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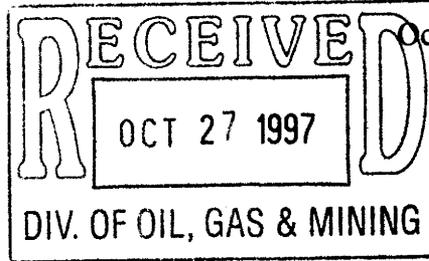
CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528



Office (801) 687-2450
FAX (801) 687-5238
Coal Sales (801) 687-5777

Coal Program
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801



October 23, 1997

To Whom It May Concern,

*Copy Mary Ann, Ken
Sharon, [unclear] Ann*

Re: Water Monitoring Data Review, Birch Springs, Bear Canyon Mine, ACT 015025, #2
Emery County, Utah

On September 18, 1997, Co-Op Mining Company received a letter in accordance with Technical Directive 005 regarding recent flows in Birch Spring.

According to the letter, the Division has flow rates starting at 1985, which shows very little seasonal fluctuations with flow at about 80 gallons per minute, through mid 1988. These flows have been enclosed with this letter to be included in the file. The source of these flows are from the Star Point Mine M&RP. According to Ben Grimes, these flows were obtained from the North Emery Water Users Association. Co-Op contacted NEWUA, however, and they had no record of these flows in their books. A table has also been included summarizing the flows which their records did show. Co-Op would like to note that the flows which NEWUA did have during the 80's do not match the Star Point flow rates. Co-Op is concerned with the accuracy of the flow rates available prior to the installation of the flow meter on Birch Spring in 1991. Of significant note is a flow taken by NEWUA in December of 1986 which showed the Spring flowing at 30 gpm. The Starpoint data shows it flowing at 87 gpm during the same period of time. In addition, the methods of flow measurement and accuracy of measurement are not known for the Starpoint data. The flows obtained from NEWUA were measured using the amount of time it took to fill a bucket. These flows also show more fluctuation than the Starpoint data during this period. Additional flows were taken from Birch Spring in 1978 and 1979 by the USGS. These flows ranged from a low of 9.3 gpm to a high of 23 gpm. This is similar to the current flows being measured in Birch Spring.

The post-1991 flow data, however, appears to indicate a possible decline. Following is a discussion of the investigations Co-Op has undertaken to try to account for any decline in the flows.

As Co-Op demonstrated and the Board of Oil, Gas & Mining found in Co-Op's Tank Seam hearing, Co-Op's permit area is hydrologically isolated from Birch Spring. Figure 2-1 of the Probable Hydrologic Consequences (M&RP, Appendix 7-J) shows a piper diagram analyzing the chemical data of Birch Spring compared to the minewater and other springs in the area. The data showed Birch Spring to have the least similar water to the Bear Canyon minewater. The most significant difference in the waters was a much higher concentration of sulfate than in both the mine water and the other springs in the area. This was also coupled with the existence of several significant faults between the Bear Canyon Mine and Birch Spring. Therefore, any decline in spring flow must be attributable to other causes.

Co-Op has analyzed the Birch Spring water for Tritium. The results of this analysis showed a tritium value of 1.12 TU. This value indicated that the age of the majority of the water in Birch Spring is pre-1953, which explains the lack of seasonal fluctuation in the Spring. The spring does not appear to be significantly influenced by surface runoff. In 1996, the local water agencies did some additional isotopic dating of Birch Spring, which was presented in the October 17, 1996 informal conference. This data also confirmed that Birch Spring presently appears to be isolated from the influence of surface water.

Therefore, even if the spring area received an increased amount of precipitation, as was seen in 1995, Birch Spring would not immediately respond to this increased precipitation. Rather, it would take several years of increased precipitation to recharge the aquifer which feeds Birch Spring, thus increasing the head on the spring. The Bear Canyon precipitation data taken from 1991 through 1996 indicates that 1995 was the only year with a significant increase in precipitation, receiving 14.45 inches. The current data for 1997 also indicates that this year may also result in increased precipitation. The 1992 through 1994 and 1996 data, however, showed an average annual precipitation of 8.87 inches, which is below the average of 13.18 inches for the area (See Table 11-1 of the M&RP). This would likely not be enough to significant recharge the aquifer feeding Birch Spring.

Co-Op has examined the collection area and collection system of Birch Spring for any potential impacts to the flow. Birch Spring was originally developed in the 1970's. According to Ben Grimes, the collection pipes were initially covered with "pea gravel" which created a problem with the collection system plugging up.

NEWUA was formed in the early 1980's, and assumed responsibility for the springs. The springs were then redeveloped in the Fall of 1984 (verbal conversation with Jack Stoyanoff and Charles Reynolds). A copy of the proposed development which was submitted to the Utah State Department of Health is also attached to this letter for the file, along with a general as-built diagram of the collection system.

According to Jack Stoyanoff (Informal Conference record, Volume I, pg. 57), the spring was not turned into the water system at that time. NEWUA felt they had not captured all of the water flowing from the springs. So they re-excavated the collection system in 1986, but the water they felt they were missing was not found. So the collection system was buried up again, covered with impervious material, and connected into the water system.

