Report

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DEC

Conceptual Remedial Program

Eagle Comtronics, Inc.
Clay, New York

November 1989

O'BRIEN & GERE

REPORT

CONCEPTUAL REMEDIAL PROGRAM

EAGLE COMTRONICS, INC.

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NOVEMBER, 1989

O'BRIEN & GERE ENGINEERS, INC.
1304 BUCKLEY ROAD
SYRACUSE, NEW YORK 13221

CONCEPTUAL REMEDIAL PROGRAM

Objectives

The stated objectives of the proposed conceptual remedial program are to:

- Remediate ground water to "acceptable" levels
- Remove contaminant source
- Prevent downgradient migration
- Minimize economic impacts in capital costs and O&M costs

The definition of an "acceptable" remediation level is subjective without direct feedback and negotiation from the New York State Department of Environmental Conservation (NYSDEC). However, the intent of this program is to develop a conceptual program that will eventually satisfy site-specific regulatory requirements.

Part of this strategy is to prevent further contamination of the ground water by removing the potential source. Should traces of the volatile organic compounds remain in the unsaturated soils in the suspected source area, then it would is necessary to remove and dispose of these soils in a proper manner.

Containment of downgradient migration of the ground water is also necessary in order to isolate and remediate the contaminant plume, and protect downgradient populations.

Underlying all of these technical objectives is the need to develop a remedial program which will be the most cost effective for Eagle Comtronics. This involves both capital costs as well as operation and maintenance costs.

Strategy

The remedial program outlined herewith represents the type of program which will likely be implemented to control and/or eliminate the ground water contamination found on the Eagle Comtronics site. However, there are a number of outstanding variables which could impact the nature of this remedial program (i.e. State input, additional investigations), therefore, it should be noted that the program outlined herein does not necessarily represent the final approach to be implemented. It is merely outlined at this point to provide an indication of the direction and approximate costs associated with this project.

The strategy outlined herein represents a single perspective based on the data obtained to date. As this project proceeds, other perspectives will be incorporated, and additional data will be generated. These factors may result in subtle and/or drastic changes to the conceptual remedial program presented herewith.

There are two major assumptions which underlie this approach. First, the NYSDEC will not require off-site remediation; remediation will be restricted to on-site areas. And secondly, the ground water contamination is limited to the upper portions of the unconfined aquifer. Deviation from these assumptions would most likely be the reason for changes to the conceptual program outlined herewith.

Source Remediation

As stated in the remediation objectives, the removal of any contaminant source(s) in the overburden will be necessary in order to avoid any further contamination of the unconfined aquifer. To do so, the first step is identifying the existence of any contaminants in the unsaturated soils through a program of soil borings and sampling.

A soil boring and sampling program should be conducted in the limited area where the alleged spill of waste solvents occurred in 1981 in order to define the horizontal and vertical extent of soil contamination. This program should consists of a grid based layout which will cover the suspect area whereby unsaturated soil samples would be obtained and analyzed for volatile organic compounds.

A preliminary boring program is portrayed in Figure 4 which shows a grid at the southwest corner of the manufacturing building. At each grid point, a boring would be advanced and three composite soil samples would be taken at the following depths: 0 to 1 foot, 1 to 2 feet, and 2 feet to ground water.

Assuming that some unsaturated soils are found to contain concentrations of volatile organic compounds, these contaminated soils should be excavated and replaced with clean backfill. The soil which is removed from the source area must then be treated and/or disposed of in a safe and proper manner. Several treatment/disposal options exist including aeration, vapor extraction, and off-site disposal.

For purposes of this exercise, off-site disposal will be identified as the method of choice since a relatively small volume of contaminated soil (on the order of 10 cubic yards) can be expected due to the very limited conditions of the spill. Also, the possibility exists that the contaminants may no longer be present in the unsaturated soils due to in-situ volatilization and/or percolation. Should large quantities of soil require removal it may be more cost effective to consider other options, however, this cannot be determined until the soil boring and sampling program is undertaken.

