interval - 5

1290	25.65	1398	25.89	1506	25.98	1614	26.16
1292	25.90	1400	26.09	1508	26.50	1616	26.64
1294	25.64	1402	26.05	1510	26.30	1618	26.67
1296	25.65	1404	25.81	1512	26.34	1620	26.56
1298	25.74	1406	25.68	1514	26.05	1622	26.76
1300	25.90	1408	26.33	1516	26.48	1624	26.35
1302	25.87	1410	26.03	1518	26.49	1626	26.53
1304	25.61	1412	25.96	1520	26.27	1628	26.92
1306	25.74	1414	25.91	1522	26.18	1630	26.27
1308	25.67	1416	25.46	1524	26.49	1632	26.10
1310	25.84	1418	26.02	1526	26.24	1634	26.68
1312	25.44	1420	25.82	1528	26.39	1636	26.57
1314	25.57	1422	26.08	1530	26.26	1638	26.32
1316	25.87	1424	25.85	1532	26.40	1640	26.85
1318	25.77	1426	25.72	1534	26.08	1642	26.78
1320	25.70	1428	26.02	1536	26.20	1644	26.89
1322	25.62	1430	25.77	1538	26.24	1646	26.41
1324	25.79	1432	25.44	1540	26.48	1648	26.35
1326	25.82	1434	26.12	1542	26.40	1650	26.63
1328	25.80	1436	25.88	1544	26.52	1652	26.90
1330	25.76	1438	26.10	1546	26.37	1654	26.68
1332	25.82	1440	26.50	1548	25.98	1656	26.59
1334	25.72	1442	26.32	1550	26.09	1658	26.59
1336	25.75	1444	26.03	1552	26.26	1660	26.53
1338	25.73	1446	25.92	1554	26.59	1662	26.46
1340	25.72	1448	26.20	1556	25.92	1664	26.40
1342	26.01	1450	25.85	1558	26.35	1666	26.73
1344	25.79	1452	26.11	1560	26.34	1668	26.43
1346	26.05	1454	26.24	1562	26.11	1670	26.52
1348	25.84	1456	26.10	1564	26.81	1672	26.74
1350	26.16	1458	26.10	1566	26.52	1674	26.92
1352	25.83	1460	26.06	1568	26.57	1676	26.63
1354	25.75	1462	25.96	1570	26.64	1678	26.50
1356	25.56	1464	26.03	1572	26.37	1680	26.22
1358	25.68	1466	26.26	1574	26.12	1682	26.42
1360	25.86	1468	26.10	1576	26.50	1684	26.41
1362	25.90	1470	26.26	1578	26.56	1686	26.22
1364	26.18	1472	26.34	1580	26.46	1688	27.01
1366	25.51	1474	26.54	1582	26.49	1690	26.41
1368	25.89	1476	26.19	1584	26.64	1692	26.63
1370	25.59	1478	26.45	1586	26.46	1694	26.34
1372	25.81	1480	26.22	1588	26.65	1696	26.78
1374	25.74	1482	26.02	1590	26.44	1698	26.55
1376	25.71	1484	25.99	1592	26.76	1700	26.86
1378	25.42	1486	26.21	1594	26.62	1702	26.54
1380	26.02	1488	26.28	1596	26.61	1704	26.52
1382	25.49	1490	26.26	1598	26.22	1706	26.94
1384	25.49	1492	26.52	1600	26.79	1708	26.70
1386	25.85	1494	25.85	1602	26.24	1710	26.56
1388	25.92	1496	25.88	1604	26.18	1712	26.37
1390	25.95	1498	25.98	1606	26.39	1714	26.44
1392	26.09	1500	25.89	1608	26.37	1716	26.68
1394	25.53	1502	26.16	1610	26.40	1718	26.76
1396	25.71	1504	26.09	1612	26.11	1720	26.66

Pumping Interval - 6

1722	26.53	1830	26.61	1938	26.71	2046	26.82
1724	26.60	1832	26.50	1940	26.61	2048	26.44
1726	26.75	1834	27.25	1942	26.77	2050	26.79
1728	26.69	1836	26.62	1944	26.69	2052	26.69
1730	26.60	1838	26.94	1946	26.79	2054	27.02
1732	26.58	1840	26.73	1948	26.46	2056	26.46
1734	26.67	1842	27.07	1950	26.52	2058	26.75
1736	26.70	1844	26.57	1952	25.87	2060	26.67
1738	26.70	1846	26.61	1954	26.82	2062	26.85
1740	26.69	1848	26.49	1956	26.27	2064	26.41
1742	26.64	1850	26.76	1958	26.97	2066	26.71
1744	26.93	1852	26.63	1960	26.36	2068	26.15
1746	26.37	1854	26.96	1962	26.31	2070	26.63
1748	26.58	1856	26.34	1964	26.62	2072	26.85
1750	26.18	1858	26.55	1966	26.29	2074	27.02
1752	26.71	1860	26.76	1968	26.67	2076	26.93
1754	26.30	1862	26.57	1970	26.82	2078	26.53
1756	26.61	1864	26.45	1972	26.80	2080	26.95
1758	26.45	1866	26.74	1974	26.94	2082	26.21
1760	26.76	1868	26.89	1976	26.71	2084	26.89
1762	26.34	1870	26.50	1978	27.00	2086	26.90
1764	26.72	1872	26.60	1980	26.57	2088	26.97
1766	26.73	1874	26.67	1982	26.58	2090	27.01
1768	26.66	1876	26.29	1984	26.73	2092	27.03
1770	26.90	1878	26.57	1986	26.64	2094	26.68
1772	26.92	1880	26.70	1988	26.83	2096	26.79
1774	26.55	1882	26.82	1990	26.92	2098	26.68
1776	26.76	1884	26.96	1992	26.48	2100	26.66
1778	26.87	1886	26.68	1994	26.66	2102	26.82
1780	26.35	1888	27.01	1996	26.91	2104	26.90
1782	26.61	1890	26.56	1998	26.27	2106	27.14
1784	26.73	1892	26.77	2000	26.36	2108	26.55
1786	26.44	1894	26.96	2002	26.98	2110	26.87
1788	26.71	1896	26.96	2004	26.60	2112	27.04
1790	26.71	1898	26.72	2006	26.95	2114	26.67
1792	26.53	1900	26.94	2008	26.46	2116	27.11
1794	26.61	1902	26.83	2010	26.64	2118	27.04
1796	26.94	1904	26.52	2012	26.63	2120	27.09
1798	26.42	1906	26.95	2014	26.24	2122	26.78
1800	26.33	1908	26.77	2016	26.24	2124	26.82
1802	26.61	1910	26.56	2018	26.72	2126	26.82
1804	26.72	1912	26.79	2020	26.68	2128	27.07
1806	26.56	1914	26.56	2022	26.57	2130	27.01
1808	26.44	1916	26.76	2024	26.85	2132	26.53
1810	27.07	1918	26.50	2026	26.77	2134	27.19
1812	26.70	1920	26.39	2028	26.65	2136	26.49
1814	26.82	1922	26.63	2030	26.51	2138	26.50
1816	26.69	1924	26.44	2032	26.57	2140	27.37
1818	26.77	1926	26.47	2034	26.38	2142	26.84
1820	26.73	1928	26.72	2036	26.81	2144	26.76
1822	27.07	1930	26.53	2038	26.99	2146	26.68
1824	26.49	1932	26.75	2040	26.76	2148	26.79
1826	26.43	1934	26.31	2042	26.60	2150	26.96
1828	26.73	1936	26.87	2044	26.43	2152	26.81

Pumping Interval - 7

2154	26.53	2262	26.85
2156	26.93	2264	26.90
2158	26.93	2266	27.00
2160	26.94	2268	26.83
2162	26.78	2270	27.17
2164	27.02	2272	26.88
2166	26.43	2274	26.69
2168	26.57	2276	26.57
2170	26.55	2278	27.04
2172	26.74	2280	27.12
2174	26.33	2282	26.73
2176	26.83	2284	27.61
2178	26.26	2286	26.71
2180	26.71	2288	27.23
2182	26.61	2290	27.28
2184	26.68	2292	26.76
2186	27.12	2294	26.78
2188	26.52	2296	26.91
2190	26.62	2298	26.81
2192	26.76	2300	27.32
2194	26.60	2302	27.20
2196	26.80	2304	26.89
2198	26.35	2306	26.67
2200	26.70	2308	27.00
2202	26.55	2310	26.71
2204	26.50	2312	26.93
2206	26.58	2314	26.72
2208	27.04	2316	27.16
2210	26.95	2318	27.13
2212	26.27	2320	26.72
2214	27.08	2322	27.23
2216	27.01	2324	26.72
2218	26.96	2326	27.28
2220	26.67	2328	26.45
2222	26.39	2330	26.57
2224	27.22	2332	25.91
2226	26.41	2334	26.44
2228	26.64	2336	24.85
2230	26.89		
2232	27.07		
2234	27.02		
2236	26.88		
2238	27.08		
2240	27.05		
2242	26.75		
2244	26.92		
2246	27.16		
2248	26.66		
2250	26.91		
2252	26.97		
2254	26.75		
2256	26.86		
2258	26.65		
2260	26.56		