Of significant note was the fact that explosives were used during excavation in the initial redevelopment of the collection system in 1984 (Verbal, Jack Stoyanoff). The use of explosives may have opened up additional fractures underneath the collection system, which could account for the lack of water upon re-excavation.

In 1988 and 1989, there appeared to be a disruption in the flows of Birch Spring. This disruption began prior to Co-Op encountering the in-mine flows at SBC-9, and is not related to the mining activities at the Bear Canyon Mine. One theory, presented by the Water User's experts at the 1990 and 1996 informal conferences, is the occurrence of an earthquake in the area during this period of time, which may have released stored groundwater. According to Peter Nielson, a similar effect was observed in upper Tie Fork Canyon (Informal Conference record, Volume II, pg. 107).

During this time period, according to Jack Stoyanoff, the spring had to be turned out of the water system, and the spring box filled up with sediment. Water also flowed for a short time period on the surface. This would indicate that the disruption appeared to create a connection to the springs from the surface, through the impenetrable layer shown in the attached redevelopment plan. If sediment reached the spring box, it would have entered through the collection system. Following this event, the "relatively impervious" backfill has probably healed itself, as indicated by the current isotopic data showing very little communication with the surface.

Co-Op has also observed a substantial vegetative cover over the collection system. The original development plan called for all trees and brush within 50' of the collection tiles to be removed to keep the lines free of roots. Since redevelopment, trees and shrubs have re-established themselves over the collection lines. This creates a potential for roots to enter the collection lines.

A review of the current flow data shows remarkably similar patterns to the flow data collected by the USGS prior to redevelopment of the spring in the early 1980's. This similarity points to a strong likelihood that we may be seeing similar collection problems to those encountered prior to redevelopment.

In 1997, Co-Op has also noted a large area below and across Highway 31 which appears to be seeping significant amounts of water. It is not known when the seepage may have first become apparent, but the presence of the vegetation within the area indicates that it has probably been there for several years. This area is upgradient from the Huntington River and immediately downgradient from Birch Spring, in the mouth of the same drainage as the Birch Spring collection system. There is no apparent surface source to this seepage area.

A potential source for this water is from the same source as Birch Spring. If, indeed, fractures were created when explosives were used to redevelop the spring, and the collection system has since become partially restricted, it is very likely that a significant portion of the original flow into Birch Spring may be bypassing their system and seeping through the colluvium until it surfaces downgradient from the spring.

In analyzing the flow data on the spring, the history of the spring, and the construction of the spring, Co-Op has concluded the loss in flow is likely the result of a deteriorating and partially restricted collection system.

If you have any questions, please call myself or Charles Reynolds at (435) 687-2450.

Thank You,

A handwritten signature in cursive script that reads "Wendell Owen".

Wendell Owen,
Resident Agent

Enclosure (s)

Birch Springs - North Emery Water Users Association Data (From the Star Point mine plan)

Flow GPM							
Jan-85	85	Jan-86	85	Jan-87	85	Jan-88	81
Feb-85	85	Feb-86	85	Feb-87	85	Feb-88	81
Mar-85	84	Mar-86	84	Mar-87	86	Mar-88	82
Apr-85	85	Apr-86	84	Apr-87	85	Apr-88	81
May-85	85	May-86	84	May-87	86	May-88	82
Jun-85	85	Jun-86	85	Jun-87	86	Jun-88	81
Jul-85	85	Jul-86	86	Jul-87	86	Jul-88	81
Aug-85	85	Aug-86	86	Aug-87	85	Aug-88	105
Sep-85	86	Sep-86	85	Sep-87	84	Sep-88	133
Oct-85	87	Oct-86	84	Oct-87	89	Oct-88	130
Nov-85	86	Nov-86	85	Nov-87	85	Nov-88	130
Dec-85	85	Dec-86	87	Dec-87	83	Dec-88	117
Jan-89	70	Jan-90	230	Jan-91	34	Jan-92	29
Feb-89	65	Feb-90	70	Feb-91	34	Feb-92	29
Mar-89	60	Mar-90	65	Mar-91	21	Mar-92	29
Apr-89	55	Apr-90	60	Apr-91	33	Apr-92	29
May-89	85	May-90	70	May-91	33	May-92	28
Jun-89	100	Jun-90	85	Jun-91	33	Jun-92	29
Jul-89	90	Jul-90	75	Jul-91	33	Jul-92	28
Aug-89	85	Aug-90	55	Aug-91	33	Aug-92	29
Sep-89	80	Sep-90	40	Sep-91	33	Sep-92	27
Oct-89	230	Oct-90	40	Oct-91	33	Oct-92	27
Nov-89	230	Nov-90	38	Nov-91	33	Nov-92	27
Dec-89	230	Dec-90	34	Dec-91	33	Dec-92	27
Jan-93	27	Jan-94	29	Jan-95		Jan-96	
Feb-93	27	Feb-94		Feb-95	22	Feb-96	20.5
Mar-93	27	Mar-94	23	Mar-95		Mar-96	
Apr-93	27	Apr-94		Apr-95		Apr-96	
May-93		May-94		May-95	21.5	May-96	21.5
Jun-93	29	Jun-94		Jun-95		Jun-96	
Jul-93	29	Jul-94		Jul-95		Jul-96	
Aug-93	25	Aug-94		Aug-95	20	Aug-96	21.5
Sep-93	25	Sep-94		Sep-95		Sep-96	
Oct-93	25	Oct-94		Oct-95	20	Oct-96	20
Nov-93		Nov-94		Nov-95		Nov-96	
Dec-93		Dec-94		Dec-95		Dec-96	
Jan-97							
Feb-97	19						
Mar-97							
Apr-97							
May-97	16						
Jun-97							