Ground Water Withdrawal

To accomplish the goal of downgradient protection, it is necessary to consider a system which will control and contain the flow of contaminated ground water. This will involve a system to collect and withdraw ground water from within the unconfined aquifer.

In general, there are two types of systems which are typically used to withdraw ground water. The first type is either a single or series of well points. These well points are driven into the aquifer and ground water is pumped from within the water bearing zone. The other type of withdrawal system is a trench system which consists of a cutoff barrier of a permeable backfill into which ground water is drawn. Within this trench of permeable backfill would be a perforated collection pipe connected to a collection sump from where the ground water would be pumped.

The well point system is well suited for applications where there is a known area of elevated concentrations of contaminates, or in a fairly permeable material. A trench system is well suited for an generalized area of contamination with no specific "hot spots".

For purposes of this exercise, a combination of a well point system and a trench system appears feasible. A single well point could be installed near the northeast corner of the manufacturing building, and a recovery trench could be installed across a portion of the northern and eastern sides of the manufacturing building. It was assumed that a shallow withdrawal system would be adequate to recover contaminated ground water. This will require confirmation through further investigations (see below). Refer to Figure 5 for a conceptual layout of these systems.

It should be noted that the conceptual system portrayed in this section is based on a very limited investigatory program. Final design and construction of a ground water withdrawal system will require further design-related investigations to better define the physical and chemical nature of the ground water. Specifically, installation of deeper monitoring wells will be necessary to determine the exact depth to which the ground water withdrawal systems should be designed. Furthermore, additional studies are necessary to better determine the flow rate from the withdrawal system. Nonetheless, the investigations done to date do grossly identify the extent of contamination and enable the conceptualization of the type of system which can be expected.

The purpose of the well point is to actively pump contaminated ground water from the more permeable structural backfill underlying the building's foundation and slab. This is supported by the analyses which indicated a higher concentration of organics in this material.

The purpose of the trench system is to passively collect ground water at a downgradient location. This system will intercept ground water as it moves across the site, and the water will be pumped from the system at the approximate rate of inflow in order to maintain a stable system. Figure 6 provides additional detail on how this trench would be constructed. Final placement and construction will depend on the existing site conditions, and field investigations.

A preliminary estimate of flow from this conceptual system is that the system will withdraw ground water at the approximate rate of 10 gallons per minute. This estimate is subject to variability due to further investigations, seasonal variations, and final configuration of the withdrawal system.

Ground Water Treatment

Having extracted the ground water from the unconfined aquifer, it will then be necessary to dispose of the water. There exists a limited number of options available for water disposal including discharge to the sanitary sewer or discharge to surface waters. Either approach will require some form of treatment to remove the organic compounds present in the water.

Discharge to surface waters is discounted at this time since the discharge requirements will be stringent thereby requiring a high degree of treatment. Also, a SPDES permit would have to be obtained from the NYSDEC for discharge into the nearby wetlands which include the environmentally-sensitive Clay Marsh.

Discharge into the sanitary sewer would also require permitting, however, the degree of treatment would most likely be less stringent. The Onondaga County Department of Drainage and Sanitation (OCDDS) would be responsible for administering a sewer use permit which would most likely include limitations to the discharge in terms of quantity and quality. Informal inquiries with OCDDS revealed that Eagle Comtronics is tributary to the Oak Orchard Wastewater Treatment Plant, and that a connection into this system would most likely be possible pending negotiation of acceptable permit conditions.

In terms of treating the ground water prior to discharge into the sanitary sewer, the most likely approach would be to use an air stripper. An air stripper exposes a high surface area of water against an induced draft of air. As a result of the air/water interface, the organic compounds volatilize and evaporate. This process is called stripping.

For purposes of this exercise, an air stripper is proposed for installation behind the manufacturing building at the southeastern corner. This device would have to be contained in a small heated enclosure for year round operation, and would have to be sized in accordance with the ground water withdrawal system (approximately 10 gpm as stated previously).