Recovery Interval - 8

t' (min)	Residual Drawdown (metres)	t' (min)	Residual Drawdown (metres)	t' (min)	Residual Drawdown (metres)	t' (min)	Residual Drawdown (metres)
		98	2.98	202	2.29	306	1.86
		100	2.96	204	2.28	308	1.86
		102	2.94	206	2.27	310	1.85
		104	2.92	208	2.26	312	1.84
2	7.31	106	2.91	210	2.25	314	1.83
4	5.68	108	2.89	212	2.24	316	1.83
6	5.26	110	2.87	214	2.23	318	1.83
8	5.02	112	2.86	216	2.22	320	1.82
10	4.84	114	2.86	218	2.21	322	1.81
12	4.69	116	2.83	220	2.20	324	1.81
14	4.57	118	2.81	222	2.19	326	1.80
16	4.47	120	2.80	224	2.18	328	1.79
18	4.38	122	2.78	226	2.17	330	1.79
20	4.30	124	2.77	228	2.17	332	1.78
22	4.22	126	2.75	230	2.16	334	1.77
24	4.16	128	2.73	232	2.15	336	1.77
26	4.09	130	2.72	234	2.14	338	1.76
28	4.03	132	2.70	236	2.13	340	1.75
30	3.98	134	2.69	238	2.12	342	1.75
32	3.92	136	2.67	240	2.11	344	1.74
34	3.88	138	2.66	242	2.10	346	1.73
36	3.83	140	2.65	244	2.10	348	1.73
38	3.79	142	2.63	246	2.09	350	1.72
40	3.75	144	2.62	248	2.08	352	1.71
42	3.70	146	2.61	250	2.08	354	1.71
44	3.66	148	2.60	252	2.07	356	1.70
46	3.64	150	2.59	254	2.06	358	1.69
48	3.60	152	2.57	256	2.06	360	1.69
50	3.57	154	2.56	258	2.05	362	1.68
52	3.53	156	2.55	260	2.04	364	1.67
54	3.50	158	2.53	262	2.03	366	1.67
56	3.47	160	2.52	264	2.02	368	1.66
58	3.44	162	2.51	266	2.01	370	1.66
60	3.40	164	2.50	268	2.01	372	1.65
62	3.38	166	2.48	270	2.00	374	1.64
64	3.36	168	2.47	272	1.99	376	1.64
66	3.33	170	2.46	274	1.98	378	1.63
68	3.30	172	2.45	276	1.97	380	1.62
70	3.28	174	2.44	278	1.97	382	1.62
72	3.25	176	2.42	280	1.96	384	1.61
74	3.23	178	2.41	282	1.95	386	1.61
76	3.20	180	2.40	284	1.94	388	1.60
78	3.18	182	2.39	286	1.94	390	1.59
80	3.16	184	2.38	288	1.93	392	1.59
82	3.13	186	2.37	290	1.92	394	1.58
84	3.12	188	2.35	292	1.91	396	1.58
86	3.10	190	2.35	294	1.91	398	1.57
88	3.08	192	2.34	296	1.90	400	1.56
90	3.06	194	2.33	298	1.89	402	1.56
92	3.04	196	2.32	300	1.88	404	1.56
94	3.02	198	2.31	302	1.88	406	1.55
96	3.00	200	2.30	304	1.87	408	1.55

Recovery Interval - 9

410	1.54	514	1.27	618	1.04	722	0.84
412	1.54	516	1.27	620	1.04	724	0.84
414	1.53	518	1.26	622	1.04	726	0.83
416	1.52	520	1.26	624	1.03	728	0.83
418	1.52	522	1.25	626	1.03	730	0.82
420	1.51	524	1.25	628	1.02	732	0.82
422	1.51	526	1.24	630	1.02	734	0.82
424	1.50	528	1.24	632	1.01	736	0.82
426	1.50	530	1.23	634	1.01	738	0.81
428	1.49	532	1.23	636	1.00	740	0.81
430	1.48	534	1.22	638	1.00	742	0.80
432	1.48	536	1.22	640	1.00	744	0.79
434	1.47	538	1.21	642	0.99	746	0.78
436	1.47	540	1.21	644	0.99	748	0.77
438	1.46	542	1.20	646	0.98	750	0.77
440	1.46	544	1.20	648	0.98	752	0.76
442	1.45	546	1.20	650	0.98	754	0.76
444	1.45	548	1.19	652	0.97	756	0.76
446	1.44	550	1.19	654	0.97	758	0.75
448	1.43	552	1.18	656	0.96	760	0.75
450	1.43	554	1.18	658	0.96	762	0.75
452	1.42	556	1.17	660	0.96	764	0.74
454	1.42	558	1.17	662	0.95	766	0.74
456	1.41	560	1.16	664	0.95	768	0.73
458	1.41	562	1.16	666	0.95	770	0.73
460	1.40	564	1.15	668	0.94	772	0.73
462	1.40	566	1.15	670	0.93	774	0.72
464	1.39	568	1.15	672	0.93	776	0.72
466	1.38	570	1.14	674	0.93	778	0.71
468	1.38	572	1.14	676	0.92	780	0.71
470	1.37	574	1.13	678	0.92	782	0.71
472	1.37	576	1.13	680	0.92	784	0.70
474	1.36	578	1.12	682	0.91	786	0.70
476	1.36	580	1.12	684	0.91	788	0.70
478	1.35	582	1.11	686	0.91	790	0.69
480	1.35	584	1.11	688	0.90	792	0.69
482	1.34	586	1.11	690	0.90	794	0.68
484	1.34	588	1.10	692	0.90	796	0.68
486	1.33	590	1.10	694	0.89	798	0.68
488	1.33	592	1.09	696	0.89	800	0.67
490	1.32	594	1.09	698	0.88	802	0.67
492	1.32	596	1.08	700	0.88	804	0.67
494	1.31	598	1.08	702	0.88	806	0.67
496	1.31	600	1.08	704	0.87	808	0.66
498	1.31	602	1.07	706	0.87	810	0.66
500	1.31	604	1.07	708	0.87	812	0.66
502	1.30	606	1.06	710	0.86	814	0.65
504	1.30	608	1.06	712	0.86	816	0.65
506	1.29	610	1.05	714	0.86	818	0.64
508	1.29	612	1.05	716	0.85	820	0.64
510	1.28	614	1.05	718	0.85	822	0.64
512	1.28	616	1.05	720	0.84	824	0.64