Birch Springs - North Emery Water Users Association Data

Flow GPM

Aug-86	70	Jan-91	34	Jan-92	29	Jan-93	27
Dec-86	30	Feb-91	33	Feb-92	29	Feb-93	27
		Mar-91	33	Mar-92	29	Mar-93	27
Jun-87	60	Apr-91	33	Apr-92	29	Apr-93	27
		May-91	34	May-92	28	May-93	27
Jan-90	100	Jun-91	34	Jun-92	28	Jun-93	26
Sep-90	40	Jul-91	36	Jul-92	29	Jul-93	25
Nov-90	37.5	Aug-91	33	Aug-92	28	Aug-93	24.5
		Sep-91	33	Sep-92	28	Sep-93	24.5
		Oct-91	33	Oct-92	27	Oct-93	24
		Nov-91	33	Nov-92	27	Nov-93	25
		Dec-91	33	Dec-92	27	Dec-93	24
Jan-94	24	Jan-95	22	Jan-96	20.5	Jan-97	19
Feb-94	24	Feb-95	22	Feb-96	20.5	Feb-97	19
Mar-94	24.5	Mar-95	21.5	Mar-96	20.5	Mar-97	19.5
Apr-94	24	Apr-95	22	Apr-96	21.5	Apr-97	19
May-94	23	May-95	21.5	May-96	21.5	May 5	16
Jun-94	23	Jun-95	21.5	Jun-96	21	May 14	14.5
Jul-94	22	Jul-95	20.5	Jul-96	20	Jun-97	16.5
Aug-94	22	Aug-95	20	Aug-96	21.5	Jul-97	17
Sep-94	22	Sep-95	20	Sep-96	19.5	Aug-97	17
Oct-94	22	Oct-95	20	Oct-96	20	Sep-97	19
Nov-94	2.5	Nov-95	20.5	Nov-96	19.5		
Dec-94	22	Dec-95	21	Dec-96	19.5		

Scott M. Matheson
Governor



STATE OF UTAH
DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

Alvin E. Rickers, Director
Room 474 801-533-6121

James O. Mason, M.D., Dr.P.H.
Executive Director
801-533-6111

May 25, 1982
533-4207

DIVISIONS

Community Health Services
Environmental Health
Family Health Services
Health Care Financing

OFFICES

Administrative Services
Community Health Nursing
Management Planning
Medical Examiner
State Health Laboratory

Mr. Ben Grimes, President
North Emery Water Users Association
P. O. Box 418
Elmo, Utah 84521

Dear Mr. Grimes:

Re: Gates Spring Redevelopment

We acknowledge receipt of your letter dated May 3, 1982, and its accompanying documentation. From our review of the information submitted we understand you propose to replace the collection line at Gates Spring because you suspect the pipe perforations have become plugged reducing the water collected from the spring.

The materials and method of construction appear to comply with the standards of the "Utah Public Drinking Water Regulations" with one exception. Building paper is not acceptable for separating the gravel backfill from the impervious overburden. We recommend that a non-toxic plastic material approved by the National Sanitation Foundation be considered or a gradation of sand and gravel as shown on Diagram 6-5 in the appendix to the regulations [copy enclosed].

Please notify either the local health department or this office prior to backfilling the excavation in order that the construction can be inspected.

Should you have any questions concerning this correspondence or if we can be of further assistance, please contact this office.