Once again, it must be noted that this system is only conceptual in nature and subject to change pending further investigations. One such investigation which should be done prior to final design and construction would be to perform treatability tests to determine the suitability of the specific organic constituents for stripping.

Other Remedial Aspects

In addition to the conceptual approach discussed above, there are other aspects to the remedial program which need to be recognized. These include:

- Periodic monitoring of ground water
- Periodic monitoring of sanitary sewer discharge
- Maintenance of remedial systems
- System life
- Permitting
- Design-related investigations

Eagle Comtronics should be prepared to conduct periodic ground water monitoring on their site during and after the remediation systems are in operation. Typically, the NYSDEC will require monitoring and reporting on a quarterly basis. The parameters will be at a minimum volatile organic compounds (either EPA Method 601/602 or EPA Method

625), and others should the total priority pollutant analyses reveal other constituents. Quarterly monitoring will be required throughout the time that contaminants are detected in the ground water, and probably for some time continuing after the contaminants are no longer detected.

Assuming that the system does discharge into the sanitary sewer, periodic monitoring and reporting of this discharge will be required under the terms of a sewer use permit. Similar to above, the OCDDS will likely require self monitoring on at least a quarterly basis. In addition, the OCDDS will likely impose a surcharge based on the volumes being discharged in to the sewer.

Periodic maintenance of the various remedial systems (pumps, air stripper, valving, etc.) will be required to ensure that they operational and permit conditions are being met. This function could probably be absorbed into Eagle's existing maintenance operation with little or no additional manpower needs.

The system life is a function of how long it will take to remove the contaminants from the unconfined aquifer which in turns relates to the relative concentrations, the ground water flow and movement, pumping rates, contaminant mobility, and other factors. It is difficult to accurately assess all of these variables in order to estimate the amount of time it will take to satisfactorily remediate the ground water.

As previously mentioned, a sewer use permit will be required to discharge the effluent from the air stripper into the sanitary sewer. To initiate this process, Eagle will be required to complete an Industrial Wastewater Questionnaire, and then enter into negotiations with the OCDDS.

To develop a final design of the remedial systems, several different investigatory tasks need to be done. The vertical extent of the contamination needs to be determined through sampling and analysis of deeper monitoring wells. This will dictate the depth to which the withdrawal systems should be installed. Also, studies on the aquifer yield need to be conducted in order to better size the pumping and treatment hardware. Treatability testing needs to be conducted on the ground water in order to ensure a proper design of the treatment system. A careful examination of the existing underground utilities needs to be done to avoid conflicts and construction problems. These are examples of the types of things which must be considered prior to initiating a final design.

Costs

Included as an Attachment is a cost estimate for the conceptual program described herewith. The intent of this cost estimate is provide some indication of the magnitude of anticipated costs associated with implementing a remedial program. As previously stated, the program will be subject to change given possible State input and the gathering of additional data. However, this cost is useful in identifying the approximate financial liability associated with ground water remediation at the Eagle Comtronics site.

The cost estimate was broken into three parts. The first part (Part A) includes costs for additional investigations necessary to implement remediation. These additional investigations are based on the knowledge rendered from the initial investigations nearing completion. The second part of the cost estimate (Part B) focuses on the hardware

costs associated with the remedial program discussed in earlier sections. And thirdly, the last part of the estimate (Part C) includes provisions for operation and maintenance costs. This annual cost was converted to a present worth based on a project life of 3 years and 10 percent interest.

In summary, the total financial liability associated with this project was estimated at $180,000 which is based on the conceptual program outlined in this document.