Recovery Interval - 10

826	0.63	930	0.48	1034	0.32	1138	0.24
828	0.63	932	0.47	1036	0.32	1140	0.24
830	0.62	934	0.47	1038	0.32	1142	0.24
832	0.62	936	0.47	1040	0.32	1144	0.24
834	0.62	938	0.46	1042	0.31	1146	0.24
836	0.61	940	0.46	1044	0.31	1148	0.24
838	0.61	942	0.46	1046	0.31	1150	0.24
840	0.61	944	0.45	1048	0.31	1152	0.24
842	0.60	946	0.45	1050	0.30	1154	0.24
844	0.60	948	0.45	1052	0.30	1156	0.24
846	0.60	950	0.45	1054	0.30	1158	0.24
848	0.59	952	0.44	1056	0.29	1160	0.24
850	0.59	954	0.44	1058	0.29	1162	0.24
852	0.59	956	0.44	1060	0.29	1164	0.24
854	0.58	958	0.43	1062	0.29	1166	0.24
856	0.58	960	0.43	1064	0.28	1168	0.24
858	0.58	962	0.43	1066	0.28	1170	0.24
860	0.57	964	0.42	1068	0.28	1172	0.24
862	0.57	966	0.42	1070	0.28	1174	0.24
864	0.57	968	0.42	1072	0.27	1176	0.24
866	0.56	970	0.42	1074	0.27	1178	0.24
868	0.56	972	0.41	1076	0.27	1180	0.24
870	0.56	974	0.41	1078	0.27	1182	0.24
872	0.55	976	0.41	1080	0.27	1184	0.24
874	0.55	978	0.40	1082	0.27	1186	0.24
876	0.55	980	0.40	1084	0.27	1188	0.24
878	0.54	982	0.40	1086	0.26	1190	0.24
880	0.54	984	0.40	1088	0.26	1192	0.24
882	0.54	986	0.39	1090	0.26	1194	0.24
884	0.53	988	0.39	1092	0.26	1196	0.24
886	0.53	990	0.39	1094	0.25	1198	0.24
888	0.53	992	0.38	1096	0.25	1200	0.23
890	0.53	994	0.38	1098	0.25	1202	0.24
892	0.53	996	0.38	1100	0.25	1204	0.23
894	0.53	998	0.38	1102	0.25	1206	0.23
896	0.53	1000	0.37	1104	0.25	1208	0.24
898	0.52	1002	0.37	1106	0.25	1210	0.23
900	0.52	1004	0.37	1108	0.25	1212	0.23
902	0.52	1006	0.36	1110	0.25	1214	0.23
904	0.51	1008	0.36	1112	0.25	1216	0.23
906	0.51	1010	0.36	1114	0.25	1218	0.23
908	0.51	1012	0.36	1116	0.25	1220	0.23
910	0.51	1014	0.35	1118	0.25	1222	0.23
912	0.50	1016	0.35	1120	0.25	1224	0.23
914	0.50	1018	0.35	1122	0.25	1226	0.23
916	0.50	1020	0.34	1124	0.25	1228	0.23
918	0.49	1022	0.34	1126	0.25	1230	0.23
920	0.49	1024	0.34	1128	0.24	1232	0.23
922	0.49	1026	0.34	1130	0.24	1234	0.23
924	0.49	1028	0.33	1132	0.24	1236	0.23
926	0.48	1030	0.33	1134	0.25	1238	0.23
928	0.48	1032	0.33	1136	0.24	1240	0.23

Recovery Interval - 11

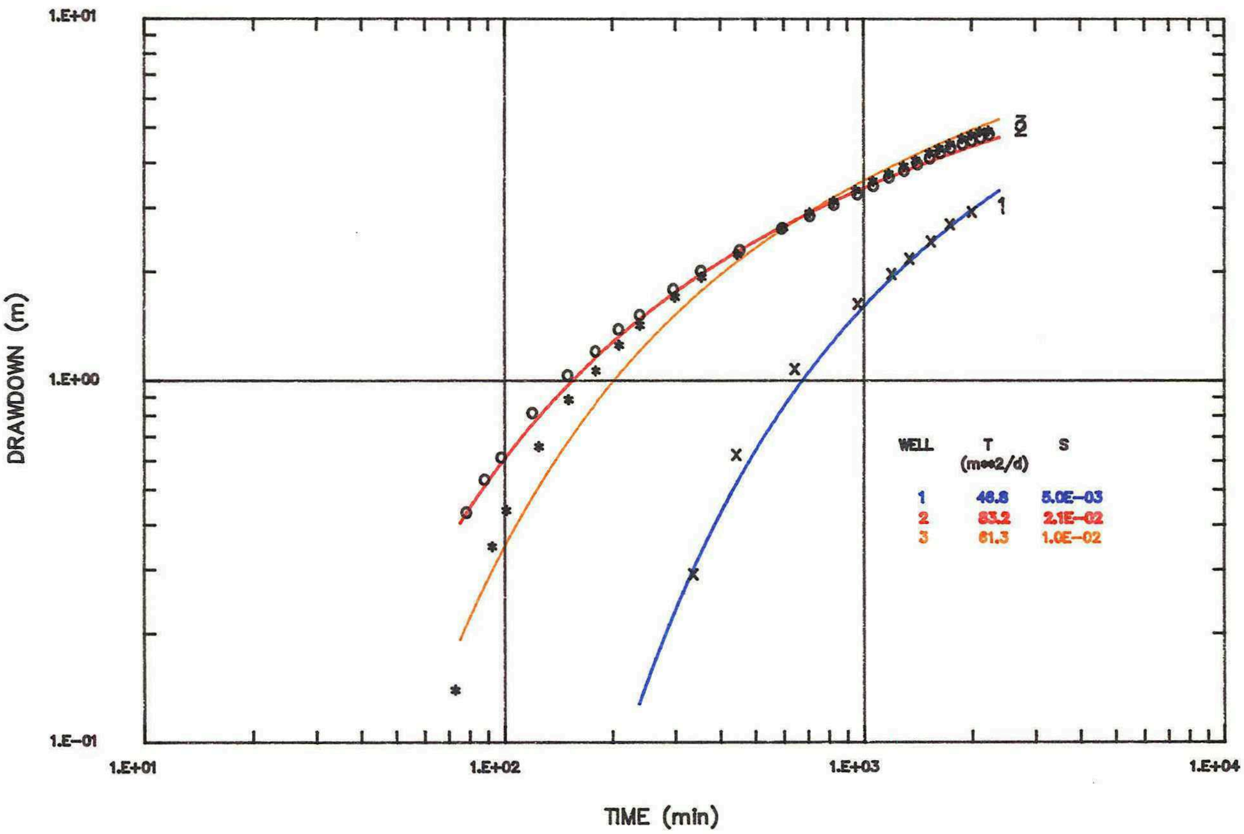
1242	0.23	1346	0.22	1450	0.21	1554	0.21
1244	0.23	1348	0.22	1452	0.21	1556	0.21
1246	0.23	1350	0.22	1454	0.21	1558	0.21
1248	0.23	1352	0.22	1456	0.21	1560	0.21
1250	0.23	1354	0.22	1458	0.21	1562	0.21
1252	0.23	1356	0.22	1460	0.21	1564	0.21
1254	0.23	1358	0.22	1462	0.21	1566	0.21
1256	0.23	1360	0.22	1464	0.21	1568	0.21
1258	0.23	1362	0.22	1466	0.21	1570	0.21
1260	0.23	1364	0.22	1468	0.21	1572	0.21
1262	0.22	1366	0.21	1470	0.21	1574	0.21
1264	0.23	1368	0.22	1472	0.21	1576	0.21
1266	0.22	1370	0.22	1474	0.21	1578	0.21
1268	0.22	1372	0.22	1476	0.21	1580	0.21
1270	0.22	1374	0.21	1478	0.21	1582	0.21
1272	0.22	1376	0.21	1480	0.21	1584	0.21
1274	0.22	1378	0.21	1482	0.21	1586	0.21
1276	0.22	1380	0.21	1484	0.21	1588	0.21
1278	0.22	1382	0.21	1486	0.21	1590	0.21
1280	0.22	1384	0.21	1488	0.21	1592	0.21
1282	0.22	1386	0.21	1490	0.21	1594	0.21
1284	0.22	1388	0.21	1492	0.21	1596	0.21
1286	0.22	1390	0.21	1494	0.21	1598	0.21
1288	0.22	1392	0.21	1496	0.21	1600	0.21
1290	0.22	1394	0.21	1498	0.21	1602	0.21
1292	0.22	1396	0.21	1500	0.21	1604	0.21
1294	0.22	1398	0.21	1502	0.21	1606	0.21
1296	0.22	1400	0.21	1504	0.21	1608	0.21
1298	0.22	1402	0.21	1506	0.21	1610	0.21
1300	0.22	1404	0.21	1508	0.21	1612	0.21
1302	0.22	1406	0.21	1510	0.21	1614	0.21
1304	0.22	1408	0.21	1512	0.21	1616	0.21
1306	0.22	1410	0.21	1514	0.21	1618	0.21
1308	0.22	1412	0.21	1516	0.21	1620	0.21
1310	0.22	1414	0.21	1518	0.21	1622	0.21
1312	0.22	1416	0.21	1520	0.21	1624	0.21
1314	0.22	1418	0.21	1522	0.21	1626	0.21
1316	0.22	1420	0.21	1524	0.21	1628	0.21
1318	0.22	1422	0.21	1526	0.21	1630	0.21
1320	0.22	1424	0.21	1528	0.21	1632	0.21
1322	0.22	1426	0.21	1530	0.21	1634	0.21
1324	0.22	1428	0.21	1532	0.21	1636	0.21
1326	0.22	1430	0.21	1534	0.21	1638	0.21
1328	0.22	1432	0.21	1536	0.21	1640	0.21
1330	0.22	1434	0.21	1538	0.21	1642	0.22
1332	0.22	1436	0.21	1540	0.21	1644	0.22
1334	0.22	1438	0.21	1542	0.21	1646	0.21
1336	0.22	1440	0.21	1544	0.21	1648	0.22
1338	0.22	1442	0.21	1546	0.21	1650	0.22
1340	0.22	1444	0.21	1548	0.21	1652	0.22
1342	0.22	1446	0.21	1550	0.21	1654	0.22
1344	0.22	1448	0.21	1552	0.21	1656	0.22