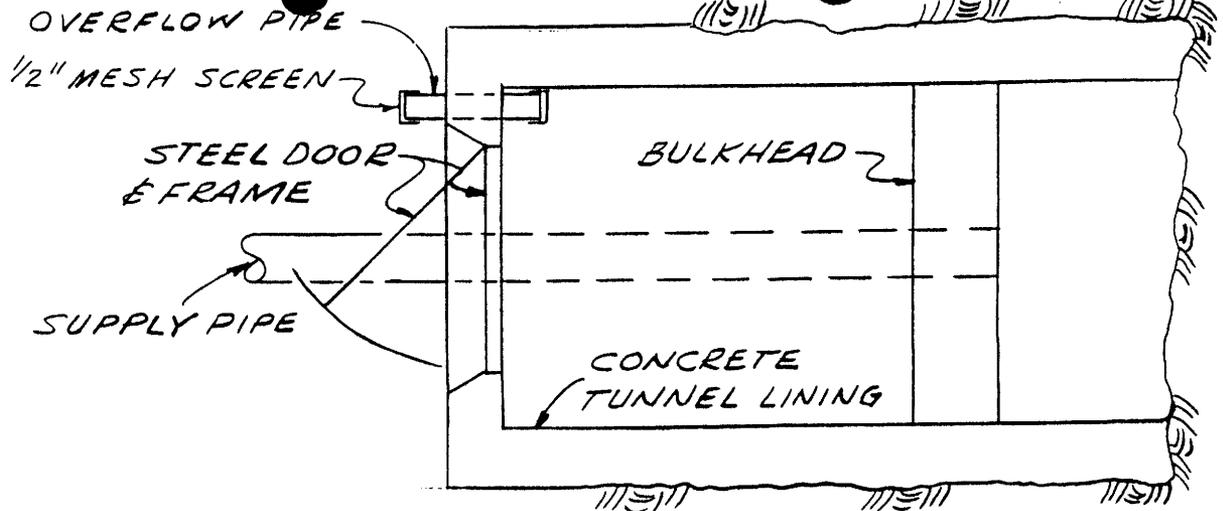
Sincerely,

Michael B. Georgeson
Chief/Engineering Section
Bureau of Public Water Supplies

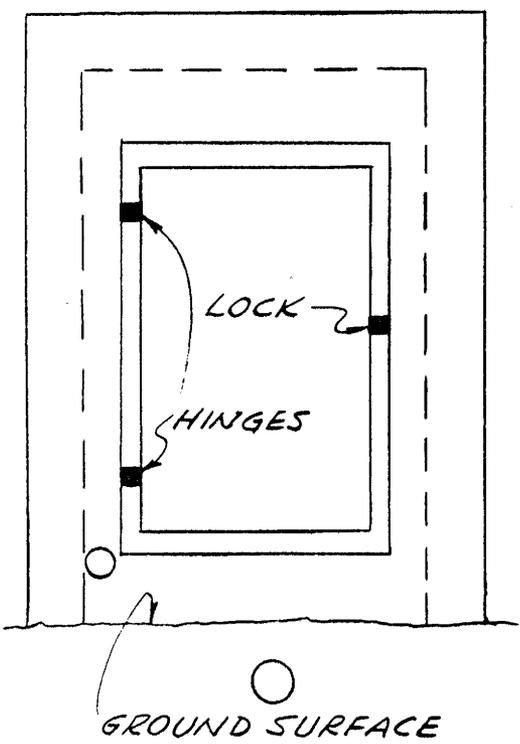
LJM:br

Enclosure

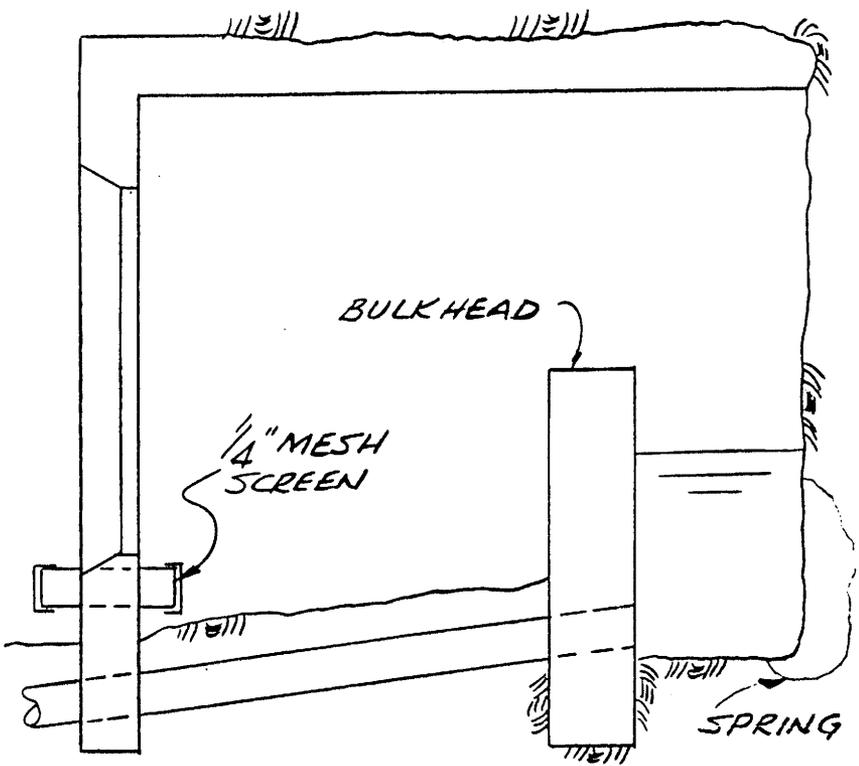
cc: Southeastern District Health Department
Bureau of Land Management