Figures

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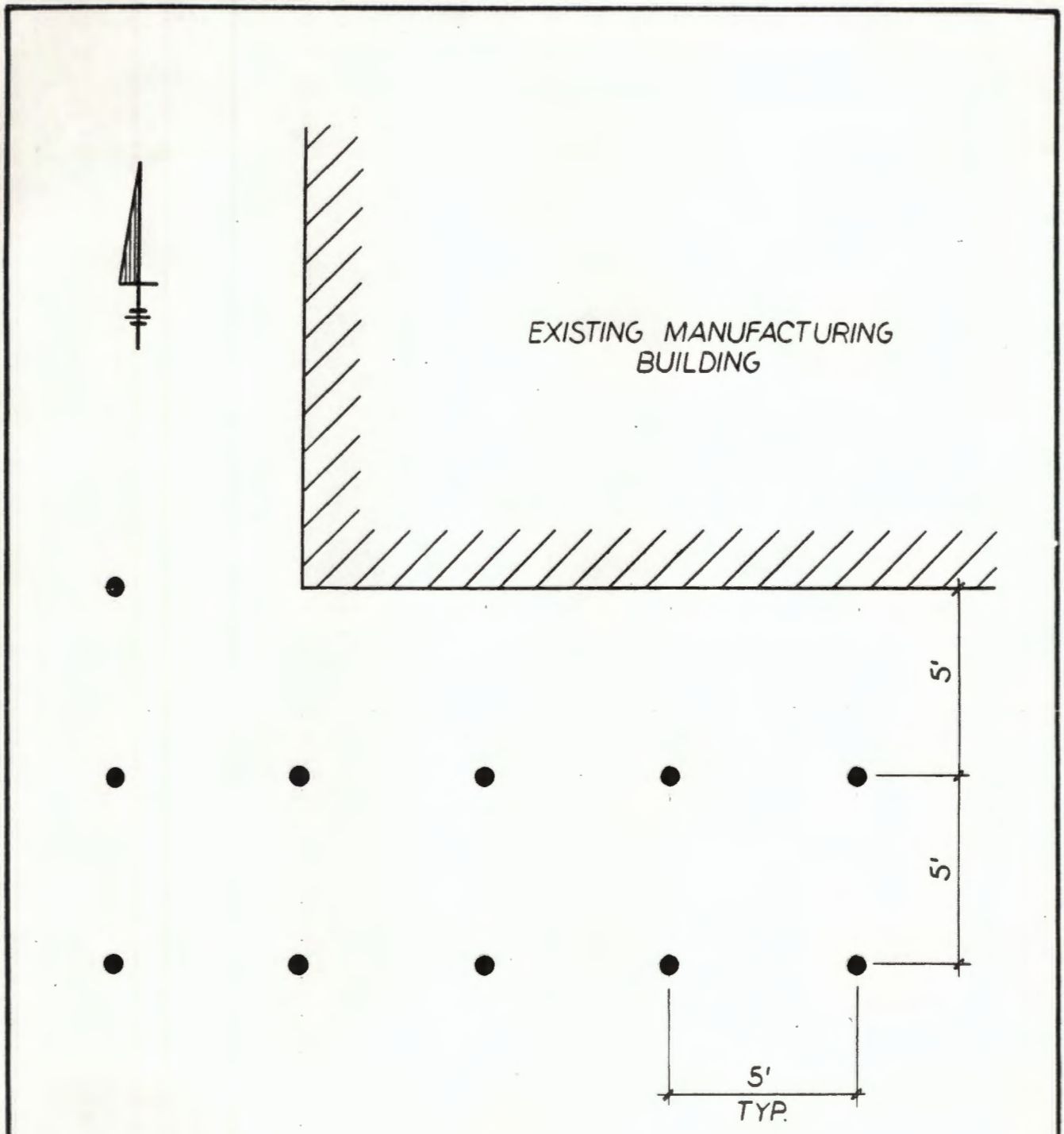
FIGURE 4



PROPOSED SOIL BORING GRID
EAGLE COMTRONICS, INC.