Recovery Interval - 12

1658	0.22
1660	0.22
1662	0.22
1664	0.22
1666	0.22
1668	0.22
1670	0.22
1672	0.22
1674	0.22
1676	0.22
1678	0.22
1680	0.22
1682	0.22
1684	0.22
1686	0.22
1688	0.22
1690	0.22
1692	0.22
1694	0.22
1696	0.22
1698	0.22
1700	0.22
1702	0.22
1704	0.22
1706	0.22
1708	0.22
1710	0.22
1712	0.22
1714	0.22
1716	0.22
1718	0.22
1720	0.22
1722	0.22
1724	0.22
1726	0.22
1728	0.22
1730	0.22
1732	0.22
1734	0.22
1736	0.22
1738	0.22
1740	0.22
1742	0.22
1744	0.22
1746	0.22
1748	0.22
1750	0.22
1752	0.22
1754	0.22
1756	0.22
1758	0.22
1760	0.22
1762	0.22
1764	0.22
1766	0.22
1768	0.22
1770	0.22
1772	0.22
1774	0.22
1776	0.22
1778	0.22
1780	0.22
1782	0.22
1784	0.22
1786	0.22
1788	0.22
1790	0.22
1792	0.22
1794	0.22
1796	0.22
1798	0.22
1800	0.22
1802	0.22
1804	0.22
1806	0.22
1808	0.22
1810	0.22
1812	0.22
1814	0.22
1816	0.22
1818	0.22
1820	0.22
1822	0.22
1824	0.22
1826	0.22
1828	0.22
1830	0.22
1832	0.22
1834	0.22
1836	0.22
1838	0.22
1840	0.22
1842	0.22
1844	0.22
1846	0.22
1848	0.22
1850	0.22
1852	0.22
1854	0.22
1856	0.22
1858	0.22
1860	0.22

Piezometers GPH-89-01, 89-02 and 89-03 Used as Observation Water Wells During Pumping of Dewatering Water Well GDW-89-01

Theis Curve Matching

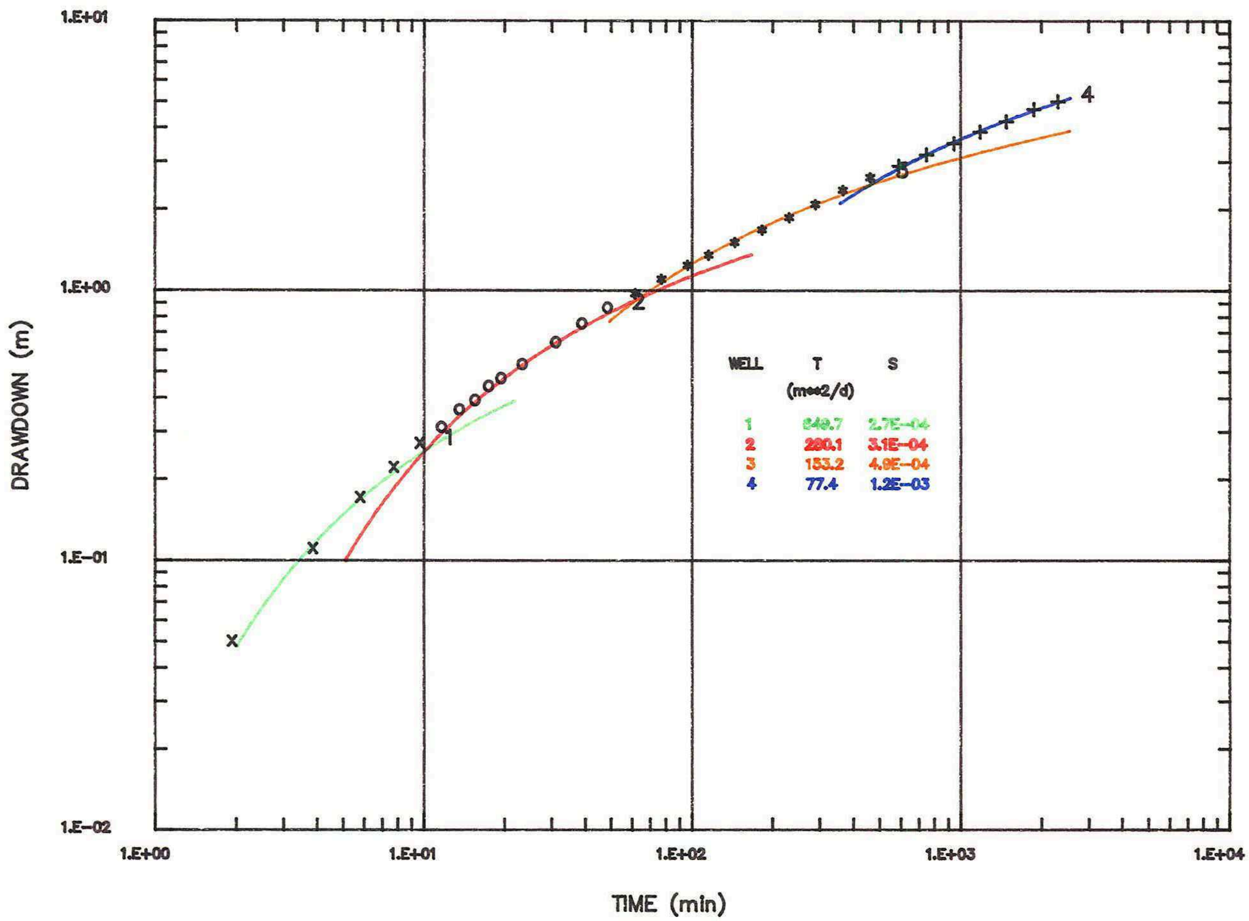


Curragh Resources Limited Grum Pit 1989 Dewatering Assessment	
Log-Log Plot GPH 89-01, 89-02 & 89-03	
June, 1989	Appendix A.

hydrogeological Consultants ltd.

Piezometer No. GPH-89-01
Used as an Observation WW During Pumping of
Dewatering Water Well GDW-89-01