PLAN



ELEVATION

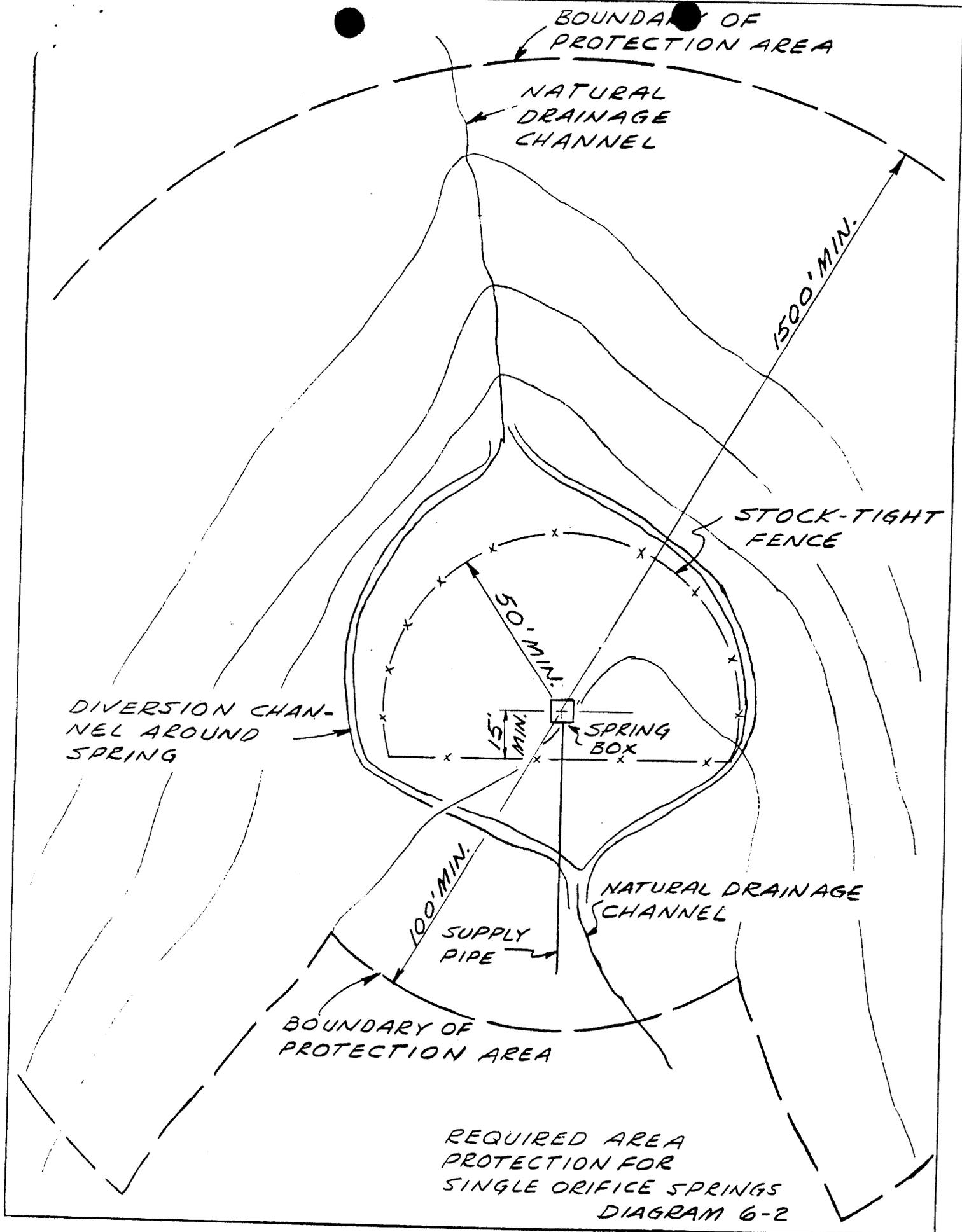


SECTION

NOTE:
 INCLUDE PERMANENT
 FLOW METERING
 DEVICE

SUGGESTED DETAILS FOR
 COLLECTION OF SPRING
 WATER IN TUNNELS

DIAGRAM 6-1



BOUNDARY OF PROTECTION AREA. SEE DIAG. 6-2 FOR DETAILS

1500' MIN.

NOTE:
ALL TREES AND BRUSH
WITHIN 50' OF THE COL-
LECTION TILES SHOULD
BE REMOVED TO KEEP
THE LINES FREE OF ROOTS.

DIVERSION CHANNEL

TYPICAL JUNCTION BOX

TYPICAL COLLECTION TILES

50' MIN.