063597

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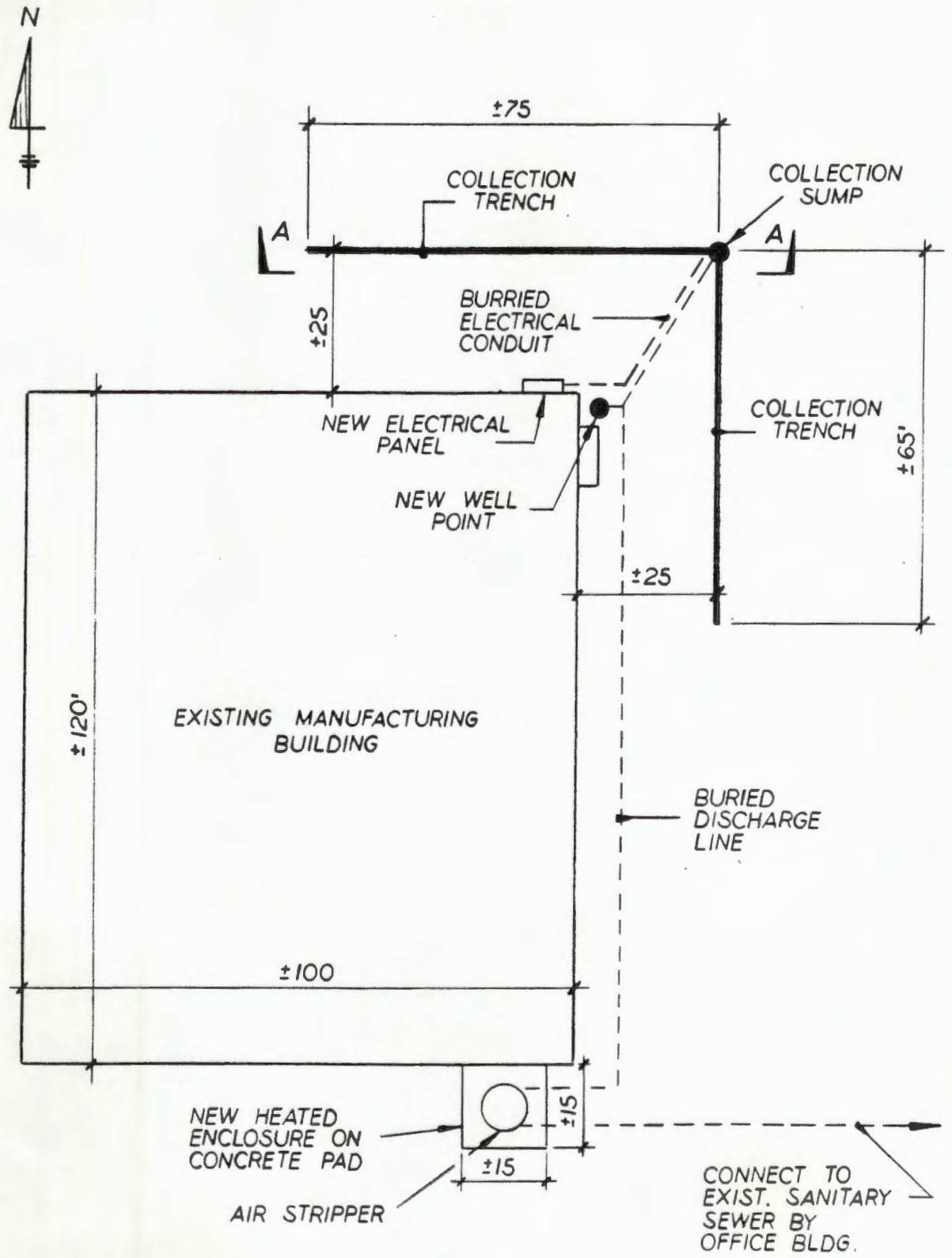
FIGURE 5

GROUND WATER WITHDRAWAL AND TREATMENT CONCEPTUAL LAYOUT

SCALE: 3/4" = 20'