Theis Curve Matching



Curragh Resources Limited

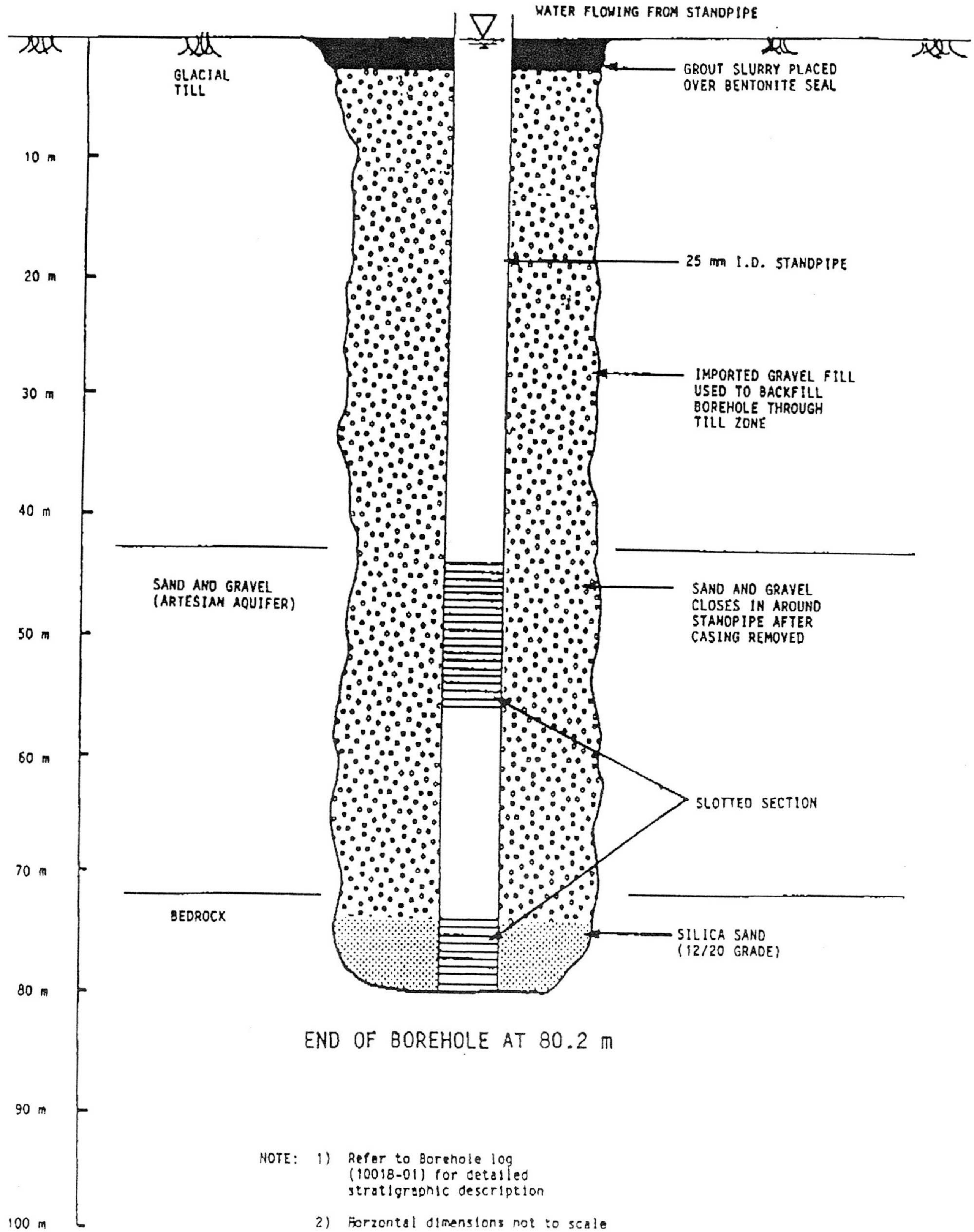
Grum Pit

1989 Dewatering Assessment

Log-Log Plot
Piezometer GPH-89-01 as Obs WW

June, 1989 Appendix A.

hydrogeological consultants ltd.



EBA Engineering Consultants Ltd.	PROJECT GRUM MINE SITE - FARO, YUKON
CLIENT CURRAGH RESOURCES INC.	TITLE PIEZOMETER GPH-89-01 INSTALLATION DETAILS
DATE 89/05/16 DWN WAS CHKD [signature]	DWG NO. 0201-10018

Curragh Resources Limited
Grum Pit
1989 Dewatering Assessment
GPH-89-01

Used as an Observation Water Well During Aquifer Test I
with GDW-89-01
Aquifer Test I Distance= 112.8 metres

Non-Pumping Water Level: flowing
Date Test Started: 89/05/24
Pumping Interval: 2336 min.
Depth of Piezometer: 80.2 m

Depth Casing Set: not sealed

Average Test Rate: 1134.6 lpm
Time Test Started: 12:30 Hrs
Recovery Interval: 1860 min
Depth to Top of Main Aquifer: 42 m
Depth to Pump Intake: n/a

Comments:

Pumping from the dewatering well began at 12:30 Hrs on May 24, 1989. Recovery began at 03:26 Hrs on May 26, 1989. Water levels were measured using a pressure transducer connected to input channel 2 on data logger 312. These levels differed from manually measured water levels by 1.96 metres.

Flow from the piezometer stopped between 250- and 345-minute reading when the data logger registered 1.96 metres of drawdown.

Pumping Interval - 2

t (min)	Drawdown (metres)
2	0.05
4	0.11
6	0.17
8	0.22
10	0.27
12	0.31
14	0.36
16	0.39
18	0.44
20	0.47
22	0.51
24	0.53
26	0.56
28	0.59
30	0.62
32	0.64
34	0.67
36	0.69
38	0.72
40	0.75
42	0.76
44	0.80
46	0.80
48	0.84
50	0.86
52	0.88
54	0.89
56	0.91
58	0.93
60	0.95
62	0.97
64	0.98
66	1.00
68	1.02
70	1.03
72	1.05
74	1.06
76	1.07
78	1.09
80	1.11
82	1.13
84	1.15
86	1.16
88	1.17
90	1.17
92	1.18
94	1.20
96	1.22
98	1.24
100	1.25
102	1.25
104	1.26
106	1.28
108	1.31
110	1.31
112	1.32
114	1.33
116	1.34
118	1.35
120	1.36
122	1.37
124	1.39
126	1.40
128	1.42
130	1.42
132	1.44
134	1.45
136	1.46
138	1.48
140	1.47
142	1.49
144	1.49
146	1.50
148	1.51
150	1.52
152	1.53
154	1.55
156	1.58
158	1.57
160	1.59
162	1.60
164	1.60
166	1.59
168	1.61
170	1.63
172	1.63
174	1.64
176	1.65
178	1.65
180	1.67
182	1.67
184	1.67
186	1.66
188	1.67
190	1.69
192	1.70
194	1.71
196	1.72
198	1.72
200	1.73
202	1.74
204	1.75
206	1.75
208	1.76
210	1.77
212	1.78
214	1.79
216	1.79
218	1.80
220	1.81
222	1.82
224	1.82
226	1.83
228	1.84
230	1.84
232	1.85
234	1.86
236	1.86
238	1.87
240	1.88
242	1.89
244	1.90
246	1.90
248	1.91
250	1.91
252	1.92
254	1.93
256	1.93
258	1.94
260	1.95
262	1.95
264	1.96
266	1.96
268	1.96
270	1.97
272	1.98
274	1.99
276	2.00
278	2.01
280	2.01
282	2.02
284	2.03
286	2.04
288	2.05
290	2.06
292	2.06
294	2.08
296	2.08
298	2.09
300	2.10
302	2.11
304	2.12
306	2.12
308	2.13
310	2.13
312	2.14
314	2.14
316	2.15
318	2.16
320	2.17
322	2.18
324	2.18
326	2.19
328	2.20
330	2.21
332	2.21
334	2.22
336	2.23
338	2.24
340	2.24
342	2.24
344	2.25
346	2.26
348	2.27
350	2.27
352	2.28
354	2.28
356	2.29
358	2.30
360	2.30
362	2.31
364	2.32
366	2.33
368	2.33
370	2.34
372	2.35
374	2.35
376	2.36
378	2.36
380	2.37
382	2.38
384	2.38
386	2.39
388	2.40
390	2.40
392	2.41
394	2.42
396	2.41
398	2.41
400	2.43
402	2.43
404	2.44
406	2.45
408	2.45
410	2.45
412	2.46
414	2.47
416	2.47
418	2.48
420	2.48
422	2.49
424	2.50
426	2.50

Pumping Interval - 3

428	2.51	536	2.78	644	3.00	752	3.19
430	2.51	538	2.78	646	3.01	754	3.20
432	2.52	540	2.79	648	3.01	756	3.20
434	2.52	542	2.79	650	3.01	758	3.21
436	2.53	544	2.79	652	3.02	760	3.21
438	2.54	546	2.80	654	3.02	762	3.21
440	2.54	548	2.80	656	3.03	764	3.22
442	2.55	550	2.81	658	3.03	766	3.22
444	2.55	552	2.81	660	3.03	768	3.22
446	2.56	554	2.81	662	3.04	770	3.23
448	2.56	556	2.82	664	3.04	772	3.23
450	2.56	558	2.82	666	3.05	774	3.23
452	2.57	560	2.83	668	3.05	776	3.24
454	2.57	562	2.83	670	3.05	778	3.24
456	2.58	564	2.83	672	3.06	780	3.24
458	2.58	566	2.84	674	3.06	782	3.25
460	2.59	568	2.84	676	3.06	784	3.25
462	2.60	570	2.85	678	3.07	786	3.25
464	2.61	572	2.85	680	3.07	788	3.25
466	2.61	574	2.86	682	3.08	790	3.26
468	2.62	576	2.86	684	3.08	792	3.26
470	2.62	578	2.86	686	3.08	794	3.26
472	2.63	580	2.87	688	3.09	796	3.27
474	2.63	582	2.87	690	3.09	798	3.27
476	2.63	584	2.88	692	3.10	800	3.27
478	2.64	586	2.88	694	3.10	802	3.28
480	2.64	588	2.89	696	3.10	804	3.28
482	2.65	590	2.89	698	3.11	806	3.28
484	2.65	592	2.89	700	3.11	808	3.29
486	2.66	594	2.90	702	3.11	810	3.29
488	2.66	596	2.90	704	3.11	812	3.29
490	2.67	598	2.91	706	3.11	814	3.30
492	2.68	600	2.91	708	3.12	816	3.30
494	2.68	602	2.91	710	3.12	818	3.30
496	2.69	604	2.92	712	3.12	820	3.31
498	2.69	606	2.92	714	3.13	822	3.31
500	2.69	608	2.93	716	3.13	824	3.31
502	2.70	610	2.93	718	3.13	826	3.32
504	2.70	612	2.93	720	3.14	828	3.32
506	2.70	614	2.94	722	3.14	830	3.33
508	2.70	616	2.94	724	3.15	832	3.33
510	2.71	618	2.95	726	3.15	834	3.33
512	2.71	620	2.95	728	3.15	836	3.34
514	2.72	622	2.96	730	3.16	838	3.34
516	2.73	624	2.96	732	3.16	840	3.34
518	2.73	626	2.97	734	3.16	842	3.34
520	2.74	628	2.97	736	3.17	844	3.35
522	2.74	630	2.97	738	3.17	846	3.35
524	2.75	632	2.97	740	3.17	848	3.36
526	2.76	634	2.98	742	3.18	850	3.36
528	2.76	636	2.98	744	3.18	852	3.36
530	2.76	638	2.99	746	3.18	854	3.36
532	2.77	640	2.99	748	3.19	856	3.37
534	2.77	642	3.00	750	3.19	858	3.37