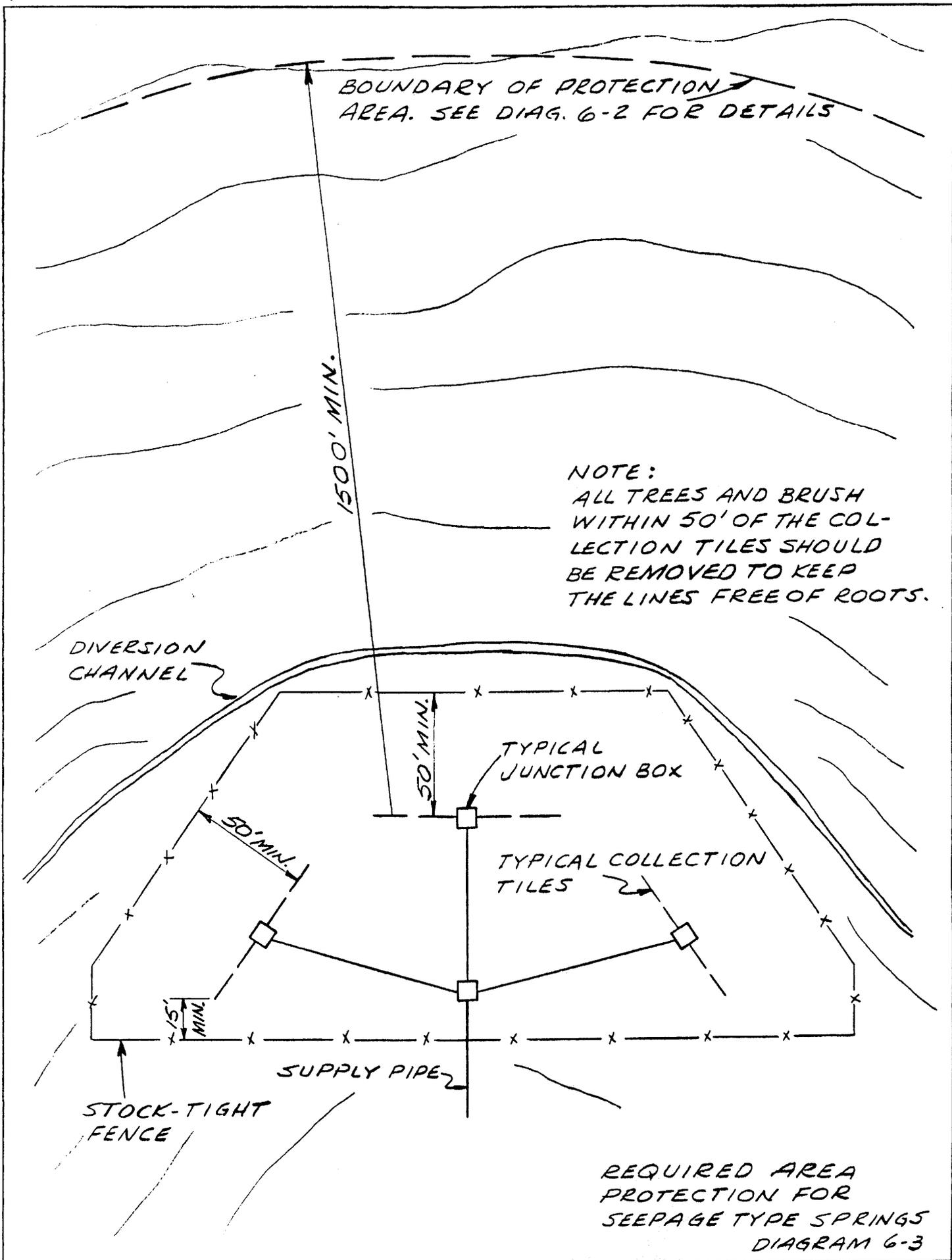
50' MIN.

5' MIN.