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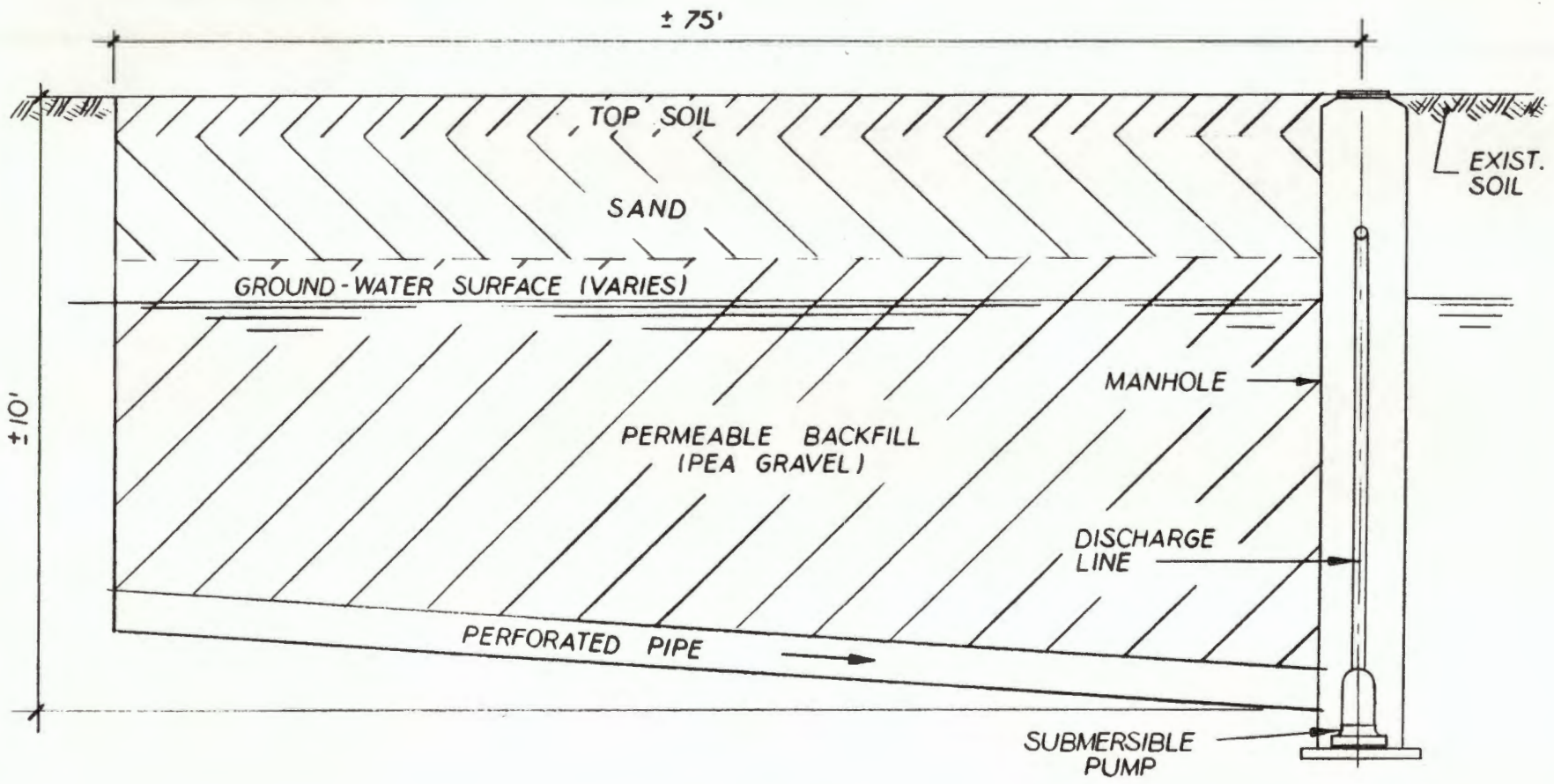
GROUND WATER COLLECTION TRENCH

(LOOKING NORTH)



SECTION A-A

SCALE: 1" = 10'

FIGURE 6

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Attachments

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Cost Estimate

Project	Date	Job No.
Additional Investigations (Part A)	10/23/89	2665.002
	By LWM	Page 1/5