Pumping Interval - 4

860	3.37	968	3.54	1076	3.71	1184	3.87
862	3.38	970	3.55	1078	3.71	1186	3.87
864	3.38	972	3.55	1080	3.72	1188	3.88
866	3.38	974	3.55	1082	3.72	1190	3.88
868	3.39	976	3.55	1084	3.72	1192	3.89
870	3.39	978	3.56	1086	3.73	1194	3.88
872	3.39	980	3.56	1088	3.73	1196	3.89
874	3.39	982	3.56	1090	3.73	1198	3.90
876	3.40	984	3.57	1092	3.73	1200	3.90
878	3.40	986	3.57	1094	3.74	1202	3.90
880	3.40	988	3.57	1096	3.74	1204	3.91
882	3.40	990	3.58	1098	3.74	1206	3.91
884	3.41	992	3.58	1100	3.75	1208	3.91
886	3.41	994	3.58	1102	3.75	1210	3.91
888	3.42	996	3.59	1104	3.75	1212	3.92
890	3.42	998	3.59	1106	3.76	1214	3.92
892	3.42	1000	3.59	1108	3.76	1216	3.91
894	3.43	1002	3.60	1110	3.76	1218	3.92
896	3.43	1004	3.60	1112	3.77	1220	3.93
898	3.43	1006	3.60	1114	3.77	1222	3.93
900	3.44	1008	3.60	1116	3.77	1224	3.93
902	3.44	1010	3.61	1118	3.77	1226	3.93
904	3.44	1012	3.61	1120	3.78	1228	3.93
906	3.45	1014	3.62	1122	3.78	1230	3.93
908	3.45	1016	3.62	1124	3.78	1232	3.93
910	3.45	1018	3.62	1126	3.79	1234	3.94
912	3.46	1020	3.62	1128	3.79	1236	3.94
914	3.46	1022	3.63	1130	3.79	1238	3.95
916	3.46	1024	3.63	1132	3.80	1240	3.96
918	3.47	1026	3.63	1134	3.80	1242	3.95
920	3.47	1028	3.64	1136	3.80	1244	3.96
922	3.47	1030	3.64	1138	3.80	1246	3.96
924	3.48	1032	3.65	1140	3.81	1248	3.96
926	3.48	1034	3.65	1142	3.81	1250	3.96
928	3.48	1036	3.65	1144	3.81	1252	3.98
930	3.49	1038	3.65	1146	3.82	1254	3.98
932	3.49	1040	3.66	1148	3.83	1256	3.98
934	3.49	1042	3.66	1150	3.83	1258	3.98
936	3.49	1044	3.66	1152	3.83	1260	3.97
938	3.50	1046	3.66	1154	3.83	1262	3.97
940	3.50	1048	3.67	1156	3.83	1264	3.98
942	3.50	1050	3.67	1158	3.84	1266	3.99
944	3.51	1052	3.67	1160	3.84	1268	3.99
946	3.51	1054	3.68	1162	3.84	1270	3.99
948	3.51	1056	3.68	1164	3.84	1272	4.00
950	3.52	1058	3.68	1166	3.84	1274	4.00
952	3.52	1060	3.69	1168	3.85	1276	4.00
954	3.52	1062	3.69	1170	3.85	1278	4.00
956	3.52	1064	3.69	1172	3.85	1280	4.02
958	3.53	1066	3.69	1174	3.86	1282	4.01
960	3.53	1068	3.70	1176	3.87	1284	4.00
962	3.53	1070	3.70	1178	3.87	1286	4.01
964	3.54	1072	3.71	1180	3.85	1288	4.01
966	3.54	1074	3.71	1182	3.86	1290	4.02