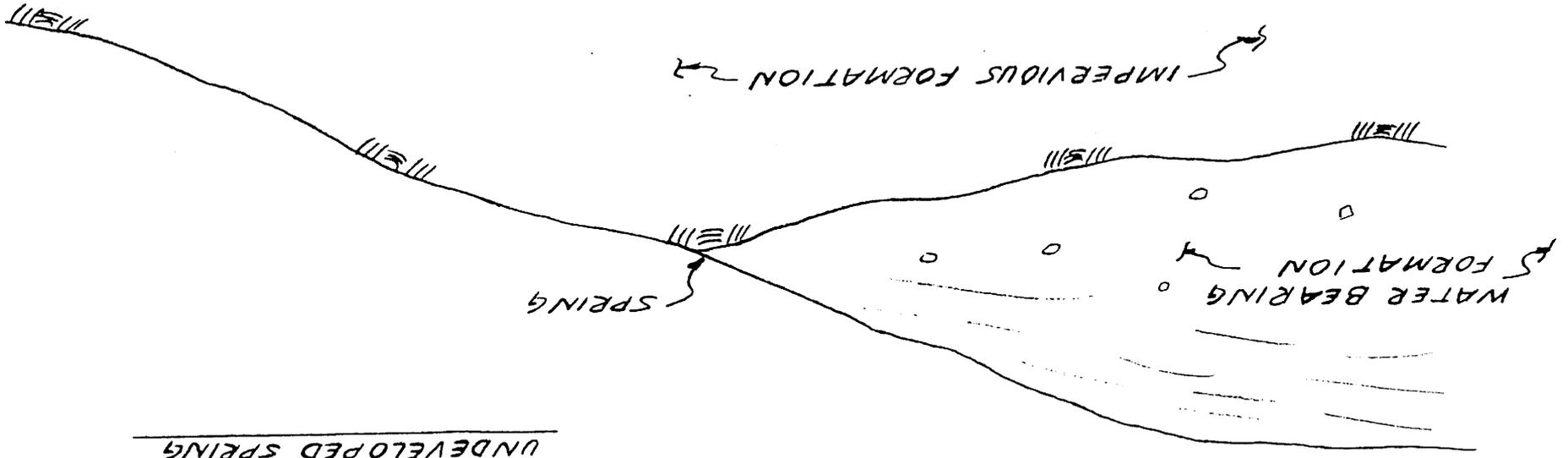
SUPPLY PIPE

STOCK-TIGHT FENCE

REQUIRED AREA
PROTECTION FOR
SEEPAGE TYPE SPRINGS
DIAGRAM 6-3



UNDEVELOPED SPRING



DEVELOPED SPRING

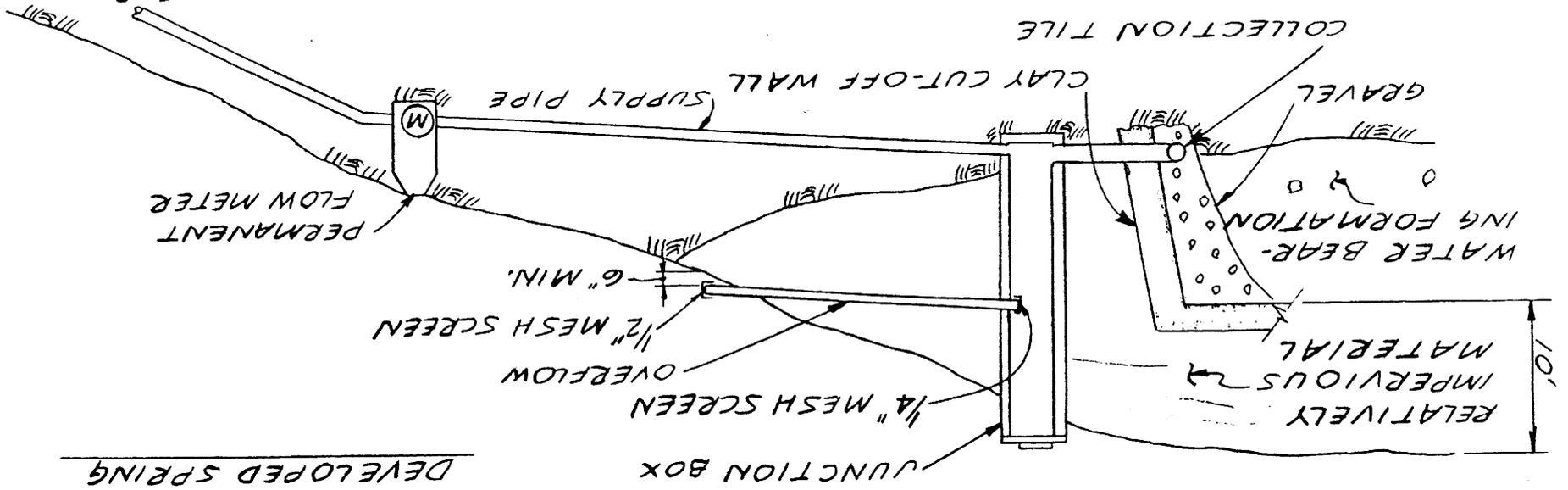
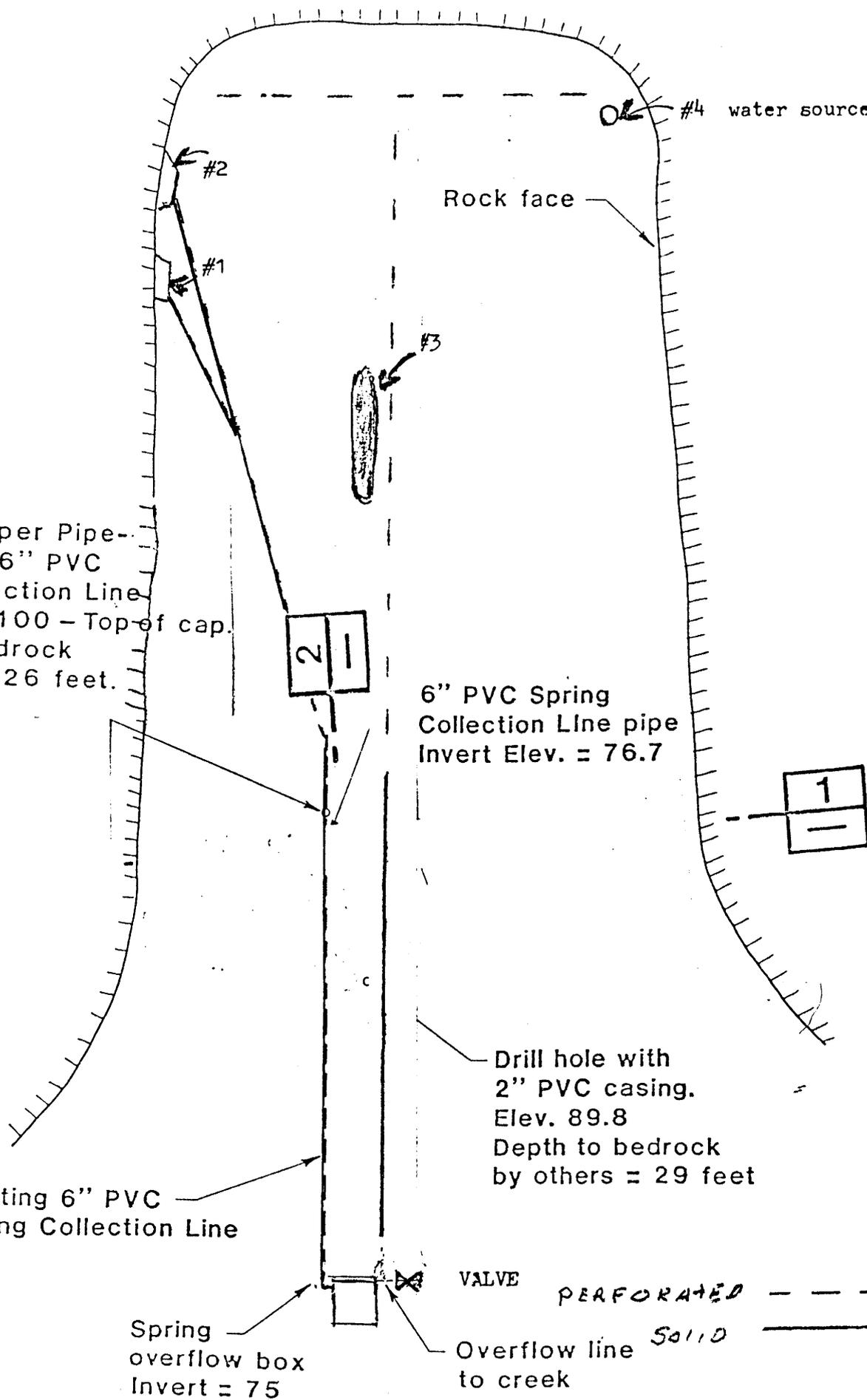