Item	DESCRIPTION	QUANTITY	MATERIALS		LABOR	
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.
1	Soil Borings	11	100	1,100		
2	Soil Samples - VOC's	33	100	3,300		
3	Deep Monitoring Wells	2	1500	3,000		
4	GW Samples	9	100	900		
5	OBG Field Work	--		5,000		
6	RI Report (Phase II)			10,000		
				23,300		
	say			**25,000**		

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Cost Estimate

Project	Date	Job No.
Ground Water Remediation (Part B)	10/23/89	2665.002
	By LWM	Page 2/5

Item	DESCRIPTION	QUANTITY	MATERIALS		LABOR	
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.
1	Mobilization	LS		2,000		
2	Excavation (140'x3'x10') + 15%	18Yd.^{3}	5	900		
3	Sheeting - Trench Box Placement			10,000		
4	Pea Gravel	120Yd^3	20	2,400		
5	Top soil	20Yd^3	15	300		
6	Perforated Pipe (8")	140LF	3	420		
7	Manhole (15')	1		2,500		
8	Submersible Pump	1		500		
9	Discharge Line (3")	300 LF	1	300		
10	Trenching (Discharge Line, Conduit)	160 LF	2	320		
11	Trench Backfill	20Yd^3	5	100		
12	Soil Placement (on-site spoils)	200 Yd^3	3	600		
13	Recovery Well	20LF 50		1,000		
14	Ground Water Pump	1		5,000		
15	Electrical Panel/Conduit	As Req'd		5,000		
16	Level Control	2	2000	4,000		
17	Concrete Pad (15 x 15)	5 Yd^3	100	500		
18	Air Stripper (20 gpm)	1	10,000	10,000		

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Cost Estimate

Project	Date	Job No.
Ground Water Remediation (Part B)	10/23/89	2665.002
	By LWM	Page 3/5

Item	DESCRIPTION	QUANTITY	MATERIALS		LABOR	
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.
19	Enclosure	225Ft^2	25	5,625		
20	Space Heater	1	1000	1,000		
21	Utilities to Heater	As Req'd	1500	1,500		
22	Misc. Piping & Valving	As Req'd	2500	2,500		
23	Source Excavation	10Yd^3	20	200		
24	Soil Disposal	10Yd^3	300	3,000		
	Subtotal			59,665		
25	Contingencies, Engineering (30%)			17,900		
	Total Cost			77,565		
	say			**80,000**		

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Cost Estimate

Project	Date	Job No.
Operation & Maintenance (Part C)	10/23/89	2665.002
	By LWM	Page 4/5

Item	DESCRIPTION	QUANTITY	MATERIALS		LABOR	
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.
1	Electricity - Pumping					
	Assumptions					
	-10% operation					
	-2 5 HP Motors (7.46 kw)					
	7.46 kw x 24 hr/day x 365 day/yr. x 0.10					
	= 6535 KW-HR					
	Cost = $0.15/KW-HR x 6535 KW HR					
	$980/yr			980		
2	Electricity - Heating					
	-Use 1/2 of energy for pumping					
	$490/yr			490		
3	Quarterly Monitoring					
	9 samples x 4 events/year x $150/sample					
	=$5,400					
	Labor for sampling & report = $5,000					
	=$10,400			10,400		
4	Discharge Surcharge					
	10 GPM x 60 Min/Hr. x 24 Hr/day					
	x 365 day/yr. x 10%=525,600 gal.					
	Cost=$35/1000 gal x 525.6 = $18,400			18,400		
	Total Annual Est. O&M Cost			30,270		
	Present Worth = $30,270/yr (P/A 10% .3)					
	= $30,270 (2.4876)					
	= $75,300					
	say - $75,000					

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Cost Estimate

Project	Date	Job No.
Cost Summary	10/23/89	2665.002
	By: LWM	Page: 5/5

Item	DESCRIPTION	QUANTITY	MATERIALS		LABOR	
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.
A	Additional Investigation			25,000		
B	Ground Water Remediation			80,000		
C	Present Worth Cost - O&M			15,000		
				$180,000		