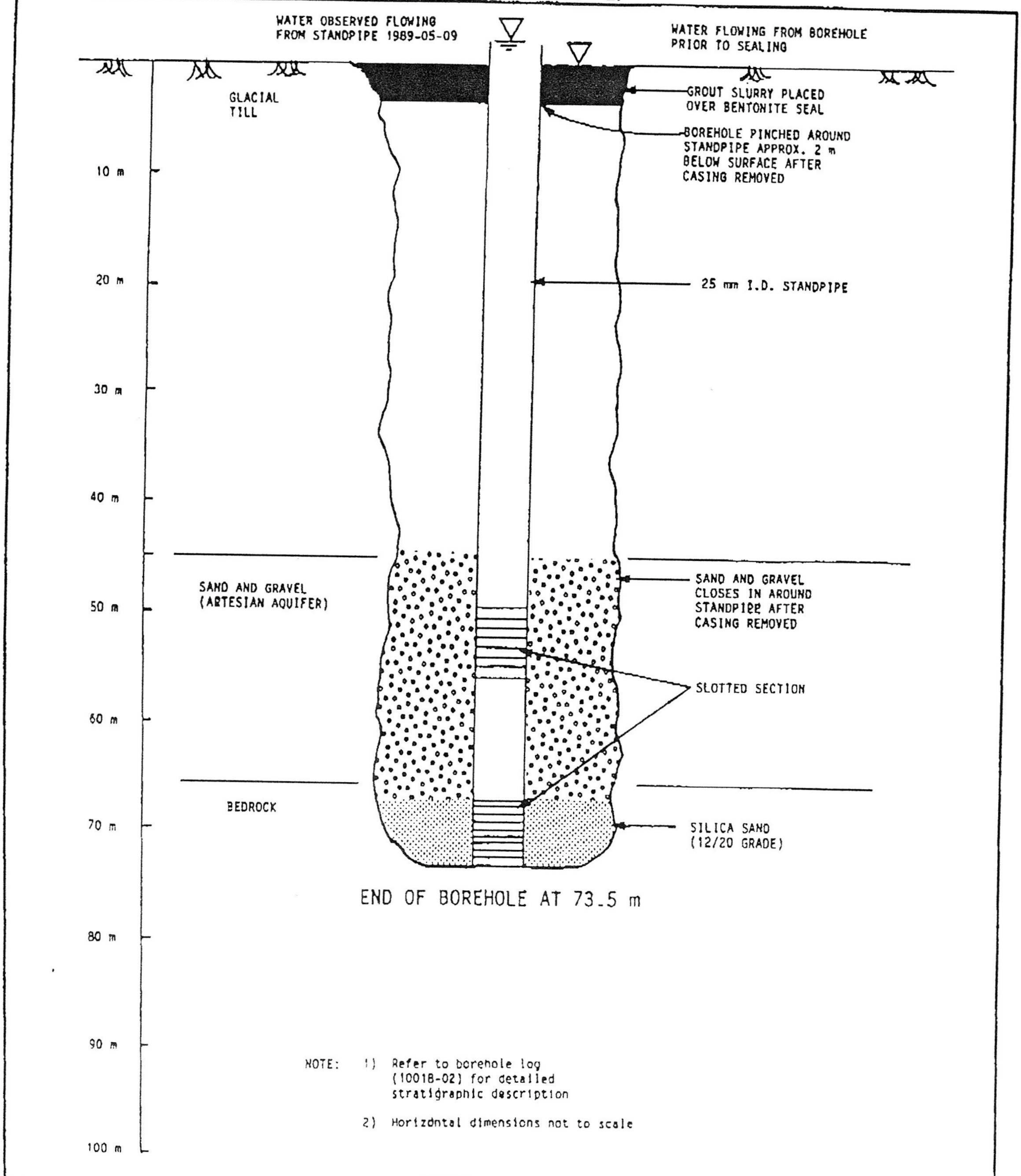
Pumping Interval - 5

1292	4.02	1400	4.16	1508	4.29	1616	4.43
1294	4.02	1402	4.16	1510	4.29	1618	4.43
1296	4.03	1404	4.17	1512	4.30	1620	4.44
1298	4.03	1406	4.17	1514	4.31	1622	4.44
1300	4.03	1408	4.17	1516	4.31	1624	4.44
1302	4.04	1410	4.18	1518	4.31	1626	4.46
1304	4.04	1412	4.18	1520	4.31	1628	4.46
1306	4.04	1414	4.18	1522	4.30	1630	4.44
1308	4.04	1416	4.18	1524	4.32	1632	4.44
1310	4.04	1418	4.18	1526	4.32	1634	4.44
1312	4.05	1420	4.19	1528	4.32	1636	4.45
1314	4.06	1422	4.19	1530	4.33	1638	4.46
1316	4.05	1424	4.19	1532	4.33	1640	4.46
1318	4.05	1426	4.19	1534	4.33	1642	4.46
1320	4.06	1428	4.20	1536	4.33	1644	4.46
1322	4.06	1430	4.20	1538	4.34	1646	4.47
1324	4.07	1432	4.19	1540	4.34	1648	4.47
1326	4.06	1434	4.20	1542	4.35	1650	4.47
1328	4.07	1436	4.20	1544	4.35	1652	4.47
1330	4.07	1438	4.21	1546	4.35	1654	4.48
1332	4.07	1440	4.22	1548	4.37	1656	4.48
1334	4.08	1442	4.21	1550	4.36	1658	4.49
1336	4.08	1444	4.21	1552	4.36	1660	4.49
1338	4.08	1446	4.24	1554	4.36	1662	4.50
1340	4.08	1448	4.23	1556	4.36	1664	4.51
1342	4.09	1450	4.23	1558	4.37	1666	4.51
1344	4.09	1452	4.22	1560	4.37	1668	4.52
1346	4.09	1454	4.24	1562	4.37	1670	4.52
1348	4.09	1456	4.26	1564	4.37	1672	4.50
1350	4.09	1458	4.23	1566	4.37	1674	4.49
1352	4.10	1460	4.23	1568	4.37	1676	4.50
1354	4.10	1462	4.26	1570	4.38	1678	4.50
1356	4.10	1464	4.26	1572	4.39	1680	4.51
1358	4.10	1466	4.24	1574	4.38	1682	4.51
1360	4.11	1468	4.24	1576	4.36	1684	4.49
1362	4.11	1470	4.24	1578	4.36	1686	4.51
1364	4.11	1472	4.25	1580	4.40	1688	4.51
1366	4.12	1474	4.25	1582	4.42	1690	4.51
1368	4.12	1476	4.25	1584	4.40	1692	4.52
1370	4.12	1478	4.27	1586	4.41	1694	4.52
1372	4.12	1480	4.27	1588	4.39	1696	4.52
1374	4.13	1482	4.27	1590	4.39	1698	4.52
1376	4.13	1484	4.27	1592	4.41	1700	4.53
1378	4.13	1486	4.26	1594	4.43	1702	4.53
1380	4.13	1488	4.29	1596	4.43	1704	4.53
1382	4.14	1490	4.28	1598	4.41	1706	4.54
1384	4.14	1492	4.28	1600	4.42	1708	4.54
1386	4.14	1494	4.28	1602	4.43	1710	4.54
1388	4.15	1496	4.28	1604	4.40	1712	4.54
1390	4.15	1498	4.30	1606	4.43	1714	4.54
1392	4.15	1500	4.26	1608	4.42	1716	4.54
1394	4.15	1502	4.27	1610	4.42	1718	4.55
1396	4.16	1504	4.29	1612	4.40	1720	4.55
1398	4.16	1506	4.29	1614	4.41	1722	4.55

Pumping Interval - 6

1724	4.55	1832	4.67	1940	4.76	2048	4.86
1726	4.56	1834	4.67	1942	4.76	2050	4.86
1728	4.55	1836	4.67	1944	4.77	2052	4.86
1730	4.55	1838	4.67	1946	4.77	2054	4.86
1732	4.56	1840	4.67	1948	4.77	2056	4.87
1734	4.56	1842	4.68	1950	4.77	2058	4.87
1736	4.57	1844	4.68	1952	4.77	2060	4.87
1738	4.57	1846	4.68	1954	4.77	2062	4.87
1740	4.57	1848	4.68	1956	4.78	2064	4.87
1742	4.57	1850	4.68	1958	4.78	2066	4.87
1744	4.57	1852	4.69	1960	4.78	2068	4.87
1746	4.58	1854	4.69	1962	4.78	2070	4.88
1748	4.58	1856	4.69	1964	4.78	2072	4.88
1750	4.58	1858	4.69	1966	4.78	2074	4.88
1752	4.59	1860	4.70	1968	4.79	2076	4.88
1754	4.59	1862	4.70	1970	4.79	2078	4.88
1756	4.59	1864	4.70	1972	4.79	2080	4.89
1758	4.59	1866	4.70	1974	4.79	2082	4.89
1760	4.60	1868	4.70	1976	4.79	2084	4.89
1762	4.60	1870	4.70	1978	4.80	2086	4.89
1764	4.60	1872	4.70	1980	4.80	2088	4.89
1766	4.60	1874	4.71	1982	4.80	2090	4.89
1768	4.60	1876	4.72	1984	4.80	2092	4.90
1770	4.60	1878	4.72	1986	4.80	2094	4.90
1772	4.62	1880	4.71	1988	4.80	2096	4.90
1774	4.62	1882	4.72	1990	4.81	2098	4.90
1776	4.62	1884	4.71	1992	4.81	2100	4.91
1778	4.63	1886	4.72	1994	4.81	2102	4.91
1780	4.63	1888	4.72	1996	4.81	2104	4.91
1782	4.63	1890	4.72	1998	4.81	2106	4.91
1784	4.63	1892	4.72	2000	4.81	2108	4.91
1786	4.63	1894	4.73	2002	4.81	2110	4.91
1788	4.63	1896	4.73	2004	4.82	2112	4.91
1790	4.63	1898	4.73	2006	4.82	2114	4.91
1792	4.63	1900	4.73	2008	4.82	2116	4.92
1794	4.63	1902	4.73	2010	4.83	2118	4.92
1796	4.63	1904	4.74	2012	4.83	2120	4.92
1798	4.63	1906	4.74	2014	4.83	2122	4.92
1800	4.63	1908	4.74	2016	4.83	2124	4.92
1802	4.64	1910	4.74	2018	4.83	2126	4.92
1804	4.64	1912	4.74	2020	4.83	2128	4.92
1806	4.64	1914	4.74	2022	4.83	2130	4.93
1808	4.64	1916	4.75	2024	4.84	2132	4.93
1810	4.64	1918	4.75	2026	4.84	2134	4.93
1812	4.65	1920	4.75	2028	4.84	2136	4.93
1814	4.65	1922	4.75	2030	4.84	2138	4.93
1816	4.65	1924	4.75	2032	4.84	2140	4.94
1818	4.65	1926	4.76	2034	4.85	2142	4.94
1820	4.66	1928	4.76	2036	4.85	2144	4.94
1822	4.66	1930	4.76	2038	4.85	2146	4.94
1824	4.66	1932	4.76	2040	4.85	2148	4.94
1826	4.66	1934	4.76	2042	4.85	2150	4.94
1828	4.66	1936	4.76	2044	4.85	2152	4.94
1830	4.66	1938	4.76	2046	4.86	2154	4.95