DIAGRAM 6-4

Existing Upper Pipe -
Air vent to 6" PVC
Spring Collection Line
BM Elev. = 100 - Top of cap.
Depth to bedrock
by others = 26 feet.



#4 water source

Rock face

#2

#1

#3

2
1

6" PVC Spring
Collection Line pipe
Invert Elev. = 76.7

1
—

Drill hole with
2" PVC casing.
Elev. 89.8
Depth to bedrock
by others = 29 feet

Existing 6" PVC
Spring Collection Line

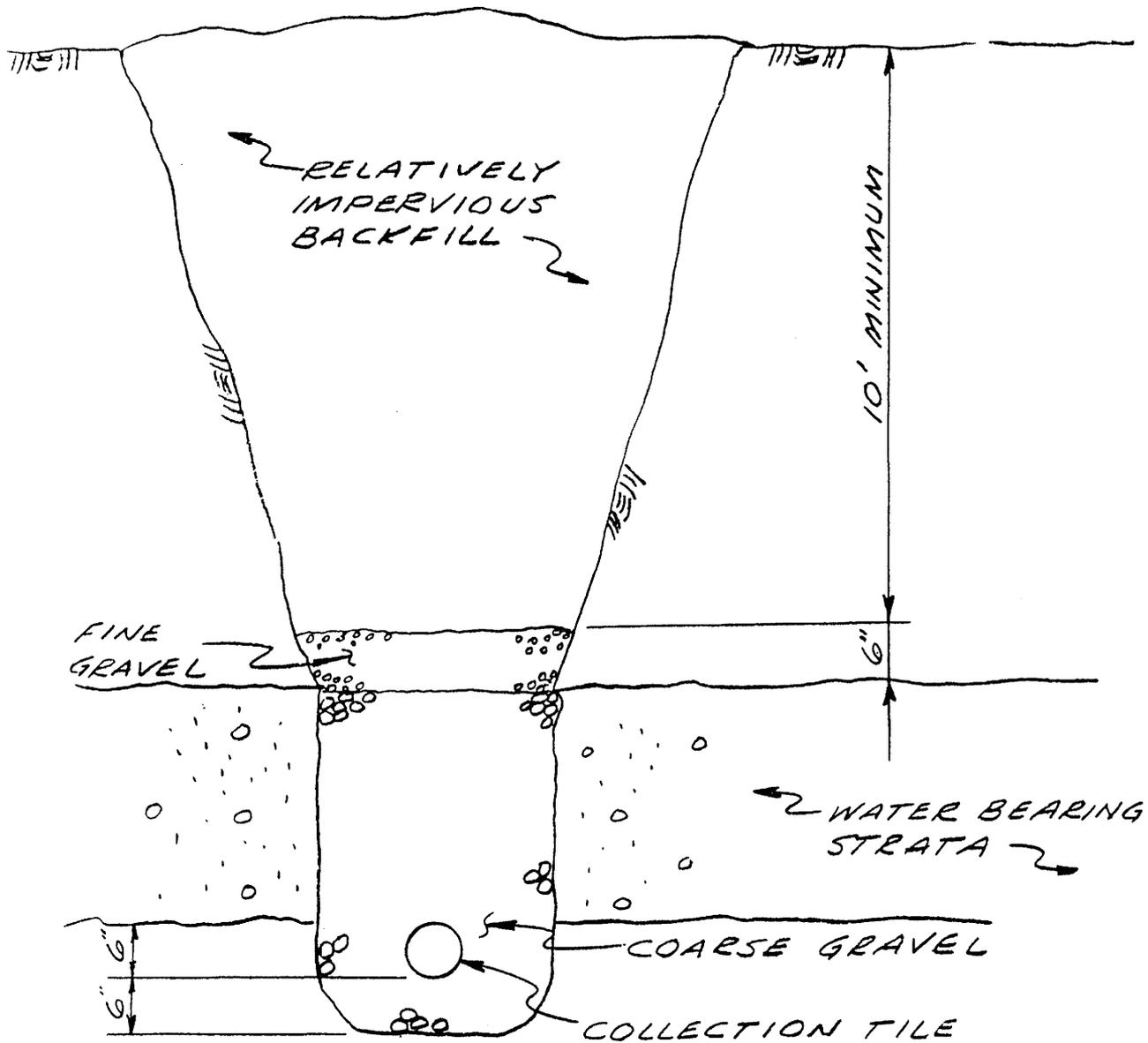
Spring
overflow box
Invert = 75

VALVE

Overflow line
to creek

PERFORATED

SOLID



SPRING WATER COLLECTION LINE
DESIGN