2156	4.95	2264	5.04
2158	4.95	2266	5.04
2160	4.95	2268	5.04
2162	4.95	2270	5.04
2164	4.95	2272	5.04
2166	4.96	2274	5.04
2168	4.96	2276	5.04
2170	4.96	2278	5.04
2172	4.96	2280	5.05
2174	4.96	2282	5.05
2176	4.96	2284	5.05
2178	4.97	2286	5.05
2180	4.97	2288	5.05
2182	4.97	2290	5.05
2184	4.97	2292	5.05
2186	4.97	2294	5.06
2188	4.97	2296	5.06
2190	4.97	2298	5.06
2192	4.98	2300	5.06
2194	4.98	2302	5.06
2196	4.98	2304	5.07
2198	4.98	2306	5.07
2200	4.98	2308	5.07
2202	4.98	2310	5.07
2204	4.98	2312	5.07
2206	4.98	2314	5.08
2208	4.99	2316	5.08
2210	4.99	2318	5.08
2212	4.99	2320	5.08
2214	4.99	2322	5.08
2216	4.99	2324	5.09
2218	5.00	2326	5.08
2220	5.00	2328	5.08
2222	5.00	2330	5.08
2224	5.00	2332	5.08
2226	5.00	2334	5.08
2228	5.01	2336	5.05
2230	5.01		
2232	5.01		
2234	5.01		
2236	5.01		
2238	5.01		
2240	5.01		
2242	5.02		
2244	5.02		
2246	5.02		
2248	5.02		
2250	5.02		
2252	5.02		
2254	5.03		
2256	5.03		
2258	5.03		
2260	5.03		
2262	5.03		



EBA Engineering Consultants Ltd.	PROJECT GRUM MINE SITE - FARO, YUKON
CLIENT CURRAGH RESOURCES INC.	TITLE PIEZOMETER GPH-89-02 INSTALLATION DETAILS
DATE 89/05/16 DWN WAS CHKD [signature]	DWG NO. 0201-10018

Curragh Resources Limited
Grum Pit
1989 Dewatering Assessment
GPH-89-02

Used as an Observation Water Well During Aquifer Test I
with GDW-89-01
Aquifer Test I Distance= 27.3 metres

Non-Pumping Water Level: flowing
Date Test Started: 89/05/24
Pumping Interval: 2336 min.
Depth of Piezometer: 73.5 m

Depth Casing Set: not sealed

Average Test Rate: 1134.6 lpm
Time Test Started: 12:30 Hrs
Recovery Interval: 1860 min
Depth to Top of
Main Aquifer: 45 m
Depth to Pump Intake: n/a

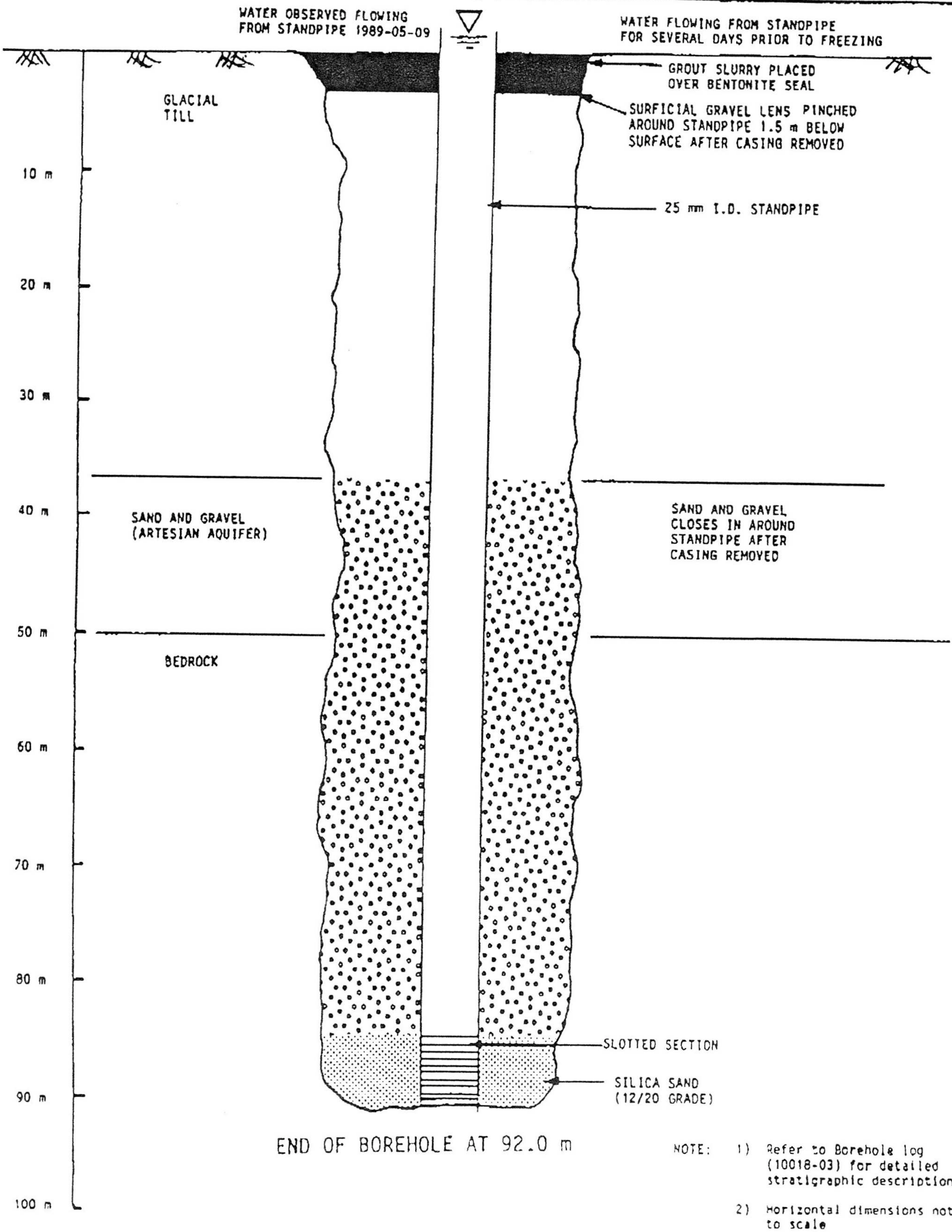
Comments:

Pumping from the dewatering well began at 12:30 Hrs on May 24, 1989. Recovery began at 03:26 Hrs on May 26, 1989. Water levels were manually measured.

Flow from the piezometer stopped between 30- and 80-minute reading.

Pumping Interval - 2

t (min)	Drawdown (metres)
80	0.43
90	0.53
100	0.61
122	0.81
153	1.03
183	1.20
213	1.38
244	1.51
303	1.78
362	2.00
464	2.28
607	2.62
725	2.84
846	3.05
983	3.26
1087	3.44
1203	3.63
1324	3.79
1443	3.95
1563	4.10
1670	4.24
1788	4.37
1926	4.48
2044	4.58
2163	4.67
2284	4.77



NOTE: 1) Refer to Borehole log (10018-03) for detailed stratigraphic description

2) Horizontal dimensions not to scale

EBA Engineering Consultants Ltd.	PROJECT GRUM MINE SITE - FARO, YUKON
CLIENT CURRAGH RESOURCES INC.	TITLE PIEZOMETER GPH-89-03 INSTALLATION DETAILS
DATE 89/05/16 · DWN WAS · CHKD [signature]	DWG NO. 0201-10018

Curragh Resources Limited
Grum Pit
1989 Dewatering Assessment
GPH-89-03

Used as an Observation Water Well During Aquifer Test I
with GDW-89-01
Aquifer Test I Distance = 43.8 metres

Non-Pumping Water Level: flowing
Date Test Started: 89/05/24
Pumping Interval: 2336 min.
Depth of Piezometer: 92.0 m

Depth Casing Set: not sealed

Average Test Rate: 1134.6 lpm
Time Test Started: 12:30 Hrs
Recovery Interval: 1860 min
Depth to Top of
Main Aquifer: 38 m
Depth to Pump Intake: n/a

Comments:

Pumping from the dewatering well began at 12:30 Hrs on May 24, 1989. Recovery began at 03:26 Hrs on May 26, 1989. Water levels were manually measured.

Flow from the piezometer stopped between 30- and 75-minute reading.

Pumping Interval - 2

t (min)	Drawdown (metres)
75	0.14
95	0.35
104	0.44
128	0.66
155	0.89
185	1.07
215	1.26
246	1.43
308	1.71
366	1.94
459	2.24
616	2.66
728	2.92
849	3.14
976	3.37
1090	3.57
1207	3.75
1327	3.93
1435	4.08
1566	4.27
1665	4.39
1785	4.53
1931	4.68
2048	4.79
2166	4.89
2286	4.92